# Metro

*Los Angeles County Metropolitan Transportation Authority*
*One Gateway Plaza*
*3rd Floor Board Room*



## Agenda - Final Revised

**Thursday, November 19, 2015**

**9:00 AM**

**One Gateway Plaza, Los Angeles, CA 90012,**
**3rd Floor, Metro Board Room**

## Construction Committee

***Don Knabe, Chair***
***Jacquelyn Dupont-Walker, Vice Chair***
***Mike Bonin***
***Diane DuBois***
***Ara Najarian***
***Carrie Bowen, non-voting member***
***Phillip A. Washington, Chief Executive Officer***

**METROPOLITAN TRANSPORTATION AUTHORITY BOARD RULES** (ALSO APPLIES TO BOARD COMMITTEES)

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The public may also address the Board on non-agenda items within the subject matter jurisdiction of the Board during the public comment period, which will be held at the beginning and/or end of each meeting. Each person will be allowed to speak for up to three (3) minutes per meeting and may speak no more than once during the Public Comment period. Speakers will be called according to the order in which the speaker request forms are received. Elected officials, not their staff or deputies, may be called out of order and prior to the Board's consideration of the relevant item.
In accordance with State Law (Brown Act), all matters to be acted on by the MTA Board must be posted at least 72 hours prior to the Board meeting. In case of emergency, or when a subject matter arises subsequent to the posting of the agenda, upon making certain findings, the Board may act on an item that is not on the posted agenda.

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b. A breach of the peace, boisterous conduct or violent disturbance, tending to interrupt the due and orderly course of said meeting.
c. Disobedience of any lawful order of the Chair, which shall include an order to be seated or to refrain from addressing the Board; and
d. Any other unlawful interference with the due and orderly course of said meeting.

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**NOTE: ACTION MAY BE TAKEN ON ANY ITEM IDENTIFIED ON THE AGENDA**

## CALL TO ORDER

**21. APPROVE Consent Calendar Items: 22 and 23.**

**Consent Calendar items are approved by one motion unless held by a Director for discussion and/or separate action.**

**22.** RECEIVE AND FILE update report on the **Project Labor Agreement and Construction Careers policy programs for activity through the quarter ending September 2015**. 2015-1570

***Attachments:*** Attachment A- PLA CCP Report September 2015

**(ALSO ON EXECUTIVE MANAGEMENT COMMITTEE)**

**23.** RECEIVE oral **Program Management Executive Director's report.** 2015-1643

***Attachments:*** Program Management Executive Director's report - November 2015

**Non-Consent Items**

**24.** RECEIVE oral report by the **Caltrans District Director on Delivery of Projects on I-5.** 2015-1678

**25.** AUTHORIZE the Chief Executive Officer to execute a Contract Modification to Contract No. C0988 with **Walsh/Shea Corridor Constructors (WSCC), to increase Contract Schedule C Provisional Sums Items for the Crenshaw/LAX Transit Project** in an amount not to exceed $3,000,000, increasing the total contract value from $1,286,777,827 to $1,289,777,827. 2015-1572

***Attachments:*** Attachment A - Procurement Summary
Attachment B - Contract Modification
Attachment C - Schedule C
Attachment D - DEOD Summary

**26.** AUTHORIZE an increase in Contract Modification Authority (CMA) to Contract No. C0974 with **McCarthy Building Companies for Division 13 Bus Operations and Maintenance Facility** in the amount of $1,000,000, increasing the total CMA from $18,512,000 to $19,512,000. This action does not affect the FY2016 or Life of Project budget. 2015-1596

***Attachments:*** Attachment A - Procurement Summary C0974
Attachment B - Contract Modification-Change Order Log C0974
Attachment C DEOD Summary

**27.** CONSIDER: 2015-1555

A. EXTENDING Contract No. MC069 with **Stantec Consulting, Inc. to provide Construction Management Support Services for Crenshaw/LAX Transit Project, including the Southwestern Yard,** from March 2016 to June 2021. All other existing Contract Work Orders not pertaining to Crenshaw/LAX Transit Project will be closed by March 18, 2016;

B. AUTHORIZING an increase to the Crenshaw/LAX Transit Project CWO16 and Southwestern Yard CWO27 within Contract No. MC069, with Stantec Consulting, Inc. to provide Construction Management Support Services in an amount not-to-exceed $28,566,728 for the FY16/FY17 18-month Work Program Funding increasing the CWO values from $28,607,941 to $57,174,669. Therefore, the total contract value will increase from $97,412,136 to $125,978,864; and

C. AUTHORIZING the Chief Executive Officer to execute individual Contract Work Orders and Modifications within the Board approved contract value.

***Attachments:*** Attachment A - Procurement Summary .pdf
Attachment B - Contract Work Value Summary.pdf
Attachment C - Work Program Funding
Attachment D - DEOD Summary

**28.** CONSIDER: 2015-1630

A. INCREASING the **Life of Project (LOP) Budget on the Regional Connector Project** by $131.8 million, from $1,420 million to $1551.8 million;

B. INCREASING the **Regional Connector FY16 Budget by $20 million**;

C. AUTHORIZING the CEO to execute Contract Modification No. 32 to Contract C0980, Regional Connector Constructors (RCC) for additional utility work and schedule recovery measures, in an amount not-to-exceed $49,000,000, increasing the total contract price from $986,177,590 to $1,035,177,590; and

D. AUTHORIZING the CEO to execute Contract Modification No. 33 to Contract C0980, Regional Connector Constructors (RCC) for the addition of a fan plant at the wye junction, in an amount not-to-exceed $12 million, increasing the total contract price from $1,035,177,590 to $1,047,177,590. Upon Board approval of this recommendation and execution of Modification no. 33, staff will cancel Modification No. 4 $4.1 million. Therefore, the net effect of this additional work is $7.9 million.

***Attachments:***
Attachment A - Procurement Summary
Attachment B - DEOD Summary
Attachment C - Contract Modification Authority (CMA) Summary
Attachment D - Project Cost Summary by Element and LOP Variance
Attachment E - Funding-Expenditure Plan
Attachment F - Uniform Cost Management Process and Policy Analysis
Attachment G- Regional Connector Presentation

**29.** AUTHORIZE the Chief Executive Officer to Execute Contract Modification No. 57 to Contract No. PS43502000 Parsons Brinkerhoff Inc. to **provide continued design support services during construction for Section 1 of the Westside Purple Line Extension Project**, from December 2015 through June 2017, in the amount not-to-exceed $9,282,218 increasing the Total Contract Value from $152,503,103 to $161,785,321. 2015-1597

***Attachments:***
Attachment A - Procurement Summary.pdf
Attachment B - Contract Modification-Change Log.pdf
Attachment C - DEOD Summary .pdf

**30.** APPROVE AND ADOPT project definition changes, CEQA Addendum and Findings and authorize staff to file a Notice of Determination on the Addendum for the **Westside Purple Line Extension Project - Section 2**. 2015-1601

***Attachments:*** Attachment A Hyperlink - Addendum to the Final Environmental Impact Report/\
Attachment B- Notice of Determination

**31.** APPROVE an increase in Contract Modification Authority (CMA) for **pending and future Contract Modifications in the amount of $400,000 for Contract No. C1043 Universal City Pedestrian Bridge, awarded to Griffith Company**, increasing the total CMA from $2,142,500 to $2,542,500. This action does not affect the Life of Project budget. 2015-1600

***Attachments:*** Attachment A - Procurement Summary C1043
Attachment B - Contract Modification-Change Order Log C1043
Attachment C - DEOD Summary C1043

**48.** CONSIDER: 2015-1593

A. FINDING that utilizing design-build delivery pursuant to Public Utilities Code ("PUC") Section 130242 will achieve private sector efficiencies in the **integration of the design, project work, and components related to the construction and installation of new roofs at Divisions 11 and 22 to later enable the installation of solar photovoltaic ("PV") systems at Divisions 9, 11, 22 and the Expo Yard**;

(REQUIRES TWO-THIRDS VOTE)

B. AUTHORIZE the Chief Executive Officer to solicit a design-build contract for **design, construction and installation of new roofs for Divisions 11 and 22**, pursuant to PUC Section 130242

C. INCREASING the Life of Project Budget for the **Lighting Retrofit at two Rail Divisions project** (CP#204801) from $1,557,000 by $2,648,100 to include design and construction of new roofs for Divisions 11 and 22; the new LOP amount will be $4,205,100.

***Attachments:*** Attachment A - Renewable Energy Policy.pdf
Attachment B -Funding Operating Sustainability-Related Infras.pdf
Attachment C - Solar PPA Estimated Energy and Operational Costs.pdf
Attachment D - Report on Alternative Financing.pdf

Consideration of items not on the posted agenda, including: items to be presented and (if requested) referred to staff; items to be placed on the agenda for action at a future meeting of the Committee or Board; and/or items requiring immediate action because of an emergency situation or where the need to take immediate action came to the attention of the Committee subsequent to the posting of the agenda.

## Adjournment

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

**File #:** 2015-1570, **File Type:** Informational Report **Agenda Number:** 22.

**EXECUTIVE MANAGEMENT COMMITTEE**
**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: PROJECT LABOR AGREEMENT/CONSTRUCTION CAREERS POLICY (PLA/CCP) REPORT (DATA THROUGH SEPTEMBER 2015), AND 12-MONTH PILOT LOCAL HIRE INITIATIVE**

**ACTION: RECEIVE AND FILE**

## RECOMMENDATION

RECEIVE AND FILE update report on the **Project Labor Agreement and Construction Careers policy programs for activity through the quarter ending September 2015**.

## ISSUE

In January 2012, the Board approved the Project Labor Agreement with the Los Angeles/Orange Counties Building and Construction Trades Council and the Construction Careers Policy. One benefit of the PLA is to encourage construction employment and training opportunities in economically disadvantaged geographic areas throughout the United States. Another benefit of the PLA is that work stoppages are prohibited.

Consistent with the Board approved PLA and CCP, prime contractors are required to provide monthly reports detailing progress towards meeting the targeted worker hiring goals. Additionally, consistent with Metro's Labor Compliance policy and federal Executive Order 11246, the prime contractors provide Metro with worker utilization data by ethnicity and gender.

The attached report provides the current status (through September 2015) of construction projects subject to the PLA/CCP.

## DISCUSSION

There are eight active construction contracts and seven completed contracts, as of September 2015, with the PLA/CCP program requirements.

| Project Name: | Prime Contractor: | Targeted Worker Goal (40%) | Apprentice Worker Goal (20%) | Disadvantaged Worker Goal (10%) | ** Percentage of Disadvantaged Worker Participation that are in the Criminal Justice System Category |
|---|---|---|---|---|---|
| Crenshaw/LAX Transit Corridor | Walsh/Shea Corridor Constructors | 59.11% | 17.93% | 10.18% | 43.76% |
| Regional Connector Transit Corridor | Regional Connector Constructors, JV | 58.84% | 15.01% | 12.64% | 57.05% |
| Westside Subway Extension Project, Section 1 – Design Build | Skanska-Traylor-Shea, JV | 68.56%* | 21.00%* | 0.00%* | 0.00%* |
| Metro Red Line/Metro Orange Line (MRL/MOL) North Hollywood Station West Entrance | Skanska | 62.37% | 20.24% | 14.20% | 85.15% |
| Universal City Pedestrian Bridge | Griffith Company | 32.89% | 26.62% | 10.31% | 54.57% |
| Westside Subway Extension Advanced Utility Relocation (Fairfax Station) | W.A. Rasic | 62.34% | 20.10% | 18.87% | 8.77% |
| Metro Rail Security Kiosks | Icon-West | 40.82% | 27.18% | 21.45% | 100% |
| Westside Extension Project Advanced Utility Relocation (La Cienega Station) | Bubalo Construction | 71.76% | 14.59% | 31.42% | 7.87% |

* See Narrative below for a detailed discussion of attainments.

In summary, of the eight active construction projects for this reporting period, seven Contractors are exceeding the 40% Targeted Worker goal, seven contractors are exceeding the 10% Disadvantaged Worker goal, and five contractors are achieving the 20% Apprentice Worker goal.

**Percentage of Disadvantaged Worker Participation that have had involvement with the Criminal Justice System Category

Part of Metro's PLA/CCP workforce requirement is the utilization of Disadvantaged workers on the project. One of the nine criteria for a disadvantaged worker is "having a criminal record or other involvement with the criminal justice system". The data shown above is the percentage of Disadvantaged Workers (based on hours worked) that have criminal records or involvement with the criminal justice system and were given the opportunity to work in Metro's PLA/CCP projects.

## Currently Active Contracts

Crenshaw/LAX Transit Corridor Project
Prime: Walsh/Shea Corridor Constructors

The Crenshaw/LAX Transit Corridor project contractor has completed 33.52% of the estimated construction work hours for this project. The contractor is currently exceeding the Targeted Worker goal at 59.11%, Disadvantaged Worker goal at 10.18% and the minority participation percentage goals, but not meeting the 20% Apprentice Worker goal at 17.93%% and the 6.90% Female Participation goal at 2.49%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. The contractor has submitted a plan and schedule indicating that the apprentice goal for this project should be achieved in the middle of 2017. Staff will continue to work closely with the contractor towards meeting all worker goals for this project. No labor related work stoppages have occurred on this contract.

Regional Connector Transit Corridor
Prime: Regional Connector Constructors, Joint Venture

The Regional Connector Transit Corridor Project is underway and only 1.72% of the estimated construction work hours for this project have been performed. The contractor is currently exceeding the Targeted Worker goal at 58.84%, Disadvantaged Worker goal at 12.64% and the minority participation percentage goals, but the contractor is not meeting the 20% Apprentice Worker goal at 15.01% and the 6.90% Female Participation goal at 4.77%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. This project is still in the design-phase with limited construction activities and attainment is in line with the contractor's submitted Employment Hiring Plan which states that the Apprentice Worker goal will be met in mid-2016. No labor related work stoppages have occurred on this contract.

Westside Subway Extension Project, Section 1 Design-Build
Prime: Skanska-Traylor-Shea, a Joint Venture (STS)

The Westside Subway Extension Project, Section 1 is underway and only 0.18% of the estimated construction work hours for this project have been performed. This project is in the early stage of design-phase with limited construction, and as such, is not representative of typical trades and hours that will be performed on the project. The contractor is currently exceeding the Targeted Worker goal at 68.56%, Apprentice Worker goal at 21%, Female Participation goal at 8.83% and the minority participation percentage goals, but not meeting the 10% Disadvantaged Worker goal at 0.00%. The attainment for the 20% Apprentice Worker is based on total apprentice-able hours. The attainments are in line with the contractor's submitted Employment Hiring Plan which states compliance with all PLA/CCP workforce goals will be met in Mid-2018. No labor work stoppages or grievances have occurred on this contract.

Metro Red Line/Metro Orange Line (MRL/MOL) North Hollywood Station West Entrance
Prime: Skanska

The Metro Red Line/Metro Orange Line (MRL/MOL) North Hollywood Station West Entrance project contractor has completed 61.83% of the estimated construction work hours on this project. The contractor is currently exceeding the Targeted Worker goal at 62.37%, Apprentice Worker Goal at 20.24%, Disadvantaged Worker goal at 14.20%, Female Participation goal at 8.88% and the minority participation percentage goals. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. For this reporting cycle, Contractor has met all PLA/CCP workforce provisions. No labor related work stoppages or grievances have occurred on this contract.

Universal City Pedestrian Bridge
Prime: Griffith Company

The Universal City Pedestrian Bridge project contractor has completed 85.06% of the estimated construction work hours on this project. The contractor is currently exceeding the Apprentice Worker goal at 26.62%, Disadvantaged Worker goal at 10.31% and the minority participation percentage goals, but not meeting the 40% Targeted Worker goal at 32.89% and the 6.90% Female Participation goal at 2.07%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. Metro has issued several Notices of Non-Compliance to the Contractor for low attainment on the Targeted Worker goal and will keep the Board updated on the Contractor's progress. No labor related work stoppages have occurred on this contract.

Westside Subway Extension Advanced Utility Relocation (Fairfax Station)
Prime: W.A. Rasic

The Westside Subway Extension Advanced Utility Relocation - Fairfax Station project contractor has completed 98.29% of the estimated construction work hours on this project. The contractor is currently exceeding the Targeted Worker goal at 62.34%, Apprentice Worker goal at 20.10%, Disadvantaged Worker goal at 18.87% and the minority participation percentage goals, but not meeting the 6.90% Female Participation goal at 2.36%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. No labor related work stoppages have occurred on this contract.

Metro Rail Security Kiosks
Prime: Icon-West

The Metro Rail Security Kiosks project contractor has completed 67.29% of the estimated construction work hours on this project. The contractor is currently exceeding the Targeted Worker goal at 40.82%, Apprentice Worker goal at 27.18%, Disadvantaged Worker goal at 21.45% and the minority participation percentage goals, but not meeting the 6.90% Female Participation goal at 0.00%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. No labor related work stoppages or grievances have occurred on this contract.

Westside Extension Project Advanced Utility Relocation (La Cienega)
Prime: Bubalo Construction

The Westside Extension Project Advance Utility Relocation project contractor has completed 35.19% of the estimated construction work hours on this project. The contractor is currently exceeding the Targeted Worker goal at 71.76%, Disadvantaged Worker goal at 31.42%, and the minority participation percentage goals, but not meeting the 20% Apprentice Worker goal at 14.59% and the 6.90% Female Participation goal at 0.52%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. Contractor has submitted an updated Employment Hiring Plan indicating that attainment on the Apprentice Worker goal will be met by the end of 2015. No labor related work stoppages or grievances have occurred on this contract.

## Completed Contracts

| Completed Projects: | Prime Contractor: | Targeted Worker Goal (40%) | Apprentice Worker Goal (20%) | Disadvantaged Worker Goal (10%) | *Percentage of Disadvantaged Workers that are in the Criminal Justice System Category |
|---|---|---|---|---|---|
| Crenshaw Advanced Utility Relocation Project | Metro Builders | 61.41% | 13.84% | 21.08% | 2.90% |
| Westside Subway Extension Advanced Utility Relocation | Metro Builders | 67.47% | 11.12% | 11.08% | 0.00% |
| Westside Subway Exploratory Shaft | Innovative Construction Solutions | 50.88% | 75.05% | 11.23% | 96.23% |
| Regional Connector Transit Corridor Adv. Utility Relocation | Pulice Construction | 51.61% | 21.37% | 22.83% | 28.39% |
| CNG Emergency Generator Division 7 & 8 | Taft Electric | 46.42% | 25.51% | 39.08% | 39.48% |
| Division 13 CNG Fueling Facility, Design/Build/Operate | Clean Energy | 67.54% | 20.17% | 60.72% | 49.48% |
| Metro Blue Line Stations Refurbishments | S.J. Amoroso | 56.01% | 26.10% | 13.62% | 28.03% |

Crenshaw Advanced Utility Relocation Project
Prime: Metro Builders

The Crenshaw Advanced Utility Relocation project is 100% complete as of September 2014. Final reporting shows the Targeted Worker attainment at 61.41%, Disadvantaged Worker attainment at 21.08% and the minority participation percentage goals were attained, but the contractor did not meet the 20% Apprentice Worker goal at 13.84% and the 6.90% Female Participation goal at 0.52%. The attainment for the 20% Apprentice worker goal is based on total apprentice-able hours. Metro staff met with the contractor in January 2015, and executed a special assessment for not meeting the apprentice goal for this project. The contractor complied with Metro's special assessment and this issue is closed.

Westside Subway Extension Advanced Utility Relocation
Prime: Metro Builders

The Westside Subway Extension Advanced Utility Relocation project is 100% complete as of October 2014. Final reporting shows the Targeted Worker attainment at 67.47%, Disadvantaged Worker attainment at 11.08%, Female Participation attainment at 7.48% and the minority participation percentage goals were attained, but the contractor did not meet the 20% Apprentice Worker goal at 11.12%. The attainment for the 20% Apprentice worker goal is based on total apprentice-able hours. Metro staff met with the contractor in January 2015, and executed a special assessment for not meeting the apprentice goal for this project. The contractor complied with Metro's special assessment and this issue is closed.

Westside Subway Exploratory Shaft
Prime: Innovative Construction Solutions (ICS)

The Westside Subway Extension Exploratory Shaft project is 100% complete as of October 2014. Final reporting shows the Targeted Worker attainment at 50.88%, Apprentice Worker attainment at 75.05%, Disadvantaged Worker attainment at 11.23% and the minority participation percentage goals were attained, but the contractor did not meet the 6.90% Female Participation goal at 0.42%. The attainment for the 20% Apprentice worker goal is based on total apprentice-able hours. No work stoppages or grievances occurred on this project.

Regional Connector Transit Corridor Advanced Utilities Relocation
Prime: Pulice Construction

The Regional Connector Transit Corridor Advanced Utilities Relocation project was terminated for convenience in April 2015 and is now closed. Final reporting shows the Targeted Worker attainment at 51.61%, Apprentice Worker attainment at 21.37%, Disadvantaged Worker attainment at 22.83% and the minority participation percentage goals were attained, but the contractor did not meet the 6.90% Female Participation goal at 2.57%. No work stoppages occurred on this project.

CNG Emergency Generator Division 7 and 8
Prime: Taft Electric

The CNG Emergency Generator Division 7 and 8 project is 100% complete as of May 2015. Final reporting shows the Targeted Worker attainment at 46.42%, Apprentice Worker attainment at 25.51%, Disadvantaged Worker attainment at 39.08% and the minority percentage goals were attained, but the contractor did not meet the 6.90% Female Participation goal at 4.68%. The attainment for the 20% Apprentice worker goal is based on total apprentice-able hours. No work stoppages or grievances occurred on this project.

Division 13 CNG Fueling Facility, Design/Build/Operate
Prime: Clean Energy

The Division 13 CNG Fueling Facility, Design/Build/Operate project contractor is 100% complete as of June 2015. Final reporting shows the Targeted Worker attainment at 67.54%, Apprentice Worker attainment at 20.17%, Disadvantaged Worker attainment at 60.72% and the minority percentage goals were attained, but the contractor did not meet the 6.90% Female Participation goal at 1.69%. The attainment for the 20% Apprentice worker goal is based on total apprentice-able hours. No work stoppages or grievances occurred on this project.

Metro Blue Line Station Refurbishments
Prime: S.J. Amoroso

The Metro Blue Line Station Refurbishments project contractor is 100% complete as of August 2015. Final reporting shows the Targeted Worker attainment at 56.01%, Apprentice Worker attainment at 26.10%, Disadvantaged Worker attainment at 13.62% and the minority percentage goals were attained, but the contractor did not meet the 6.90% Female Participation goal at 0.48%. The attainment for the 20% Apprentice Worker goal is based on total apprentice-able hours. No work stoppages occurred on this contract.

**FEMALE UTILIZATION UPDATE:**

Below is a female utilization participation report on Metro's PLA/CCP projects to track progress. Shown below is a chart of the number of cumulative female workers on active PLA/CCP projects within the last three months as requested at the July 2015 Committee meeting.

| Project Name: | Prime Contractor: | No. of Female Workers July 2015 | No. of Female Workers August 2015 | No. of Female Workers September 2015 |
|---|---|---|---|---|
| Crenshaw/LAX Transit Corridor | Walsh/Shea Corridor Constructors | 43 | 49 | 51 |
| Regional Connector Transit Corridor | Regional Connector Constructors, JV | 6 | 7 | 7 |
| Westside Subway Extension Project, Section 1 | Skanska-Traylor-Shea, JV | No data reported | No data reported | 2 |
| Metro Red Line/Metro Orange Line (MRL/MOL) North Hollywood Station West Entrance | Skanska | 3 | 3 | 4 |
| Universal City Pedestrian Bridge | Griffith Company | 3 | 3 | 5 |
| Westside Subway Extension Advanced Utility Relocation (Fairfax Station) | W.A. Rasic | 2 | 2 | 2 |
| Metro Rail Security Kiosks | Icon-West | 0 | 0 | 0 |
| Westside Extension Project Advanced Utility Relocation (La Cienega Station) | Bubalo Construction | 1 | 1 | 2 |

In an effort to increase female participation within Metro's PLA/CCP projects which has averaged 2.76% for all active PLA/CCP projects, staff is currently coordinating the following efforts:

- Metro has convened a Women Build METRO LA Committee to develop strategies and outreach activities to highlight the need for women in the construction industry, with emphasis on the opportunities and assistance that is available. The taskforce membership includes: LA/OC Building Construction Trade Council Executive Secretary, Ron Miller, IBEW Vice President Jane Templin, UNITEHERE President, Maria Elena Durazo, Women in Non-Traditional

  Employment Roles (WINTER), National Association of Women in Construction (NAWIC), Prime Contractors, Jobs Coordinators and others. The group has agreed to present a female-

centric event, featuring women in the Trades and women in managerial ranks. The main target audience will be women who have demonstrated an interest in construction and are actively pursuing a career. Training coordinators will be on hand to accept applications and to speak directly to women who attend the event. Young men who attend will be welcome to participate, as will people seeking information about construction as a career option. The event will be titled "Women Building Metro L.A." and is scheduled to take place in November 2015.

- Metro staff has convened a taskforce to develop an Apprenticeship Prep training program in conjunction with Los Angeles Trade Technical College. The taskforce consist of the Vice President of Academic Affairs & Workforce Development of Los Angeles Trade Technical College, Prime Contractor representatives and Metro staff.

    - Prime Contractors have committed to assist in providing employment opportunities to graduates of this Apprenticeship Prep training program.
    - The 1st Apprenticeship Prep training program is scheduled to take place during the Winter of 2015.
    - Recruitment for this training program will be focused primarily on women interested in starting a career in the construction industry.

- As part of a continuing effort to introduce the entire gamut of the construction industry to young girls, DEOD will host a group as part of a larger program, entitled Girls Build LA. This is part of a Metro-wide team effort and we have committed to present a panel of women who are successful Tradeswomen to discuss the benefits of being part of a construction related union. Further, the panel will include women who have chosen a career in project management, engineering and other areas of interest.

  The focus of the panel will be to impart to the young women what it takes to be successful in the industry, and what things the women wish they had known when they were the age of the members of Girls Build LA. The session will include a question and answer period and a site tour, as appropriate.

Staff will provide updates as these programs are further developed.

## PILOT LOCAL HIRE INITIATIVE

In March 2015, the U.S. Department of Transportation (DOT) announced an initiative to permit, on an experimental basis, Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) recipients and sub- recipients the ability to utilize previously disallowed local/geographic-based labor hiring preferences and economic-based labor hiring preferences on Construction and Rolling Stock projects. This initiative will be carried out as a pilot program for a period of 1 year unless extended under the FHWA and FTA's existing Authorities. The Pilot initiative may be implemented

immediately on federally funded Construction projects.

As of this quarterly reporting period, there is currently one construction project that is active and subject to the Pilot Local Hire Initiative;

- C0991 Division 16 - Southwestern Yard (contract amount of $172mil)

This requirement was included in the solicitation for the Westside Purple Line Extension Section 2 design build contract. Staff is continually monitoring federally funded PLA/CCP covered projects awarded during the "Pilot Local Hire Initiative" implementation period and will report any additional projects subject to the Local Hire Initiative Program to the Board.

Metro received DOT and FTA approval on September 30, 2015 to use Metro's Local Employment Program (LEP) on four (4) Rolling Stock procurements. The Local Employment Program may only be applied on an experimental basis on Metro's New Heavy Rail Car, New Bus Buy and two Rail Car Overhaul solicitations. The FTA's approval also contained specific conditions that limit the Local Employment Program to a voluntary program. This means that the program cannot be used to determine responsiveness to the solicitation or as a basis for award. Nonetheless, the Local Employment Program will provide Proposers with an opportunity to receive up to 5% additional preferential scoring points if new jobs are committed as part of their proposal.

The FTA's approval also modified the definition of how Metro may define its geographical preference for new jobs and facility improvements for the New Heavy Rail Car and New Bus RFPs. For those two procurements the definition of local employment will include anywhere in the State of California. For the two rail vehicle overhaul projects the FTA will allow Metro to limit the geographical preference for new job creation to Los Angeles County.

Proposers that volunteer to participate in Metro's Local Employment Program and who commit to new job local job creation must also commit to hiring a minimum of 10% of their new work force as Disadvantaged Workers. The targeted hiring requirement will be a condition for obtaining any preferential scoring points.

Currently, the New Heavy Rail Car RFP is due November 30, 2015, and A650 Red Line Car Overhaul RFP was due October 16, 2015. The P2000 light Rail Car Overhaul RFP is due January 7, 2016. All three procurements are in Black-out. The New Bus Buy will be issued sometime in Spring 2016.

Staff will continue to report on the "Pilot Local Hire Initiative" on a quarterly basis as part of the Project Labor Agreement/Construction Careers Program quarterly updates.

## OUTREACH

In efforts to attain the highest percentages of Targeted, Apprentice and Disadvantaged Workers on PLA/CCP projects, and to keep the community informed of opportunities, the contractors and DEOD participated and/or coordinated the following outreach efforts during this reporting period:

- Updated Metro's Federal Legislative Programs to request more stringent rules and local

enforcement capabilities regarding employment of women and under-represented minorities in construction.

- Daily/Weekly/bi-weekly meetings with outreach team, contractor, elected staffers and/or community representatives.
- Presentation at the Los Angeles County Jail on Metro's PLA/CCP workforce initiatives held on June 2, 2015.
- "10,000 Strong" Veterans Career Summit held on July 14, 2015.
- Flintridge Center Apprenticeship Preparatory Graduation Ceremony held on August 6, 2015.
- 3rd Annual Veterans Economic Summit Job Fair held on August 7, 2015.
- Inaugural Career and Resources Fair for Veterans held on August 21, 2015.
- Site tour and meeting with Brothers' Keeper Training Program (Carpenters Union Pre-Apprenticeship Training Program) held on September 30, 2015
- Women Build METRO LA event scheduled for November 17, 2015.

## NEXT STEPS

Staff will continue to monitor and assist Contractors with hiring efforts, and will enforce compliance as necessary.

## ATTACHMENTS

A. PLA/CCP Report, Data Through September 2015

Prepared by: Miguel Cabral, Deputy Executive Officer, Strategic Business, PLA/Construction Careers, (213) 922-2232

Victor Ramirez, Interim Executive Officer, Vendor & Contract Management, (213) 922-1059

Keith Compton, Director, PLA/CCP Compliance & Administration, (213) 922-2406

Miriam Long, Manager, Strategic Business & Construction Career Resources, (213) 922-7249

Reviewed by: Ivan Page, Interim Executive Director, Vendor/Contract Management (213) 922-6383



Phillip A. Washington
Chief Executive Officer

# Project Labor Agreement (PLA) / Construction Careers Policy (CCP) Update

Report Data Through

September 2015 Reporting Period

Metro

# Crenshaw/LAX Transit Corridor Project

## PLA Targeted Worker Attainment: Prime: Walsh/Shea

### Report Data Through September 26, 2015

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 1,005,748.36 | 59.11% | 17.93% Based on Total Apprenticeable Work Hours | 10.18% |

Percentage Project Complete Based on Worker Hours: 33.52% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 1,005,748.36 | 16.43% | 1.23% | 22.71% | 55.06% | 1.20% | 3.37% | 73.92% | 2.49% |

Metro

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# Regional Connector Transit Corridor Project PLA Targeted Worker Attainment: Prime: R.C.C., Joint Venture

## Report Data Through September 2015

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 56,415.50 | 58.84% | 15.01% Based on Total Apprenticeable Work Hours | 12.64% |

Percentage Project Complete Based on Worker Hours: 1.72% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 56,415.50 | 7.72% | 0.55% | 24.37% | 64.65% | 0.98% | 1.73% | 73.90% | 4.77% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# Westside Subway Extension Project, Section 1 – D/B

## PLA Targeted Worker Attainment: Report Data Through September 2015

Prime: S.T.S., Joint Venture

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 5,972.75 | 68.56% | 21.00% Based on Total Apprenticeable Work Hours | 0.00% |

Percentage Project Complete Based on Worker Hours: 0.18% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 5,972.5 | 9.85% | 0.00% | 7.32% | 73.07% | 0.00% | 9.75% | 82.92% | 8.83% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# MRL/MOL North Hollywood Station West Entrance

## PLA Targeted Worker Attainment: Report Data Through September 2015 – Prime: Skanska

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 32,770.50 | 62.37% | 20.24% Based on Total Apprenticeable Work Hours | 14.20% |

Percentage Project Complete Based on Worker Hours: 61.83% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 32,770.50 | 11.33% | 0.05% | 24.14% | 60.51% | 1.32% | 2.65% | 73.21% | 8.88% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# Universal City Pedestrian Bridge
# PLA Targeted Worker Attainment: Prime: Griffith Company

## Report Data Through September 2015

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 31,686.25 | 32.89% | 26.62% Based on total Apprenticeable Work hours | 10.31% |

Percentage Project Complete Based on Worker Hours: 85.06% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 31,686.25 | 9.06% | 4.04% | 23.50% | 61.74% | 0.34% | 1.32% | 75.18% | 2.07% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# Westside Subway Extension Project AUR (Fairfax Station)

## PLA Targeted Worker Attainment: Report Data Through September 2015 – Prime: W.A. Rasic

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 35,383.00 | 62.34% | 20.10% Based on Total Apprenticeable Work Hours | 18.87% |

Percentage Project Complete Based on Worker Hours: 98.29% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 35,383.00 | 9.14% | 0.01% | 14.16% | 76.60% | 0.00% | 0.09% | 85.75% | 2.36% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# Metro Rail Security Kiosks
# PLA Targeted Worker Attainment: Prime: Icon-West

## Report Data Through September 2015

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 3,691.75 | 40.82% | 27.18% Based on Total Apprenticeable Work Hours | 21.45% |

Percentage Project Complete Based on Worker Hours: 67.29% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 3,691.75 | 52.44% | 0.54% | 15.99% | 28.46% | 1.72% | 0.85% | 83.16% | 0.00% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# Westside Extension Project AUR (La Cienega Station)

## PLA Targeted Worker Attainment: Report Data Through September 2015

Prime: Bubalo Construction

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 10,556.00 | 71.76% | 14.59% Based on Total Apprenticeable Work Hours | 31.42% |

Percentage Project Complete Based on Worker Hours: 35.19% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 10,556.00 | 0.25% | 0.00% | 8.85% | 90.91% | 0.00% | 0.00% | 91.16% | 0.52% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# Crenshaw/LAX Advanced Utilities Relocations

## PLA Targeted Worker Attainment: Prime: Metrobuilders

Report Data Through Oct 31, 2014 (FINAL)

| No. of Work Hours | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 61,708.26* | 61.41% | | 21.08% |
| 43,277.52** | | 13.84% | |

Percentage Project Complete Based on Worker Hours: 100%

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 61,708.26 | 11.66% | 0.01% | 22.02% | 66.29% | 0.01% | 0.00% | 77.97% | 0.52% |

* Total Cumulative Project Hours as Reported by Prime Contractor.

** Total Apprenticeable Cumulative Hours as Reported by Prime Contractor.

# Westside Subway Extension Advanced Utilities

## PLA Targeted Worker Attainment: Reported Data Through November 2014 (FINAL)

Prime:

Metrobuilders

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 37,731.75 | 67.47% | 11.12% | 11.08% |

Percentage Project Complete Based on Worker Hours: 100%

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 37,731.76 | 3.92% | 0.00% | 12.76% | 76.87% | 0.00% | 6.45% | 80.79% | 7.48% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# Westside Subway Extension Exploratory Shaft

## PLA Targeted Worker Attainment: Report Data Through October 2014 (FINAL)

Constructive Solutions – Prime: Innovative

| No. of Work Hours | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| *18,049.25 | 50.88% | | 11.23% |
| **238.50 | | 75.05% | |

Percentage Project Complete Based on Worker Hours: 100%

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 18,049.25 | 11.40% | 0.00% | 22.71% | 33.18% | 1.19% | 31.52% | 45.77% | 0.42% |

* Total Cumulative Project Hours as Reported by Prime Contractor.

** Total Apprenticeable Cumulative Hours as Reported by Prime Contractor.

Metro

# Regional Connector Advanced Utility Relocations PLA Targeted Worker Attainment: Prime: Pulice

## Report Data Through May 2015 (FINAL)

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 58,903.00 | 51.61% | 21.37% Contractor Reported Based on Total Work Hours | 22.83% |

Percentage Project Complete Based on Worker Hours: 100.00% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 58,903.00 | 1.36% | 0.41% | 17.43% | 80.30% | 0.00% | 0.50% | 82.07% | 2.57% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

# CNG Emergency Generator Division 7 and 8

## PLA Targeted Worker Attainments: Prime: Taft Electric Company

Reported Data Through May 2015 (FINAL)

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 3,289.50 | 46.42% | 25.51% Based on Total Apprenticeable Work Hours | 39.08% |

Percentage Project Complete Based on Worker Hours: 100.00% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 3,289.50 | 14.47% | 1.92% | 38.21% | 45.40% | 0.00% | 0.00% | 61.79% | 4.68% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# Division 13 CNG Fueling Facility, Design/Build/Operate

## PLA Targeted Worker Attainment: Prime: Clean Energy

Reported Data Through June 2015 (FINAL)

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 11,496.00 | 67.54% | 20.17% Based On Total Apprenticeable Work Hours | 60.72% |

Percentage Project Complete Based on Worker Hours: 100.00% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 11,496.00 | 31.21% | 3.03% | 26.54% | 39.23% | 0.00% | 0.00% | 73.47% | 1.69% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Metro

# Metro Blue Line Station Refurbishments
# PLA Targeted Worker Attainment: Prime: S.J. Amoroso

## Report Data Through June 2015 (FINAL)

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) **Goal: 40%** | Apprentice Utilization (%) **Goal: 20%** | Disadvantaged Worker Utilization (%) **Goal: 10%** |
|---|---|---|---|
| 41,274.75 | 56.01% | 26.10% Based on Total Apprenticeable Work Hours | 13.62% |

Percentage Project Complete Based on Worker Hours: 100.00% (rounded)

## Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/ Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/ Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 41,274.75 | 16.59% | 1.55% | 20.72% | 61.14% | 0.00% | 0.00% | 79.28% | 0.48% |

*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

# Board Report

**File #:** 2015-1643, **File Type:** Oral Report / Presentation **Agenda Number:** 23.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

RECEIVE oral **Program Management Executive Director's report.**

## DISCUSSION

RECEIVE **Program Management Executive Director's report.**

## ATTACHMENTS

Attachment A - Program Management Executive Director's report - November 2015

Prepared by:

- **Crenshaw/LAX -** Charles Beauvoir, Deputy Executive Officer, Project Mgmt., (213)299-3095
- **Regional Connector -** Girish Roy, Deputy Executive Officer, Project Mgmt., (213)893-7119
- **Westside Purple Line Ext 1 and 2-** Dennis Mori, EO Project Mgmt., (213)922-7238
- **I-405 -** Nazem Moussa, Deputy Executive Officer, Project Mgmt. (213)922-7221
- **Division 13 -** Timothy Lindholm, EO Project Engr., (213)922-7297
- **Patsaouras Plaza Busway Station -** Timothy Lindholm, EO Project Engr., (213)922-7297
- **MRL - MOL North Hollywood Station -** Timothy Lindholm, EO Project Engr., (213)922-7297
- **Universal Pedestrian Bridge -** Timothy Lindholm, EO Project Engr., (213)922-7297
- **Metro Blue Line Station -** Samuel Mayman, EO Project Engr., (213)922-7289
- **Presentation -** Yohana Jonathan, Departmental System Analyst, (213)922-7592

Reviewed by:

Richard Clarke, Executive Director, Program Management, (213) 922-7557



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# Program Management -- Transit Status Report

## Significant Issues

Presented By
**Richard Clarke**
Executive Director,
Program Management

# CRENSHAW/LAX TRANSIT PROJECT

## SIGNIFICANT HIGHLIGHTS

- Overall completion 36.5% complete. Design-builder's design is 96.1% complete. Design-builder is behind schedule but discussion underway with design-builder regarding expediting work efforts
- 6 underground structures: all have commenced construction and are at different levels of progress
  - Expo Station – excavation complete down to base, mud slab and waterproofing are underway
- 6 bridges: all have commenced construction and are at different levels of progress
  - Aviation/Century Station/bridge – Falsework largely complete with rebar placement ongoing




**CRENSHAW/EXPOSITION STATION** – Phase #1 mud slab completion



**AVIATION/CENTURY BRIDGE –** Rebar Installation

# REGIONAL CONNECTOR TRANSIT CORRIDOR

## SIGNIFICANT HIGHLIGHTS

- As of Sep. 2015, Overall Construction Progress (Cashflow) is 28%, Design Build (DB) Construction is 3.9% complete and DB Final Design is 79.5% complete
- Metro/RCC have developed schedule recovery measures and are working with LADWP on Utility Relocation and construction opportunities to address the field issues



Pile drilling at 1st/Central Station yard

- Major street closures are being coordinated with LABOE, LADOT and CD14.
- Public comments of Supplemental Environmental Impact Statement (SEIS) have been addressed and FTA approval and amended Record of Decision (ROD) expected to be issued at the end of October 2015
- Life of Project Budget contingency is the subject of Board Report

# WESTSIDE PURPLE LINE – SECTION 1

## SIGNIFICANT HIGHLIGHTS

The Advanced Utility Relocations (AUR) work involving three contracts is 63% complete overall.

- The Wilshire/Fairfax Advanced Utility Relocations Contractor achieved substantial completion on October 7, 2015, ahead of schedule and within budget.
- The Wilshire/La Cienega Advanced Utility Relocations Contractor continues with the Southern California Edison (SCE) power relocation work and the City of Beverly Hills sanitary sewer, water and storm drain relocations. This is the last AUR contract.



**Installation of Soundwall Panels at North Wilshire/La Brea Construction Staging Site**

Tunnels, Stations, Trackwork and Systems Design-Build Contract is 4% complete.

- Following the Notice to Proceed in January 2015, the Design/Builder for Tunnels, Stations, Trackwork, Systems and Systems Integration Testing has submitted 60% to 85% final design submittals for the underground stations and tunnels. The Wilshire/La Brea north construction staging area is nearing completion in preparation for the Tunnel Boring Machines launch site.

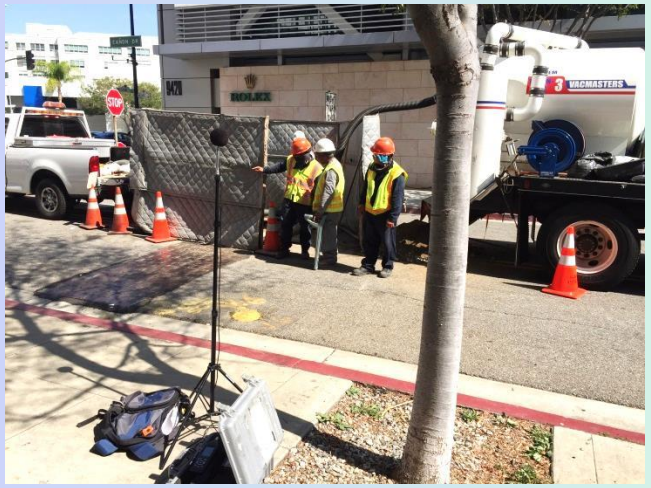
# WESTSIDE PURPLE LINE – SECTION 2

## SIGNIFICANT HIGHLIGHTS

- Contract C1120 – Design/Build Request for Qualifications/Request for Proposal was released on September 14, 2015.
- Statements of Qualifications were received on October 30, 2015.
- Price Proposals are due on May 16, 2016
- Geotechnical investigations in the City of Beverly Hills are scheduled to be completed on time before Thanksgiving, in accordance with permits authorized by City Council. Potholing was completed on November 2, 2015.
- California Court of Appeal upheld decision in CEQA lawsuit.



Geotechnical Drilling on Wilshire at Reeves




Potholing utilities near Wilshire/Rodeo Station site

# I-405 SEPULVEDA PASS IMPROVEMENTS PROJECT

## SIGNIFICANT HIGHLIGHTS

- Substantial completion was granted on September 18, 2015, process for partial contract closeout payment & release of retention underway



# DIVISION 13 BUS O&M FACILITY

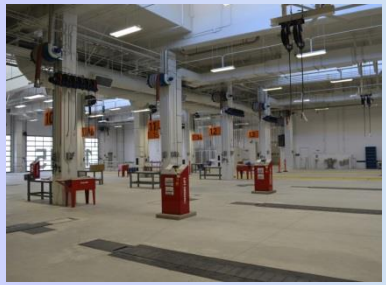
## SIGNIFICANT HIGHLIGHTS

- Project 98% complete. Project completion extended by two months due to issues with lower level ventilation system. Mitigation is complete. Substantial completion scheduled for November 2, 2015 with revenue operations opening date of January 31, 2016.
- Primary work at present includes commissioning, startup activities, punch list, final landscape, and furnishing










# PATSAOURAS PLAZA BUSWAY STATION

## SIGNIFICANT HIGHLIGHTS

- Project approximately 5% complete, construction start now scheduled for February 2016
- Pending issues include timely approval of 100% design package with Caltrans, receipt of Caltrans permits and ROW certifications to start construction and resolution of change order/budget issues for Red Line tunnel foundation conflicts
- LOP increase required to address the above issues is planned for Board consideration in January 2016
- Project completion scheduled for Spring/Summer 2017



# CIP PROJECTS

**MRL-MOL N. Hollywood Station West Entrance:**

## Progress:

- Construction is 44% complete and scheduled for completion by May 2016
- Knockout Panel (KOP) removed
- Base Foundation Poured
- Side wall Construction ongoing
- Escalators delivered at site
- Walls/ Bulkheads/Water-stops in progress
- CMC Rebar installation ongoing






# CIP PROJECTS

## Universal Pedestrian Bridge:

### Progress:

- Construction 46% complete. First phase completion targeted by early February 2016 to meet Universal's requirements. Second phase completion targeted by April 2016
- Transformer Foundation and conduit installation ongoing
- Structural Steel for elevator shaft at Station #1, Station # 2, and Station # 3 ongoing
- Bridge structural steel under fabrication
- Escalator and Elevator are currently being manufactured
- Cost Risk: Potential shortfall in CMA and possibly in LOP Budget







# CIP PROJECTS

## MBL Stations Refurbishment:

- Punch List items resolved
- Project in final closeout  phase



# Cost & Schedule Performance Summary Chart

| Project | Cost Performance | Schedule Performance | Comments |
|---|---|---|---|
| Crenshaw/LAX | OK | ◆ | The design-build contractor is currently reporting that they are behind schedule. Staff is working with contractor to attempt to mitigate delay. |
| Westside Purple Line Extension-Section 1 | OK | OK | |
| Regional Connector | ▲! | ▲! | Project cost analysis is being performed to evaluate adequacy of project contingency and budget. Differing site conditions in the Advance Utility Relocation phase have led to redesign, scope changes and major schedule impacts. Metro is working with DB contractor, and others to minimize knock-on schedule impacts. The interface with city departments is critical to the success of the mitigation measures. Staff scheduled to go to the Board in November to request LOP Budget adjustment. |
| I-405 Sepulveda Pass Improvements Project | ▲! | OK | Substantial Completion was granted on 9/18/15. Board approved an interim $103M LOP budget increase in October to fund current project commitments. Does not include Hearing 2. |
| Universal City Pedestrian Bridge | ◆ | OK | Construction is only 50% complete and contingency is at 1.5% due to unforeseen conditions and changes. Staff is monitoring the project budget and contingency level closely. |
| MOL to MRL North Hollywood Connector | OK | OK | |
| Metro Blue Line Station Refurbishments | OK | OK | Construction completion was 8/27/15. $1.3M construction budget remained. Zero claims and injuries. Closeout anticipated by November 2015 |
| Patsaouras Plaza | ▲! | ▲! | Change orders have been negotiated for design error/tunnel conflict and other issues and Errors + Omissions process underway. Schedule delayed due to permitting, environmental, and ROW issues with Caltrans. LOP Budget increase for project will be brought forward for Board consideration in January 2016. |
| Division 13 | OK | ◆ | Delays have occurred due to issues with the ventilation system but have been mitigated. Substantial completion scheduled for November 2, 2015 with opening in January 2016. |
| P3010 Rail Car Vehicle Procurement | OK | OK | First vehicles acceptance and vehicle level qualification testing are taking longer than planned. Delays not evident yet and potential mitigation plans are being developed. |
| Gold Line Foothill Ext. | OK | OK | |
| Expo Phase II | OK | OK | |

Metro

OK On target ◆ Possible problem ▲! Major issue

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

# Board Report

**File #:** 2015-1678, **File Type:** Oral Report / Presentation **Agenda Number:**

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

RECEIVE oral report by the **Caltrans District Director on Delivery of Projects on I-5.**



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# Caltrans District 7 - Corridor Report for I-5 North Projects

November 2015 @ Metro Construction Committee by Carrie Bowen, Caltrans District 7 Director



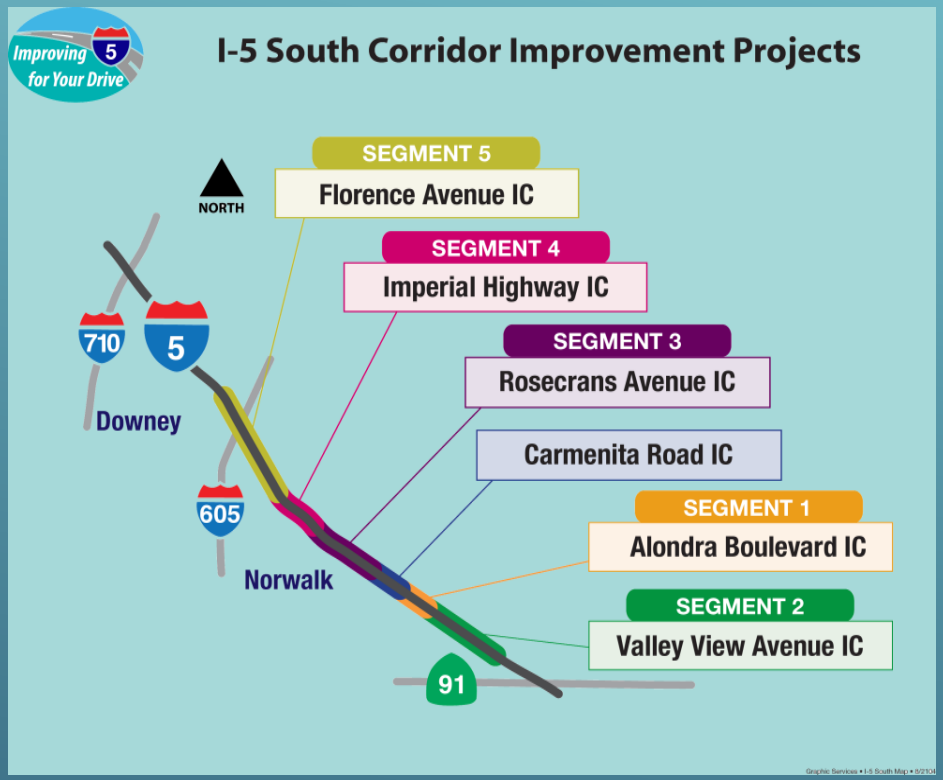

- Four projects, Segments 1-4, from SR 134 to SR 118, a total of ≈ 12 miles.
- Four lanes each direction. The freeway is being widened to add one HOV lane in each direction.
- Total I-5 North corridor budget is about $884 million , $434 million for Const Cap. Construction is within budget.
- All four segments are in the construction phase. **Segments 1 and 2 are substantially complete, and the NB HOV lane opened March 2015 and the SB HOV lane opened May 27, 2015.** Segments 3 and 4 will be open to traffic Winter 2018.
- Empire IC Segment 3 and Southernmost Segment 4 HOV lane open-to-traffic target dates are for Winter 2018.
- Empire project has incentive provisions for the contractor to finish early.
- EB and WB Alameda onramps to Interstate 5 will be closed November 18 through 23 to facilitate concrete paving.

## North I-5 Corridor

| Segment | EA | Phase | Phase % Complete | Description | Project Length/ Miles | Construction Award Amount | Contract Start Date | Open to Traffic |
|---|---|---|---|---|---|---|---|---|
| 1 | 1219U | Const | 91% | Add HOV from Route 170 to Route 118 | 3.4mi | $121 M | 5/06/2010A | 2015 |
| 2 | 1218V | Const | 99% | Add HOV lanes from Buena Vista Street to Route 170 | 4.4mi | $59 M | 10/14/2010A | 2015 |
| 3 | 1218W | Const | 32% | Empire Interchange from south of Magnolia Blvd. to just north of Buena Vista Street | 2.2mi | $196 M | 12/20/2012A | Winter 2018* |
| 4 | 12184 | Const | 66% | Add HOV lane from Route 134 to south of Magnolia Blvd. | 2.7mi | $58 M | 12/6/2010A | Winter 2018 * |
| *These will be opened jointly | | | | | | | | |

# Caltrans District 7 - Corridor Report for I-5 South Projects

November 2015 @ Metro Construction Committee by Carrie Bowen, Caltrans District 7 Director




- Six projects including Carmenita Interchange and Segments 1 through 5, from OC County line to Interstate 605 and makes a total of approximately 7 miles.
- Three lanes in each direction. The freeway is being widened to add one general purpose lane and one HOV lane in each direction.
- The total I-5 South corridor budget is about $1.8 billion with construction capital budget at $649 million.
- 5 of 6 projects are in the construction phase, including Carmenita Interchange and Segments 1, 3, 4 and 5. (Segment 5 utility relocations are underway).
- Segment 1 is in Plant Establishment period.
- Segment 2, is expected to start construction in Summer 2016.
- Segment 3, Rosecrans UC pile driving on weekdays/weekends.
- Segment 4, SB frontage road and Adoree Street between Imperial/Norwalk will be opened this month.
- Segment 5, Bridge demolition at Orr & Day OH.
- Carmenita, work on all four connecting on and offramps continue

## South I-5 Corridor

| Segment | EA | Phase | Phase % Complete | Description | Project Length/Miles | Construction Award Amount | Contract Start Date | Open to Traffic |
|---|---|---|---|---|---|---|---|---|
| 1 | 21591 | Const | 99% | Add HOV and mix flow lanes, Alondra Blvd. Interchange | 0.9mi | $45 M | 12/21/2011A | Winter 2019 |
| 2 | 21592 | Design | 100% | Add HOV and mix flow lanes, Valley View Ave. Interchange | 1.4mi | N/A | Summer 2016 | Winter 2019 |
| 3 | 21593 | Const | 65% | Widen and Realign Freeway, Rosecrans Ave. Interchange | 1.3mi | 89 M | 9/18/2012A | Winter 2019 |
| 4 | 21594 | Const | 58% | Add HOV and mix flow lanes, Imperial Highway Interchange | 1.8mi | $142 M | 9/18/2012A | Winter 2019 |
| 5 | 21595 | Const | 15% | Add HOV and mix flow lanes, Florence Ave. Interchange | 1.7mi | $96 M | 5/13/2014A | Winter 2019 |
| Carmenita | 2159C | Const | 75% | Carmenita Interchange | 1.2mi | $102 M | 9/13/2011A | Winter 2019 |

# Board Report

**File #:** 2015-1572, **File Type:** Contract **Agenda Number:** 25.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: CRENSHAW/LAX TRANSIT PROJECT**

**ACTION: APPROVE CONTRACT MODIFICATION**

## RECOMMENDATION

AUTHORIZING the Chief Executive Officer to execute a Contract Modification to Contract No. C0988 with **Walsh/Shea Corridor Constructors (WSCC), to increase Contract Schedule C Provisional Sums Items for the Crenshaw/LAX Transit Project** in an amount not to exceed $3,000,000, increasing the total contract value from $1,286,777,827 to $1,289,777,827.

## ISSUE

Provisional Sums are used to pay for unknown but anticipated items of work that could not be accurately addressed in the preliminary engineering documents that were included in the bid document at time of award to Contract C0988. One of the line items within Contract Schedule C Provisional Sums, Item No. 1 Unknown Utilities, is estimated to exceed current contract value, and therefore the Board is requested to approve the increase to Schedule C Provisional Sum costs by a total of $3,000,000.

## DISCUSSION

The Crenshaw/LAX Transit Project (Project) is a north/south corridor that serves the cities of Los Angeles, Inglewood, and El Segundo, as well as portions of unincorporated Los Angeles County. The adopted alignment extends 8.5 miles, from the intersection of Crenshaw and Exposition Boulevards to a connection with the Metro Green Line at the Aviation/LAX Station. The Project consists of multiple contracts, which includes the C0988 contract that was awarded to Walsh/Shea Corridor Constructors (WSCC) for the main line work and the C0991 contract that was awarded to Hensel Phelps/Herzog JV for the Southwestern Yard (Division 16) maintenance facility along the project alignment near Arbor Vitae that the main line will connect to.

Contract No. C0988 was issued for a total value of $1,272,632,356, including $1,168,307,356 in base Contract Work Schedule A, $95,600,000 in Options Schedule B, and $8,725,000 in Schedule C Provisional Bid Items. Provisional Sums are used to pay for unknown but anticipated items of work that could not be accurately addressed in the preliminary engineering documents that were included in the bid document at time of award to Contract C0988. Metro staff assigned values to nine (9)

Provisional Sum Items and included these amounts in the Contract as part of Schedule C.

The actual scope of work applicable to usage of Provisional Sums is finalized during the design-build process, and funds are expended upon written authorization by Metro's project manager, based on an agreed price between the design-builder and Metro, or the work is performed by the design-builder on a time and material basis. One of the line items within Schedule C Provisional Sum, Item No. 1 Unknown Utilities, is estimated to exceed current contract value, and therefore the Board is requested to approve the increase to Schedule C Provisional Sum costs by a total of $3,000,000. The $3,000,000 will be drawn down from the project's unallocated contingency budget line item.

Within the Advanced Utility Relocation Contract and the design-builder's Contract, there is substantial base scope of work for utility relocations. During the course of investigation by the design-builder of actual conditions in the field, there can be discoveries of unknown utilities and utility conditions that need to be relocated or protected in place prior to the start of construction. These types of utilities were unknown to Metro at the time of bid and are not included as base scope of work. These utilities have to be relocated or protected in place to not impact the design-builder's schedule. The use of Line Item No. 1 in the Contract Provisional Sums is customary in this instance as the funding was already allocated and the work can proceed on time.

This action will increase the total estimated amount for all Schedule C Provisional Sums work from $8,725,000 to $11,725,000 (Attachment C).

## DETERMINATION OF SAFETY IMPACT

This Board action will not have an impact on established safety standards for Metro's Construction projects.

## FINANCIAL IMPACT

The funds for this action are included in the FY16 budget under Project 865512 (Crenshaw/LAX Transit Project), in Cost Center 8510 (Construction Project Management). This action draws down the Project's unallocated contingency and does not impact the Life of Project budget. Since this is a multi-year project, the Executive Director, Engineering and Construction, will be accountable for budgeting in future years.

Impact to Budget

The sources of funds for this project are Federal STP, CMAQ, State Proposition IB, Proposition A 35% and Measure R 35% as included in the adopted Long Range Transportation Plan and updated by Board action in June 2013. The FY16 budget does not include any Prop A 35% funds which are eligible for rail operations and capital improvements. The other funds are not eligible for bus and rail operating expenditures. No other funds were considered.

## ALTERNATIVES CONSIDERED

The Board may choose not to move forward with executing this contract modification at this time. This is not recommended since it is more efficient for the Project to have the Schedule C Provisional Sums funding in advance so when a critical need arises, the project manager can direct the use of such funds to prevent any delays in the design-builder's construction schedule. By not allowing the increase in funding for Provisional Sums, the project may incur increased cost due to disruption, inefficiencies or schedule delays.

## NEXT STEPS

Upon Board Authorization, staff will proceed with a Contract Modification to increase the value for Schedule C Provisional Sums funding. Metro staff will continue to monitor closely the use of Provisional Sums till the end of the project.

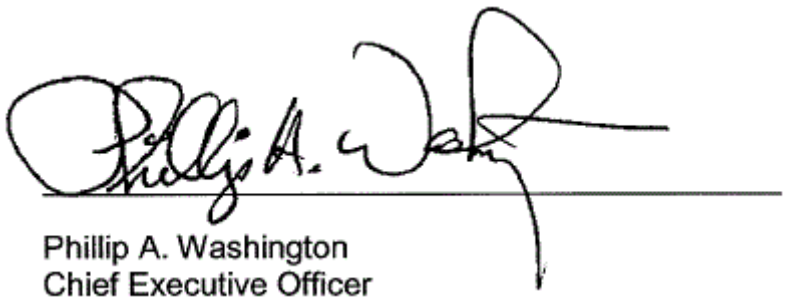
## ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - Contract Modification / Change Order Log
Attachment C - Schedule C Provisional Items - Current and Revised Values
Attachment D - DEOD Summary

Prepared by: Charles H. Beauvoir, Deputy Executive Officer, Project Management (213) 922-3095
Frederick Origel, Director of Contract Administration (213) 922-7331
Bryan Pennington, Deputy Executive Director, Program Management, (213) 922-7449

Reviewed by: Ivan Page, Interim Executive Director, Vendor/Contract Management (213) 922-6383

Richard Clarke, Executive Director, Program Management, (213) 922-7557



Phillip A. Washington
Chief Executive Officer

**ATTACHMENT A**

## PROCUREMENT SUMMARY

## CRENSHAW/LAX TRANSIT PROJECT

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number:** C0988 Crenshaw/LAX Transit Corridor Design-Build | | | |
| **2.** | **Contractor:** Walsh/Shea Corridor Constructors (WSCC) | | | |
| **3.** | **Mod Work Description:** Increased Provisional Sum Funds | | | |
| **4.** | **Contract Work Description:** N/A – Provisional funding action only | | | |
| **5.** | **The following data is current as of:** September 29, 2014 | | | |
| **6.** | **Contract Completion Status:** | | | |
| | | | | |
| | **Proposals Opened** | 6/12/12 | **% Completion $'s** | 21% |
| | **Contract Awarded** | 6/27/13 | **% Completion Time** | 21% |
| | **Notice to Proceed (NTP)** | 9/10/13 | **Orig. Contract Days** | 1824 |
| | **Orig. Completion Date** | 9/08/18 | **Change Order Days** | 0 |
| | **Current Estimated Comp Date** | 9/08/18 | **Suspended Days** | 0 |
| | | | **Total Days** | 1824 |
| **7.** | **Financial Status:** | | | |
| | **Contract Award** | | | $1,272,632,356 |
| | **Total Contract Modifications Approved** | | | $14,145,471.23 |
| | **Current Contract Value** | | | $1,286,777,827.23 |
| **8.** | **Contract Administrator:**<br>Frederick Origel<br>Director, Contract Administration | | **Telephone Number:**<br>(213) 922-7331 | |
| **9.** | **Project Director:**<br>Charles Beauvoir, S.E.<br>Deputy Executive Officer, Project Management | | **Telephone Number:**<br>(213) 922-3095 | |

## A. Contract Action Summary

This Board action is to authorize the Chief Executive Officer (CEO) to execute a contract modification to Contract No. C0988 with Walsh/Shea Corridor Constructors (WSCC), to increase funding for Contract Schedule C Provisional Sums, Line Item Item 1, Unknown Utilities, in an amount not to exceed $3,000,000

Attachment B shows modifications issued to date add/or deleted work and the proposed modifications currently pending authorization.

## B. Cost Price Analysis

The price(s) for releases of work compensated by Provisional Sum line items in the contract will be determined to be fair and reasonable in accordance with Metro Procurement Policies and Procedures. The process will include, but not be limited to, clarification, fact-finding, technical analysis, cost analysis, and negotiations.

| Item No. | Changes | Proposed Amount | Metro ICE | Negotiated Amount or NTE |
|---|---|---|---|---|
| 1 | Provisional Sum | $3,000,000 | N/A | N/A |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG – CRENSHAW/LAX TRANSIT PROJECT

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 1 | Administrative Change, Update Special Provision SP -05-Notice and Service and SP-06-Insurance Requirements | Approved | No Cost |
| 2 | Administrative Change, Technical Reports Part 6.3 PSR/PR | Approved | No Cost |
| 3 | CPUC Application | Approved | No Cost |
| 4 | Administrative Change - Revised Contractor's Mailing address | Approved | No Cost |
| 5 | Clarification of Schedule F Applicability | Approved | No Cost |
| 7 | Design -Aviation/Century Station – Pedestrian Vertical Circulation | Approved | $366,400 |
| 8 | Design - Century Boulevard Future Right Turn Lane (LAWA) | Approved | $47,820 |
| 9 | Design -Protect for Future Transport. Corridor at 98th Street | Approved | $120,458 |
| 11 | Special Events Traffic Control Site Improvements | Approved | $26,754 |
| 12 | Design Fare Gates At-Grade Latching | Approved | $239,000 |
| 13 | Construction of Fare Gates At-Grade Latching | Approved | $2,310,000 |
| 14 | Hazardous Material Abatement Parcel | Approved | $260,339 |
| 15 | Hazardous Material Abatement Parcel Florence | Approved | $481,555 |
| 16 | Updated Volume 1, 4, and 7 | Approved | No Cost |
| 17 | Construction - Century Boulevard Future Right Turn Lane (LAWA) | Approved | $122,503 |
| 18 | Construction -Protect for Future Transport. Corridor at 98$^{th}$ St | Approved | $240,434 |
| 19 | Update MRDC Station Benches | Approved | No Cost |
| 20 | Waste Removal Bellanca & Arbor ROW | Approved | $80,880 |
| 21 | Design Underground Structure HDPE | Approved | No Cost |
| 22 | ADA Directional Tile | Approved | No Cost |
| 23 | Modify Property Turnover Dates | Approved | No Cost |
| 24 | Phone System For Field Office | Approved | $44,019 |
| 25 | Additional Property Demo, Parcel HS-2706 | Approved | $60,732 |
| 26 | MRDC – Full Height Platform End Gate | Approved | $194,412 |
| 27 | Rail Design Criteria Update – LED Lighting | Approved | $407,242 |
| 29 | Traffic Control Support for DWP Utility Work | Approved | $113,232 |
| 31 | Security Guard – Crenshaw/LAX IPMO | Approved | $102,758 |
| 32 | ACM Removal Century-Aviation Bridge | Approved | $55,012.20 |
| 33 | Revised Steel Canopy Sections | Approved | (66,254.00) |
| 34 | Temporary Fencing at Avis Property | Approved | $1,212.43 |
| 35 | Haz Mat Abatement Gourmet Food Bldg | Approved | $341,074.00 |
| 36 | Hazard Material Abatement-Bldgs /Prop | Approved | $211,166.00 |
| 37 | Canceled | Canceled | Canceled |

| | | | |
|---|---|---|---|
| 38.2 | Update Volume 1 Conformed Articles | Approved | No Cost |
| 39.1 | Update Vol 1 SP 6 Ins. Req | Approved | No Cost |
| 40.1 | ADA Tactile Guidance Pathways | Approved | $565,376.00 |
| 40.2 | ADA Tactile – Color Change | Approved | No Cost |
| 41 | Parking for Florence/West Park & Ride | Approved | $99,500.00 |
| 42 | SC Edison Design Eng. | Approved | $55,606.11 |
| 43 | HVAC Repair/Replacement LAX IPMO | Approved | $119,630.00 |
| 44 | Fencing at ROW Cedar/Eucalyptus | Approved | $8,695.00 |
| 45 | Construct Struct. Geo membrane Cush | Approved | $697,495.00 |
| 46 | Striping | Approved | $19,041.13 |
| 47 | CHP Support for Century Crush | Approved | $46,566.84 |
| 48.2 | 35 Day Delay – Milestone | Approved | No Cost |
| 49 | Hazard. Material Parcels | Approved | $52,420.00 |
| 50 | UST Removal – Parcels SW-0103 | Approved | $51,827.00 |
| 51 | UST Remv-Parcels HS2201/2206 CR3701 | Approved | $176,376.00 |
| 52 | Update Roll-Up Grilles & Pay Phone | Approved | $136,597.00 |
| 53 | Contaminated Soil/Slurry | Approved | $240,218.00 |
| 54 | COI Design Serv. Century Crush | Approved | $14,543.00 |
| 55 | Security Guard – 24 hour Shifts | Approved | $82,947.12 |
| 56 | Canceled | Canceled | Canceled |
| 57 | Millstone Rev Exerc Option 2A & 2B | Approved | No Cost |
| 58.1 | Design Extended Track | Approved | $274,876.55 |
| 59 | SP 24 Incorporating BAFO Changes | Approved | No Cost |
| 60 | Design Accom. 96 St Sept 1,2, Part A | Approved | $641,378.28 |
| 61 | TIFA Certification Requirements (61.1) | Pending | No Cost |
| 62 | Design Centinela Crossing/Eucalyptus | Approved | $251,158.00 |
| 63 | Design Harbor Sub At Grade Light | Approved | $216,080.00 |
| 64 | Removal of Contaminated Seg A Imperial | Approved | $1,824.07 |
| 65 | Capri AC Unit Replacement | Approved | $22,191.89 |
| 66 | Unknown UG Obstruction at MLK Phase | Approved | $30,234.68 |
| 67 | 3rd Party (Conad) Repair on Victoria | Approved | $1,592.63 |
| 68 | LADWP Gate and Laydown | Approved | $1,767.14 |
| 69.1 | Revised Radio System Frequencies | Approved | $6,222.00 |
| 71 | Aviation/Century Temp Sidewalk | Approved | $18,207.00 |
| 72 | Haz Mat Removal at Parcel SW-010CR 3304 | Approved | $33,212.00 |
| 73 | DIR Rent A Car Fac. Mat Removal | Approved | $204,924.00 |
| 74 | Access to Covered Manholes | Approved | $200,000.00 |
| 75 | Design Uptd Sta Cstmr Sgng Dir Dwgs | Approved | $55,665.00 |
| 76 | Capri Electrical-Surveillance Camera | Approved | $19,649.58 |
| 77 | Relocate LAWA Water Service – Design | Approved | $50,702.00 |
| 78 | African Drum Project Tree Removal | Approved | $2,512.76 |
| 79 | Update Vol. 1 Indefinite Qty Equipment | Pending | No Cost |
| 80 | Canceled | Canceled | Canceled |

| | | | |
|---|---|---|---|
| 81 | Reroute Northrop Bent 1A | Approved | $20,988.00 |
| 82 | 96th Station West Option Analysis | Approved | $17,333.52 |
| 83 | Additional Recurring of Properties | Approved | $8,331.44 |
| 84 | MIC Control System | Approved | $1,076,736 |
| 85 | Delete HS-2001 & 0.1 FM SP 16/17 | Canceled | Canceled |
| 86 | Fence Adjustment at MLK | Approved | $10,011.21 |
| 87 | Claim Resolution-Electric Mtrg Switchgear | Approved | $610,300.00 |
| 88 | Design 10 & 8 Abandon Lines Crenshaw | Approved | $18,180.00 |
| 89 | At Grade Station Ticketing Zone | Pending | $70,074.00 |
| 90 | Utility Investigation for 96th Street | Pending | $35,808.21 |
| 91 | Additional Security " Taste of Soul" | Pending | $15,912.55 |
| 92 | Abandoned 8" and 10" Pipe | Pending | $225,752.00 |
| 93 | Daily Stand By Construction Zone 2/2A | Pending | $90,000.00 |
| | Provisional Sum – Unknown Utility | Pending | $3,000,000.00 |
| CO 2.4 | W. Alignment Shift 96th | NTE | $300,000.00 |
| CO 11.1 | HBR Sub- Encasement Verification | NTE | $52,000.00 |
| CO 12.1 | Harbor Sub Potholing – Unknown Utilities | NTE | $32,000.00 |
| CO 13.1 | HBR Sub- Encasement | NTE | $96,000.00 |
| CO 14 | Encasement Verification – City of LA | NTE | $30,000.00 |
| CO 16 | Haz Mat Investigation – Car Wash UST | NTE | $20,000.00 |
| CO 17 | Park Mesa Median Planting | NTE | $50,000.00 |
| CO 18 | Track Drainage CL Pipe in Lieu PVC | NTE | $100,000.00 |
| CO 21 | ATC at Slauson | NTE | $40,000.00 |
| CO 22 | Intrusion Detection Access | NTE | $100,000.00 |
| CO 26 | Station Architectural Standards | NTE | $50,000.00 |
| CO 27 | Crenshaw Tree Box Size | NTE | $50,000.00 |
| CO 28 | Florence/Sta Redondo Temp Parking | NTE | $50,000.00 |
| CO 29 | Unknown Obstruction at 405 bridge | NTE | $10,000.00 |
| CO 30 | Board Approved Station Name Change | NTE | $10,000.00 |
| CO 31 | City of Inglewood Water Line | NTE | $100,000.00 |
| CO 32 | Cable Transmission System Equip UPd | NTE | $25,000.00 |
| CO 33 | Deflection Monitoring | NTE | $52,500.00 |
| CO34 | 18 Inch Sanitary Swr Relocation – MSE Wall | NTE | $600,000.00 |
| CO 35 | Electrical Duct Banks | NTE | $406,306.28 |
| CO 36 | Green Line Safety Walkway | NTE | $50,000.00 |
| | | Subtotal – Approved Modifications | **$14,145,471.23** |
| | | Subtotal – Pending Changes/Modifications | **$3,437,546.76** |
| | | **Total Mods and Pending Changes (including this change)** | **$17,583,017.99** |
| | | | |
| | | Prior CMA Authorized by the Board (including base award and other modifications) | **$134,699,993** |
| | | Increased CMA for this recommended action | **$0** |
| | | **Total CMA including this action** | **$134,699,993** |
| | | **Remaining CMA for Future Changes** | **$117,116,975.01** |

**ATTACHMENT C**

## SCHEDULE C PROVISIONAL ITEMS – CURRENT AND REVISED VALUES

## CRENSHAW/LAX TRANSIT PROJECT

| Item | Description | Current Value | This Board Action | Revised Total |
|---|---|---|---|---|
| 1 | Unknown Utilities | $3,000,000 | $3,000,000 | $6,000,000 |
| 2 | Treatment and Disposal of Contaminated Groundwater Beyond Known Base Conditions | $300,000 | | $300,000 |
| 3 | Allowance for Spare Parts | $2,000,000 | | $2,000,000 |
| 4 | Deleted | | | |
| 5 | Incremental costs of artwork enhanced materials for Art Program | $2,000,000 | | $2,000,000 |
| 6 | Incremental Community Temporary Directional Signage and Temporary Construction Art | $400,000 | | $400,000 |
| 7 | Safety's First Incentive Program SP-24 | $200,000 | | $200,000 |
| 8 | Partnering SP-30 | $400,000 | | $400,000 |
| 9 | Alternative Dispute Resolution | $300,000 | | $300,000 |
| 10 | Miscellaneous Materials and Equipment for Systems Integration and Testing as directed by LACMTA | $125,000 | | $125,000 |
| | **Schedule "C" - Subtotal** | $8,725,000 | $3,000,000 | $11,725,000 |

**ATTACHMENT D**

**DEOD SUMMARY**

**CRENSHAW/LAX TRANSIT PROJECT/C0988**

## A.(1) Small Business Participation – Design

WSCC made a 21.49% Disadvantage Business Enterprise (DBE) Anticipated Level of Participation (DALP) commitment for Design. DBE commitments were made to Ten (10) DBE subcontractors at the time of award, and ten (10) additional DBE subcontractors have been added to-date. WSCC is exceeding their DBE commitment, with a current DBE participation of 23.63%.

| DISADVANTAGED BUSINESS ENTERPRISE ANTICIPATED LEVEL OF PARTICIPATION COMMITMENT | DALP 21.49% | DISADVANTAGED BUSINESS ENTERPRISE ANTICIPATED LEVEL OF PARTICIPATION | DALP 23.63% |
|---|---|---|---|

| Item No. | DBE Subcontractors | Ethnicity | % Commitment | Current Participation[1] |
|---|---|---|---|---|
| 1. | BA, Inc. | African American | 0.63% | 0.78% |
| 2. | D'Leon Consulting Engineers | Hispanic American | 0.89% | 1.24% |
| 3. | FPL and Associates, Inc. * | Asian Pacific American | 0.42% | 0.32% |
| 4. | IDC Consulting Engineers, Inc. | Asian Pacific American | 0.98% | 0.99% |
| 5. | Innovative Engineering Grp., Inc. * | Asian Pacific American | 0.24% | 0.21% |
| 6. | Lynn Capouya | Non-Minority Women | 1.01% | 0.94% |
| 7. | Martin & Libby | Non-Minority Women | 0.89% | 0.91% |
| 8. | MGE Engineering | Asian Pacific American | 1.54% | 2.08% |

| | | | | |
|---|---|---|---|---|
| 9. | Mia Lehrer + Associates | Hispanic American | 0.53% | 0.27% |
| 10. | NBA Engineering | Non-Minority Women | 0.74% | 0.83% |
| 11. | Parikh Consultants | Asian Pacific American | 1.94% | 2.84% |
| 12. | Sapphos Environmental * | Hispanic American | 0.02% | 0.02% |
| 13. | Selbert Perkins Design Collaborative * | Non-Minority Women | 0.28% | 0.28% |
| 14. | TEC Management * | African American | 0.42% | 0.75% |
| 15. | Ted Tokio Tanaka Architects * | Asian Pacific American | 0.53% | 0.52% |
| 16. | Togo Systems * | Asian Pacific American | 0.49% | 0.77% |
| 17. | Universal Reprographics * | Non-Minority Women | 0.03% | 0.13% |
| 18. | V&A, Inc. | Hispanic American | 9.67% | 9.63% |
| 19. | YBI Management Services | Hispanic American | 0.03% | 0.02% |
| 20. | YEI Engineers * | Asian Pacific American | 0.21% | 0.10% |
| | **Total Commitment** | | **21.49%** | **23.63%** |

[1]*Current Participation = Total Actual amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

** DBEs added after contract award*

## A.(2) Small Business Participation - Construction

WSCC made a 20% DALP commitment for Construction at the time of contract award, and made five (5) DBE subcontract commitments. Since the start of Construction, WSCC has added fifty- one (51) DBE subcontractors. Based on contract awards to date, WSCC is current DBE commitment is 9.07%. Additionally, based on the total amount paid-to-date to WSCC, the total actual amount paid-to-date to DBE subcontractors, current DBE participation is 29.58%.

WSCC is expected to continue ongoing outreach to meet their DBE contract commitment, and DBE commitments are expected to continue to increase as Construction progresses.

| DISADVANTAGED BUSINESS ENTERPRISE ANTICIPATED LEVEL OF PARTICIPATION COMMITMENT | DALP 20% | DISADVANTAGED BUSINESS ENTERPRISE ANTICIPATED LEVEL OF PARTICIPATION | DALP 29.58% |
|---|---|---|---|

| Item No. | DBE Subcontractors | Ethnicity | % Commitment | Current[1] Participation |
|---|---|---|---|---|
| 1. | Ace Fence Company* | Hispanic American | 0.03% | 0.10% |
| 2. | Advantage Demolition & Grading* | African American | 0.00% | 0.02% |
| 3. | Alameda Construction * | African American | 0.06% | 0.20% |
| 4. | Analysis & Solution Consultants * | African American | 0.04% | 0.08% |
| 5. | Anytime Dumping * | African American | 0.68% | 0.64% |
| 6. | B&B Diversified Materials* | Asian Pacific American | 0.27% | 0.32% |
| 7. | Bravo Pacific* | Hispanic American | 1.69% | 0.49% |
| 8. | C Bass Dirtyworks* | African American | 0.03% | 0.05% |
| 9. | Clean Up America * | African American | 0.00% | 0.08% |
| 10. | Clean Up America (Alameda)* | African American | 0.00% | 0.00% |
| 11. | Coast Surveying | Hispanic American | 0.25% | 0.21% |
| 12. | Coleman Construction * | African American | 0.03% | 0.13% |
| 13. | CPR Trucking | Hispanic American | 0.20% | 0.11% |
| 14. | DC Engineering Group | Sub-Continent Asian American | 0.01% | 0.20% |
| 15. | Davis Blue Print Co., Inc.* | Hispanic American | 0.00% | 0.01% |
| 16. | DCD Electric* | African American | 0.00% | 0.01% |
| 17. | DCD Electric* | African American | 0.02% | 0.03% |
| 18. | DCD Electric* | African American | 0.06% | 0.28% |

| | | | | |
|---|---|---|---|---|
| 19. | Deborah Dyson Electrical Contractor* | African American | 0.00% | 0.02% |
| 20. | E-Nor Innovations* | African American | 0.07% | 0.23% |
| 21. | EW Corporation | Hispanic American | 0.01% | 8.78% |
| 22. | Excelsior Elevator Corporation* | Asian Pacific American | 0.37% | 0.13% |
| 23. | Excelsior Elevator Corporation* | Asian Pacific American | 0.25% | 0.03% |
| 24. | Fine Grade Equipment* | Native American | 0.02% | 0.01% |
| 25. | Flores Construction * | Hispanic American | 0.00% | 0.01% |
| 26. | G & C Equipment Corporation * | African American | 0.01% | 0.06% |
| 27. | G & C Equipment Corporation * | African American | 0.93% | 4.59% |
| 28. | G & C Equipment Corporation * | African American | 0.10% | 0.70% |
| 29. | G & C Equipment Corporation * | African American | 0.01% | 4.32% |
| 30. | G & C Equipment Corporation * | African American | 0.00% | 0.02% |
| 31. | G & C Equipment Corporation * | African American | 0.00% | 0.82% |
| 32. | G & C Equipment Corporation * | African American | 0.30% | 0.93% |
| 33. | Soteria Company (Griego and Associates) | Hispanic American | 0.11% | 0.16% |
| 34. | Integrity Rebar Placers * | Hispanic American | 0.43% | 0.01% |
| 35. | Integrity Rebar Placers * | Hispanic American | 2.13% | 3.32% |
| 36. | Lowers Welding and Fabrication, Inc. | Non- Minority Female | 0.02% | 0.44% |
| 37. | Morgner Construction Management * | Hispanic American | 0.03% | 0.07% |
| 38. | Morgner Construction Management * | Hispanic American | 0.04% | 0.07% |
| 39. | Nextline Protection Services * | African American | 0.03% | 0.26% |
| 40. | Pacrim Engineering * | Asian Pacific American | 0.00% | 0.00% |

| | | | | |
|---|---|---|---|---|
| 41. | Padilla & Associates | Hispanic American | 0.15% | 0.39% |
| 42. | Quality Engineering, Inc. * | African American | 0.31% | 0.28% |
| 43. | Robnett Electric, Inc. * | African American | 0.00% | 0.01% |
| 44. | RJ Safety Supply Co.* | Non-Minority Women | 0.00% | 0.00% |
| 45. | Safeprobe * | Asian Pacific | 0.01% | 0.05% |
| 46. | Sapphos Environmental | Hispanic American | 0.05% | 0.09% |
| 47. | South Coast Sweeping * | Non-Minority Women | 0.12% | 0.19% |
| 48. | The Jungle Nursery * | Hispanic American | 0.01% | 0.00% |
| 49. | Thomas Land Clearing * | African American | 0.03% | 0.19% |
| 50. | TEC Management Consulting* | African American | 0.00% | 0.02% |
| 51. | Titan Disposal * | African American | 0.03% | 0.00% |
| 52. | Treesmith Enterprises * | Hispanic American | 0.02% | 0.07% |
| 53. | Universal Reprographics, Inc. * | Non-Minority Women | 0.00% | 0.04% |
| 54. | V&A, Inc. | Hispanic American | 0.07% | 0.19% |
| 55. | VMA Communications | Hispanic American | 0.04% | 0.11% |
| 56. | YBI Management Services * | Hispanic American | 0.00% | 0.01% |
| | | **Total Commitment** | **9.07%** | **29.58%** |

*[1]Current Participation = Total Actual amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

** DBEs added after contract award*

## B. Project Labor Agreement / Construction Careers Policy

The Crenshaw/LAX Design Build Transit project is 3.75% (based on estimated hours) complete and the contractor is exceeding the 40% Targeted Worker goal (60.77%), and 10% Disadvantaged Worker goal (12.79%). However, the contractor is not meeting the 20% Apprentice Worker goal (12.25%). In efforts to improve the Apprentice Worker participation, on June 11, 2014, WSCC commenced a "boot camp" to bring new apprentices into the construction trade. WSCC has also committed to sponsor a tunneling training with the Local 300 in August of 2014 to introduce workers to this area of construction and has provided a chart delineating when it anticipates meeting the apprentice goal.

### Crenshaw/LAX Transit Corridor Project

### PLA Targeted Worker Attainment: Prime: Walsh/Shea

**Report Data Through Aug 16, 2014**

| No. of Work Hours* | Targeted Economically Disadvantaged Worker Utilization (%) Goal: 40% | Apprentice Utilization (%) Goal: 20% | Disadvantaged Worker Utilization (%) Goal: 10% |
|---|---|---|---|
| 112,420.24 | 60.77% | 12.25% | 12.79% |

**Percentage Project Complete Based on Worker Hours: 3.75% (rounded)**

### Executive Order 11246 Demographic Summary

| No. of Work Hours* | African American Utilization | Asian/Pacific Islander Utilization | Caucasian Utilization | Hispanic Utilization | Native American Utilization | Other/Declined to state | Minority Utilization Goal: 28.3% (rounded) | Female Utilization Goal: 6.9% |
|---|---|---|---|---|---|---|---|---|
| 112,420.24 | 16.65% | 2.33% | 25.20% | 51.60% | 0.64% | 3.58% | 71.22% | 2.49% |

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*Cumulative Hours Through End of Noted Reporting Period – as Reported by Prime Contractor. Data subject to change to reflect updates or audits.

## C. Living Wage Service Contract Worker Policy

The Living Wage and Service Contract Worker Retention Policy is not applicable to this modification.

## D. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

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# Board Report

**File #:** 2015-1596, **File Type:** Contract **Agenda Number:** 26.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: DIVISION 13 BUS OPERATIONS AND MAINTENANCE FACILITY (DIVISION 13) CONSTRUCTION CONTRACT**

**ACTION: INCREASE CONTRACT MODIFICATION AUTHORITY**

## RECOMMENDATION

AUTHORIZING an increase in Contract Modification Authority (CMA) to Contract No. C0974 with **McCarthy Building Companies for Division 13 Bus Operations and Maintenance Facility** in the amount of $1,000,000, increasing the total CMA from $18,512,000 to $19,512,000. This action does not affect the FY2016 or Life of Project budget.

## ISSUE

This action is required to provide additional funding to issue Contract Modifications for construction of Division 13 and not delay final completion scheduled for December 2015.

## DISCUSSION

The volume of construction change orders is depleting the CMA and is directly related to design-related changes. Numerous design errors and omissions caused significant impacts in McCarthy's planned construction effort, resulting in above industry-standard construction change orders and requiring additional redesign effort from the designer-of-record, Maintenance Design Group (MDG), to correct design-related changes. The design disciplines that have been the most problematic include mechanical, electrical and plumbing. The project team estimates that design-related changes amounted to approximately $10,445,141 in additional costs, or approximately 14% of the original contract value. These costs were also absorbed by the project contingency as identified in the attached Contract Modification/Change Order Log (Attachment B). Metro has evaluated all design-related changes related to this project, have retained counsel, and are actively pursuing an Errors and Omissions claim to recover these costs from the designer-of-record, its subcontractors and/or their insurers.

## DETERMINATION OF SAFETY IMPACT


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This Board action will not have an impact on established Metro safety standards.

## FINANCIAL IMPACT

The funding for this change order will come from the Division 13 budget, Capital Projects 202001. There are sufficient funds within the Life-of-Project (LOP) budget for this expenditure, and the LOP for the project will not be changed. This is a multi-year project. The Project Manager and Executive Director, Program Management will be responsible for budgeting future costs.

Impact to Budget

The source of funds for this action is already included within the Division 13 contingency budget. No additional funds are being requested.

## ALTERNATIVES CONSIDERED

The Board may choose not to authorize an increase to the Contract Modification Authority for Contract C0974. This alternative is not recommended because without additional CMA, Division 13 would not have additional funding to process construction change orders with McCarthy. This would significantly delay staff from completing this much needed bus maintenance and operations facility while the project is under construction.

## NEXT STEPS

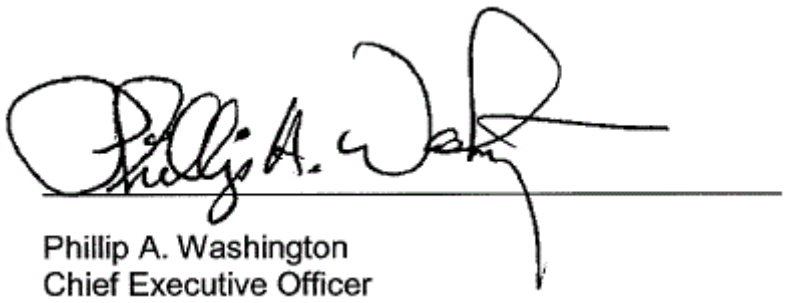
Upon Board approval, Metro's project team will continue to work diligently processing and negotiating construction change orders with McCarthy within the revised Contract Modification Authority. Division 13 is scheduled to begin revenue operations in January 2016.

## ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - Contract Modification/Change Order Log
Attachment C - DEOD Summary

Prepared by: Manuel Gurrola, Project Manager, (213) 922-8889
Tim Lindholm, Executive Officer, Capital Projects, (213) 922-7297

Reviewed by: Ivan Page, Interim Executive Director, Vendor/Contract Management (213) 922-6383
Richard Clarke, Executive Director, Program Management, (213) 922-7557



Phillip A. Washington
Chief Executive Officer

**ATTACHMENT A**

## PROCUREMENT SUMMARY

## DIVISION 13 BUS MAINTENANCE AND OPERATION FACILITY

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number**: C0974 | | | |
| **2.** | **Contractor**: McCarthy Building Companies, Inc. | | | |
| **3.** | **Work Description**: Increase Contract Modification Authority (CMA) | | | |
| **4.** | **The following data is current as of**: October 8, 2015 | | | |
| **5.** | **Contract Status**: | | | |
| | | | | |
| | **Bids/Proposals Opened**: | 9/20/11 | **Contract Award Amount**: | $73,364,803 |
| | **Contract Awarded**: | 4/30/12 | **Total of Modifications Approved**: | 185 |
| | **NTP** | 7/23/12 | **Current Contract Value**: | $89,032,357 |
| | **Original Complete Date**: | 6/23/14 | **Current Est. Complete Date**: | 12/10/15 |
| | | | | |
| **6.** | **Contract Administrator**: Deborah Spottsville | | **Telephone Number**: (213) 922-1040 | |
| **7.** | **Project Manager**: Manuel Gurrola | | **Telephone Number**: (213) 922-8889 | |

### A. Procurement Background

On April 30, 2012, Contract No. C0974 was awarded to McCarthy Building Companies, Inc. (McCarthy), the lowest responsive and responsible bidder, in the amount of $73,364,803, for construction of the Division 13 Bus Maintenance and Operations Facility.

Attachment B shows that 185 Contract Modifications have been negotiated and issued to date to add or delete scope of work, and 93 Contract Modifications are currently pending completion of negotiation.

### B. Cost/Price Analysis

The price of any future changes will be determined to be fair and reasonable in accordance with Metro Procurement Policies and Procedures. The negotiation process will include, but not be limited to scope of work clarification, fact-finding, technical analysis, cost analysis and discussions. In addition Metro staff will complete Independent Cost Estimates on all merited changes prior to initiating change orders or contract modifications with McCarthy.

**ATTACHMENT B**

## CONTRACT MODIFICATION/CHANGE ORDER LOG

## DIVISION 13 BUS MAINTENANCE AND OPERATIONS FACILITY/C0974

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 1 | Reduce retention to 5% | Approved | $0 |
| 2 | Delete sound wall/add pedestrian gate<br>PLA costs | Approved | $27,662 |
| 3 | Removal of unforeseen monitoring wells | Approved | $12,438.98 |
| 4 | Offsite AFC plans | Approved | $0 |
| 5 | Bus pad<br>Non-compensable rain extension | Approved | $27,821 |
| 6 | Saturated soils at Metro Drive | Approved | $14,278 |
| 7 | Change in Allowance Language | Approved | $0 |
| 8 | Value Engineering Jellyfish Units | Approved | ($72,487.82) |
| 9 | Demolition discrepancies water | Approved | $6,778 |
| 10 | Lubrication tank relocation | Approved | $35,730 |
| 11 | Bulletin 1 Plasma Cutter and VMC | Approved | $301,999. |
| 12 | Irrigation lines for Bldg. 1 | Approved | $27,957.73 |
| 13 | Backflow demolition and replacement | Approved | $3,477.59 |
| 14 | Bulletin 6 Adjustment to footing<br>at Grid B-2 | Approved | $8,596.49 |
| 15 | Administrative Changes | Approved | $0 |
| 16 | Adjustment to Quantities | Approved | $463,818 |
| 17 | Wiring and Phasing for ATS | Approved | $7,382. |
| 18 | Shoring obstructions on Vignes St | Approved | $21,911 |
| 19 | BDP Switchboard Amperage | Approved | $55,950 |
| 20 | Existing street light conduits on Vignes St | Approved | $10,027 |
| 21 | Existing vault air pump & sump pump power | Approved | $7,361 |
| 22 | Sample box at underground tanks | Approved | $1,921 |
| 23 | Rebar for 12" thick wall at water tank #2 | Approved | $17,303 |
| 24 | Unforeseen soil conditions at Vignes St. | Approved | $33,817 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 25 | Keller St. Driveway Approach | Approved | $38,396 |
| 26 | - Bulletin 7 Transp. Bldg. Windows<br>- TIA #2 Compensable Time Extension<br>- Sub-soil drainage dewatering pump | Approved | $96,737 |
| 27 | - Bulletin 2 Relocated water lines<br>- Bulletin 4 Reserved Parking<br>- TIA #1 Non-Compensable Time Extension | Approved | ($3,053.22) |
| 28 | - Bulletin 5 Overhead Doors<br>- Obstructions on Vignes<br>- Gas line relocation | Approved | $186,574 |
| 29 | - Bulletin 8 Water Capture at Jail Wall<br>- Reduced Pressure Principle Assembly | Approved | $81,685 |
| 30 | Temp power for FACP cabinet | Approved | $42,960 |
| 31 | Bulletin 13 Shoring at Grid 12 (Diamond Building), Footing Redesign | Approved | $78,646 |
| 32 | Soil & groundwater at Diamond Bldg. | Approved | $52,441 |
| 34 | - SD Manhole 55<br>- Repair Existing Corroded Water Line | Approved | $8,987 |
| 35 | Import for Backfill - Chatsworth | Approved | $181,939 |
| 36 | Import for Backfill - 405 Fwy | Approved | $101,627 |
| 37 | Temp. Power for Radiator Shop | Approved | $6,964 |
| 38 | TIA #4 Compensable Time Extension | Approved | $153,440 |
| CO18 | Delete DWP Vaults | Approved | ($105,691) |
| CO19 | Credit Allowance #2 Unused Funds | Approved | ($75,445.36) |
| CO20 | Delete DWP Underground Power | Approved | ($545,837) |
| 39 | - Propane and Oxygen for Radiator<br>- Floor Drain for 6" ASR | Approved | $38,111 |
| 40 | - Intake Air Duct to Water Heater A1<br>- Mechanical Duct Relocation for FCU | Approved | $12,134 |
| 41 | - Shear Wall Dimension and Openings<br>- H Line Wall Thickness | Approved | $10,951 |
| 42 | LADWP Utility Yard Switchgear | Approved | $300,010 |
| CO27 | Delete Schedule C Unused Funds | Approved | ($160,237) |
| 43 | - VFD for Supply Fans<br>- Bracing of Walls at GL 11<br>- Power to Boil Out Tank | Approved | $35,600 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 44 | - Storm & Domestic Water<br>- Gas pressure vent lines<br>- Oil, water separator, EQ 2236 | Approved | $15,150 |
| 45 | - Rebar Size at Concrete Slab Level 1<br>- Electrical, Exhaust Venting and<br>- Duct Collection to New Plasma Cutter Table | Approved | $85,987 |
| 47 | TIA #5 Compensable Time Extension | Approved | $85,168 |
| 48 | Radiator shop containment basin | Approved | $21,390 |
| 33 | Rev Fire Sprinkler Hazard Class | Approved | $93,551 |
| CO37 | Credit for Equipment Quantity Decrease | Approved | ($165,783) |
| 49 | -Bulletin 11 Day Cleaning Catch Basin<br>-Unforeseen Utilities at Metro Drive<br>-Haul SC Gas Soils from TSA site | Approved | $97,101 |
| 50 | SC Gas Haz Soil Excavation over 125% | Approved | $192,058 |
| 51 | Misc Electrical Power Requirements | Approved | $89,264 |
| 52 | Bulletin 34: Revisions to 3HR Rated Wall | Approved | $113,934 |
| CO42 | Credit for Deletion of Translucent Soffit | Approved | ($426,316) |
| 53 | -Load SCG Soils<br>-Unforeseen Concrete Obstructions<br>-Relocate Soils Onsite | Approved | $122,058 |
| 54 | -Draka Lifeline Cable<br>-Temporary Water & Power for Irrigation<br>-Exit Lights | Approved | $296,824 |
| 55 | -Variable Air Volume Registers & Duct<br>-Temperature Sensors for Zone Control | Approved | $24,752 |
| 56 | Phase 1 Traffic Control for DWP Undergrounding (Aug 2013 – Dec 2013) | Approved | $300,000 |
| 58 | Reimbursement for PV Panels | Approved | $124,728 |
| 59 | Phase 2 Traffic Control for DWP Undergrounding (Jan 2014 – June 2014) | Approved | $450,000 |
| 60 | Sanitary Sewer Manhole 24 – Unforeseen Obstructions | Approved | $319,171 |
| 61 | - Bulletin 33 Sub-metering Area 4<br>- Industrial Waste Tie<br>- Misc Electrical Revisions<br>- Circuit Requirements | Approved | $43,804 |
| 64 | Delay Compensation<br>(Administrative Change) | Approved | $0 |
| 65 | TIA #6 Compensable Time Extension | Approved | $254,800 |
| 66 | TIA #7 Compensable Time Extension | Approved | $173,264 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 67 | Bulletin 26 – 3 hr Wall at Grid Line 12 | Approved | $188,218 |
| 68 | -Bypass Sewer at Lyon Street<br>-Selective and Added Demolition Bldg 1 | Approved | $67,578 |
| 69 | Existing Storm Drain | Approved | $237,156 |
| 46 | PV Panels | Approved | $1,539,815 |
| 70 | Archeological Find at Storm Drain on Vignes Street | Approved | $235,849 |
| 71 | -Bulletin 9 Restroom Vanities<br>-Bulletin 10 Door Exit devices<br>-Bulletin 12 Clerestory Windows<br>Concrete Slab Type PS-1 in lieu of PS-2 | Approved | $35,655 |
| 72 | -Bulletin 15 Exposed/Concealed Conduit<br>-Multiple Credit Deletions<br>-Elevator Overhead Power and Lighting | Approved | $23,121 |
| 73 | Adjustment to Contract for Eqpt CO#37 | Approved | $87,603 |
| 74 | -Sewer Lateral Obstructions<br>-Trap Primers in Radiator Shop | Approved | $186,574 |
| 75 | Direct Cost for Materials & Equipment for Vignes Street Sewer Delay | Approved | $428,177 |
| 76 | Direct Labor Costs for<br>Vignes Street Sewer Delay | Approved | $315,000 |
| CO 36.1 | Delete Fiber Optic and Telecom Cable from Gateway Bldg to Bldg 1 & Bldg 2 | Approved | ($42,615) |
| 77 | Delete Fiber Optic and Telecom Cable from POC A to POC B | Approved | ($33,969) |
| CO 38.1 | Delete Fiber Optic and Telecom Conduit and Vaults from Bldg 1 to Bldg 2 | Approved | ($98,171) |
| 78 | Delete Fiber Optic and Telecom Conduit and Vaults from POC a to POC B | Approved | ($159,243) |
| 79 | Jack and Bore Casing for Sewer at Vignes Street | Approved | $234,483 |
| 80 | -Bulletin 19 Expansion Joint<br>-Slot cutting at Building 1 | Approved | $247,635 |
| 81 | -Bulletin 16 – Wastewater Vent Piping<br>-Bulletin 28 - Reduced Pressure principle<br>-Bulletin 29 – Storm Drain Manhole | Approved | $90,261 |
| 82 | -Bulletin 18 – Door Clarifications<br>-Sales and Use Tax Increase to 9%<br>-Existing Radiator Shop Clarification<br>-Bulletin 25 – Tire Shop Eqpt Power | Approved | $97,164 |
| 83 | Bulletin 22 – 10” Fire service connection | Approved | $84,011 |
| 84 | Bulletin 37R1, Utility Yard Revisions | Approved | $247,063 |
| 85 | Bulletin 21, Metro Driveway Water Line Revisions | Approved | $93,918 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 86 | Import Soils for Chassis Wash Area and<br>Bldg #1 and Diamond Bldg. Soils | Approved | $90,261 |
| 87 | Bulletin 20, Metal Roof Panels<br>Bulletin 43, Door Actuator and Egress Hardware Revisions | Approved | $67,278 |
| 88 | Hazardous Soil Removal Adjustment of Unit Rates and Quantities<br>Exceeding 25% Quantity | Approved | $303,757 |
| 89 | -Bulletin 24, LEED Revisions<br>-Bulletin 42, CNG Yard Modifications<br>-Bulletin 31, Waste Plumbing Revisions<br>-Bulletin 51, Lubrication Fluid Piping<br>-Miscellaneous Electrical Changes | Approved | $99,932 |
| 90 | Revisions to Wall Footings, CMU Wall Dimension Changes at Bldg. 1 | Approved | $70,000 |
| 91 | Misc. Electrical Items Part 1: Power to VFDs, Power to Flashometers and<br>Motion Sensor to Exhaust Fans | Approved | $65,000 |
| 92 | - Misc. Electrical Items<br>- Veeder Root Petroleum Monitor Console Relocation to Aisle C129 | Approved | $83,459 |
| 93 | SC Gas Soil Import and Slot Cutting | Approved | $82,480 |
| 94 | Claims Resolution | Approved | $386,837 |
| 95 | Delete DWP Undergrounding | Approved | $(545,837) |
| 96 | Add Power to Block Heater, Battery Charger and Remote Annunciator to<br>Generator | Approved | $73,931 |
| 97 | Bulletin 39, Lighting at Stairs/Doors and Power for DWP Metering<br>Switchboard Heater | Approved | $50,799 |
| 98 | Bulletin 44, Soffit Ceiling at SW Plaza | Approved | $102,000 |
| 99 | - Bulletin 17, House Gas Tap Connection<br>- Diamond Bldg Roof Drain Connection<br>- Bulletin 50, Framed Furred Walls<br>- Bulletin 52, Roof Drainage at Parking<br>- Sink Hole Remediation<br>- Flexible Tubing/Piping at 3-Hr Wall | Approved | $51,581 |
| 100 | - Electrical Misc Items, Part 2<br>- Street Lighting Switch Over on Cesar Chavez<br>- Remstar Vertical Carousel EQ #1389<br>- Bulletin 45, Electrical Yard Sub-Metering Rough-In | Approved | $67,489 |
| 101 | TIA 10R1, Compensable time Extension | Approved | $94,000 |
| 102 | - Multiple Plumbing Changes<br>- Radiator Shop Exhaust Fans Curbs on Roof | Approved | $36,400 |
| 103 | Bulletin 66, Tapered Concrete at Utility Yard | Approved | $17,358 |
| 104 | Direct Costs for Delays at Vignes Street Sewer | Approved | $470,000 |
| 105 | - Bulletin 46 EQ 1730 Revisions<br>- Relocation and Balancing of Soils | Approved | $47,600 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 106 | Metro Driveway Retaining Wall Conflict | Approved | $52,896 |
| 107 | AFC Street Lighting Plans | Approved | $57,760 |
| 108 | Parking Construction Joints for PT Beams | Approved | $68,936 |
| 109 | - Misc Changes<br>- Hollow Metal Frame Installation | Approved | $77,144 |
| 110 | - Bulletin 61, Enlargement of doors C103, 104<br>- Bulletin 65, Equipment 1401 Revisions | Approved | $30,790 |
| 111 | - Robot Traffic Control<br>- Sewer Manhole 35 Revisions | Approved | $28,595 |
| 112 | - Delete Domestic Water Meters<br>- Bulletin 58, Structural Steel Corbel<br>- Door Hardware Changes Submittal 08 71 00 | Approved | $26,979 |
| 113 | - Bulletin 41, Art Panel Modifications<br>- Bulletin 48, Bency Kiosk<br>- Bulletin 64, Delete Compressed Air Drop<br>- Bulletin 63, Equipment 5430 Safety Enclosure | Approved | $23,602 |
| 114 | TIA 10R1, Direct Schedule Mitigation Costs | Approved | $76,133 |
| 115 | Temp Lighting and Equipment Costs | Approved | $25,737 |
| 116 | Sewer Unforeseen Obstruction | Approved | $82,734 |
| 117 | Bldg C Clerestory Infill Framing | Approved | $44,294 |
| 118 | Applied Graphics | Approved | $14,583 |
| 119 | Removal of Exterior Structural Steel | Approved | $16,448 |
| 120 | Non-compensable time extension for rain | Approved | $0 |
| 121 | Underfloor Humidity Control Requirements | Approved | $173,023 |
| 122 | - Bulletin 27, Structural Support for Atrium<br>- Bulletin 36, Revised Fiber Optic Pathway<br>- Storm Water Reuse Filters and Pumps<br>- Bulletin 40r1, Wall Addition at Elevator | Approved | $44,753 |
| 123 | AFC Traffic Signal Permit Plans | Approved | $35,123 |
| 124 | Concrete and Rebar Changes: RFC 132; RFIs 822, 817-2; RFC 151; RFIs 710, 736, 782, 803, 803-1, 861, 868; RFCs 153, 898; RFC 161, RFI 845, RFI 982 | Approved | $59,017 |
| 125 | - Bulletin 72 PCC Paving at Gas MSA<br>- Utility Yard Footing & Curtain Wall | Approved | $60,603 |
| 126 | - Plumbing at Chassis Wash Area<br>- Relocation of Existing Roof & Storm Drain Bldg. 1<br>- Bldg 1, Remove Capped Utilities | Approved | $52,880 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| 127 | Bulletin 53, Revisions to the Electrical Single Line Diagram | Approved | $6,800 |
| 128 | Traffic Signal Impacts | Approved | $108,886 |
| 129 | Bulletin 71R2, Exit Signs | Approved | $80,599 |
| 130 | Bulletin 47, Revised Existing Weld Booth No. 6 & Misc. Electrical Conditions | Approved | $21,557 |
| 131 | - Plumbing J-Mould & Fireproofing<br>- Bulletin 69, EQ 7250 & 7255 Hose Hangers<br>COL 48.1, EQ 1401 Difference in Cost to Change from 13 ft to 19 ft | Approved | $70,170 |
| 132 | Bulletin 59, New Fuel Lines to EMF Emergency Generator | Approved | $166,917 |
| 133 | Adjustment to Contract Value for DWP Water Service Connection Cost CO #18 | Approved | $30,453 |
| 134 | - Medium Pressure Gas Piping<br>- Deleted Card Access System<br>- Cost of Import Soils due to PCC | Approved | $61,266 |
| CO 137 | Bulletin 38r2, Telecommunications & Credit Changes to Low Voltage Systems | Approved | $(140,080) |
| CO 138 | Bulletin 79, Fare Retrieval System | Approved | $95,023 |
| CO 139 | Bulletin 73, PV System Components | Approved | $274,708 |
| 135 | VM6 Procurement | Approved | $161,243 |
| 136 | - Bulletin 68, Remote FDC Connection<br>-Bulletin 76, Provide Signage as Required by code & LA Fire Dept. | Approved | $101,709 |
| CO 140 | Bulletin 32, Updated Elec Panelboard, Feeder, Single Line Diagram | Approved | $(26,872) |
| CO 144 | Bulletin 56 & 56R1, Transportation & Maintenance Bldg Revisions | Approved | $257,173 |
| 137 | Bulletin 67, Shower Floor Finish & bulletin 77 Ambulatory Toilet Stall | Approved | $43,507 |
| CO 143 | Generator Fuel Supply Line RFI 785 | Approved | $22,397 |
| 138 | Bulletin 70, Art Work | Approved | $488,650 |
| CO 145 | Bulletin 60R2, Upgrades to Elec Single Line Panel | Approved | $141,028 |
| 139 | RFC 172, Temp Detector Loop & RFC 188 PV Racking Attachments | Approved | $46,367 |
| CO 147 | - RFC 202, RFI 972 (T1 and Z1 DMX Controllers)<br>- RFI 1037, 120 Volt Power for WLAN and M3 | Approved | $68,112 |
| CO 148 | Bulletin 82, Lighting at SW Corner of Building B | Approved | $487,366 |
| 140 | Bulletin 75, Door Security | Approved | $71,970 |
| 141 | - RFI 318-5, Plasma Table Relocation<br>- RFI 1195, Added Concentric Flue Vent | Approved | $26,888 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| | - RFI 985, Bldg C Stair 13/Roofing Conflict | | |
| 142 | - RFI 975, Location for Alarm Panel & Annunciator (FA003)<br>- RFI 955-1, Bldg C Restroom Wall & Opening Rev. | Approved | $17,737 |
| 143 | Bulletin 55, Pass thru Door | Approved | $9,108 |
| 144 | - Bulletin 83, Security Screening<br>- Bulletin 85, Stair #12, Core Finish | Approved | $220,769 |
| 145 | RFI 1250-3, B1 thru B5 Exhaust Air Flow Revisions – Procurement & Submittal | Approved | $154,549 |
| CO 149 | Bulletin 49, Updated Electrical Schedule, Part 2 | Approved | $3,074 |
| CO 150 | RFI 1060, Power to Coiling Doors | Approved | $42,585 |
| CO 151 | Relocated & Added Clocks. Added Panel for Wash Equipment | Approved | $160,908 |
| 146 | Bulletin 64, Revised Utilities at Chassis Wash | Approved | $21,300 |
| CO 152 | - RFI 591-1, Exhaust Fan Control<br>- RFI 699, Existing Fire Pump Monitoring<br>- RFI 880, Equipment circuit and Conduit Clarification | Approved | $36,702 |
| CO 153 | RFI 918, Exhaust Fans B-3 to B-5 VFD Locations | Approved | $4,691 |
| CO 154 | Bulletin 75, Access Control Door, MCM – Electrical | Approved | $71,173 |
| CO 155 | Bulletin 78, Entry Soffit A100 and Exterior Paint | Approved | $43,529 |
| CO 156 | RFI 1030, Area 9 Level 1 Lighting Clarifications | Approved | $7,760 |
| CO 157 | Bulletin 80, Static Control Flooring | Approved | $20,087 |
| 147 | - RFI 1027, 8-in. Roof Insulation<br>- RFI 1115, Supervisor Room Lower Ceiling | Approved | $32,063 |
| 158 | RFI 1050, Additional Power for EWC B-1 | Approved | $3,488 |
| 159 | Bulletin 74, Roof Beam Stiffeners | Approved | $27,749 |
| 148 | - RFI 1100, Elevation Discrepancy at Non-Revenue Wash Area<br>- Schedule C Obstructions Allowance – Unforeseen Obstructions | Approved | $64,882 |
| 163 | RFI 1097, Underfloor Power Module | Approved | $22,788 |
| 149 | Multiple RFIs: 897, 1149, 1100, 1111, 1101, 1120, 981; Bulletin 90R1, 1202, 1225 | Approved | $89,244 |
| 150 | RFI 1132, Roofing at RTU, HVU and HP Prefab Curbs | Approved | $25,959 |
| 151 | Data Acquisition System for PV to Report to DWP | Approved | $95,511 |
| CO 165 | Bulletin 81, Roof Girder Stiffener | Approved | $69,967 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| CO 166 | Bulletin 64 and Bulletin 86, Electrical Changes | Approved | $53,289 |
| CO 164 | T&M Bulletin 88R1 | Approved | $170,000 |
| CO 167 | RFI 1139, Rev 1 and Rev 2, Bypass Fan and VFD Requirements | Approved | $109,960 |
| 152 | - RFI 1129, Building C VAV Access Door<br>- RFI 1112, Building C Exhaust Reels Revisions | Approved | $18,916 |
| CO 168 | RFI 1193, Vacuum Pump Power Requirements | Approved | $41,920 |
| CO 169 | RFI 1095-1, Combination Fire Smoke Dampers (CDs) on a 120-Volt Circuit | Approved | $8,376 |
| CO 170 | - RFI 1099-1, Boiler Control Panel Locations<br>- RFI 166, Missing Outlets for Solenoid Valve | Approved | $14,123 |
| TBD | Builders Risk Adjustment | Pending | $40,041 |
| TBD | Structural Support for EQ ID 7720 | Pending | 36,241 |
| TBD | RFI 1012, Rebar detail for two-way slab | Pending | $10,000 |
| TBD | Adhered Roof at Bldg C Concrete Roof Deck | Pending | $39,816 |
| TBD | RFI 1061, Repair Bay Light Fixture Switch | Pending | $15,000 |
| TBD | RFI 1056, Stair Tread Nosings at Interior CFP Stairs | Pending | $14,716 |
| TBD | RFI 0917, Overcurrent Protection | Pending | $1,331 |
| TBD | RFI 1098, Shunt Trip Signal CNG Detection | Pending | $34,704 |
| TBD | RFI 1121, Bulletins 22 and 29, Conflict with Backflow Preventer | Pending | $5,050 |
| TBD | Perforated Panel at Fueling Area Design Change | Pending | $3,000 |
| TBD | RFI 1117, CFSD Opening Through CMU Wall, Area 8 | Pending | $7,500 |
| TBD | RFI 1118, CFSD Access Obstruction | Pending | $18,223 |
| TBD | RFI 1038-1, Rev 2: Low Voltage Distance Limitations | Pending | $293,343 |
| TBD | RFI 1095-1, 24-Volt CFSDs Fed by 120-Volt Circuit | Pending | $8,376 |
| TBD | RFI 1099 and 1166, Electrical Changes | Pending | $14,123 |
| TBD | RFI 1119, 1119-1: Stair 6 FS Elevation vs. Gate Swing | Pending | $33,289 |
| TBD | LA Gross Tax | Pending | $50,000 |
| TBD | South Façade Panel Layout | Pending | $15,000 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| TBD | RFI 1045, Gap at East End of Chavez Retaining Wall | Pending | $18,000 |
| TBD | RFI 973-2, Lighting Control System Changes | Pending | $100,000 |
| TBD | RFI 1216, LADWP PV Switch Gear Pad Extension | Pending | $11,090 |
| TBD | RFI 1029-1, Power for WH C-1 and CP C-1 | Pending | $19,950 |
| TBD | RFI 1207, Building B LV B-14 and B-17 | Pending | $18,000 |
| TBD | RFI 1182, Light Fixture Conflict at Bldg C North Mezz | Pending | $22,000 |
| TBD | RFI 1150, Type Q Fixture at Building A ACT | Pending | $5,000 |
| TBD | Elevator #1 Changes via Submittal 14 21 00-0001.1 | Pending | $2,650 |
| TBD | RFI 1028, Partition Wall at Bldg C | Pending | $5,505 |
| TBD | RFI 1206, Receptacles at Restroom Bldg. A, Level 1, RFI 1228 | Pending | $1,255 |
| TBD | RFI 1214, Installation of Lighting Protection on Bldg. B Parapets | Pending | $4,839 |
| TBD | Street Improvement Changes/Obstruction During Road Work | Pending | $65,000 |
| TBD | RFI 1168-1, Cesar Chavez SD Manhole | Pending | $20,000 |
| TBD | RFI 1131, Bldg A Kickers Above Windows B15 and B16 | Pending | $15,487 |
| TBD | RFI 1189, Fixture/Duct Conflict | Pending | $16,830 |
| TBD | RFI 1151, 1152: Exhaust Reel Changes | Pending | $50,866 |
| TBD | RFI 1172 and 1192: Gate Hardware Revisions | Pending | $66,901 |
| TBD | RFI 992, Elevation Discrepancies at Chassis Wash | Pending | $10,413 |
| TBD | - RFI 1159, Bldg. A Transfer Air Opening<br>- RFI 1155, Floor Registers | Pending | $20,982 |
| TBD | Bulletin 84, A/V Equipment Provisions | Pending | $221,865 |
| TBD | RFI 536, 1144, 1207, 1215: Electrical Changes | Pending | $56,046 |
| TBD | RFI 1164 and 1165: Light Fixture Relocation | Pending | $12,200 |
| TBD | - RFI 1250, EF B-1 thru B-5 Exhaust Air Flow<br>- RFI 1264, Economizer Return | Pending | $8,089 |
| TBD | - RFI 1267, Vignes/Chavez Curb Ramp Issue<br>- RFI 1218-1, Unforeseen Manhole<br>- RFI 1217, Lyon Sidewalk Rework | Pending | $37,947 |
| TBD | RFI 1229, Closure Plates at Column Penetrations | Pending | $45,993 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| TBD | RFI 314 and RFI 1278, Additional FRP at Bldg C | Pending | $5,076 |
| TBD | Sunshade Assembly between Bldgs A and B (QAR 157) | Pending | $35,761 |
| TBD | RFI 1259, Vacuum Equipment Revisions at Brake and Body Shop | Pending | $62,154 |
| TBD | RFI 1262, Veeder Root Communication | Pending | $7,540 |
| TBD | RFI 1266, Motor Oil and ATF Tanks | Pending | $35,693 |
| TBD | RFIs 534, 749, 750, and 929: Electric Adds | Pending | $76,394 |
| TBD | Permitted Signal and Stripping Changes | Pending | $60,000 |
| TBD | Bulletin 87R1, Stripping and Protection | Pending | $250,000 |
| TBD | Unforeseen Conditions at Cesar Chavez | Pending | $45,780 |
| TBD | RFIs 1185, 1197, 1204 and 1236: Electrical Changes | Pending | $22,681 |
| TBD | RFIs 1203, 1234, and 1231: Miscellaneous Metal Add | Pending | $36,498 |
| TBD | RFI 1257, Sidewalk at Metro Gate | Pending | $39,433 |
| TBD | Added PV Signage per DWP Punch List | Pending | $1,715 |
| TBD | RFI 862, 935, Series 953-1, 961, 963: Steel Changes | Pending | $40,073 |
| TBD | RFIs 994, 1053, 1201, 1205 and 1261: Steel Adds and Modifications | Pending | $26,496 |
| TBD | Bulletin 89, Overhead Fall Protection System in Chassis Wash | Pending | $45,400 |
| TBD | RFI 691-1, Garden Roof Steel Angle Size | Pending | $23,880 |
| TBD | RFI 1265, Body Shop Trapeze Assembly | Pending | $29,984 |
| TBD | RFI 1268, Circuits for EQ #5558 Lighting | Pending | $5,542 |
| TBD | RFI 1275, Fire Sentinels for Coiling Doors | Pending | $39,808 |
| TBD | RFI 1233, Room to Room Soundproofing at Bldg A | Pending | $4,344 |
| TBD | RFI 1274, C210 Door Swing | Pending | $5,673 |
| TBD | RFI 1255, 1255-1: P-Lam Cabinets and Tile at Sinks | Pending | $9,918 |
| TBD | TIA #12, Bulletin 81: Added Roof Girder Stiffener | Pending | $32,079 |
| TBD | TIA #13, By-Pass Fans at Bldg A 32 CD, 24 WD | Pending | $256,632 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| TBD | Bulletin 92Ra, Lube/Compressor Room Fire Resistance | Pending | $15,000 |
| TBD | Bulletin 91, Water Supply at Day Cleaning | Pending | $6,520 |
| TBD | Trench Drain Repair | Pending | $;69,843 |
| TBD | PCC Paving Thickness Change from 9" to 10 ½" Area 8 South | Pending | $70,503 |
| TBD | RFIs 641-1, 1150, 1223-1, 1258: Electrical Changes | Pending | $49,051 |
| TBD | RFIs 1237, 1244, 1248-1, 1270, 1282: Electrical Changes | Pending | $16,530 |
| TBD | Preparation for Dignitaries | Pending | $7,896 |
| TBD | Gap at East End of Chavez Retaining Wall | Pending | $18,000 |
| TBD | RFI 0702, Hose Reel | Pending | $10,000 |
| TBD | Additional Metal Roof Anchors – PV Panel Loading | Pending | $6,000 |
| TBD | RFI 1102, Unforeseen Duct Bank | Pending | $7,000 |
| TBD | Cesar Chavez Sidewalk Phased Demo | Pending | $5,500 |
| TBD | Delete Watson Dispatch Console | Pending | ($13,747) |
| TBD | RFI 1250-3, EF B-1 Athena Cost Pt 2 and Other Trades | Pending | $270,510 |
| TBD | Additional Street Tree Planting and Street Substitution | Pending | $6,014 |
| TBD | Seal Ceiling Penetration Above Switchgear | Pending | $14,136 |
| TBD | Fire Alarm Connection to CNG Equipment | Pending | $4,769 |
| TBD | RFI 1279-1, Piano Hinge Gates | Pending | $2,709 |
| TBD | LADOT Traffic Signal Permit St Sheets 3, 4, 5 | Pending | $40,000 |
| TBD | RFI 1293, Building A Underfloor Plenum Pressure Differential Issue | Pending | $45,422 |
| TBD | TIAs 11, 12, and 13: Concurrent and Compensable Time Extension – 189 Calendar Days, 19 Working Days | Pending | $178,600 |
| TBD | RFIs 1038, 1095, 1110, 1111, 1112, 1119, 1129: Multiple MEP Changes | Pending | $77,000 |
| TBD | RFI 1250-3, Exhaust Fan Procurement Incentive | Pending | $30,000 |
| TBD | RFI 1289, Emergency Lighting Fire Marshal Comments | Pending | $60,352 |
| TBD | RFI 1223-1 and 1258: Control Changes | Pending | $21,616 |

**ATTACHMENT B**

## CONTRACT MODIFICATION / CHANGE ORDER LOG

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| | | | |
| Subtotal – Approved Modifications | | | $15,738,915 |
| Subtotal – Pending Changes/Modifications | | | $3,714,439 |
| | | | |
| **Subtotal Totals: Mods. + Pending Changes/Modifications** | | | **$19,453,354** |
| | | | |
| **Total: Mods + Pending Changes/Mods** | | | **$19,453,354** |
| | | | |
| Previous Authorized CMA | | | **$18,512,000** |
| CMA Necessary to Execute Pending Changes/Mods + Possible Claims | | | **$1,000,000** |
| | | | |
| **Total CMA including this Action** | | | **$19,512,000** |
| | | | |
| **CMA Remaining for Future Changes/Mods after this Action** | | | **$58,646** |

**ATTACHMENT C**

## DEOD SUMMARY

## DIVISION 13 BUS MAINTENANCE AND OPERATIONSS FACILITY/C0974

### A. Small Business Participation

McCarthy Building Companies made a 1.42% Disadvantaged Business Enterprise (DBE) Anticipated Level of Participation (DALP) commitment for this contract. Current participation is 1.06%, representing a 0.36% shortfall. The contract is 99.9% complete.

Going forward, the CEO has directed that a goal percentage attainment tracking system be created and measured against project percentage completion. This would allow Metro to have an early alert mechanism if contractors are nearing contract completion and are short of DBE/SBE goal attainment.

| SMALL BUSINESS COMMITMENT | 1.42% DALP | SMALL BUSINESS PARTICIPATION | 1. 06% DALP |
|---|---|---|---|

| | DBE Subcontractors | Ethnicity | % Commitment | % Participation[1] |
|---|---|---|---|---|
| 1. | MB Professional Services | Non Minority Women | 1.23% | 1. 06% |
| 2. | Interclean Equipment | Non Minority Women | 0.19% | 0.00% |
| | **Total Commitment** | | **1.42%** | **1. 06%** |

*[1]Current Participation = Total Actual Amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

### B. Living Wage Service Contract Worker Policy

The Living Wage and Service Contract Worker Retention Policy is not applicable to this modification.

### C. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

**File #:** 2015-1555, **File Type:** Contract **Agenda Number:** 27.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: CONSTRUCTION MANAGEMENT SUPPORT SERVICES CONTRACT FOR CRENSHAW/LAX TRANSIT PROJECT**

**ACTION: INCREASE CONTRACT BUDGET THROUGH FY17 WORK PROGRAM FOR STANTEC CONSULTING, INC**

## RECOMMENDATION

A. EXTENDING Contract No. MC069 with **Stantec Consulting, Inc. to provide Construction Management Support Services for Crenshaw/LAX Transit Project, including the Southwestern Yard,** from March 2016 to June 2021. All other existing Contract Work Orders not pertaining to Crenshaw/LAX Transit Project will be closed by March 18, 2016;

B. AUTHORIZING an increase to the Crenshaw/LAX Transit Project CWO16 and Southwestern Yard CWO27 within Contract No. MC069, with Stantec Consulting, Inc. to provide Construction Management Support Services in an amount not-to-exceed $28,566,728 for the FY16/FY17 18-month Work Program Funding increasing the CWO values from $28,607,941 to $57,174,669. Therefore, the total contract value will increase from $97,412,136 to $125,978,864; and

C. AUTHORIZING the Chief Executive Officer to execute individual Contract Work Orders and Modifications within the Board approved contract value.

## ISSUE

On February 19, 2009, the Board approved the Construction Management Support Services (CMSS) contract to support Board adopted capital projects. Contract No. MC069 with Stantec Consulting, Inc. is set to expire on March 18, 2016. With the project currently in construction along the entire length of the 8.5 mile alignment, it is critical that there be no disruption in construction management oversight in order to allow the existing experienced CMSS staff to continue to augment Metro staff to successfully deliver the project on time. The recommended actions are to extend Contract No. MC069 with Stantec Consulting, Inc. to provide Construction Management Support Services for Crenshaw/LAX Transit Project from March 2016 to June 2021 as well as approve funding for the remaining six months of FY16 and 12-month FY17 Work Program solely for the Crenshaw/LAX

Transit Project and the related Southwestern Yard Project. Existing funding for the CWO will be depleted in December 2015.This will allow for CMSS construction support during the peak construction period.

All other Contract Work Orders (CWO's) under this contract that have supported other capital projects are to be closed by March 18, 2016. These CWOs have adequate funding to perform the expected level of effort through March 18, 2016.

## BACKGROUND

The primary role of the CMSS is to provide skilled and qualified staff to support Metro with construction management of Metro's construction contracts. Both Metro and CMSS consultant staff, in most cases, work side-by-side in an integrated project management offices (IPMO). The CMSS contract funds are authorized by issuing separate contract work orders (CWOs) for various projects for labor classifications and rates set forth in the contract. Modifications to existing CWOs are issued as additional work is identified.

In February 2009, the Metro Board authorized the Chief Executive Officer to award CMSS to Stantec Consulting, Inc., and execute individual CWOs and modifications within the Board approved contract value. The CMSS contract is an indefinite delivery/indefinite quantity labor-hour contract for a term of seven years, inclusive of two one-year options. The Contract was executed on March 18, 2009, and the expiration date of the five year base contract was March 18, 2014. In FY14, based on prior board approvals, Metro exercised both one year options on March 10, 2014 to extend the contract period of performance through March 18, 2016. This CMSS contract terms and conditions allows the coordination of funding of existing CWO's beyond the contract end date to maintain staffing continuity. Metro staff will report back to the Board whether any extension of CMSS services will be needed after March 18, 2016 for the I-405 project."

## DISCUSSION

With the Crenshaw/LAX Transit Project currently in construction along the entire length of the 8.5 mile alignment, it is critical that there be no disruption in construction management oversight. The project is excavating three underground stations with concrete operations to commence soon. The project will also be constructing multiple bridges with tunneling operations commencing in 2016. Metro staff has determined the best option going forward is to keep the current CMSS contractor on board through completion of the Crenshaw/LAX Transit Project. By extending this CMSS contract, the period of performance will be extended from March 18, 2016 to June 2021 which will allow Metro to have CMSS expertise available beyond the revenue service date of October 2019, to support the close-out phase of the design-builder's contract.

In July 2015, Metro staff received Board approval for FY16 funding for six months (July 2015 through December 2015) pending the CEO's mid-year cost budgeting exercise. The recommended action allows for the continuation of funding of existing CWOs for Crenshaw/LAX Transit Corridor Project from January 2016 through June 2017. For the remaining six-months of FY16 and FY17 funding for the CMSS contract is intended to fund the existing CMSS staff currently on the project.

**STATUS OF CONVERSION OF CONSULTANT POSITIONS TO FTEs**

Metro staff received Board approval in July 2015 to solicit and hire 11 new Metro full-time equivalents (FTEs) to replace consultant positions from the CMSS contractor for the Crenshaw/LAX Transit Project and Southwestern Yard Project. As these positions were just authorized in July 2015, all these positions are currently in recruitment phase. Due to the uncertainty of the hiring of new Metro positions in a timely manner, the CMSS staffing plan includes five CMSS positions (of the 11 new Metro FTEs) for the oversight support of the Southwestern Yard Project. When a Metro staff is hired the CMSS staffing plan will be reduced accordingly to reflect a Metro staff person replacing a planned CMSS position. Metro staff will update the Board when the remaining six new Metro FTE positions have been filled.

**PROPOSED CONTRACT ENHANCEMENTS BY STANTEC**

The CMSS contractor, Stantec Consulting Services Inc., is committed to actively contributing to the community and proposes the following enhancements with an overall project cost savings of $3.2 million for the period January 2016 - June 2021:

- Increased participation by historically underutilized businesses. Stantec has achieved a 29% Disadvantage Business Enterprise (DBE) performance against a 15% (voluntary) contract goal. The 29% is comprised of Asian/Pacific, Hispanic, African American and Woman-owned businesses. Beginning in January 2016, the CMSS contractor is proposing an increase in the Minority Business Enterprise participation to 10% of new Contract work, and an increase in the DBE participation to 35%. This level of DBE participation will increase their projected total DBE participation to 32% for their entire Contract. Stantec will also continue to involve the current DBEs on the team.
-

| Stantec Classification of Firm | Current | Proposed |
|---|---|---|
| MBE Partnering | 0.0% | 10% |
| DBE Firms | 29.51% | 35% |
| All Other Firms | 70.49% | 55% |
| Total | 100% | 100% |

- Adoption of a formal mentor protégé program as part of enhanced business participation. Subject to the pre-approval by Metro, Stantec will partner with a Minority Business Enterprise (MBE) firm to develop a formal mentor protégé program to further strengthen their commitment to the success of their small business firms and on-going informal mentoring activities.
- In efforts to work with Metro to reduce program costs, Stantec is exploring additional cost efficiencies including position transfers as approved for senior to mid-level staff to grow and mentor future transit professionals; and conducting field rate reviews and instituting changes, when fair and reasonable. Such changes may help reduce individual billing rates up to 15%.

**DETERMINATION OF SAFETY IMPACT**

This Board action will not have an impact on established safety standards for Metro's Construction projects.

## FINANCIAL IMPACT

The funds for FY16 portion of $8,000,000 for these services is included in cc 8510 in projects 865512 Crenshaw/LAX Transit project and 860003 Southwestern Yard. Since this is a multi-year contract, the cost center managers and Executive Director, Engineering and Construction will be responsible for budgeting the remaining amount in FY17.

Impact to Budget

The funding for this contract extension is included in the Crenshaw/LAX Transit and Southwestern Yard life-of-project budgets. In addition to the federal and state grants, these projects utilize Proposition A 35% and Proposition C 40% which are eligible for bus and rail capital and operating use.

## ALTERNATIVES CONSIDERED

The Board may elect to discontinue using Stantec Consulting, Inc., for CMSS through FY17. Staff does not recommend this alternative as the current CMSS staff assigned to the Crenshaw/LAX Transit Project has been on board since the start of the design-build contract in September 2013 and the experience and lessons learned that have been acquired is instrumental in the successful completion of the Crenshaw/LAX Transit Project. This alternative would also seriously impact the near and long term businesses of the local, DBE firms that make up the Stantec Consulting, Inc. team's 29% DBE percentage.

## NEXT STEPS

Staff will proceed with processing only the Crenshaw/LAX Transit Project and the related Southwestern Yard Project required CWOs for the remaining six months of FY16 and the12-month FY17 Work Program funding. When new Metro FTE is hired for the Crenshaw/LAX Transit Project, Metro staff will reduce the corresponding CMSS position in the applicable CWO staffing plan.

## ATTACHMENTS

A - Procurement Summary
B - Contract Work Value Summary
C - Remaining 6-month FY16 and 12-month FY17 Work Program Funding
D - DEOD Summary

Prepared by: Charles Beauvoir, Deputy Executive Officer and Project Director,
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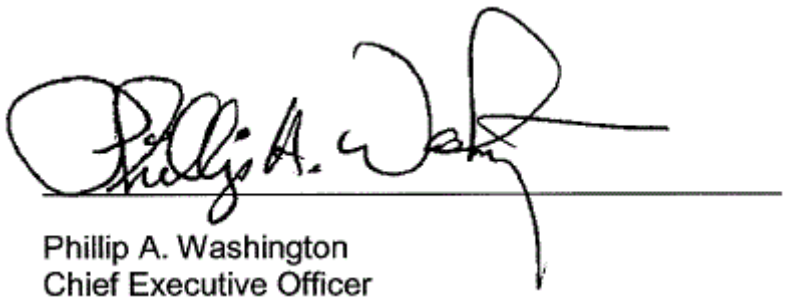

Phillip A. Washington
Chief Executive Officer

**ATTACHMENT A**

## PROCUREMENT SUMMARY

## Construction Management Support Services

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number**: MC069 | | | |
| **2.** | **Contractor**: Stantec, Inc. | | | |
| **3.** | **Mod. Work Description**: Increase Contract Value through FY17 Work Program Funding | | | |
| **4.** | **Work Description**: Construction Management Support Services | | | |
| **5.** | **The following data is current as of**: September 30, 2015 | | | |
| **6.** | **Contract Completion Status**: | | **Financial Status**: | |
| | | | | |
| | **Award Date**: | 2/19/09 | **Prior Board Approved Contract Annual Work Program Funding** | $97,412,136 |
| | **Notice to Proceed (NTP)**: | 3/18/09 | **Increased Work Program Funding for this recommended action** | $28,566,728 |
| | **Original Completion Date**: | 3/18/16 | **Total Work Program Funding including this action** | $125,978,864 |
| | **Current Est. Complete Date**: | 06/30/20 | | |
| | | | | |
| **7.** | **Contract Administrator**: Valerie Dean | | **Telephone Number**: 323-903-4123 | |
| **8.** | **Project Manager**: Charles Beauvoir | | **Telephone Number:** 323-903-4113 | |

## A. Contract Action Summary

This Board Action is to approve funding for 18-months to provide construction management support services for Crenshaw/LAX and Southwestern yard CWOs. Any contract modifications required for this work will be processed in accordance with Metro's Acquisition Policy.

In February 2009, Metro Board authorized the Chief Executive Officer to award Contract No. MC069 to Stantec Consulting, Inc., (Stantec) and execute individual Contract Work Orders (CWOs) and Modifications within the Board approved work program funding.

The recommended actions will provide funding for 18 months. The funding amount requested is calculated based on the forecasted construction management support needs of the Crenshaw/LAX and Southwestern Yard projects.

Metro staff continuously monitors Stantec's performance and cost for each CWO. Stantec provides a separate invoice for each CWO. Each invoice submitted by Stantec is reviewed by the respective project manager, contract administrator and project control manager before payment is authorized.

## B. Cost/Price Analysis

The recommended funding for the Crenshaw/LAX and Southwestern yard modifications was determined to be fair and reasonable based upon MAS audit findings and cost analysis.

**ATTACHMENT B**

# CONTRACT WORK VALUE SUMMARY

## CONSTRUCTION MANAGEMENT SUPPORT SERVICES / CONTRACT MC069

| Contract Work Order (CWO) | Description | Value | Status |
|---|---|---|---|
| | **CWOs Related to Crenshaw/LAX and Southwestern Yard** | | |
| 16 | Crenshaw/LAX Transit Corridor Project Support | $27,880,417 | Open |
| 25 | Crenshaw/LAX Transit Corridor Project Security | $40,752 | Complete |
| 27 | Southwestern Yard Project Support | $686,772 | Open |
| | | | |
| | **All Other CWOs** | | |
| 1 | Metro Orange Line Extension | $4,399,025 | Complete |
| 2 | I-405 HOV Sepulveda Pass Widening | $42,984,463 | Closes as of 3/18/16 |
| 3 | Union Division (Division 13) Contract Administration Support | $1,357,899 | Closes as of 3/18/16 |
| 4 | I-405 HOV Partnering Sessions | $244,433 | Complete |
| 5 | I-405 HOV Performance Assessment | $171,379 | Complete |
| 6 | MRL Station Canopy Support | $212,252 | Complete |
| 7 | Express Lanes Support | $7,722,319 | Complete |
| 8 | Cancelled | $0 | Cancelled |
| 9 | I-10 & I-1100 Express Toll Lanes Constructability Review | $210,170 | Complete |
| 10 | I-710 Val0ue Engineering Analysis | $33,838 | Complete |
| 11 | LA Congestion Reduction Demonstration Program- El Monte Transit Center and Patsaouras Plaza | $3,174,572 | Complete |
| 12 | Design & Imple0ment PMIS - Measure R | $1,341,932 | Complete |
| 13 | Document Control Support | $15,000 | Complete |
| 14 | Soundwall Package # 4 Support | $540,698 | Complete |
| 15 | Multiple projects Contract Administration Support | $1,006,056 | Closes as of 3/18/16 |
| 17 | Bauchet Street Storage Project Support | $25,000 | Complete |
| 18 | ATMS Upgrade Project Support | $139,430 | Complete |
| 19 | Escalator Replacement at Civic Center Support | $248,304 | Complete |
| 20 | Measure R Project Control Support | $178,065 | Complete |
| 21 | Division 20 Carwash and Cleaning Platform Support | $198,686 | Complete |
| 22 | Martin Luther King Transit Center Support | $54,801 | Complete |
| 23 | Soundwall Packages 5,6,7 & 8 Contract Administration Support | $431,679 | Complete |
| 24 | I-405 HOV Claims Support | $145,408 | Complete |
| 26 | Metro Red Line North Hollywood West Entrance Contract Administration Support | $119,187 | Complete |
| 28 | Cancelled | $0 | Cancelled |
| 29 | Patsaouras Plaza Busway Station Project | $704,566 | Closes as of 3/18/16 |
| Subtotal – CWO's issued-to-date for Crenshaw/LAX & Southwestern Yard | | $28,607941 | |
| Subtotal – CWO's issued-to-date for All Other CWOs | | $65,659,562 | |
| Subtotal – pending CWO's/Modifications | | $0 | |
| Total Approved CWO's/Modifications | | $94,267,503 | |
| Prior Board Approved Annual Work Program Funding | | $97,412,136 | |
| Increased Work Program Funding for this Recommended Action | | $28,566,728 | |
| Total Work Program Funding including this action | | $125,978,864 | |

**ATTACHMENT C**

## JANUARY 2016 TO JUNE 2017

## REMAINING 6-MONTH FY16 AND 12-MONTH FY17 WORK PROGRAM FUNDING

## CONSTRUCTION MANAGEMENT SUPPORT SERVICES

| Contract Work Order | Description | Total $'s Required for Board Action |
|---|---|---|
| 16 | Crenshaw/LAX Transit Project Support | $26,433,198 |
| 27 | Southwestern Yard | $1,301,530 |
| | Subtotal | $27,734,728 |
| | Unallocated Contingency (3%)* | $832,000 |
| | Total | $28,566,728 |

* Requesting only 3% instead of customary 10% unallocated contingency as some CMSS positions may be reduced due to hiring of replacement Metro staff over the next 18 month period.

## DEOD SUMMARY

## CONSTRUCTION MANAGEMENT SUPPORT SERVICE / MC069

### A. Small Business Participation

Stantec Consulting Services made a 17.89% Disadvantaged Business Enterprise (DBE) Anticipated Level of Participation (DALP) commitment. Current DBE participation[1] is 29.51%. Stantec is exceeding its DALP commitment. Beginning in January 2016, Stantec is proposing an increase in the Minority Business Enterprise participation to 10% of new Contract work, and an increase in the DBE participation to 35%. This increased level of DBE participation will increase their projected total DBE participation to 32% for their entire Contract.

| SMALL BUSINESS COMMITMENT | 17.89% DALP | SMALL BUSINESS PARTICIPATION | 29.51% DALP |
|---|---|---|---|

| | DBE Subcontractors | Ethnicity | % Commitment | % Participation[1] |
|---|---|---|---|---|
| 1. | Arellano Associates | Hispanic American | 0.20% | 0.29% |
| 2. | Diaz Yourman & Associates | Hispanic American | 0.03% | 0.07% |
| 3. | Kal Krishnan Consulting | Sub-continent Asian American | 12.02% | 13.42% |
| 4. | Lenax Construction Services | Caucasian Female | 2.02% | 4.69% |
| 5. | LKG-CMC | Caucasian Female | 0.99% | 1.57% |
| 6. | Safework | Caucasian Female | 2.63% | 8.50% |
| 7. | Power-Tech Engineers | Hispanic American | Added | 0.32% |
| 8. | Kevin Scott Tunnel Consultants | African American | Added | 0.65% |
| | | **Total Commitment** | **17.89%** | **29.51%** |

[1]*Current Participation = Total Actual amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

### B. Living Wage Service Contract Worker Policy

The Living Wage and Service Contract Worker Retention Policy is not applicable to this modification.

### C. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial

Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

# Board Report

**File #:** 2015-1630, **File Type:** Contract **Agenda Number:** 28.

**2nd REVISED**
**CONSTRUCTION COMMITTEE**
**NOVEMBER19, 2015**

**SUBJECT: REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT**

**ACTION: ESTABLISH A REVISED LIFE OF PROJECT BUDGET AND AUTHORIZE CONTRACT MODIFICATIONS TO CONTRACT C0980 TO MITIGATE COST AND SCHEDULE IMPACTS**

## RECOMMENDATION

A. INCREASING the **Life of Project (LOP) Budget on the Regional Connector Project** by $131.8 million, from $1,420 million to $1551.8 million;

B. INCREASING the **Regional Connector FY16 Budget by $20 million**;

C. AUTHORIZING the CEO to execute Contract Modification No. 32 to Contract C0980, Regional Connector Constructors (RCC) for additional utility work and schedule recovery measures, in an amount not-to-exceed $49,000,000, increasing the total contract price from $986,177,590 to $1,035,177,590; and

D. AUTHORIZING the CEO to execute Contract Modification No. 33 to Contract C0980, Regional Connector Constructors (RCC) for the addition of a fan plant at the wye junction, in an amount not-to-exceed $12 million, increasing the total contract price from $1,035,177,590 to $1,047,177,590. Upon Board approval of this recommendation and execution of Modification no. 33, staff will cancel Modification No. 4 $4.1 million. Therefore, the net effect of this additional work is $7.9 million.

## ISSUE

In May 2014, the Metro Board awarded the C0980 contract to RCC for $927.23 million, and established a life of project budget for the project at $1,420 million, including $92.7 million in contingency. Since contract award, several significant costs have been incurred which have eroded project contingency. Furthermore, FTA requested a project contingency analysis be performed which indicated that additional contingency is required to complete the project. The staff recommendation includes additional funding of $132 million to cover cost growth on the project and to replenish contingency. Staff intends to aggressively manage all areas of the project and to continue to reduce costs wherever possible.

On April 30, 2015, the Metro Board approved Contract Modification No. 10, to transfer the remaining utility relocation work from Contract C0981R, for a not-to-exceed amount of $27.1 million. Staff has negotiated the direct costs this work in the amount of $18.1 million. The remaining amount is associated with extended overhead associated with schedule delay. These costs are currently being audited by MASD and the audit is expected to be completed by the end of November. As a follow-up to the Board's previous authorization, this report also recommends the approval of a not-to-exceed Contract Modification of $49 million, to Contract C0980 to resolve all remaining costs associated with the additional utility work as well as schedule recovery measures, to ensure the project is completed by the FTA FFGA Revenue Service Date (RSD) of May 2021 and TIFIA. Staff is requesting approval of a not-to-exceed value at this time so that work critical to the project recovery schedule may begin by early January 2016. The recommended recovery measures must be started no later than January 4, 2016, or the Project will not be completed per the FFGA schedule agreed with FTA and TIFIA. If the FFGA schedule is not met, then as much as $587.24 million in FFGA/TIFIA funds may be at risk. Late completion will also entitle the C0980 Contractor to additional extended overhead costs of $3 million per month, as well as other Project costs, totaling approximately $5 million per month. Also, late completion of the Regional Connector may put at risk future FTA funds for other Metro projects.

This report also recommends the approval of a not-to-exceed Contract Modification of $12 million, to Contract C0980 to design and construct a fan plant at the wye junction. The addition of the fan plan resolves a long-standing project design issue to address on-going operational and fire/life safety recommendations. Upon Board approval of this recommendation and execution of the Modification no. 33, staff will cancel Modification No. 4 (Option 10 - Add Open Roof) as it will not be necessary when the fan plant is added, saving the project $4.1 million. Therefore, the net effect to this Project of this additional work is $7.9 million. Staff is requesting approval of a not-to-exceed value at this time so that work critical to the project schedule may begin in early December 2015. Overall design of the project is now 85% complete and delays in implementing the fan plant will negatively impact the overall project completion schedule and increase project costs.

There are a number of Lessons Learned arising from the content of this Board Report, many of which have already been implemented by staff and include, but are not limited to: timing of development of the final LOP in relation to the ~~Full Funding Grant Agreement process~~ project budget; additional risk assessments beyond those normally conducted; increased early utility investigations with a corresponding budget increase (additional community interface); and, close collaboration with the City of Los Angeles departments and Council to garner and receive support for granting of variances, permits and necessary street closures. These items are essential to progress and success of Metro projects.

## DISCUSSION

Project Description:
The Regional Connector Transit Corridor Project (the Project) consists of the design and construction of a 1.9-mile light rail transit subway in downtown Los Angeles which creates an underground trunk line, connecting the existing Metro Gold Line, Metro Blue Line, and Metro Exposition Line light rail transit (LRT) systems.
The Project begins at the existing 7th/Metro Station and extends north to 2nd Street and Hope Street,

turning east along 2nd street to a new underground rail junction on Alameda street. The Project will include three new underground stations at 2nd/Hope, 2nd/Broadway, and 1st/Central Avenue.

The contract currently calls for construction to be substantially complete on October 23, 2020, followed by two months of pre-revenue testing to be completed on December 23, 2020. The Revenue Service Date (RSD) required under the FFGA is May 29, 2021, which provided five months of schedule float for project completion.

Background
In February 2014, the FFGA budget of $1,402.9 million was approved for the project, including $670 million in federal New Start funds. In May 2014, the C0980 design-build construction contract was ~~approved~~ awarded for $927.23 million establishing ~~and~~ the life of project budget ~~was established~~ at $1,420 million, including $~~92.7~~ 141.7 million in project contingency. The design-build construction contract (including options) was $111 million higher than what was ~~the~~ estimated ~~construction line item~~ in the approved FFGA budget. The budget and estimate was set very early in the process with only a conceptual engineering design since Metro wanted to expedite the execution of the FFGA and secure the funding early to advance the project.

Contingency Recovery: The current project contingency is $67.5 million including allocated and unallocated contingency. A project risk assessment has been performed in accordance with FTA guidelines, which establishes contingency level recommendations for the project. The revised LOP budget in amount of $1,551.8 million contains ~~Accordingly the revised LOP budget contains the FTA recommended~~ the contingency of $114.9 million.~~, including allocated contingency of $34.6 million and $80.3 million of unallocated contingency (FFGA and Non-FFGA).~~ This will increase the current project ~~percentage~~ contingency from ~~4.8~~7.1% to ~~7.4~~10.7% of remaining project budget that is within FTA guidelines.

Since the inception of the contract, additional work scope has been identified requiring the issuance of contract modifications to the design-builder. Additionally, there has been a corresponding increase in associated support costs which collectively have eroded contingency levels on the project. A summary of 1) design-build contract costs, and 2) associated project support costs is provided below. A detailed discussion of each major project cost element is provided in Attachment D.

Since the award of the Design-Build contract (C0980), the following three significant events have occurred which have increased, or will potentially increase, the contract cost.

1.0 Design Build Contract Costs

A. Selection of Design Options: During the Best and Final Offer negotiations with the Design-Builder, a number of project elements were identified as possible options and were added to the contract as potential cost saving measures. The intent was that after award, the Design-Builder would have time to fully investigate these elements and to determine if they were necessary, potentially reducing costs to within the available budget. A total of 21 options totaling $58.7 million were added to the contract. After award, nine options were exercised, which added $35.7 million to the contract. By not exercising the remaining 12 options, the project was able to reduce potential costs by $21 million, along with a

corresponding drawdown from contingency.

B. AUR Transfer: Due to continuous and multiple unforeseen conditions and schedule delays, the AUR (Advanced Utility Relocation) contract (C0981R) was terminated for convenience and the Board approved transferring the balance of this utility work to the C0980 contract in April 2015, at a cost to the project of $27.1 million. Since transferring this work to C0980, significant additional discoveries have occurred, including the discovery that electrical utilities, which were originally anticipated to be suspended under the deck, could not be temporarily supported for safety reasons, and which now all must be relocated in advance of construction. This and other unforeseen discoveries have added additional scope, costs and schedule impacts to the project. These additional scope, costs and schedule impacts are addressed in Item C (Schedule Delay Mitigation) below.

C. Schedule Delay Mitigation: With the transfer the AUR work, the Board action recognized that the project schedule would be impacted by six months, based on the best information available at that time. As mentioned above, the additional work required as a result of the additional utility discoveries have extended the project schedule by a minimum of 2 and potentially 4 additional months, for a total impact of 8 to 10 months to contract C0980. These delays need to be recovered to meet the FFGA RSD of May 29, 2021. Staff has aggressively analyzed multiple schedule recovery scenarios and has worked collaboratively with the Design-Builder over the last several months to jointly develop a schedule recovery plan to meet FFGA schedule. A significant contributor to the LOP budget request is the estimated not-to-exceed amount of $49 million associated with performing additional utility work required, as well as accelerating construction to meet the FFGA schedule. Without proactive measures to recover lost schedule, the contractor has the contractual right to submit a request for extended overhead costs for the actual utility caused delay. With 8 to 10 months of project delay, the potential cost to the project if mitigation measures are not adopted, ranges between $49 and $59 million. The incremental net cost to Metro for accelerating construction for an on-time completion is estimated at up to $10 million. With the continued support of the City, the recovery strategy is scheduled to begin in early January 2016, subject to Board approval.

2. Associated Project Support Costs:

Additional support services costs are included in the project budget. These costs include: Third Party Work, Right-of-Way Acquisition, P3010 Light Rail Vehicles, Professional Services, Other Support Costs, and Environmental Planning. A detailed discussion of each of these project cost elements is provided in Attachment D.

## DETERMINATION OF SAFETY IMPACT

This Board action will not have any negative impact on established safety standards.

## FINANCIAL IMPACT

The funding increase of $131.8 million will be included in the Life-of-Project budget under Project 860228 (Regional Connector Transit Corridor), in Cost Center 8510 (Construction Project Management). The FY16 Budget will be increased by $20 million.

Since this is a multi-year capital project, the Executive Director of Program Management and the Project Manager will be responsible for budgeting costs for future years.

Impact to Budget

As discussed in Attachment F, the analysis required by the Uniform Cost Management Process and Policy for Measure R projects, the increase to the Life of Project budget for this project presents a special challenge in that the Metro Reform and Accountability Act of 1998 made underground work ineligible for Propositions A and C. In addition, the Regional Connector LOP already includes its full complement of Measure R funding, $160 million. This leaves very few alternatives for addressing the LOP increase. To address the funding eligibility challenges, we recommend the funding transfers shown in Table 2, Strategy to Address Regional Connector Funding Gap in Attachment F.

The recommended transfers keep the LOP of project budgets whole for the projects already under construction. In June of 2015, we reported to the Metro Board of Directors that a shortfall exists in the SRTP forecast. At that time, the shortfall was still manageable, but we identified the risk of changing circumstances, such as rising costs and the possibility of a recession. Next spring, we will be updating the SRTP forecast and returning to the Metro Board of Directors with a recommendation for addressing this continuing problem.

## ALTERNATIVES CONSIDERED

The Board may decline to approve recommended actions A and B. This is not recommended as not approving the LOP budget adjustment and funding under recommendations A and B, would have a significant impact on the Agency's ability to deliver the project with the current total ~~unallocated~~ contingency of ~~2.2~~7.1% ($67.5~~30~~ million). The Board may also decline to approve recommendation C. This is also not recommended as not approving the additional utility work and adoption of schedule recover measures means that work required to complete the project could not be performed, and that the Project would not be completed per the FFGA schedule agreed with FTA and TIFIA. This puts at risks the receipt of future FTA funds for other Metro projects. This late completion also entitles the C0980 Contractor to additional extended overhead costs as well as additional Project costs totaling approximately $5 million per month.

## NEXT STEPS

Under the terms of the Design-Build contract and as part of risk sharing, Metro and the Design-Build Contractor have respective responsibilities for applying for, and obtaining, the necessary City permits, variances and approvals under the terms of the base contract. In this regard, Staff anticipates working closely with City staff and the Council representative to obtain all necessary permits, variances, and approvals to expedite the project schedule so that Metro meets its commitment to FTA.

At this time, the project is approximately 20% complete. By FY18, Staff anticipates the project will be over 50% complete (design will be complete, and tunneling and excavation for stations will be substantially complete). In the intervening period, Staff will undertake a formal risk assessment with FTA. The results of this risk assessment will be shared with the Board, along with a recommendation for the appropriate Board action in FY18, which could include a request for additional funding resources.

## ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - DEOD Summary
Attachment C - Contract Modification Authority (CMA) Summary
Attachment D - Project Cost Summary by Element and LOP Variance
Attachment E - Funding/Expenditure Plan
Attachment F - Uniform Cost Management Process and Policy Analysis
Attachment G- Regional Connector Presentation

Prepared by:
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Phillip A. Washington
Chief Executive Officer

**ATTACHMENT A**

## PROCUREMENT SUMMARY

## REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT / CONTRACT NO. C0980

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number**: C0980 | | | |
| **2.** | **Contractor**: Regional Connector Constructors, J.V. | | | |
| **3.** | **Mod. Work Description**: Additional Utility Work and Schedule Recovery Measures | | | |
| **4.** | **Contract Work Description**: Regional Connector Transit Corridor Project | | | |
| **5.** | **The following data is current as of**: October 13, 2015 | | | |
| **6.** | **Contract Completion Status**: | | | |
| | | | | |
| | **Bids/Proposals Opened**: | 4 | **% Completion $**: | 25.89% |
| | **Contract Awarded**: | 05/06/14 | **% Completion time**: | 18.35% |
| | **NTP**: | 07/07/14 | **Original Contract Days**: | 2,430 |
| | **Original Complete Date**: | 03/04/21 | **Change Order Days**: | 0 |
| | **Current Est. Complete Date**: | 03/04/21 | **Suspended Days:** | 0 |
| | | | **Total Revised Days**: | 2,430 |
| **7.** | **Financial Status**: | | | |
| | **Contract Award**: | | **$927,226,995** | |
| | **Total Contract Modifications Approved**: | | **$ 58,950,595** | |
| | **Current Contract Value**: | | **$986,177,590** | |
| | | | | |
| | **Contract Administrator**: Susan Santoro | | **Telephone Number**: 213-922-4974 | |
| **8.** | **Project Manager**: Girish Roy, P.E. Deputy Executive Officer, Project Management | | **Telephone Number**: 213-893-7119 | |

## A. Contract Action Summary

This Board Action is to approve the authorization of the CEO to execute two Contract Modifications. Contract Modification No. 32 is to implement additional utility work and schedule recovery measures throughout the project to complete all utility work required and mitigate project delay. Contract Modification No. 33 is to add the Alameda Wye Fan Plant.

These contract modifications will be processed in accordance with Metro's Acquisition Policy and the contract type is a Firm Fixed Price.

On May 6, 2014, Contract No. C0980 was awarded to Regional Connector Constructors (RCC), a Joint Venture between Skanska USA Civil West California District, Inc., and Traylor Bros. Inc., the responsive and responsible proposer determined to provide Metro with the best value, in the amount of $927,226,995 for the final design and construction of the Regional Connector Transit corridor project. The period of performance for this contract is 2,430 calendar days.

On April 30, 2015, the Metro Board approved Contract Modification No. 10, to transfer the remaining utility relocation work from Contract C0981R, for a not-to-exceed amount of $27.1 million. Staff has negotiated the direct costs for this work in the amount of $18.1 million. The remaining amount is associated with extended overhead associated with schedule delay. These costs are currently being audited by MASD and the audit is expected to be completed by the end of November. Contract Modification No. 32 is to resolve all remaining costs associated with the additional utility work as well as schedule recovery measures, to ensure the project is completed by the FTA FFGA Revenue Service Date (RSD) of May 2021 and TIFIA. Staff is requesting approval of a not-to-exceed value at this time so that work critical to the project may begin by early January 2016.

Contract Modification No. 33 is to add a fan plant at the wye junction. Metro staff is requesting approval of a not-to-exceed amount for this work to allow the necessary design to be initiated as soon as negotiations are completed, so that any potential delays to the project schedule are minimized and so that the necessary real estate acquisition may begin.

## B. Cost/Price Analysis

The final price for the contract changes will be reviewed and analyzed by Metro staff and determined to be fair and reasonable in accordance with Metro Procurement Policies and Procedures. The negotiation process will include, but not be limited to, clarification, fact-finding, technical analysis, cost analysis and discussions. Metro staff will complete an independent cost estimate prior to initiating negotiations with RCC. The recommended price will be audited by MASD and subject to removal of any unallowable or unallocable costs.

| Item No. | Changes | Proposal amount | Metro ICE | Negotiated or NTE amount |
|---|---|---|---|---|
| 1. | Mod 32 Schedule Recovery Measures | TBD | TBD | $49 million |
| 2. | Mod 33 Alameda Wye Fan Plant | TBD | TBD | $12 million |

## DEOD SUMMARY

## REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT / CONTRACT NO. C0980

### A(1) Small Business Participation - Design

Regional Connector Constructors (RCC) made a 22.63% Race Conscious (RC) Disadvantaged Business Enterprise (DBE) commitment for Design. At the time of contract award, RCC listed seven (7) DBE subcontractors for Design, and five (5) additional DBE subcontractors have been added to date. Current DBE participation[1] is 16.29%, a shortfall of 6.34%. Design is 79% complete. RCC was contacted to address their current participation and indicated that the project's Lead Designer, Hatch Mott MacDonald (HMM), has identified additional scopes of work and executed contract awards that are expected to increase participation as Design continues. RCC is working closely with HMM to refine their projection as to the final total amounts for Design, and expects the 22.63% commitment to be met or exceeded by HMM's continuing DBE subcontractor commitments.

| DISADVANTAGED BUSINESS ENTERPRISE COMMITMENT | 22.63% DBE | DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION | 16.29% DBE |
|---|---|---|---|

| | DBE Subcontractors | Ethnicity | % Commitment | Current Participation[1] |
|---|---|---|---|---|
| 1 | Abratique & Associates, Inc. | Asian Pacific American | 0.74% | 0.47% |
| 2 | Anil Verma Associates, Inc. | Sub Asian American | 0.52% | 0.64% |
| 3 | Armand Consulting, Inc. | Sub Asian American | 1.86% | 1.17% |
| 4 | D'Leon Consulting Engineers | Hispanic American | 1.44% | 1.29% |

| | | | | |
|---|---|---|---|---|
| 5 | MARRS Services, Inc. | Asian Pacific American | 1.61% | 1.97% |
| 6 | McLean & Schultz | Hispanic American | 3.07% | 2.48% |
| 7 | Transmetrics | Hispanic American | 2.46% | 0.94% |
| 8 | Earth Mechanics* | Asian Pacific American | 3.27% | 0.48% |
| 9 | Electrical Building Systems* | Hispanic American | 2.53% | 1.59% |
| 10 | PacRim Engineering* | Asian Pacific American | 1.26% | 1.99% |
| 11 | V&A* | Hispanic American | 3.20% | 2.91% |
| 12 | Parthenon Corporation (formerly Romjean* | African American | 0.67% | 0.36% |
| | | **Total** | **22.63%** | **16.29%** |

[1]*Current Participation = Total Actual Amount Paid-to-Date to DBEs ÷Total Actual Amount Paid-to-date to Prime.*

* *DBEs added after contract award*

## A(2) Small Business Participation - Construction

RCC made an 18.00% DBE commitment for Construction at the time of contract award, listing one (1) known DBE subcontractor and identifying DBE scopes of work. After the start of Construction, 29 DBE subcontractors have been added to date. RCC is currently achieving 0.43% of their proposed 18% DBE subcontract commitment for Construction. Construction is currently 9% complete. It is expected that DBE commitments will continue to increase as Design is completed and Construction work is bid out. Based on the total amount paid-to-date to RCC and the total actual amount paid-to-date to subcontractors, current DBE participation is 6.96%. RCC is expected to continue ongoing outreach and good faith efforts to meet their DBE contract commitment.

| DISADVANTAGED BUSINESS ENTERPRISE COMMITMENT | 18.00% DBE | DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION | 6.96% DBE |
|---|---|---|---|

| | DBE Subcontractors | Ethnicity | % Commitment | Current Participation[1] |
|---|---|---|---|---|
| 1 | TSG Enterprises, Inc. (Solis) | Hispanic American | 0.04% | 0.21% |
| 2 | Abratique & Atienza, Inc.* | Asian–Pacific American | 0.05% | 0.72% |
| 3 | Absolute Security International* | Asian–Pacific American | 0.00% | 0.10% |
| 4 | Ace Fence* | African American | 0.01% | 0.00% |
| 5 | Alameda Construction* | African American | 0.01% | 0.05% |
| 6 | Angela Liu Consulting* | African American | 0.00% | 0.00% |

| | | | | |
|---|---|---|---|---|
| 7 | Anytime Dumping* | African American | 0.01% | 0.00% |
| 8 | Aragon Construction* | African American | 0.01% | 0.00% |
| 9 | C G O Construction Company* | African American | 0.01% | 0.51% |
| 10 | C2PM* | Asian–Pacific American | 0.00% | 0.00% |
| 11 | Clean Street Sweeping, Inc.* | Hispanic American | 0.01% | 0.03% |
| 12 | Clean Up America, Inc.* | African American | 0.08% | 0.15% |
| 13 | Davis Blue Print, Co., Inc.* | Hispanic American | 0.00% | 0.03% |
| 14 | E.W. Moon, Inc. | African American* | 0.00% | 0.37% |
| 15 | Empire Steel, Inc. | Asian-Pacific American* | 0.01% | 0.00% |
| 16 | E-Nor Innovations, Inc. (Supplier) | African American* | 0.02% | 0.87% |
| 17 | E-Nor Innovations, Inc. (Sub) | African American* | 0.00% | 0.18% |
| 18 | EW Corporation | Hispanic American* | 0.06% | 0.37% |
| 19 | G & C Equipment Corporation | African American* | 0.05% | 0.15% |
| 20 | G & F Concrete Cutting, Inc. | Hispanic American* | 0.01% | 0.35% |
| 21 | Invictus Enviromental Safety Solutions | African American* | 0.00% | 0.01% |

| | | | | |
|---|---|---|---|---|
| 22 | Morgner Technology Management | Hispanic American* | 0.01% | 2.47% |
| 23 | PTS Surveying, Inc. | Native American* | 0.00% | 0.00% |
| 24 | Soteria Company, LLC | Hispanic American* | 0.01% | 0.05% |
| 25 | Supreme Wholesale Electric, Inc. | African American* | 0.01% | 0.31% |
| 26 | The Jungle Nursery | African American* | 0.01% | 0.00% |
| 27 | The Mop Crew | African American* | 0.01% | 0.00% |
| 28 | Treesmith Enterprises, Inc. | Hispanic American* | 0.00% | 0.00% |
| 29 | Ultimate Maintenance Services* | Hispanic American* | 0.00% | 0.00% |
| 30 | Young Communications | African American* | 0.00% | 0.03% |
| | | **Total** | **0.43%** | **6.96%** |

[1]*Current Participation = Total Actual Amount Paid-to-Date to DBEs ÷Total Actual Amount Paid-to-date to Prime.*
* *DBEs added after contract award*

## B. Project Labor Agreement / Construction Careers Policy (PLA/CCP)

The Contractor has committed to complying with PLA/CCP requirements for this project. This project is 1.72% complete (based on total construction labor hours expended/total estimated construction labor hours in the approved employment hiring plan) and the contractor is achieving the 40% Targeted Worker Goal at 58.84%, not achieving the 20% Apprentice Worker Goal at 15.01%, and achieving the 10% Disadvantaged Worker Goal at 12.64%. The contractor is still in the design-phase with limited construction activity, and is on schedule with their employment hiring plan. Staff will continue to monitor and report the contractor's progress toward meeting the goals of the PLA/CCP.

## C. Living Wage Service Contract Worker Policy

The Living Wage and Service Contract Worker Retention Policy is not applicable to this modification.

## D. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

## ATTACHMENT C

## CONTRACT MODIFICATION/CHANGE LOG
## REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT / CONTRACT NO. C0980

| Mod. No. | Description | Status | Cost |
|---|---|---|---|
| CO 001 | TIFIA Certification Requirements | Approved | 0 |
| CO 002 | Revision to SP-01 DBE Reporting | Approved | 0 |
| CO 003 | Advanced Utility Relocation Transfer from C0981R | Approved | 18,140,287* |
| 2 | Opt.3 – 2nd/Hope Upper Level Entr. & Ped. Bridge | Approved | 3,320,000 |
| 3 | Opt. RCC-1 2nd/Broadway SEM | Approved | 16,000,000 |
| 4 | Option No. 10 Add Open Roof | Approved | 4,100,000 |
| 5 | Option No. 11 Add Ventilation Under Duct | Approved | 2,150,000 |
| 6 | Option No. 12 Change Basis of Design | Approved | 8,000,000 |
| 7 | Opt. RCC-2 Add Deep Foundations at 2nd/Broadway | Approved | 1,250,000 |
| 8 | Opt. RCC-5 2nd/Broadway Decking | Approved | 100,000 |
| 9 | Opt. RCC-3 Glazing at Portal Canopies | Approved | 500,000 |
| 10 | See CO 003 | Pending | TBD |
| 11 | Rail Car Transporter | Approved | 991,749 |
| 12 | Little Tokyo Station Second Entrance Design | Approved | 150,528 |
| 13 | Shoofly Temp. Communications Design | Approved | 26,880 |
| 14 | Add'l Site Investigation at Volk Property | Approved | 16,606 |
| 15 | Hazardous Mat'l. Abatement at Volk Property | Approved | 13,115 |
| 16 | Wye Realignment Study | Approved | 11,123 |
| 17 | Lead-Contaminated Soil Removal at Volk Property | Approved | 377,237 |
| 18 | Revise SOE at 1st/Central Station | Approved | 595,560 |
| 19 | Lead-Contaminated Soil Removal at Volk Property Ph. 2 | Approved | 131,822 |
| 20 | Opt. RCC-8 Revert to Tunnel Lighting | Approved | 340,000 |
| 21 | 1st/Alameda Bump-outs & Widening Design | Approved | 626,287 |
| 22 | Extra Utility Relocation Mobilization | Approved | 999,971 |
| 23 | Deputy Grading Inspector at TBM Launch Pit | Approved | 165,424 |
| 24 | Deletion of Easements at Stavrum Property | Approved | 0 |
| 25 | Tactile Guidance Strips in Stations Design | Approved | 209,637 |
| 26 | Admin. Change to Conformed Contract | Pending | 0 |
| 27 | Modify Tunnel Liners @ JVP Design Only | Approved | 41,209 |
| 28 | Brick Structure at Shoofly Ductbank and Rose Street | Approved | 102,900 |
| 29 | Little Tokyo Station Second Entrance and Shoofly Temp. | Approved | 552,520 |
| 30 | Relocate Tree No. 37 (Cherry Tree) | Approved | 10,540 |
| 31 | Rail Car Transporter Trailer Modifications | Approved | 27,200 |
| 32 | Schedule Recovery Measures | Recommended | 49,000,000 |
| 33 | Alameda Wye Fan Plant | Recommended | 12,000,000 |
| | **Subtotal – Approved Modifications** | | **$58,950,595** |
| | **Subtotal – Recommended Changes/Modifications** | | **$61,000,000** |
| | **Total Approved Mods and Recommended Changes (including this change)** | | **$119,958,595** |
| | **Prior CMA Authorized by the Board (including base award & other mods)** | | **$123,142,700** |
| | **Increased CMA for this recommended action** | | **$0** |
| | **Remaining CMA for Future Changes** | | **$55,232,392** |

*Partial amount, remainder to be determined.

**ATTACHMENT D**

**REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT**
Project Cost Summary by Element and LOP Variance

In May 2014, the Board awarded the design-build contract for the C0980 Regional Connector project to RCC for $927.23 million and established the life of project (LOP) budget at $1,420 million.

Since that date, a number of additional costs have been incurred which have eroded the contingency levels on the project. A summary of these items is provided in Table 1 together with accompanying justification.

**Table 1: Summary LOP Budget Adjustment**

| **Project Budget Summary** | | | | |
|---|---|---|---|---|
| Cost Element | | Original | Forecast | Change |
| **1.0 DESIGN-BUILD CONTRACT (C0980)** | | | | |
| **1.1** | C0980 Design Build Contract | 927,227 | 1,024,849 | 97,619 |
| | | | | |
| **2.0 PROJECT SUPPORT COSTS** | | | | |
| **2.1** | 3rd Party, City of LA and Other Agency | 28,413 | 52,331 | 23,918 |
| **2.2** | Right of Way Acquisition | 74,208 | 82,704 | 8,495 |
| **2.3** | P3010 Light Rail Vehicles | 16,275 | 16,275 | 0 |
| **2.4** | Professional Services | 176,183 | 184,540 | 8,357 |
| **2.5** | Other (Environmental, Community Outreach, Art etc.) | 20,975 | 27,828 | 6,852 |
| **2.6** | Environmental Planning | 24,200 | 26,250 | 2,050 |
| **2.7** | C0981R AUR Contract | 25,643 | 22,170 | (3,473) |
| **2.8** | C0980 Contingency | | | |
| | Allocated Contingency | 0 | 34,573 | 34,573 |
| | Un-allocated Contingency | 126,892 | 80,325 | (46,567) |
| | Total | 1,420,016 | 1,551,841 | 131,824 |

1. **Design-Build Contract (C0980):** Since the award of the Design-build contract the following three significant events have occurred which have increased or will potentially increase the contract cost and which have eroded the project contingency levels.

    a. Selection of Options: During the procurement phase, several design elements were identified as possible options to the contract in an effort to reduce costs to within available budget. During the BAFO process, nine of these options were exercised resulting in an approximate $35.8 million increase in the contract value, Option 12 is expected to have a credit of $6 million. The selected options listed in Table 2.

**Table 2: Options Exercised**

| Option | Options Exercised | Amount ($1000s) |
|---|---|---|
| 3 | 2nd Hope Street Station, Upper Elevator entrance and pedestrian | 3,320 |

| | | |
|---|---|---|
| | bridge | |
| 10 | Add open roof over Alameda crossover | 4,100 |
| 11 | Add ventilation under duct at 2nd/Broadway Station crossover | 2,150 |
| 12 | Change basis of design to super fast growth rate/arson fire | 8,000 |
| RCC-1 | Add 2nd/Broadway SEM Cavern and Crossover, Complete | 16,000 |
| RCC-2 | Add deep foundations for 2nd/Broadway ancillary box for Future Overbuild | 1,250 |
| RCC-3 | Utilize Glazing Supported by spiders at portal canopies | 500 |
| RCC-5 | 2nd/Broadway decking required to be installed during weekend closures in lieu of full street closure for period of 1 month | 100 |
| RCC-8 | Revert to 25 feet spacing of tunnel lighting. | 340 |
| | Subtotal | 35,760 |
| | Credit Adjustments for option 12 | (6,000) |
| | Total | 29,760 |

b. Transfer of Incomplete Utility Work: In January 2014, Metro awarded a contract for the advance utility relocations (AUR) of water, sewer and electrical power lines to allow for the cut and cover construction of the project's stations, guideways and portals. During the performance of this work, the AUR contractor encountered a significant number of unknown and abandoned utilities and structures that were either not shown or shown incorrectly on the current as-built drawings. As a result, the utility construction progress and schedule was impacted, to the extent that the AUR utility work was beginning to significantly impact construction work of the C0980 Design-Build Contractor. Based on the rate of progress, it was anticipated that the AUR contractor would have needed another 10 to 12 months to complete the work. In consideration of this and for the convenience of both parties, the AUR contract was terminated and the balance of work was transferred to the Regional Connector (C0980) contract by Board action in April 2015 at a cost to the project of $27.1 million, paid through project contingency.

Since assuming this work, the design-build contractor has made significant additional discoveries involving electrical utilities which could not be temporarily supported from the temporary station deck structure as was anticipated. Potholing revealed that the age and conditions of these facilities make it unsafe to excavate and LADWP now requires that new facilities be installed before the existing services are removed from service. As this work needs to be completed prior to beginning station box construction at 2nd/Broadway, the project has incurred additional costs and time delay for design and construction.

c. Schedule Delay Mitigation**:** With the Board action to transfer the balance of the AUR work to the C0980 contract, it was acknowledged that the Regional Connector project's baseline schedule would be impacted by approximately six months, based on the information available at that time. Subsequently, it was discovered that certain electrical utilities could not be temporarily supported as anticipated for safety reasons, due to their deteriorated

condition, and had to be relocated in advance of construction. These discoveries have greatly impacted cost and extended the schedule. In total, the contract C0980 contract schedule has been impacted by approximately 8 to 10 months, or 2 to 4 months past the FFGA Revenue Service Date (RSD) after utilizing all available schedule float. Mitigation of these delays is required to complete the project by the FFGA RSD date of May 29, 2021.

Working together with the design-build contractor, Metro staff have aggressively analyzed multiple schedule recovery scenarios and jointly developed a three part strategy which offers the best opportunity to complete the project by the FFGA RSD. The proposed recovery strategy involves re-sequencing, modifying and accelerating elements of the contract work.

The proposed recovery strategy consists of three elements with the objective of launching the TBM from the Mangrove site earlier than currently possible under the impacted schedule. For the schedule recovery to be successful, implementation of the first recovery measure is scheduled to begin by January 2016, subject to Board approval. The second and third elements of the recovery strategy will be implemented in August and September of 2016 respectively, and consist of re-sequencing major work activities. In addition to recovering the schedule, staff believes that the proposed recovery plan helps mitigates many of the potential risks still associated with critical activities ~~within the City~~.

The preliminary cost proposal from the contractor to complete the additional utility work and implement the recovery strategy to complete the project by the FFGA RSD is $49 million. In order for staff to finalize the costs for each of the recovery measures, the contractor must redesign portions of the work and prepare detailed estimates and schedules for negotiation. Due to the time required to complete these tasks and to preserve the opportunity to complete on time by beginning accelerated construction work in January 2016, staff is seeking authorization to issue a contract modification to the design-build contractor, for an amount not-to-exceed $49,000,000. It is Staff's intent to fully negotiate all costs prior to issuing a Modification for these recovery efforts to the contractor. Funding for this change is contained within the life of project budget authorization requested by this report.

If a recovery strategy is not implemented, the contractor has the contractual right to submit a request for extended overhead costs for the actual delay. With 8 to 10 months of project delay, the potential cost to the project ranges between $49 and $59 million, including extended agency and consultant oversight costs. The incremental net cost to Metro for re-sequencing and accelerating construction for an on-time completion is therefore estimated to be up to $10 million.

This report also recommends the approval of a not-to-exceed Contract Modification of $12 million, to Contract C0980 to design and construct a fan plant at the wye junction. The addition of the fan plan resolves a long-standing project design issue to address on-going operational and fire/life safety recommendations. Upon Board approval of this recommendation and execution of the Modification no. 33, staff will cancel Modification No. 4 (Option 10 – Add Open Roof) as it will not be necessary when the fan plant is added, saving the project $4.1 million. Therefore, the net effect to this Project of this additional work is $7.9 million, which will be offset by using unallocated contingency. Staff is requesting approval of a not-to-exceed value at this time so that work critical to the project schedule may begin in early December 2015. Overall design of the project is now 85% complete and delays in implementing the fan plant will negatively impact the overall project completion schedule and increase project costs. Additionally, immediate implementation of the fan plant design is required so that the necessary real estate acquisition may begin.

**2. Project Support Costs:** The following is a description of the budget status of the various project support services on the project.

2.1 Third Party Work: Third party activities include primarily private utility relocations and task order costs for the various City agencies under Master Cooperative Agreements. The overall cost for 3rd Party services has risen from a budgeted amount of $28 million to a projected $55 million. Of this $27 million overrun, approximately $19 million is attributed to private utility relocation costs. Due to the need to redesign and replace a substantial portion of the LADWP electrical infrastructure along 2nd street between Spring and Broadway, the utility relocation expense has risen significantly.

| | Third Party Cost Element | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Private Utilities (includes LADWP) | 11,413 | 30,231 | 18,818 |
| | Private Utilities Contingency | | 3,000 | 3,000 |
| 2 | MCA's (City of Los Angeles and other Agencies) | 17,000 | 17,000 | 0 |
| 3 | Other Misc. Costs | 0 | 5,100 | 5,100 |
| | Total | 28,413 | 55,331 | 26,918 |

2.2 Right of Way Acquisition: Right of way acquisition costs on the project are projected to increase by $8.5 million.

| | ROW Cost Element | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Japanese Village | 7,340 | 21,480 | 14,140 |
| 2 | Robert Volk | 13,661 | 20,760 | 7,099 |
| 3 | Veolia Energy | 21,659 | 22,196 | 537 |
| 4 | L.A. Times | 10,941 | 73 | (10,868) |
| 5 | Others Properties | 20,608 | 18,195 | (2,413) |
| | Total | 74,208 | 82,704 | 8,495 |

2.3 P3010 Light Rail Vehicles: Budget allocation for the purchase of vehicles for the project – no change.

2.4 Professional Services: Professional services required to support the project consist of agency management and administrative support, community relations staff, engineering management support, construction management services, Metro operational support, and advisory and audit functions. Collectively, these costs are projected to increase from $176.2 million to $184.5 million. Staff is actively managing these services to contain costs growth through the remainder of the project.

| | Professional Services Cost Element | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Agency (Metro Support Staff) | 54,542 | 54,542 | 0 |
| 2 | Others (TAP, Auditing, QA Labor Compliance & Legal) | 12,833 | 13,963 | 1,130 |
| 3 | Community Relations & Storefront Lease | 2,759 | 3,559 | 800 |
| 4 | Engineering Management | 58,168 | 64,595 | 6,427 |
| 5 | Construction Management Services | 41,857 | 41,857 | 0 |
| 6 | Metro Operations | 6,024 | 6,024 | 0 |
| | Total | 176,183 | 184,540 | 8,357 |

1.5 Other Support Costs: Cost growth of approximately $6.9 million has also been experienced in environmental planning and mitigation, public art, the universal fare system and central control expansion.

| | Other Support Costs | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Environmental | 2,480 | 8,030 | 5,550 |
| 2 | Art Program | 398 | 1,300 | 902 |
| 3 | Central Control | 2,369 | 2,369 | 0 |
| 4 | Universal Fare System | 8,214 | 8,214 | 0 |
| 5 | Misc. Printing, Community Outreach, IPMO office etc. | 7,515 | 7,915 | 400 |
| | Total | 20,976 | 27,828 | 6,852 |

2.6 Environmental Planning: Environmental planning costs have increased $2.3 million.

| | Environmental Planning Cost Element | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Environmental Planning | 24,200 | 26,250 | 2,050 |
| | Contingency | | 250 | 250 |
| | Total | 24,200 | 26,500 | 2,300 |

2.7 AUR Contract C0981R: As stated above, the Advance Utilities Contract was terminated for convenience. A settlement of for all outstanding costs has been reached which is $3.5 million below the original contract value. These savings will be allocated back to the project budget.

2.8 Contingency Recovery: A project risk assessment has been performed in accordance with FTA guidelines, which establishes contingency level recommendations for the project. Accordingly the revised LOP budget

contains the recommended allocated contingency of $34.6 million, including $80.3 million of unallocated contingency (FFGA and Non-FFGA)

| | C0980 Contingency Allocation | Original | Forecast | Change |
|---|---|---|---|---|
| 1 | Allocated Contingency | 0 | 34,573 | 34,573 |
| 2 | Unallocated Contingency | 126,892 | 80,325 | (46,567) |
| | Total | 126,892 | 114,898 | (11,994) |

## REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT

## ATTACHMENT E

## FUNDING/EXPENDITURE PLAN

## (Dollars in Millions)

| Capital Project 860228 | Prior | FY16 | FY17 | FY18 | FY19 | FY20 | FY21 | FY22 | Total | % of Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Uses of Funds** | | | | | | | | | | |
| Construction | 220.17 | 138.39 | 184.57 | 122.36 | 149.94 | 227.07 | 62.12 | 19.70 | **1,124.31** | 72.5% |
| Right-of-Way | 26.12 | 43.70 | 8.89 | 4.00 | 0.00 | 0.00 | 0.00 | 0.00 | **82.70** | 5.3% |
| Vehicles | 0.00 | 2.00 | 2.64 | 5.06 | 6.06 | 0.51 | 0.00 | 0.00 | **16.28** | 1.0% |
| Prof. Services | 143.07 | 50.05 | 22.27 | 18.18 | 16.92 | 12.04 | 3.16 | 0.00 | **265.69** | 17.1% |
| Project Contingency | 0.00 | 13.59 | 1.06 | 7.00 | 7.00 | 7.00 | 0.71 | 0.00 | **36.36** | 2.3% |
| Subtotal Project | 389.35 | 247.72 | 219.43 | 156.60 | 179.93 | 246.62 | 65.99 | 19.70 | **1,525.34** | 98.3% |
| Environmental/Planning | 24.63 | 0.57 | 1.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **26.50** | 1.7% |
| **Total Project Cost** | **413.99** | **248.29** | **220.73** | **156.60** | **179.93** | **246.62** | **65.99** | **19.70** | **1,551.84** | **100.0%** |
| **Original Project Cost** | **372.54** | **273.14** | **255.83** | **242.36** | **222.47** | **38.32** | **15.34** | **0.00** | **1,420.02** | |
| **Variance** | **41.44** | **-24.85** | **-35.11** | **-85.76** | **-42.54** | **208.30** | **50.65** | **19.70** | **131.82** | |
| **Sources of Funds** | | | | | | | | | | |
| Federal 5309 New Starts | 82.04 | 115.03 | 100.00 | 96.29 | 93.08 | 136.26 | 47.20 | 0.00 | 669.90 | 43.2% |
| Measure R 35% (TIFIA Loan Proceeds) | 0.00 | 61.86 | 21.09 | 26.16 | 25.91 | 6.86 | 18.11 | 0.00 | 160.00 | 10.3% |
| Lease Revenues | 0.00 | 0.00 | 0.00 | 6.01 | 27.84 | 30.40 | 0.00 | 0.00 | 64.25 | 4.1% |
| Repaymnt of Cap Proj Loans (1) | 98.92 | 4.68 | 48.65 | 8.96 | 33.10 | -38.78 | -2.87 | 0.00 | 152.67 | 9.8% |
| TDA | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.0% |
| STIP Regional Improvement Program | 2.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.59 | 0.2% |
| City of Los Angeles contribution | 0.00 | 5.00 | 7.00 | 6.00 | 0.00 | 23.98 | 0.00 | 0.00 | 41.98 | 2.7% |
| High Speed Rail Bonds | 114.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 114.87 | 7.4% |
| Prop 1B PTMISEA | 92.16 | 20.86 | 8.90 | 13.18 | 0.00 | 0.00 | 0.00 | 0.00 | 135.10 | 8.7% |
| CMAQ | 23.15 | 40.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 64.00 | 4.1% |
| RIP | 0.00 | 0.00 | 14.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14.40 | 0.9% |
| Repaymnt of Cap Proj Loans (2) | 0.00 | 0.00 | 20.69 | 0.00 | 0.00 | 87.89 | 3.55 | 19.70 | 131.82 | 8.5% |
| **Total Project Funding** | **413.99** | **248.29** | **220.73** | **156.60** | **179.93** | **246.62** | **65.99** | **19.70** | **1,551.84** | **100.0%** |

**ATTACHMENT F**

# ANALYSIS OF UNIFIED COST MANAGEMENT PROCESS AND POLICY FOR MEASURE R PROJECTS

## Introduction

The Measure R Cost Management Process and Policy (the Policy) was adopted by the Metro Board of Directors in March 2011. The Policy caps Measure R project funding at the amounts in the Expenditure Plan approved by voters. The intent of the Policy is to inform the Metro Board of Directors regarding potential cost increases to Measure R-funded projects and the strategies available to close any funding gaps. The Regional Connector project is subject to this policy analysis.

The Regional Connector Project Life-of-Project budget requires an increase in cost from $1,420.02 million to $1,551.84 million (Table 1). This analysis recommends trade-offs required by this policy to identify the funds necessary to meet the $131.82 million multi-year cost increase described below.

**Table 1 – Regional Connector Cash Flow Needs ($ in millions)**

| Capital Project 860228 | Prior | FY16 | FY17 | FY18 | FY19 | FY20 | FY21 | FY22 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Total Project Cost (Oct 2015)** | **414.0** | **248.3** | **220.7** | **156.6** | **179.9** | **246.6** | **66.0** | **19.7** | **1,551.8** |
| Original LOP (April 2014 Bd Rept | 372.5 | 273.1 | 255.8 | 242.4 | 222.5 | 38.3 | 15.3 | - | 1,420.0 |
| 2015 Over/(Under) 2014 LOP | 41.4 | (24.9) | (35.1) | (85.8) | (42.5) | 208.3 | 50.6 | 19.7 | 131.8 |
| Cash Flow as of FY2016 Budget | 372.5 | 227.8 | 301.2 | 242.4 | 222.5 | 38.3 | 15.3 | | 1,420.0 |
| **Oct 2015 Over/(Under) FY2016** | **41.4** | **20.5** | **(80.4)** | **(85.8)** | **(42.5)** | **208.3** | **50.6** | **19.7** | **131.8** |

To increase the Regional Connector Project Life-of-Project budget, the Board's Policy calls for approval of an action plan to address the increase at the project level, i.e. with value engineering, scope reductions, local contributions, corridor and/or sub-regional contributions, prior to using other countywide resources, as described below.

## Measure R Cost Management Policy Summary

The adopted Policy stipulates the following:
If a project increase occurs, the LACMTA Board of Directors must approve a plan of action to address the issue prior to taking any action necessary to permit the project to move to the next milestone. Increases will be measured against the 2009 Long Range Transportation Plan (LRTP) as adjusted by subsequent actions on cost estimates taken by the LACMTA Board of Directors. With certain exceptions, shortfalls will first be addressed at the project level prior to evaluation for any additional resources using these methods in this order:

1) Value engineering and/or scope reductions;
2) New local agency funding resources;

3) Shorter segmentation;
4) Other cost reductions within the same transit corridor or highway corridor;
5) Other cost reductions within the same sub-region; and finally,
6) Countywide transit and highway cost reductions and/or other funds will be sought using pre-established priorities.

The policy was amended in January 2015 to establish Regional Facility Areas at Ports, airports and Union Station; and states that any:

> *"…capital project cost increases to Measure R funded projects within the boundaries of these facilities are exempt from the corridor and subregional cost reductions. Cost increases regarding these projects will be addressed from the regional programs share."*

The Regional Connector Project does not fall within a Regional Facility Area.

Value Engineering and/or Scope Reductions

The Regional Connector Project has undergone several scope reductions, including the removal of the 5th/Flower Street Station. Further reductions in scope would likely substantially delay the project or result in a project not consistent with the Locally Preferred Alternative. As a result, we recommend moving to the next step.

New Local Agency Funding Resources

At this time, there are no new additional funding resources available to this project. At this time, the funding levels from MAP-21 have not been increased. Additionally, the zero fund estimate for the 2016 State Transportation Improvement Program has resulted in no new programming capacity from the state. As we move forward, we can bring new funding opportunities to the Board's attention. Given the lack of new funding resources, we recommend moving to the next step.

Shorter Segmentation

Given that the goal of the Regional Connector project is to provide seamless travel between two points, it is not possible to shorten the project. The two end points of the project (Little Tokyo/Arts District Station and 7th Street/Metro Center Station) are 1.9 miles apart and there is no possible way to shorten the segment between these points which is consistent with the LPA and the operational objectives of the project. We therefore recommend moving to the next step.

Other Cost Reductions within the Same Transit Corridor

As the Regional Connector links several corridors together into one, we looked at possible cost reductions along all connected corridors. The corridors included in this analysis were Exposition Light Rail Transit Phase II, Gold Line Foothill Extension Phase 2A, and the Gold Line Eastside Transit Corridor Extension Phase II.

The Exposition Phase II and Gold Line Foothill Extension Phase 2A project are undergoing pre-revenue service testing. At this time, it is not possible to attain project savings from these projects as there may remain additional closeout costs and claims

which need to be settled. The Gold Line Eastside Extension Phase II project is not funded in the first decade, making it impossible to reduce its scope of work and move funds from that project to the Regional Connector.

Other Cost Reductions within the Same Sub-region

The Regional Connector Project is located within the Central Subregion. Given that this project will create continuous corridors between several subregions (Central, Gateway, San Gabriel Valley, and Westside), we are recommending that the cost increase of the Regional Connector Project be dealt with at the Countywide level.

Countywide Cost Reductions and/or Other Funds

Given the regional nature of this project, we are proposing shifting funds between two other projects and deferring a future transit or highway project as shown in Table 2. This is necessary for two principal reasons: 1) Proposition A and Proposition C funds are restricted to non-subway uses only; and, 2) no additional Measure R Transit Capital subfund can be assigned to this project because the Measure R Expenditure Plan caps the Measure R contribution at $160 million. Additionally, the lack of additional funding resources from the state and federal level at this time means we may need to defer future projects to maintain the delivery schedule of projects under construction.

To close the Regional Connector Project funding gap, we recommend shifting $131.82 million in Repayment of Capital Loans Fund 3562 from the Purple Line Extension to the Regional Connector. To replace those funds, we recommend backfilling the Purple Line Extension with Measure R Transit Subfund, previously assigned to the Crenshaw/LAX LRT Project. To then fully restore funding to the Crenshaw/LAX LRT Project, we recommending using Proposition C 25% funds for that project.

**Table 2 – Strategy to Address Regional Connector Funding Gap**

| | **Repayment of Capital Loans** | **Measure R 35%** | **Proposition C 25%** | **Total** |
|---|---|---|---|---|
| **Regional Connector** | $131.82 | | | $131.82 |
| **Purple Line Extension** | ($131.82) | $131.82 | | $0 |
| **Crenshaw/LAX LRT** | | ($131.82) | $131.82 | $0 |
| **Additional SRTP Shortfall** | | | ($131.82) | ($131.82) |
| **Balance** | **$0** | **$0** | **$0** | **$0** |

To make the Proposition C 25% available, a future highway or transit project that is not yet awarded for contruction may need to be deferred. On June 22, 2015, we provided the Board through a Board Box Memo with an illustrative example of projects that may be deferred. This analysis arose out of a request from the Board and the Executive Director, Finance and Budget.

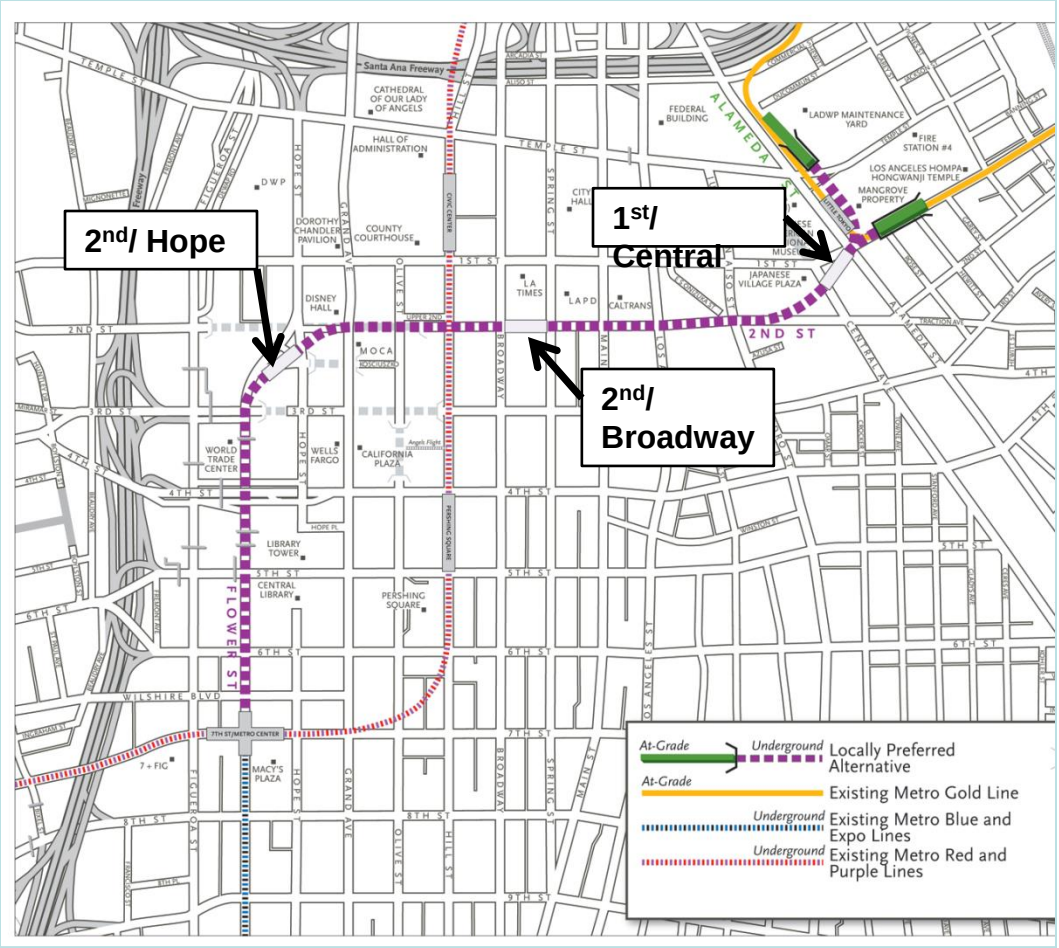
# Regional Connector Transit Corridor

## Project LOP BUDGET Summary and Little Tokyo/Art District Station Bus Bridge - November 9, 2015



# Regional Connector Transit Corridor Project Overview

- 1.9 mile underground light rail line from 7th Street/ Metro Center to the Metro Gold Line at 1st/ Alameda Streets
- 3 underground stations-
  - 2nd/ Hope
  - 2nd/ Broadway
  - 1st/ Central
- Connects Metro Gold Line, Metro Blue Line, and Expo Line
- One seat ride from Azusa to Long Beach and East LA to Santa Monica



# LOP Budget & C0980 Modifications Authorization Summary

- Significant events increased DB contract cost due to differing site conditions and FFGA schedule mitigation

  Exercise of contract options, AUR scope transfer, FFGA schedule recovery, Fire Life Safety fan plant, Including C0981R credit, and contingency replenishment for a net increase of $78.8M.

- Project Support Services cost increase

  Professional Services, 3rd Party coordination, Right-of-Way acquisition, and other support cost including environmental, art and community outreach to support the major project events and changes for a net increase of $53.0M.

- Total LOP Budget increase request $131.8M

# LOP Budget Key Cost Increase Elements

- DB Contract and Project Contingency
  - ✓ Design Build Contract C0980 $97.6M
  - ✓ C0980 Allocated Contingency $31.3M
  - ✓ Unallocated Contingency (From $126.9M to $80.3M) - $46.6M
  - ✓ C0981R Contract ($5.5 Reduction -$2.0M CMA) - $ 3.5M

  Sub-total $78.8M

- Project Support Services cost increase
  - ✓ 3rd Party/Utilities $23.9M
  - ✓ 3rd Party allocated Contingency $ 3.0M
  - ✓ ROW $ 8.5M
  - ✓ Professional Services $ 8.4M
  - ✓ Environmental, Art, Community $ 8.9M
  - ✓ Environmental Allocated Contingency $ 0.3M
  - ✓

  Sub-total $53.0M

Total LOP Budget Increase $131.8M

# Lessons Learned and Approach Moving Forward

- Develop Final LOP Budget after FFGA with Greater Level of Project Development and Detailed Risk Assessment, including FTA
- More Extensive Early Utility Investigations Including Additional Investment (Can Result in Additional Community Interface)
- City Department and Council Support for Variances, Permits and Necessary Street Closures Essential
- As Project Moves from Current 20% Completion to 50% in FY18, a Formal Risk Assessment with FTA Will Be Conducted and Shared With the Board for Appropriate Board Action, Which Could Include a Request for Additional Funding Resources

# Coordination with Foothill Gold Line Opening March 5th, 2016

- Work in the area of Little Tokyo/Arts District Station will be accelerated to provide uninterrupted service with Foothill Gold Line opening.
- Related Bus Bridge work will begin on December 5th and complete by Feb 15th 2016.
  - ✓ Bus Bridging for 72 days for Gold Line patrons to from Union Station to Pico/Aliso Station.
  - ✓ Overall schedule recovery measures for Regional Connector are being proposed to the Board to mitigate AUR impacts. This work has been incorporated into that strategy for on-time completion.
  - ✓ Permits and Approvals are critical to meeting this accelerated schedule.

**File #:** 2015-1597, **File Type:** Contract **Agenda Number:** 29.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: WESTSIDE PURPLE LINE EXTENSION PROJECT - SECTION 1**

**ACTION: AUTHORIZE THE CHIEF EXECUTIVE OFFICER (CEO) TO EXECUTE CONTRACT MODIFICATION**

## RECOMMENDATION

AUTHORIZING the Chief Executive Officer to Execute Contract Modification No. 57 to Contract No. PS43502000 Parsons Brinkerhoff Inc. to **provide continued design support services during construction for Section 1 of the Westside Purple Line Extension Project**, from December 2015 through June 2017, in the amount not-to-exceed $9,282,218 increasing the Total Contract Value from $152,503,103 to $161,785,321.

## ISSUE

The Board authorized award of the PB Contract in June 2007 to provide environmental and engineering services for the nine-mile Westside Purple Line Extension Project. The Project Definition for the current nine-mile alignment, that was adopted by the Board on April 26, 2012, extends the Purple Line tunnels from the current terminus at Wilshire/Western to the Westwood/VA Hospital and includes seven underground stations. A Record of Decision for the Project was received from the Federal Transit Administration (FTA) on August 9, 2012; followed by the receipt of a Full Funding Grant Agreement (FFGA) on May 21, 2014, for the first phase (Section 1) of the Project (3.92 miles from Wilshire/Western to Wilshire/La Cienega).

Since 2007, the Board has approved Contract Modifications (Attachment B) to allow PB to continue engineering services to complete the bid documents and provide design support services during construction for three Advanced Utility Relocation (AUR) construction contracts and the Design/Build RFP solicitation documents for the tunnels, stations, systems and trackwork for the first Section (3.92 miles from Wilshire/Western to Wilshire/La Cienega) of the Project. The first of the three AUR construction contracts was successfully completed in 2014; the second reached substantial completion in October 2015; and the last AUR contract that was issued construction Notice to Proceed in January 2015, is scheduled to be completed by January 2017. The Design/Build contract which includes tunnels, stations, systems and trackwork was issued Notice to Proceed in January 2015 and is scheduled to be completed in 2023. In July 2015, the Board approved the award of the Design/Build contract for the Maintenance of Way/Non-Revenue Vehicle Repair Building that was

issued Notice to Proceed in September 2015 and is scheduled to be completed in 2017**.**

The PB team is co-located with Metro staff in the Integrated Project Management Office and is currently providing engineering services for both of the Westside Purple Line Extension (Sections 1 and 2) Projects. Approval of the recommended action to execute the Contract Modification for Section 1 will provide continuity of design support services during construction for the: 1) Advanced Utility Relocation contracts; 2) Design/Build Tunnels, Stations, Systems and Trackwork contract; and 3) Design/Build Maintenance-of-Way and Non-Revenue Vehicle Facility contract.

The recommended Board action will provide sufficient Contract Modification authority and funding for PB services through June 2017. This approach will result in better control over the management of consultant services with the ability to budget according to the planned workload over the next two years. It will also allow the Project to maintain knowledgeable Consultant staff that will be able to provide engineering "Lessons Learned" and opportunities to develop new consultant staff to transition to the Westside Purple Line Section 2 Project, if future funding and Contract Modifications are approved by the Board.

The Metro Board of Directors instructed the Office of the Inspector General (OIG) to conduct an independent audit of Contract No. PS-4350-2000, Westside Purple Line Extension Project - Section 2, Modification 52 ("Section 2 OIG Review"), to assess (1) total work hours to perform the proposed advanced preliminary engineering work, (2) proposed billable rates, (3) any potential management redundancies, and (4) accuracy and completeness of the preliminary engineering drawings. The expert consultant hired by OIG is conducting the review. The review is expected to be completed by them in late January/early February time frame. The OIG will report the results of this review to the Metro Board.

Section 2 OIG Review concerns a 2.6 mile segment that includes two new stations (Wilshire/Rodeo and Century City); whereas this Board report concerns a 3.9 mile segment (Section 1) that includes three new stations (Wilshire/La Brea, Wilshire/Fairfax, and Wilshire/La Cienega).

Section 2 OIG Review concerns a contract modification amount of $20.8 million (that is within budget but not within a Board Adopted LOP), whereas this Board report is for a lesser amount of $9.3 million and is within budget and the Board adopted LOP.

Section 2 OIG Review concerns advanced preliminary engineering, design for advanced relocation of utilities, engineering support services, design support services, whereas this Board report includes only within scope continued design support services during construction of Section 1.

## DETERMINATION OF SAFETY IMPACT

This Board action will not have an impact on established safety standards for Metro's construction

projects.

## FINANCIAL IMPACT

Funds are included in the FY16 budget for the actions under Project 865518 - Westside Purple Line Extension Project (Section 1) in Cost Center 8510 (Construction Project Management), and Account Number 50316 (Professional and Technical Services). Since this is a multi-year project, the Executive Director of Program Management and the Westside Purple Line Extension Section 1 Project Manager will be responsible for budgeting costs in future years.

### Impact to Budget

The sources of funds for the recommended action are Federal 5309 New Starts, CMAQ, Measure R 35% and TIFIA Loan Proceeds. The approved FY16 budget is designated for the Westside Purple Line Extension Project and does not have an impact to operations funding sources. These funds were assumed in the LRTP for the Westside Purple Line Extension Project. This Project is not eligible for Propositions A and C funding due to the proposed tunneling element of the Project. No other funds were considered.

## ALTERNATIVES CONSIDERED

The Board could decide to not approve the recommended Contract Modification. This is not recommended because the extension of PB's services will provide the continuity of engineering services involving qualified and knowledgeable personnel who that are part of the Westside Purple Line Extension Integrated Project Management Office approach.

## NEXT STEPS

After Board approval and execution of the Contract Modification, staff will direct the Consultant to continue providing design support services during construction for the Advanced Utility Relocation contracts; the Design/Build Tunnels, Stations, Systems and Trackwork contract; and Design/Build Maintenance of Way/Non-Revenue Vehicle Building contract that are currently underway.

## ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - Contract Modification/Change Log
Attachment C - DEOD Summary

Prepared by:

Dennis S. Mori, Executive Officer, Project Director (213) 922-7221

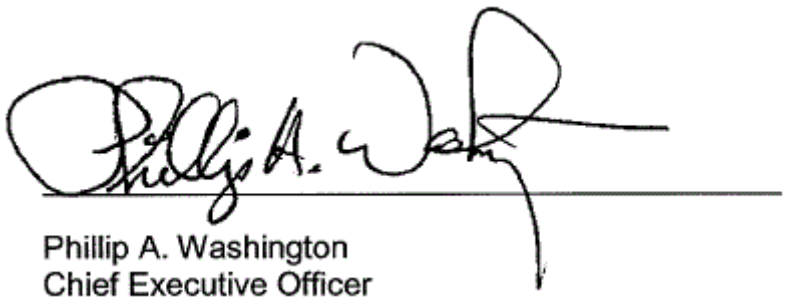
Rick Wilson, Deputy Executive Officer, Program Control (213) 922-3627

Tim Clark, Director of Contract Administration (213) 922-7246
Bryan Pennington, Deputy Executive Director, Program Management (213) 922-7449

Reviewed by:

Ivan Page, Executive Director, Vendor/Contract Management (Interim) (213) 922-6383

Richard Clarke, Executive Director, Program Management (213) 922-7447



Phillip A. Washington
Chief Executive Officer

## PROCUREMENT SUMMARY

## Westside Purple Line Extension Project
## Contract PS43502000

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number**: PS 43502000 | | | |
| **2.** | **Contractor**: Parsons Brinkerhoff (PB) | | | |
| **3.** | **Mod. Work Description**: Design Support Services During Construction and Other Tasks | | | |
| **4.** | **Contract Work Description**: Engineering Support Services | | | |
| **5.** | **The following data is current as of**: October 28, 2015 | | | |
| **6.** | **Contract Completion Status** | | **Financial Status** | |
| | | | | |
| | **Contract Awarded:** | 6/8/07 | **Contract Award Amount:** | $3,654,061 |
| | **Notice to Proceed (NTP):** | 7/16/07 | **Total of Modifications Approved:** | $148,849,042 |
| | **Original Complete Date:** | 9/16/08 | **Pending Modifications (including this action):** | $9,282,218 |
| | **Current Est. Complete Date:** | 6/30/17 | **Current Contract Value (with this action):** | $161,785,321 |
| | | | | |
| **7.** | **Contract Administrator**: Zachary Munoz | | **Telephone Number**: (213)922-7301 | |
| **8.** | **Project Manager**: Dennis Mori | | **Telephone Number**: (213)312-3109 | |

## A. Procurement Background

This Board Action is to approve Contract Modification No. 57 issued in support of Westside Purple Line Extension Section 1 Project providing design support services during construction and other tasks.

This Contract Modification will be processed in accordance with Metro's Acquisition Policy and the contract type is a cost plus fixed fee.

The solicitation for Contract No.PS43502000 was an Architectural & Engineering (qualification-based) procurement process. This method requires that each of the responding firm's qualifications be evaluated, and the most qualified firm selected, followed by analysis of the selected firm's cost proposal and successful negotiations to enter in to the contract with the selected firm.

In June 2007, The Board authorized award of this Contract to PB for alternative analysis with three options for: Draft EIS/EIR/Advanced Conceptual Engineering, Final EIS/EIR, and Preliminary Engineering in the amount of $3,654,061. In January 2009, the Board exercised the option for Draft EIS/EIR/Advanced Conceptual Engineering. In October 2010, the Board exercised options for Final EIS/EIR and Preliminary Engineering. In October 2011, the Board authorized PB to enter the next phase of work, Design Support during Final Design

and/or Construction. In April 2014, the Board authorized PB to provide continued Design Support during Final Design and/or Construction.

## B. Cost/Price Analysis

The recommended price has been determined to be fair and reasonable based upon Fact-Finding, Clarifications of the scope of work, Quantitative Technical Analysis, Independent Cost Estimate, and Cost/Price Analysis. This Contract Modification includes provisional indirect rates subject to adjustment when final year-end audited rates are established. The difference between the negotiated price and Metro's ICE is the result of an increased level of effort and corresponding hourly rates that was determined to be required after a technical evaluation of the Contractor's proposal was performed by Metro's Project Management.

| Proposal Amount | Metro ICE | Negotiated Amount |
|---|---|---|
| $11,763,158 | $8,110,826 | $9,282,218 |

**ATTACHMENT B**

# CONTRACT MODIFICATION/CHANGE LOG

## Westside Purple Line Extension Project
## Contract PS43502000

| Mod. No. | Description | Date | Amount |
|---|---|---|---|
| 1-8 | Alternatives Analysis | 9/1/09 | $27,515 |
| 9-20 | Advanced Conceptual Engineering/Draft EIS/ EIR | 9/16/10 | $18,590,710 |
| 21 | Preliminary Engineering | 11/1/10 | $43,632,826 |
| 22 | Final EIS/EIR | 11/1/10 | $4,761,377 |
| 23 | Close-out Alternative Analysis | 1/12/11 | ($31,300) |
| 24 | Additional Fault investigation – Transect 2 | 5/6/11 | $480,250 |
| 25 | Risk Management Support | 2/28/11 | $208,417 |
| 26 | Additional Fault Investigation Transec 4 | 7/5/11 | $453,264 |
| 27 | Century City Refined Ridership Forecast | 4/13/11 | $22,985 |
| 28 | Additional Rail Simulation Study | 4/20/11 | $72,646 |
| 29 | Revisions to Safety Security Manual | 3/31/11 | $0 |
| 30 | Oil Well Investigation Program | 5/4/11 | $107,165 |
| 31 | Additional Fault Investigation Transec 3 | 6/2/11 | $411,949 |
| 32 | Additional Fault Investigation Transec 7 | 7/5/11 | $310,754 |
| 33 | Historic Property Survey | 5/13/11 | $46,442 |
| 34 | Additional Fault Investigation Transec 6 | 8/9/11 | $102,054 |
| 35 | Additional Station Entrance Report | 8/9/11 | $119,074 |
| 36 | Advance Preliminary Engineering | 11/1/11 | $16,996,740 |
| 37 | LADWP Utility Relocations | 4/27/12 | $84,659 |
| 38 | Title V1 Service Equity | 4/17/12 | $51,185 |
| 39 | Design Services for Exploratory Shaft | 7/5/12 | $0 |
| 40 | Period of Performance Extension | 10/31/12 | $0 |
| 41 | Bid Period Services | 3/25/13 | $18,816,205 |
| 42 | CANCELLED | | |
| 43 | Advance Preliminary Engineering (Section 2) | 4/22/13 | $8,836,296 |
| 44 | Additional Borings | 8/16/13 | $439,292 |
| 45 | Additional Capacity Study | 10/9/13 | $24,030 |
| 46 | Ventilation Study | 12/18/13 | $470,527 |
| 47 | Additional AUR Work | 2/11/14 | $493,563 |
| 48 | Design Support Services During Construction FY 15 | 5/30/14 | $11,657,611 |
| 49 | Period of Performance Extension | 6/26/14 | $0 |
| 50 | New Starts Support Section 2 | 8/11/14 | $357,054 |

| | | | |
|---|---|---|---|
| 51 | Section 2 Station Area Planning | 8/21/14 | $126,728 |
| 52 | Continued Advanced Preliminary Engineering Section 2 | 3/30/15 | $20,820,226 |
| 53 | Utility Engineer Support | Approved | $358,798 |
| 54 | Period of Performance Extension | 12/23/14 | $0 |
| 55 | Period of Performance Extension | 12/23/14 | $0 |
| 56 | Period of Performance Extension | 12/24/14 | $0 |
| 57 | **Pending Board Approval** | | $9,282,218 |
| | | | |
| | **Total:** | | $158,131,260 |

## DEOD SUMMARY

## WESTSIDE PURPLE LINE EXTENSION PROJECT
## CONTRACT NO. PS43502000

### A. Small Business Participation

Parsons Brinckerhoff, Inc. made a 23.41% DALP commitment, listing five (5) DBE subcontractors, and has added 32 DBE subcontractors to date. The project is currently 85% complete. Current DALP participation is 20.54%, representing a 2.87% shortfall, an improvement from the 4% DBE shortfall reported in April 2014. DALP participation has increased by approximately 1.13%, since February 2015.

In November 2015, PB confirmed that they will meet the project DBE commitment of 23.41% in Fall 2016. PB expressed that they are accomplishing their DBE commitment by achieving 41.6% DBE participation on current Section 2 scope, and achieving 50% DBE participation on Section 2 Geotech work. The DBE participation anticipated on the current proposal for Continuation of Section 1, Design Support During Construction, along with the Section 2 DBE participation, will result in PB meeting its DBE commitment.

| SMALL BUSINESS COMMITMENT | DALP 23.41% | SMALL BUSINESS PARTICIPATION | DALP 20.54% |
|---|---|---|---|

| | DBE Subcontractor | % Committed | Current Participation[1] |
|---|---|---|---|
| 1. | Intueor | 2.28% | 1.55% |
| 2. | Kal Krishnan Consulting | 5.58% | 1.22% |
| 3. | LKG-CMC | 7.27% | 1.04% |
| 4. | Terry A. Hayes | 2.99% | 0.31% |
| 5. | Wagner Engineering | 5.29% | 0.73% |
| 6. | Atwell Consulting | Added | 0.34% |
| 7. | Advantec | Added | 0.71% |
| 8. | Barrio Planners | Added | 1.17% |
| 9. | C&L Drilling | Added | 0.74% |
| 10. | Cogstone Resource | Added | 0.17% |
| 11. | A Cone Zone | Added | 0.78% |
| 12. | Del Richardson | Added | 0.17% |
| 13. | Diana Ho | Added | 0.01% |
| 14. | D'Leon Consulting | Added | 2.33% |
| 15. | E.W. Moon | Added | 0.48% |
| 16. | Jad & Associates | Added | 0.67% |
| 17. | Jet Drilling | Added | 0.25% |

| | | | |
|---|---|---|---|
| 18. | Lenax Construction | Added | 0.88% |
| 19. | Melendrez | Added | 0.02% |
| 20. | Raw International | Added | 2.22% |
| 21. | Roy Willis | Added | 0.01% |
| 22. | W2 Design | Added | 0.37% |
| 23. | Wiltec | Added | 0.00% |
| 24. | Universal Reprographics | Added | 0.40% |
| 25. | Martini Drilling | Added | 0.52% |
| 26. | FPA Underground | Added | 0.59% |
| 27. | Advanced Technologies | Added | 0.13% |
| 28. | IDC Consulting | Added | 0.27% |
| 29. | Abadi Bouhier Consulting | Added | 0.90% |
| 30. | V&A Inc. | Added | 0.48% |
| 31. | Safeprobe | Added | 0.16% |
| 32. | Diaz Yourman | Added | 0.21% |
| 33. | Safe Utility Exposure | Added | 0.39% |
| 34. | Green Clean Water | Added | 0.03% |
| 35. | Atlas Teknology Group | Added | 0.04% |
| 36. | Parikh Consultants | Added | 0.13% |
| 37. | AP Engineering | Added | 0.12% |
| | **Total DBE Commitment** | **23.41%** | **20.54%** |

[1]*Current Participation = Total Actual amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

## B. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

**File #:** 2015-1601, **File Type:** Project **Agenda Number:** 30.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: WESTSIDE PURPLE LINE EXTENSION PROJECT - SECTION 2**

**ACTION: APPROVE MINOR CHANGES TO WESTSIDE PURPLE LINE EXTENSION, SECTION 2 AND CEQA ADDENDUM**

## RECOMMENDATION

APPROVING AND ADOPTING project definition changes, CEQA Addendum and Findings and authorize staff to file a Notice of Determination on the Addendum for the **Westside Purple Line Extension Project - Section 2**.

## ISSUE

On May 24, 2012, the Metro Board certified the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Westside Purple line extension from Wilshire Western to Westwood/VA and approved the Project Definition, and adopted Findings of Fact and a Statement of Overriding Considerations under CEQA. Subsequently, due to a proposed commercial development at the corner of Avenue of the Stars and Constellation Boulevard (section 2), the selected construction staging area in Scenario A (Area 1) can no longer be used for the project. Instead, the construction staging areas identified in the Final EIS/EIR as part of Scenario B sites (Area 2 and Area 3) will be used. The station entrance location will remain in the original location at the northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1), and will be incorporated into future developments to be constructed at this location.

In addition, the existing Metro bus layover site on the southeast corner of Century Park West and Constellation Boulevard will be used for the storage of construction materials and parking of construction equipment during the construction period. To offset the loss of the bus layover site, a temporary bus layover site will be constructed in the median of Santa Monica Boulevard.

Pursuant to CEQA Guidelines Section 15164, Metro analyzed potential environmental impacts of the construction area changes and concluded that an addendum would be appropriate. The Addendum

concludes that none of the changes associated with the change in construction staging areas represent substantial changes to the project, result in new significant impacts, or result in previously identified significant effects becoming substantially more severe than shown in the EIS/EIR.

## DISCUSSION

As part of the approved project, Scenario A, as identified in the approved EIS/EIR, with the Century City Constellation Station entrance and approximately 5.5 acre construction staging and laydown area at the northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1) was included in the adopted project. Scenario A had sufficient space available for a tunnel excavation operation, construction staging, parking, storage and other work areas. Due to a proposed commercial development at this site, the selected construction staging area can no longer be used for the project. Instead, the staging areas identified in the EIS/EIR as part of Scenario B will be used. The Scenario B sites (Area 2 and Area 3) include two locations along Century Park East and require approved full acquisition of 1940 Century Park East, and 1950 Century Park East as identified previously in the EIS/EIR. Additionally, a temporary construction easement may be used along the property at 2010 Century Park East (AT&T Building) for placement of a conveyor system between Staging Areas 2 and 3.

A portion (less than 0.25 acres) of Area 1 will be required for construction of the station entrance which is to remain in the original location at the northeast corner of Constellation Boulevard and Avenue of the Stars and will be incorporated into future development to be constructed at this location. Metro will coordinate with the developer regarding the station entrance. If the site is not developed at the start of the Constellation Station Construction, it is possible that more than 0.25 acres of Area 1 will be used for construction activities.

Additionally, changes in the scenarios for construction staging have prompted the following adjustments:

- The tunnel boring machine (TBM) will be lowered into the station excavation along Constellation Boulevard. This will require a six-month full closure of approximately 200 feet of the eastern end of Constellation Boulevard between Century Park East and the first driveway on the north side of the street.

- Installation of a new tunnel access shaft and conveyor in Area 2. A vertical access shaft, up to 80 feet in diameter will be constructed to provide access to the tunnel heading for workers and materials and to remove excavated material from the tunnel.

- Operation of an inpatient long-term rehabilitation facility adjacent to construction staging Area 3. Immediately south of staging Area 3, a former physician-run hospital is being remodeled to become a new inpatient rehabilitation facility with a tentative opening date of March 2016. The nine story rehabilitation facility was not in operation at the time of the EIS/EIR certification,

therefore, the analysis of the adjacent construction staging area did not assess potential noise, air quality, dust, light, and visual impacts to an inpatient medical facility. Construction Area 3 will be primarily used for the temporary storage of excavated material which will be hauled away for off-site disposal, as well as storage of materials and equipment required for tunnel and station construction, and for the design-build contractor's office, maintenance shops, and parking.

- Use of existing Metro bus layover area for construction material storage. A material storage area will be placed at the existing 0.3 acre Metro bus layover site on the southeast corner of Century Park West and Constellation Boulevard (Area 5). There will be no ground disturbing activity at the site other than for the installation and removal of soundwalls, and for removal and restoration of curbs and landscaping.

- Temporary bus layover on Santa Monica Boulevard. Due to the use of the existing Metro bus layover site (Area 5), a new temporary bus layover approximately 250 feet long and 12 feet wide will provide parking for up to five buses in the median of Santa Monica Boulevard between Avenue of the Stars and Century Park East (see Figure 4). The layover zone will be located in the landscaped median between the eastbound lanes of Santa Monica Boulevard and a dedicated bus lane, and will be in use for approximately seven years. Also included will be restroom facilities for Metro bus operators.

- Ventilation/Exhaust Structures into the Westfield Century City Property. Metro will require temporary and permanent easements in the Westfield Century City mall property for the purpose of constructing ventilation ducts to service the subway.

- Elimination of train cross-over at Wilshire/Rodeo Station. After an operational analysis was performed to verify that the train cross-over east of the Wilshire/Rodeo Station could be eliminated while maintaining operational requirements for the Westside Subway Extension Project, Section 2, the Metro Board, at its, September 2014 Board meeting approved the elimination of the cross-over. This action will result in significant shortening of the underground station, thus reducing construction costs and impacts to traffic and disruption to the surrounding streets and businesses.

## DETERMINATION OF SAFETY IMPACT

This Board action will not have an impact on established safety standards.

## FINANCIAL IMPACT

Together, all the changes described in the Addendum will not increase the cost of the Project.

## NEXT STEPS

Staff will prepare an amendment to the RFP for Westside Purple Line Extension, Section 2 that will include all necessary design specifications, and mitigation measures to minimize impacts.

## ATTACHMENTS

Attachment A - Addendum to the Final Environmental Impact Report/Westside Subway Extension
<http://libraryarchives.metro.net/DB_Attachments/151106_Attachment_A_Addendum_FEIR_with_Appendices.pdf>

Attachment B - Notice of Determination

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Los Angeles County
Metropolitan Transportation Authority

# Westside Purple Line Extension Project, Section 2

## Addendum to the Final Environmental Impact Report

**October 2015**

State Clearinghouse No. 2009031083




Metro

U.S. Department of Transportation
Federal Transit Administration

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# 1.0 INTRODUCTION

A Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the extension of the existing Metro Purple Line heavy rail subway (Metro Westside Purple Line Extension Project) was completed, and approved by the Metro Board in April 2012 in accordance with the requirements of the California Environmental Quality Act (CEQA). The EIR was part of a joint document, for which an Environmental Impact Statement (EIS) was also prepared to comply with the requirements of the National Environmental Policy Act (NEPA) and the Federal Transit Administration (FTA). For the purpose of this addendum, only the EIR portion of the joint document (i.e. EIR/EIS) will be referenced. The EIR was prepared by the Los Angeles County Metropolitan Transportation Authority (Metro). The document can be viewed on the Metro website at: http://www.metro.net/projects/westside/

The Project has been divided into three sections for funding purposes. Metro proposes changes to Section 2 of the Westside Purple Line Extension in the County of Los Angeles, California. Section 2 of the project extends from the Wilshire/La Cienega Station to the Century City Constellation Station. These changes are primarily focused on construction staging areas associated with the Century City Constellation Station. Accordingly, pursuant to CEQA Guidelines Section 15164, the purpose of this Addendum is to document changes to the Westside Purple Line Extension Project and analyze the potential environmental impacts that would result from changes to the project since the certification of the Final EIS/EIR. The May 2012 Final EIS/EIR is incorporated herein by reference as part of the analysis of this Addendum.

## 1.1 Regulatory Requirements

This Addendum presents an evaluation of the proposed project changes to assess if they would present new significant impacts or increase the severity of previously identified significant environmental effects under CEQA. CEQA provides, in Public Resources Code Section 21166, that once an EIR has been prepared for a project, no subsequent or supplemental EIR is to be prepared unless one of the following circumstances occurs:

a. Substantial changes are proposed in the project that will require major revisions to the environmental impact report;

b. Substantial changes have occurred with respect to the circumstances under which the project is being undertaken, which will require major revisions to the environmental impact report; or

c. New information, which was not known and could not have been known at the time the environmental impact report was certified as complete, has become available.

CEQA Guidelines Section 15162 further clarifies the requirements for evaluating proposed changes to a project. Generally, the guidelines state that, once an EIR has been certified, no further EIRs will be prepared unless there are substantial changes in the project, substantial changes in circumstances, or new information of substantial importance, all of which indicate that there will be either a new, significant adverse environmental impact or a substantially more severe adverse environmental impact than previously identified.

This Addendum concludes that the changes to Section 2 of the Westside Purple Line Extension Project are minor and would not be substantial, and with implementation of mitigation measures previously

identified in the Final EIS/EIR, the impact conclusions presented in that document would remain the same. As a result, the analysis concludes that preparation of a subsequent or supplemental EIR is not required.

## 1.2 Approved Project

The approved project is an 8.97 mile extension of the existing Metro Purple Line heavy rail transit subway system. The extension would operate from the current Metro Purple Line terminus at the Wilshire/Western Station to a new western terminus near the West Los Angeles Veterans Administration (VA) Hospital and include seven new stations: Wilshire/La Brea, Wilshire/Fairfax, Wilshire/La Cienega, Wilshire/Rodeo, Century City Constellation, Westwood/UCLA, and Westwood/VA Hospital (Figure 1 in Appendix A). Also included in the project is the expansion of Metro Division 20 Yard in Downtown Los Angeles for rail storage and maintenance. The project will be built in three construction segments: 1. Wilshire/Western to Wilshire/La Cienega, 2. Wilshire/La Cienega to Century City Constellation, and 3. Century City to Westwood/VA Hospital, with planned operations to the Westwood/VA Hospital Station by 2036. Construction on the first segment began in November 2014. Section 2 of the project extends from the Wilshire/La Cienega Station to the Century City Constellation Station.

## 1.3 Proposed Project Modifications

Due to a proposed commercial development at the corner of Avenue of the Stars and Constellation Boulevard (Area 1 in Figure 2), the site can no longer be used for construction staging and laydown. However, the station entrance proposed at this location will remain and be incorporated into the new development. This Addendum addresses the changes as a result of the relocation of construction staging areas within Century City, and other changed conditions in Section 2 from what was cleared in the Final EIS/EIR.

The following provides a summary of the areas that have changed from the approved construction staging areas within Century City, and other changed conditions in Section 2 from what was analyzed in the Final EIR.

1. Change in construction staging scenario locations.

   Scenario A, as identified in the Final EIS/EIR, with the Century City Constellation Station entrance and approximately 5.5 acre construction staging and laydown area (staging area) at the northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1) was selected as part of the preferred alternative. Due to a proposed commercial development at this site, the selected construction staging area can no longer be used for the project. Instead, the construction staging areas identified in Final EIS/EIR as part of Scenario B will be used, although the station entrance will remain at the northeast corner of Constellation Boulevard and Avenue of the Stars rather than the station entrance location identified as part of Scenario B (at the southwest corner of Constellation Boulevard and Avenue of the Stars). The Scenario B staging sites (Area 2 and Area 3) include two locations along Century Park East and require full acquisition of 1940 Century Park East, 1950 Century Park East, and 2040 Century Park East.

   Since the Scenario B station entrance will not be used, a portion (less than 0.25 acres) of Area 1 will be required for construction of the station entrance which is to remain in the original location at the

northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1), and will be incorporated into future development to be constructed at this location. Metro will coordinate with the developer regarding the station entrance so as not to preclude a future connection to the development. Although if development of the site has not yet begun when construction of the Century City Constellation Station begins, the station entrance would be designed as described in the Final EIS/EIR. Further, if the site is not developed at the start of the Century City Constellation Station construction, it is possible that more than 0.25 acres of Area 1 will be used for construction activities.

In addition, due to the loss of full use of Area 1, the tunnel boring machine (TBM), used to excavate the tunnels between Century City and La Cienega Boulevard, will be lowered into the station excavation along Constellation Boulevard from the street. This will require a six to nine month full closure of approximately 200 feet of the eastern end of Constellation Boulevard between Century Park East and the first driveway on the north side of the street. Constellation Boulevard is a minor 4-lane east/west collector street traversing a distance of approximately 0.4 miles between Century Park West and Century Park East that is classified in the Transportation Element of the City of Los Angeles General Plan as a Divided Secondary Highway. Within the study area, Constellation Boulevard has two travel lanes in each direction with painted two-way left-turn lanes and primarily provides a means of access to the properties located along its length. The closure of this short section of the noncontiguous Constellation Boulevard will be in place for approximately six to nine months and will not block any building or driveway entrances.

In summary, the station entrance will remain in the original location of Area 1 as identified in the Final EIS/EIR. The construction staging locations identified in Scenario B in the Final EIS/EIR will be used because the approximate 5.5 acre construction staging site identified in Scenario A is no longer available.

2. Installation of a new tunnel access shaft and conveyor in Area 2.

   As noted above, the approximate 5.5 acre construction staging site (Area 1) identified in Scenario A had sufficient space available for a tunnel excavation operation, TBM launch, construction staging, parking, storage, and other work areas. Since the majority of Area 1 will no longer be available for construction staging and removal of excavated materials, a temporary access shaft, up to 80 feet in diameter will be constructed in Area 2 to provide access to the tunnel head for workers and materials and to remove excavated material from the tunnel. The placement of an access shaft in Area 2 was not included as part of a construction staging scenario presented in the Final EIS/EIR. The access shaft will include three phases: construction of the shaft; operations conducted through the shaft including mucking, concrete work, and rail welding; and backfill of the shaft. Construction staging activities in Area 2 will occur for approximately seven years.

   Because Areas 2 and 3 are not adjacent to each other, excavated material will likely be moved between the tunnel access shaft in Area 2 and staging area in Area 3 via an enclosed conveyor system (see Figure 3 for an example of a typical enclosed conveyor system). The conveyer will be in operation for approximately three years and located along a new temporary easement of up to five years (2018-2023) to be acquired by Metro. Should a slurry-type TBM be used, the conveyance system will also carry slurry feed and discharge pipes from the tunnel access shaft to a slurry separation plant in Area 3. There are three proposed location options for the conveyor system, with the final location to be determined after negotiations with the property owner:

I. The first option aligns the conveyor system from the vertical access shaft in Area 2 and travels approximately 400 feet along the east side of the AT&T building at 2010 Century Park East to Area 3 (Figure 2). The conveyor would span the top of the parking structure located on the east side of the building. In addition to the conveyor, temporary pipe racks carrying utility lines, water, grout, foam, compressed air, etc. would also be installed over the top of the parking structure.

II. The second option is also located along the east side of the AT&T building at 2010 Century Park East. With this option the parking structure would be demolished and the conveyor system would be placed at ground level for approximately 400 feet from the access shaft to Area 3. The parking structure is structurally unsound and only partially used now. Should AT&T agree to remove the parking structure, the enclosed conveyor system would be placed at ground level between Areas 2 and 3. Removal of the parking structure would also allow for additional area behind the AT&T building to be used for construction staging and laydown activities and for movement of materials and equipment between Areas 2 and 3. In addition, the area immediately adjacent to the east side of the building will be available for use as parking for employees of the AT&T facility.

III. The third option would place the conveyor system along the west side of the AT&T building in a materials handling corridor. This option would require Metro to obtain a temporary easement along the western portion of the AT&T property and only be used if an easement along the east side of the AT&T building is not feasible. The corridor would extend from staging Area 2 to Area 3, a distance of approximately 400 feet, with a width encompassing one northbound traffic lane and sidewalk in the public right-of-way along the eastern side of Century Park East, and the space between the AT&T building and the eastern edge of the sidewalk. The corridor would be separated from traffic on Century Park East by K-Rail dividers plus fencing with fabric sight screening. Materials handling equipment would travel on the closed street lane. The enclosed conveyor would be elevated such that traffic entering the AT&T facility could pass beneath the conveyor structure. Access to the AT&T building and its facilities would be maintained through the period of use, which is approximately five years. The materials handling corridor along Century Park East would require the temporary relocation of one bus stop serving the Metro 28 line and LADOT Commuter Express line 534.

3. Change in land use adjacent to construction staging Area 3.

   Immediately south of staging Area 3, a former physician-run hospital at 2080 Century Park East that has been closed since 2008 is being remodeled to become a new inpatient rehabilitation facility with a tentative opening date of March 2016. The nine story rehabilitation facility was not in operation at the time of the EIS/EIR studies, therefore the analysis of the adjacent construction staging area did not assess potential impacts to the facility. The 138 bed facility will provide inpatient rehabilitation services. Adjacent to the building, construction staging Area 3 will primarily be used for the temporary storage of excavated material which will then be hauled away for off-site disposal. Area 3 will also be used for storage of materials and equipment required for tunnel and station construction, and for the contractor's office, maintenance shops, and parking. There is no change to the truck haul routes to be used for construction of the Century City Constellation Station identified in the Final EIS/EIR. Construction related activities will be in operation at this site for approximately seven years.

4. Use of existing Metro bus layover area for construction material storage.

   In addition to the Century Park East sites identified in the Final EIS/EIR, a material storage area will be placed at the existing 0.3 acre Metro bus layover site on the southeast corner of Century Park West and Constellation Boulevard (Area 5). The property owner also uses the site for a fuel cell installation to generate electricity. Access to the fuel cell installation will be maintained during the entire time the site is used by Metro. There will be no ground disturbing activity at the site other than for the installation and removal of soundwalls, and for removal and restoration of curbs and landscaping. Following construction of the station, the site will be returned to its current use as a Metro bus layover facility. The site will be used for approximately seven years for storage of construction materials and parking of construction equipment associated with construction of the station.

5. Temporary bus layover on Santa Monica Boulevard.

   Due to the use of the existing Metro bus layover site (Area 5) for construction material storage, a new temporary bus layover approximately 250 feet long and 12 feet wide providing parking for up to five buses, will be constructed in the median of Santa Monica Boulevard between Avenue of the Stars and Century Park East (see Figure 4). Also included will be restroom facilities for Metro bus operators. The layover zone will be located in the landscaped median between the eastbound lanes of Santa Monica Boulevard and a dedicated bus lane, and will be in use for approximately seven years.

6. Ventilation /Exhaust Structures into the Westfield Century City Property.

   Metro will require temporary and approximately 3,000 square feet of permanent easements into the Westfield Century City mall property for the purpose of construction of ventilation ducts to service the subway. Metro is currently in discussions with the property owners regarding the placement of the station appendages (exhaust and vent shafts) within the Westfield Century City property (Figure 5).

7. Elimination of train cross-over at Wilshire/Rodeo Station.

   After an operational analysis was performed to verify that the train cross-over east of the Wilshire/Rodeo Station could be eliminated while still maintaining operational requirements for the Westside Purple Line Extension Project, the Metro Board, at its September 2014 Board meeting approved the elimination of the train cross-over. As a result, the station box shifted east from El Camino Drive to Canon Drive to now Beverly Drive and Canon Drive, with a reduction in length of the station box from originally approximately 1,150 feet to approximately 950 feet (Figure 6 and Figure 7). This action will result in significant shortening of the underground station, thus reducing construction costs and impacts to traffic and disruption to the surrounding streets and businesses during construction due to a smaller construction footprint along Wilshire Boulevard and less truck trips needed for hauling excavated material.

# 2.0 EVALUATION OF ENVIRONMENTAL IMPACTS

This section demonstrates compliance with Sections 15162 – 15164 of the CEQA Guidelines. Each of the conditions identified in Sections 15162 - 15164 of the CEQA Guidelines is satisfied based on the following:

1. The changes to Section 2 of the Westside Purple Line Extension Project, as described in Section 1.3 Proposed Project Modifications, would not result in new significant environmental effects. The proposed relocation of the Century City Constellation Station construction staging areas results in the same types of construction-related impacts as disclosed in the Final EIS/EIR. The relocation and changes in construction staging areas and activities, including use of an access shaft and materials conveyor systems, would not generate significant new environmental impacts. Implementation of appropriate mitigation measures identified in the Final EIS/EIR would minimize and/or eliminate the potential impacts associated with the proposed project changes. In addition, elimination of the train cross-over structure east of the Wilshire/Rodeo Station would result in significant shortening of the underground station, thus reducing construction costs and impacts to traffic and disruption to the surrounding streets and businesses during construction.

   With the necessary relocation of staging areas, several construction activities, not previously included in the Final EIS/EIR would be required, including construction of an access shaft, launch of the TBM from Constellation Boulevard, and use of a materials conveyor system. Since the majority of Area 1 will no longer be available for construction staging and removal of excavated materials, a temporary access shaft, up to 80 feet in diameter will be constructed in Area 2 to provide access to the tunnel head for workers and materials and to remove excavated material from the tunnel. Because Areas 2 and 3 are not adjacent to each other, excavated material will likely be moved between the access shaft in Area 2 and staging area in Area 3 via an enclosed conveyor system. The conveyer will be in operation for a period of approximately three years and located along a new temporary easement to be acquired by Metro. The relocation of construction activities and required use of an access shaft and conveyor system would not generate any new significant impacts.

   Use of the Metro bus layover site on the southeast corner of Century Park West and Constellation Boulevard for materials and equipment storage during the seven year construction period would require the construction of a temporary bus layover site on Santa Monica Boulevard. The temporary bus layover site would be approximately 250 feet long and 12 feet wide and provide parking for up to five buses between the eastbound lanes of Santa Monica Boulevard and the dedicated bus lane. It would be constructed in the landscaped median of Santa Monica Boulevard between Avenue of the Stars and Century Park East. Also included would be restroom facilities for Metro bus operators. The change in bus layover location will require a minor reroute of the three affected bus lines. Since the proposed terminal will be located near the existing layover location, the impact on existing bus operations will be minimal and patrons will still be able to use a number of the existing bus stops in the area. The temporary use of the Metro bus layover site and construction of a temporary layover site on Santa Monica would not significantly impact bus operations or generate any new impacts.

2. The circumstances and conditions in the area of the Century City Constellation Station area are primarily unchanged from what was analyzed in the Final EIS/EIR, with one notable exception, which is the construction of an inpatient rehabilitation facility at 2080 Century Park East. Located immediately south of staging Area 3, the former physician-run hospital at 2080 Century Park East

that has been closed since 2008, is being remodeled to become a new inpatient rehabilitation facility with a tentative opening date of March 2016. The nine story rehabilitation facility was not in operation at the time of the EIS/EIR analysis. Therefore, the analysis of the adjacent construction staging area did not assess potential impacts to the facility. The 138 bed facility will provide inpatient rehabilitation services. Adjacent to the building, construction staging Area 3 will primarily be used for the temporary storage of excavated material which will then be hauled away for off-site disposal. Area 3 will also be used for storage of materials and as the location of equipment required for tunnel and station construction, and for the contractor's office, maintenance shops, and parking. There is no change to the truck haul routes to be used for construction of the Century City Constellation Station identified in the Final EIS/EIR. Construction related activities will be in operation at this site for approximately seven years. Based on the analysis of construction activities in Area 3, there would be no significant impacts to the new rehabilitation facility located immediately south of the site.

3. There is no substantial new information. The proposed changes to the Century City Constellation Station construction staging does not constitute substantial new information as defined in the CEQA Guidelines. The proposed changes would not result in any additional significant impacts beyond those disclosed in the Final EIS/EIR. All significant impacts identified in the Final EIS/EIR will remain the same or will be mitigated as described in the Mitigation Monitoring Reporting Plan (Appendix B). Impacts associated with changed construction conditions would be mitigated and or minimized to a less than significant level.

## 2.1 Comparison of Project to Previous Findings

The findings of the Final EIS/EIR and any associated mitigation measures are summarized to provide a basis of comparison of the impacts associated with the proposed project modifications. Generally, impacts associated with the proposed project modifications remain consistent with the findings of the Final EIS/EIR. The relocation of construction staging areas for the Century City Constellation Station would not result in long-term operational impacts. All impacts associated with the construction changes are temporary in duration from six months to seven years depending on the construction activity.

The following sections present the impacts associated with the relocation of the construction staging areas that were analyzed in this Addendum. New impacts or a change in impact severity are not expected for several resource areas identified below and these are not discussed further:

- Land use and development
- Communities and neighborhoods
- Socioeconomic characteristics
- Climate change
- Energy
- Geological resources
- Hazardous waste and materials
- Water resources

- Safety and security
- Parklands and community services and facilities
- Historic, archaeological, and paleontological resources
- Growth impacts

### 2.1.1 Transportation

#### Applicable CEQA Threshold of Significance

Would the proposed project have a new or substantially more severe impact related to an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume capacity ratio of roads, or congestion at intersections)?

The intersection level-of-service (LOS) analysis assumes that an intersection would be significantly affected by traffic volume changes if the project will cause an increase in average vehicle delay according to the following thresholds as presented in the Final EIS/EIR:

- Final LOS C – if the delay is increased by 10 or more seconds;
- Final LOS D – if the delay is increased by 7.5 or more seconds; and
- Final LOS E/F – if the delay is increased by 5 or more seconds.

The LOS definitions and ranges of delay are shown in Table 1 and represent average conditions for all vehicles at an intersection across an entire hour.

Table 1. Level-of-service Definitions for Signalized Intersections

| Level of Service | Control Delay (seconds/vehicles) | Interpretation[1] |
|---|---|---|
| A | ≤10.0 | This lese-of-service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop. Short cycle lengths may also contribute to low density. |
| B | >10.0 and ≤20.0 | This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay. |
| C | >20.0 and ≤35.0 | These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many vehicles still pass through the intersection without stopping. |
| D | >35.0 and ≤55.0 | At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. |
| E | >55.0 and ≤80.0 | These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences. |
| F | >80.0 | This level, considered unacceptable by most drivers, often occurs with oversaturation; that is, when arrival flow rates exceed the capacity of the intersection. IT may also occur at high volume-to-capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels. |

Source: *Highway Capacity Manual,* Transportation Research Board (TRB 2000)
[1]Level of Service interpretation was derived from *Highway Capacity Manual 1994,* Transportation Research Board, 1994

## Final EIS/EIR Conclusions

Chapter 3 of Final EIS/EIR concluded that traffic impacts associated with project construction include reduced roadway traffic lanes and temporary street closures which could result in major traffic disruptions and bottlenecks. As part of the project construction, full street closures would generally be limited to the nighttime and weekends. Partial street closures would be limited to nighttime, weekend, and off-peak periods, except during installation of temporary shoring where the closure would be continuous throughout the day. Potential street closure locations would be based on proposed station and station entrance construction methods, duration, and sequencing. Additionally, commercial driveways may be subject to reduced access around construction sites. Emergency vehicle access (e.g., police, fire and rescue, and ambulance) in and around construction work sites may be affected by lane closures, temporary street closures, and detours.

In Section 2, under 2035 project conditions, 24 of the 83 analyzed intersections (29 percent) would operate at an acceptable level of service (LOS) D or better in the A.M. peak hour. The remaining 59 intersections (71 percent) would operate at LOS E or F (deficient LOS) during the A.M. peak hour. Twenty-four (24) of the 83 Section 2 analyzed intersections (29 percent) would operate at an acceptable LOS D or better in the P.M. peak hour. The remaining 59 intersections (71 percent) would operate at LOS E or F (deficient LOS) during the P.M. peak hour. By 2035, the majority of study intersections would operate under congested conditions (LOS F) during peak hours both with and without the project.

Temporary street closures would require temporary rerouting of bus lines and bus stop locations, which would add transit travel time for bus riders. Before implementation of changes that affect bus operations and/or stop locations, transit providers would be contacted at least 100 days in advance.

These impacts, even with implementation of mitigation would remain as temporary significant impacts. The Final EIS/EIR stated that as construction details are further defined, additional traffic projections would be conducted to determine the expected traffic volumes at evaluated intersections and to identify if additional mitigation, beyond what was previously identified, would be necessary.

## Proposed Project Modifications

As noted above, the approximate 5.5 acre construction staging site identified in Area 1 had sufficient space available for a tunnel excavation operation, construction staging, parking, storage, and other work areas. Due to the loss of full use of Area 1, the TBM will be launched from the station excavation along Constellation Boulevard. This will require the full closure of approximately 200 feet of the eastern end of Constellation Boulevard between Century Park East and the first driveway on the north side of the street for approximately six to nine months for installation of the soldier piles, installation of the decking, excavation of the launch box at the east end of the station excavation, and assembly of the TBM.

Table 2 provides a summary of the expected changes from the existing 2015 level of service (LOS) at key intersections around the Century City Constellation Station during the approximate six to nine months that the eastern portion of Constellation Boulevard is closed to traffic.

Table 2. LOS Changes at Key Intersections

| Intersection | Existing Conditions (2015) | | | | 200 Foot Full Closure of Constellation Boulevard | | | |
|---|---|---|---|---|---|---|---|---|
| | A.M. Peak Hour | | P.M .Peak Hour | | A.M. Peak | | P.M. Peak | |
| | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay |
| Century Park East/ Santa Monica Blvd | F | 141.9 | F | 117.9 | F | 102.8 | F | 204.7 |
| Century Park East/ Constellation Blvd | C | 30.0 | D | 39.4 | A | 7.5 | A | 6.1 |
| Century Park East/ Olympic Blvd | D | 52.6 | D | 53.3 | E | 65.7 | D | 49.0 |
| Avenue of the Stars/ Santa Monica Blvd | F | 143.3 | F | 115.0 | F | 190.5 | F | 133.9 |
| Avenue of the Stars/ Constellation Blvd | D | 35.8 | C | 31.7 | F | 127.6 | F | 93.7 |
| Avenue of the Stars/ WB Olympic Blvd | B | 17.1 | A | 7.9 | C | 32.5 | A | 8.7 |
| Avenue of the Stars/ EB Olympic Blvd | D | 41.7 | C | 30.5 | F | 103.5 | E | 73.2 |
| Century Park West/ Santa Monica Blvd | F | 139.1 | F | 145.6 | F | 136.9 | F | 157.8 |
| Century Park West/ Constellation Blvd | A | 9.1 | C | 35.0 | B | 11.5 | D | 37.3 |
| Century Park West/ Olympic Blvd | F | 82.6 | E | 79.5 | F | 81.0 | F | 79.8 |

Source: *Traffic Management Plan (Draft)*, Parsons Brinckerhoff 2015

The temporary closure and diversion of traffic from the eastern end of Constellation Boulevard, would result in the three intersections along Santa Monica Boulevard (at Century Park East, Avenue of the Stars, and Century Park West) continuing to operate at LOS F during both the A.M. and P.M. peak hours. Changes in LOS would occur at seven of the intersections with four intersections, Century Park East/Olympic Boulevard, Avenue of the Stars/Constellation Boulevard, Avenue of the Stars/westbound Olympic Boulevard, and Century Park West/Constellation Boulevard, worsening in the A.M. peak. Four intersections (Avenue of the Stars/Constellation Boulevard, Avenue of the Stars/eastbound Olympic Boulevard, Century Park West/Constellation Boulevard, and Century Park West/Olympic Boulevard) would worsen in the P.M. peak. In addition, the LOS at Century Park East/Constellation Boulevard would improve in both the A.M. and P.M. peak periods since traffic would not be allowed to turn onto Constellation Boulevard from Century Park East. The remaining study intersections would continue to operate at LOS D or better during both peak hours.

The closure of a portion of one northbound lane on Century Park East to accommodate the materials handling corridor between Areas 2 and 3 would have minimal impacts to traffic operations along Century Park East. During the time that the lane on Century Park East is closed, the expected LOS at the three intersections along the street (at Santa Monica, Constellation Boulevard, and Olympic Boulevard) would generally remain the same in the A.M. peak period. Over the course of the five year period that the lane is closed to traffic, the Century Park East intersection at Constellation would fluctuate from LOS C to A, while the intersection at Olympic would fluctuate between LOS D and E depending on the other traffic control actions occurring in the area. For the P.M. peak period, the LOS for the three intersections along Century Park East would also generally remain the same, except there would be some improvements at Century Park East/Constellation Boulevard throughout the period of the lane closure. Pedestrian traffic would be detoured around the closed portion of Century Park East.

The proposed changes would affect transit operations in the vicinity of the Century City Constellation Station. The use of the existing Metro bus layover site at Century Park West/Constellation Boulevard would require Metro bus lines 16, 316, and 28 to use the temporary bus layover to be constructed along Santa Monica Boulevard. The temporary layover would be constructed in the median of Santa Monica Boulevard and would not affect existing traffic lanes. The change in bus layover location would require minor route changes in the operations of each of the affected bus lines. In addition, the materials handling corridor to be placed along a portion of the northbound side of Century Park East would require the temporary relocation of a bus stop serving Metro line 28 and LADOT Commuter Express line 534.

### Current Project-Specific or Modified Mitigation Measures:

As previously discussed, the transportation impacts associated with project construction would remain temporarily significant even following implementation of mitigation.

Implementation of the mitigation measures previously identified in the Final EIS/EIR will minimize the transportation related impacts associated with the temporary full closure of 200 feet of Constellation Boulevard, the temporary lane closure on Century Park East, and the temporary relocation of the Metro bus layover area. These measures include the following:

**TCON-1** Traffic Control Plans: Site-specific traffic control plans will be developed to minimize construction for each work zone location. These locations will include, but not be limited to utility relocations, stations, crossovers, laydown areas, TBM launch and removal locations, emergency exit shafts, station entrances, drop pipes, and grout injection. Traffic control plans will follow state and local jurisdiction guidelines and standards. Traffic control plans will be developed for Wilshire, Santa Monica, and Constellation Boulevards and north-south streets including, but not limited to, La Brea Avenue, Fairfax Avenue, La Cienega Boulevard, Rodeo Drive, Beverly Drive, Canon Drive, Century Park East, Avenue of the Stars, Westwood Boulevard, Veteran Avenue, Sepulveda Boulevard, I-405 ramps to/from eastbound Wilshire Boulevard, and Bonsall Avenue. Traffic control plans will encompass the following:

- Minimum lane widths;
- Number of available travel lanes;
- Number, length, and location of temporary right and left-turn lanes;
- Temporary street closures and detour routes;
- Traffic-control devices;
- Temporary traffic signals and street lighting;
- Temporary pedestrian access and routes;
- Temporary bicycle routes;
- Temporary driveway access;
- Temporary business access; and
- Construction site phasing.

Advanced traffic control will extend beyond one arterial street on each side of each station construction location. Business owners will be interviewed to identify the type of business, delivery and shipping schedules, and critical days/times of year for the business. Specific street closures will be developed in close coordination with the local jurisdictions during the Final Design phase.

**TCON-3 Emergency Vehicle Access**: Emergency vehicle access will be maintained at all times to the construction work site, adjacent businesses, and residential neighborhoods.

**TCON-4 Transportation Management Plan**: Once subway construction sequencing/phasing and the truck haul routes have been concurred upon by Metro and reviewed by local jurisdictions and Caltrans, an overall LPA Transportation Management Plan (TMP) will be developed with and approved by Metro and other appropriate agencies. The TMP will include the following:

- Public information (e.g., media alerts, website);
- Traveler information (e.g., traffic advisory radio, changeable message signs [CMS]);
- Incident management (e.g., TMP coordination, tow truck services);
- Construction (e.g. detour routes, haul routes, mitigation, construction times);
- Demand management (e.g., carpooling, express bus service, variable work hours, parking management); and
- Coordination with concurrent LPSs.

**TCON-6 Temporary Bus Stops and Route Diversions**: Construction impacts to local and regional transit operations will be mitigated to minimize impacts to the degree possible at each station construction location. Impacts will be mitigated through, but not limited to, the use of temporary relocated bus stops and temporary route diversions. Impacts will be coordinated with each transit agency and/or provider.

**TCON-9 Construction Worker Parking**: Metro will require that all construction contractors identify adequate off-street parking for construction workers at Metro approved locations.

**TCON-10 Pedestrian Routes and Access**: Safe pedestrian routes and access will be provided through and/or adjacent to construction work areas. Pedestrian routes and access, including temporary pedestrian facilities, will comply with the requirements of the ADA and must be properly signed and lighted.

**TCON-11 Bicycle Paths and Access**: Bicycle traffic (e.g., paths, lanes, and routes) will be maintained safely through and adjacent to construction work areas. If bicycle traffic cannot be maintained, then alternative temporary bicycle routes will be identified, signed, and lighted.

In addition to the measures presented in the Final EIS/EIR, several traffic management strategies have been identified as part of the Draft TMP (Appendix C). These strategies are closely related to TCON-4 and involve coordination and outreach with the public. The strategies include:

- Implementation of a public awareness campaign to educate motorists, merchants, residents, elected officials and governmental agencies about construction activities and associated impacts. The PAC will work to enhance public acceptance, tolerance and cooperation while helping to reduce the traffic demand in the construction zone by encouraging motorists to take alternate routes or to

travel outside of closure hours. Specific elements that may be used to accomplish these objectives include press releases/special alerts to news outlets and traffic reports which will be sent to inform motorists about construction activities. Paid advertising may also be used to inform motorists about construction activities.

- Brochures and other project notices will be prepared by Metro staff, in coordination with the contractors, to keep the public (residents, businesses, travelers, etc.) informed about the project and anticipated closures and impacts.
- Press releases and media alerts will be prepared and distributed by Metro staff in coordination with the contractors, as required or needed throughout the length of project.
- Advertisements for public meetings regarding the project will be printed in a number of publications and distributed throughout the cities surrounding the project areas.
- Public meetings will be held to provide information about the project and anticipated closures/impacts to any and all interested parties including, political offices, residents, motorists, community groups, school districts, developers, truckers, etc.
- The Metro project website (www.metro.net) will be the primary information source for up-to-date project information. The project website will contain information such as traffic alerts, current schedule, news related to the project, alternatives developed by the community, past and future meetings/hearings, frequently asked questions (FAQs), and links to major stakeholders of the project.
- A Motorist Information System will be in place during construction in order to enable motorists to make informed decisions about their travel plans and options with real-time traffic information. The key components of this system include changeable message signs (CMS), portable CMS (PCMS), and ground mounted signs, that will provide real time traffic information to motorists approaching the construction zone.
- The project will require PCMS's at various locations during construction. PCMS's should be placed and operated as needed to inform motorists of construction activities and closures. Additional PCMS's should be made available during the project and may be placed and operated as deemed necessary by the contractor. During construction, all PCMS's should be checked nightly and fixed or replaced as needed to ensure that they are in a proper working condition and that their visibility is not compromised.
- Ground mounted signs will be used during the construction of the project and these signs shall be placed at appropriate locations as specified by the contractor to guide motorists through the construction zones and detour routes.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant impacts related to transportation, circulation, and parking than previously addressed in the Final EIS/EIR.***

### 2.1.2 Acquisition and Displacement of Existing Uses

#### Final EIS/EIR Conclusions

Section 4.2.2 of the Final EIS/EIR discusses the land ownership and leasing agreements that will change due to the Project. The Final EIS/EIR indicated that there would be between 5 and 25 full property

acquisitions, one to four permanent easements required for station entrances and construction staging, and up to four temporary construction easements required for Section 2. Section 2 would also require 32 permanent underground easements for the subway tunnel.

At the Century City Constellation Station site, identified temporary construction easements include parcels at 1940, 1950 and 2040 Century Park East, in addition to a permanent easement for the station entrance at 10131 Constellation Boulevard.

## Proposed Project Modifications

The change in construction staging areas for the Century City Constellation Station will require a new temporary construction easement for materials storage and construction offices at the Metro bus layover site located at the southeast corner of Century Park West and Constellation Boulevard. To offset the loss of the five bus layover spaces, a new temporary layover area will be created in the median of Santa Monica Boulevard. Following construction of the Century City Constellation Station, the site will return to use as a Metro bus layover. In addition, access to the fuel cell installation located on the site will be maintained during the entire seven years the site is used by Metro for construction-related purposes.

A temporary construction easement of up to five years may be used along the eastern portion of the property at 2010 Century Park East (AT&T building) for placement of the conveyor system between staging Areas 2 and 3. The conveyor system would either run across the top of the existing parking structure located on the east side of the AT&T building or, should agreement be reached with the property owners for removal of the parking structure, the conveyor would connect the shaft in Area 2 to Area 3 at ground level. In addition to the installation and operation of the conveyor system, the Project will seek to acquire a temporary construction easement to a larger area of the parking lot to use for construction staging for the duration of the Project.

If use of the eastern portion of the AT&T property is not feasible, the conveyor system would be placed in a temporary construction easement, lasting approximately five years, along the west side of the AT&T building in a materials handling corridor along an approximately 400 foot long section of Century Park East. The easement would have a width encompassing one northbound traffic lane and sidewalk in the public right-of-way along the eastern side of Century Park East, and the space between the AT&T building and the eastern edge of the sidewalk.

In addition, temporary and permanent easements will be needed for ventilation and exhaust shafts within the Westfield Mall property located along the north side of Constellation Boulevard for the purpose of constructing ventilation ducts to service the subway. Metro is currently in discussions with the property owners regarding the placement of the station appendages (exhaust and vent shafts) within the Westfield Mall property.

## Current Project-Specific or Modified Mitigation Measures:

Implementation of mitigation measure CN-3, previously identified in the Final EIS/EIR, will provide mitigation for the required temporary and permanent easements.

**CN-3 Compensation for Easements**: For easements, Metro will appraise each property to determine the fair market value of the portion that will be used either temporarily during construction or permanently above and below ground. As required by both the Uniform Relocation Assistance and Real Property

Acquisition Act and California Relocation Assistance Act, just compensation, which will not be less than the approved appraisal, will be made to each displaced property owner.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant impacts related to acquisitions and displacements than previously addressed in the Final EIS/EIR.***

### 2.1.3 Visual and Aesthetics

#### Applicable CEQA Threshold of Significance

As identified in the Final EIS/EIR, visual impacts during construction will be considered significant if the construction of the project results in any of the following:

- Conflicts with or complements the existing visual character;
- Changes in visual quality;
- Effects on viewers (considers viewer sensitivity);
- Intrudes on or blocks sensitive views (emphasizes views protected by local jurisdictions);
- Creates shadows; or
- Creates new light or glare source.

#### Final EIS/EIR Conclusions

Construction-related visual impacts of the project are discussed in Section 4.15.3 of the Final EIS/EIR. The Century City area is described as a dense auto-oriented urban center with tall buildings and wide boulevards. The high-rises in the area are a visual landmark and prominent buildings contribute to the visual character. The area lacks strong consistent architectural and urban design features. Project-related construction activities would result in the introduction of heavy construction equipment, stockpiled construction-related materials, noise barriers, erosion devices, excavated materials, new lighting sources, and removal of trees from some areas which conflicts with the existing visual character and results in a change in visual quality for the areas adjacent to the construction sites. During the construction period, these visual elements will temporarily degrade the physical character of the station and staging areas, resulting in adverse effects without mitigation.

#### Proposed Project Modifications

The visual effects associated with the construction staging changes at the Century City Constellation are similar to what was identified in Section 4.15.3 of the Final EIS/EIR because project-related construction activities include the use of heavy construction equipment, stockpiled construction-related materials, noise barriers, erosion devices, excavated materials, and new lighting sources. The implementation of the mitigation measures identified below would reduce the anticipated visual impacts so that no adverse effects remain.

The change in visual conditions associated with the changes in the construction staging areas for the Century City Constellation Station are described below.

The construction of an approximate 80 feet in diameter shaft to access the tunnel and installation of a conveyor to move material out of the tunnel was not included in the Final EIS/EIR as part of the activities

in Area 2. With Area 2 surrounded by a 20 feet high temporary barrier, the shaft opening would likely be visible from only the upper floors of the office building immediately north of Area 2 (1888 Century Park East). The shaft opening would not be visible to pedestrians or motorists on Century Park East or students and faculty at Beverly Hills High School.

If the AT&T building parking structure can be removed, the conveyor system and temporary pipe racks carrying utility lines, water, grout, foam, compressed air, etc. between Areas 2 and 3 would be placed at ground level and the horizontal conveyor between the tunnel access shaft Area 3 would rise less than 10 feet above ground level. Under this scenario the conveyor system would not be visible to the surrounding properties except the upper floors of the office building immediately north of Area 2 (1888 Century Park East) and the rehabilitation facility south of Area 3 (2080 Century Park East). Removal of the parking structure would not substantially alter the visual character of the surrounding area as construction activities and demolition of structures are already planned to occur in the immediate vicinity, including the demolition of 1940 Century Park East and parking garage of the AAA building (1950 Century Park East) immediately north of the AT&T parking structure. The vertical conveyor at the shaft may exceed the height of the 20 foot barrier and require additional screening.

If the AT&T building parking structure is not demolished and the conveyor system and temporary pipe racks must span the top level of the three story parking structure, a taller vertical conveyor from the shaft would be required. In order to span the parking structure, the shaft conveyor system may be higher than the standard 20 foot barrier surrounding the site and would therefore be visible to both the upper floors of the office building immediately north of the Area 2 and Beverly Hills High School located immediately east of the staging areas and conveyor system.

If it is not feasible to install the conveyor system on the east side of the AT&T building, the system would be elevated approximately 15 feet high across the west side of the AT&T building as part of a materials handling corridor. Access to the AT&T building would be maintained. Installation of the elevated conveyor and use of an approximate 400 foot portion of Century Park East for movement of materials and equipment would present a new visual change for viewers along Century Park East. In addition, up to four large trees along Century Park East may be removed to accommodate the conveyor system and materials handling corridor. Following construction, the area would be restored and use of the sidewalk and traffic lane returned.

In order to minimize the visual intrusion of the shaft conveyor system, the structure will be screened to reduce effects on adjacent viewers. In addition, the horizontal conveyor system between Area 2 and Area 3 would be enclosed to minimize the visual and noise intrusion of the system no matter which option for its placement is used.

Construction staging activities in Area 3 will create visual impacts to the new long-term rehabilitation facility at 2080 Century Park East. The nine-story structure is located immediately south of Area 3 with the views from the north side of the building impacted by construction staging activities in Area 3, including hauling operations removing excavated material and equipment and materials storage. In addition, construction-related lighting sources would be introduced in Area 3, which may potentially affect the north side of the rehabilitation facility. There are several large trees along the northern edge of the medical facility property that would help provide some minimal screening of Area 3.

The use of the Metro bus layover at the corner of Century Park West and Constellation Boulevard (Area 5) will create a new temporary visual change for the office building (10250 Constellation Boulevard)

located east of the site, primarily the offices facing west. With the bus layover site surrounded by a 20 foot high barrier, only the upper floors of the office building, which would overlook the materials and equipment storage in Area 5, would be affected.

Installation of the temporary Metro bus layover site in the Santa Monica Boulevard median may require the removal of up to four small trees and landscaping within the median. The removal of the trees and vegetation would be a noticeable visual change for those motorists traveling east on Santa Monica Boulevard. Once use of the temporary layover site is no longer needed, the median would be restored to previous conditions.

### Current Project-Specific or Modified Mitigation Measures:

Implementation of the mitigation measures previously identified in the Final EIS/EIR will minimize the temporary visual related impacts associated with the relocation of construction staging activities and introduction of new visual elements, including the access shaft and conveyor system, to the Century City Constellation Station area. These measures include:

**CON – 2 Timely Removal of Erosion Devices**: Visually obtrusive erosion-control devices, such as silt fences, plastic ground cover, and straw bales will be removed as soon as the area is stabilized.

**CON-3 Location of Construction Materials**: Stockpile areas will be located in less visibly sensitive areas and, whenever possible, not be visible from the road or to residents and businesses. Limits on heights of excavated materials will be developed during design based on the specific area available for storage of material and visual impact.

**CON-4 Construction Lighting**: Lighting will be directed toward the interior of the construction staging area and be shielded so that it will not spill over into adjacent residential areas. In addition, temporary sound walls of Metro approved design will be installed at station and work areas. These will block direct light and views of the construction areas from residences.

**CON-5 Screening of Construction Staging Areas**: Construction staging areas will be screened to reduce visual effects on adjacent viewers.

**VIS-2 Replacement for Tree Removal**: Where mature trees are removed, replacement with landscape amenities of equal value will be incorporated into final designs, where feasible, to enhance visual integrity of the station area.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant impacts related to visual resources than previously addressed in the Final EIS/EIR.***

## 2.1.4 Air Quality

### Applicable CEQA Threshold of Significance

As outlined in the Final EIS/EIR, the CEQA significance criteria for the project was established by the South Coast Air Quality Management District (SCAQMD). The project would result in significant impacts if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

## Final EIS/EIR Conclusions

Construction period air quality impacts are discussed in Section 4.15.3 of the Final EIS/EIR. The results show that SCAQMD thresholds will be exceeded for all pollutants over the duration of the construction period. The majority of emissions will occur as a result of the removal and transport of soils for disposal from tunneling and excavation activity. Implementation of mitigation measures will help reduce air quality particulate matter impacts, but given the construction plan, it is unlikely that the levels will be below the SCAQMD thresholds during construction and therefore, adverse effects will remain after mitigation.

In addition, demolition, grading, stockpiling, and hauling soil will contribute to particulate matter emissions affecting the local environment. At TBM entry and exit sites where dirt handling exists, the SCAQMD thresholds for $PM_{10}$ will be exceeded if not mitigated.

## Proposed Project Modifications

An assessment of the air quality construction impacts was conducted to account for the changed construction conditions at the Century City Constellation Station (Appendix D). The assessment utilized California Air Resources Board (CARB) EMFAC2011 mobile source emission factors, and the SCAQMD OFFROAD emission factors. SCAQMD OFFROAD was used to develop emission factors from off-road construction equipment. Using these various data sources, daily construction emission levels were developed. The values were compared to the air quality construction significance thresholds shown in Table 3 to determine if the project would meet or exceed these values (Table 4). As the construction schedule is still preliminary at this time, construction emissions were estimated for each major activity.

Table 3. SCAQMD Air Quality Significance Thresholds

| Mass Daily Thresholds[1] | | |
|---|---|---|
| Pollutant | Construction[2] | Operation[3] |
| Nitrogen Oxides (NOx) | 100 lbs/day | 55 lbs/day |
| Volatile Organic Compounds (VOC) | 75 lbs/day | 55 lbs/day |
| Respirable Particulate Matter ($PM_{10}$) | 150 lbs/day | 150 lbs/day |
| Fine Particulate Matter ($PM_{2.5}$) | 55 lbs/day | 55 lbs/day |
| Sulfur Oxides (SOx) | 150 lbs/day | 150 lbs/day |
| Carbon Monoxide (CO) | 550 lbs/day | 550 lbs/day |
| Lead (Pb) | 3 lbs/day | 3 lbs/day |
| Toxic Air Contaminants (TACs), Odor and GHG Thresholds | | |
| TACs (including carcinogens and non-carcinogens) | Maximum Incremental Cancer Risk ≥ 10 in 1 million<br>Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Hazard Index ≥ 1.0 (project increment) | |
| Odor | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| GHG | 10,000 MT/yr CO2eq for industrial facilities | |
| Ambient Air Quality for Criteria Pollutants[4] | | |
| $NO_2$<br><br>1-hour average<br>annual average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>0.18 ppm (state)<br>0.03 ppm (state) and 0.0534 ppm (federal) | |
| $PM_{10}$<br>24-hour average<br>annual average | 10.4 µg/m3 (construction)[5] & 2.5 µg/m3 (operation)<br>1.0 µg/m3 | |
| $PM_{2.5}$<br>24-hour average | 10.4 µg/m3 (construction)5 & 2.5 µg/m3 (operation) | |
| $SO_2$<br>1-hour average<br>24-hour average | 0.25 ppm (state) & 0.075 ppm (federal-99th percentile)<br>0.04 ppm (state) | |
| Sulfate<br>24-hour average | 25 µg/m3 (state) | |
| CO<br><br>1-hour average<br>8-hour average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| Lead<br>30-day average<br>Rolling 3-month average | 1.5 µg/m3 (state)<br>0.15 µg/m3 (federal) | |

SCAQMD, March 2015, http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2
[1]Source: SCAQMD CEQA Handbook (SCAQMD, 1993).
[2]Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[3]For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[4]Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[5]Ambient air quality threshold based on SCAQMD Rule 403.
KEY: lbs/day = pounds per day; ppm = parts per million; µg/m3 = microgram per cubic meter;
≥ = greater than or equal to; MT/yr $CO_2$eq = metric tons per year of $CO_2$ equivalents

Based on the analysis, the changed construction scenario at the Century City Constellation Station would exceed SCAQMD thresholds for $PM_{10}$ as shown in Table 4. The increase in $PM_{10}$ is due to the overlap of station box dirt handling and tunnel excavation dirt handling.

Table 4. Estimated Highest Daily Construction Impacts for Century City Constellation Station Construction (lbs/day) – Before Mitigation

| Activity | VOC | CO | NOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|
| Construction Equipment | 10 | 50 | 65 | 3 | 3 |
| Dust Generated from Dirt Handling (Excavation, Backfilling, etc.) | | | | 158 | 33 |
| Mobile Sources (Deliveries, worker trips, hauling of material, etc.) | 2 | 16 | 33 | 2 | 1 |
| Highest Daily Total | 12 | 66 | 98 | 163* | 37 |
| SCAQMD Thresholds | 75 | 550 | 100 | 150 | 55 |

Note: Because the maximum daily emissions from construction equipment, dust generation, and mobile sources do not occur on the same day, the highest daily totals (which are presented) are less than the sum of the individual source maximums.
*Exceeds threshold

With implementation of the mitigation measures previously identified in the Final EIS/EIR, $PM_{10}$ and $PM_{2.5}$ will be reduced and SCAQMD thresholds will not be exceeded for any pollutant (Table 5).

Table 5. Estimated Highest Daily Construction Impacts for Century City Constellation Station Construction (lbs/day) – After Mitigation

| Activity | VOC | CO | NOx | PM10 | PM2.5 |
|---|---|---|---|---|---|
| Construction Equipment | 10 | 50 | 65 | 3 | 3 |
| Dust Generated from Dirt Handling (Excavation, Backfilling, etc.) | | | | 26 | 5 |
| Mobile Sources (Deliveries, worker trips, hauling of material, etc.) | 2 | 16 | 33 | 2 | 1 |
| Highest Daily Total* | 11 | 67 | 98 | 31 | 9 |
| SCAQMD Thresholds | 75 | 550 | 100 | 150 | 55 |

Note: Because the maximum daily emissions from construction equipment, dust generation, and mobile sources do not occur on the same day, the highest daily totals (which are presented) are less than the sum of the individual source maximums.

## Current Project-Specific or Modified Mitigation Measures:

While the analysis indicates that there would be a slight increase in $PM_{10}$ which would exceed the SCAQMD threshold, implementation of various mitigation measures previously identified in Final EIS/EIR will reduce the levels to below the threshold. These measures include the following:

**CON-6 Meet Mine Safety (MSHA) Standards**: Tunnel locomotives (hauling spoils and other equipment to the tunnel head) will be approved by Metro to meet mine safety (MSHA) standards.

**CON-7 Meet SCAQMD Standards**: Metro and its contractors will set and maintain equipment to meet SCAQMD standards, including NOx.

**CON-8 Monitoring and Recording of Air Quality at Worksites**: Monitoring and recording of air quality at the worksites will be conducted. Construction will be altered as required to maintain a safe working atmosphere. The working environment will be kept in compliance with federal, state, and local regulations, including SCAQMD and Cal/OSHA standards.

**CON-9 No Idling of Heavy Equipment**: Metro specifications will require that contractors not unnecessarily idle heavy equipment.

**CON-10 Maintenance of Construction Equipment**: Metro will require its contractors to maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies.

**CON-11 Prohibit Tampering of Equipment**: Metro will prohibit its contractors from tampering with engines and require continuing adherence to manufacturer's recommendations.

**CON-12 Use of Best Available Emissions Control Technologies**: Metro will encourage its contractors to lease new, clean equipment meeting the most stringent applicable federal or state standards (e.g., Tier 3 or greater engine standards) or best available emissions control technologies on all equipment.

**CON-13 Placement of Construction Equipment**: Construction equipment and staging zones will be located away from sensitive receptors and fresh air intakes to buildings and air conditioners.

**CON-14 Measures to Reduce the Predicted PM10 Levels**: Mitigation measures such as watering, the use of soil stabilizers, etc. will be applied to reduce the predicted PM10 levels to below the SCAQMD daily construction threshold levels. A watering schedule will be established to prevent soil stockpiles from drying out.

**CON-15 Reduce Street Debris**: At truck exit areas, wheel washing equipment will be installed to prevent soil from being tracked onto city streets, and followed by street sweeping as required to clean streets.

**CON-16 Dust Control During Transport**: Trucks will be covered to control dust during transport of spoils.

**CON-17 Fugitive Dust Control**: To control fugitive dust, wind fencing and phase grading operations, where appropriate, will be implemented along with the use of water trucks for stabilization of surfaces under windy conditions.

**CON-18 Street Watering**: Surrounding streets at construction sites will be watered by trucks as needed to eliminate air-borne dust.

**CON-19 Spillage Prevention for Non-Earthmoving Equipment**: Provisions will be made to prevent spillage when hauling materials and operating non-earthmoving equipment. Additionally, speed will be limited to 15 mph for these activities at construction sites.

**CON-20 Spillage Prevention for Earthmoving Equipment**: Provisions will be made to prevent spillage when hauling materials and operating earthmoving equipment. Additionally, speed will be limited to 10 mph for these activities at construction sites.

**CON-21 Additional Controls to Reduce Emissions:** EPA-registered particulate traps and other appropriate controls will be used where suitable to reduce emissions of particulate matter and other pollutants at the construction site.

Additionally, to minimize any potential fugitive dust associated with operation of the conveyor system, the vertical shaft conveyor at the tunnel access shaft will be screened and the conveyor system between Area 2 and Area 3 will be enclosed.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant impacts related to air quality than previously addressed in the Final EIS/EIR.***

### 2.1.5 Noise and Vibration

#### Applicable CEQA Thresholds of Significance

The criteria for assessing noise and vibration impacts for construction are based on the City of Los Angeles CEQA Thresholds Guide, City of Los Angeles noise ordinance, City of Beverly Hills noise ordinance, County of Los Angeles noise ordinance, and the Metro Baseline Specifications Section 01 56 19, Construction Noise and Vibration Control. Residential land uses (where people sleep) or institutional land uses such as theatres, churches, or schools are considered to be sensitive receivers. Commercial and industrial land uses are not considered sensitive. A summary of the construction noise limits for the City of Los Angeles and the City of Beverly Hills is presented in Table 6.

Table 6. Summary of Construction Noise Limits

| Construction Activity | Noise Limit[1], dBA |
|---|---|
| City of Los Angeles Daytime (7:00 A.M.-10:00 P.M.), general activities in or within 500 feet of a residential zone | 75 dBA at a distance of 50 feet |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), steady high-pitch noise or repeated impulsive noises | 70 dBA |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), less than 15 minute duration in a period of 60 consecutive minutes | 80 dBA |
| City of Los Angeles Nighttime (9:00 P.M.-7:00 A.M.), all activities | Nighttime Ambient + 5dB |
| City of Beverly Hills Daytime (8:00 A.M.-6:00 P.M.), all activities | Ambient +5 dB |
| City of Beverly Hills Evening (6:00 P.M.-9:00 P.M.), all activities | Evening Ambient + 5dB |
| City of Beverly Hills Nighttime (9:00 P.M.-8:00 A.M.), all activities | Nighttime Ambient + 5 dB |

Note: [1]Noise limit applies to the façade of the closest noise sensitive property.

#### Final EIS/EIR Conclusions

Section 4.15.3 of the Final EIS/EIR presents the construction-related noise and vibration impacts. Noise from at-grade construction of the stations will be generated by heavy equipment such as bulldozers, backhoes, hauling trucks, scrapers, loaders, cranes, and paving machines. Table 7 shows the noise emission levels for typical construction equipment. Noise levels from point source stationary noise sources, such as construction equipment, decrease at a rate of 6 dB per doubling of distance. For example, a distance of 250 feet from a construction area will be 14 dB less than at 50 feet.

Table 7. Construction Equipment Noise Emission Levels

| Construction Equipment | Noise Level at 50 Feet |
|---|---|
| Roller | 74 dBA |
| Concrete Vibrator, Pump, or Saw | 76 dBA |
| Spike Driver | 77 dBA |
| Backhoe, Tie Handler | 80 dBA |
| Dozer | 81 dBA |
| Ballast Equalizer, Compactor, Concrete Pump, or Shovel | 82 dBA |
| Ballast Tamper, Crane Mobile, or Scarifer | 83 dBA |
| Tie Cutter | 84 dBA |
| Concrete Mixer, Grader, Impact Wrench, Loader, Pneumatic Tool, Tie Inserter, or Auger Drill Rig | 85 dBA |
| Crane Derrick, Jack Hammer, or Truck | 88 dBA |
| Paver or Scraper | 89 dBA |
| Rail Saw | 90 dBA |
| Pile Driver (Sonic) | 96 dBA |
| Rock Drill | 98 dBA |

Source: Federal Transit Administration Manual, Table 12-1, 2006

Based on the noise emissions presented in Table 7, all of the construction equipment will exceed the existing presumed ambient noise levels in the City of Los Angeles and will introduce new sources of noise to the immediate vicinity of the construction sites. As stated in the Final EIS/EIR, noise impacts will be reduced through implementation of the identified measures but adverse construction noise impacts will remain after mitigation in areas of concentrated construction activity including near stations, tunnel access portals, and construction laydown areas.

## Proposed Project Modifications

A construction noise impact assessment was performed for the construction staging changes at the Century City Constellation Station (Appendix E). Noise measurements at various receivers adjacent to the construction areas in the City of Los Angeles and City of Beverly Hills were taken to record the preconstruction noise environment, see Table 8.

Table 8. Pre-Construction Noise Measurement Results in the Century City Constellation Station Area

| Site No. | Measurement Location | Nighttime Leq |
|---|---|---|
| A | 1918-1952 Fox Hills Drive (MFR) | 58 dBA |
| B | 2050 Century Park West (MFR) | 59 dBA |
| C | Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars | 56 dBA |
| D | 2010 Century Park East (Offices) | 63 dBA |
| E | Century City Hospital & Medical Center, 2080 Century Park East | 63 dBA |
| F | 2160 Century Park East (MFR) | 65 dBA |
| 6 | 1888 Century Park East (Offices)[(a)] | 63 dBA |
| 7 | Century Plaza Towers, 2049 Century Park East (Offices)[(a)] | 59 dBA |
| 8 | Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard[(a)] | 56 dBA |
| 9 | Bain & Company Building, 1901 Avenue of the Stars[(a)] | 61 dBA |
| 10 | The Century, 10 West Century Drive (Offices)[(a)] | 57 dBA |
| 11 | Constellation Place, 10250 Constellation Boulevard (Offices)[(a)] | 64 dBA |

| Sites G and 5 are in the City of Beverly Hills and subject to the Beverly Hills' Noise Code | | | | |
|---|---|---|---|---|
| | | Daytime | Evening | Nighttime |
| G | 401 Shirley Place, Beverly Hills (SFR) | 68 dBA | 68 dBA | 63 dBA |
| 5 | Beverly Hills High School[(a)] | 56 dBA | 53 dBA | 51 dBA |

Notes:
[(a)] 1-hour measurements were taken at Sites 5 through 11. At these locations the daytime Leq, evening Leq, and nighttime Leq were estimated by comparing the 1-hour measurement to the same hour of the nearest 24-hour measurement location.
(b ) Nighttime is from 9:00 P.M. to 7:00 A.M as defined by the City of Los Angles Municipal Code.
MFR – Multi-Family Residences
SFR – Single-Family Residences

The predicted construction noise levels and noise limits for the various receivers adjacent to the construction areas are presented in Table 9. The information presented shows the predicted construction noise during the daytime, evening, and nighttime hours for Receivers G and 5 which are in the City of Beverly Hills, compared with the Beverly Hills Municipal Code noise limit, i.e., existing ambient noise plus 5 dB. The remaining receiver sites which are within the City of Los Angeles are presented showing the predicted daytime construction noise as compared to the Los Angeles Municipal Code noise limit of 75 dBA and the nighttime construction noise to the existing ambient noise plus 5 dB.

The analysis assumed that the following equipment is expected to be used at each of the staging areas during the nighttime hours[1]:

- Area 3: front end loader, boom crane, haul trucks, ventilation plant, compressor plant, foam plant, conveyor system, mechanical shop, and electrical shop.
- Area 2: excavator, roller compactor, dozer, tower crane, rough terrain crane, hydraulic crane, haul trucks, fork lift truck, conveyor system, concrete pump, dewatering station, pickup truck, and tunnel ventilation fans and scrubbers.
- TBM Launch Site: dozer, excavator, front end loader, boom crane, rough terrain crane, concrete pump, fork lift truck, and pickup truck.

[1] Nighttime hours are 9:00 P.M. to 7:00 A.M. for the City of Los Angeles and 6:00 P.M. to 8:00 A.M. for the City of Beverly Hills

- Century City Constellation Station Box: grader, roller compacter, dozer, excavator, front end loader, boom crane, rough terrain crane, concrete pump, haul trucks, fork lift truck, pickup truck, and ventilation fans.
- Area 5: forklift and pickup truck.

In addition, the analysis assumed a 20 foot high noise barrier around all sites except for the Constellation Boulevard Station Box and TBM Launch Site areas where a moveable noise barrier with an approximate height of 14 feet, will be used to shield the construction activities. The equipment used during nighttime hours will comply with the low noise equipment emissions limits specified in Metro's Specification Section 01 56 19 Construction Noise and Vibration Control.

As shown in Table 9, the daytime construction noise level at the Beverly Hills High School (Site 5) would exceed the noise limit by 2 dB. At all the other sites analyzed the daytime noise limits are not exceeded. At Site C, Hyatt Regency Century Plaza Hotel, the nighttime noise limit is exceeded by 2 dB. Moveable noise barriers and/or sound control curtains located closer to the construction activities at the Century City Constellation Station Box can be used to further reduce the construction noise to below the noise limit. At Site 5 the nighttime noise limit would be exceeded by 1 dB. Moveable noise barriers and/or sound control curtains located closer to the construction activities at Area 2 can be used to further reduce the construction noise to below the noise limit. At all the other sites analyzed the evening and nighttime noise limits are not exceeded.

Table 9. Century City Constellation Station Construction Noise – Leq (dBA)

| Receiver[1] | Location | Daytime Construction Noise | Daytime Noise Limit[2] | Evening Construction Noise | Evening Noise Limit[3] | Nighttime Construction Noise | Nighttime Noise Limit[4] |
|---|---|---|---|---|---|---|---|
| The following receivers are within the jurisdiction of the City of Beverly Hills | | | | | | | |
| G | 401 Shirley Place (SFR) | 45 | 73 | 40 | 73 | 40 | 68 |
| 5 | Beverly Hills High School | 63 | 61 | 57 | 58 | 57 | 56 |
| The following receivers are within the jurisdiction of the City of Los Angles | | | | | | | |
| A | 1918-1952 Fox Hills Drive (MFR) | 54 | 75 | N/A | N/A | 50 | 63 |
| B | 2050 Century Park West (MFR) | 42 | 75 | N/A | N/A | 38 | 64 |
| C | Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars | 67 | 75 | N/A | N/A | 63 | 61 |
| D | 2010 Century Park East (Offices) | 62 | 75 | N/A | N/A | 58 | 68 |
| E | Century City Hospital & Medical Center, 2080 Century Park East[5] | 67 | 75 | N/A | N/A | 54 | 68 |
| F | 2160 Century Park East (MFR) | 52 | 75 | N/A | N/A | 41 | 65 |
| 6 | 1888 Century Park East (Offices) | 63 | 65 | N/A | N/A | 50 | 68 |
| 7 | Century Plaza Towers, 2049 Century Park East (Offices) | 69 | 75 | N/A | N/A | 54 | 64 |
| 8 | Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard | 66 | 75 | N/A | N/A | 54 | 61 |
| 9 | Bain & Company Building, 1901 Avenue of the Stars | 57 | 75 | N/A | N/A | 54 | 66 |
| 10 | The Century, 10 West Century Drive (Offices) | 57 | 75 | N/A | N/A | 54 | 62 |
| 11 | Constellation Place, 10250 Constellation Boulevard (Offices) | 58 | 75 | N/A | N/A | 54 | 69 |

Notes:
[1]The location of the modeled receiver is shown on Figure 2-4 of the *Section 2 Construction Noise/Vibration Mitigation and Monitoring Plan (Draft)*.
[2] Daytime is defined as 8:00 A.M. to 6:00 P.M. by the City of Beverly Hills and 7:00 A.M. to 9:00 P.M. by the City of Los Angeles.
[3] Evening is defined as 6:00 P.M. to 9:00 P.M. by the City of Beverly Hills. The City of Los Angeles municipal code does not include evening hours.
[4] Nighttime is defined as 9:00 P.M. to 8:00 A.M. by the City of Beverly Hills and 9:00 P.M to 7:00 A.M. by the City of Los Angeles.
[5] Construction noise at Site E was modeled at street level. The analysis of the upper floor construction noise is presented in Table 11.

## Rehabilitation Facility Adjacent Area 3

As previously discussed, the long-term rehabilitation facility is a new sensitive receptor that was not analyzed as part of the Final EIS/EIR and is located immediately south of staging Area 3. Area 3 will be primarily used for day and night stockpiling and off-hauling of tunnel muck for approximately two of the

seven years the site will be used for construction staging. The site will also be used for equipment operation, material storage and contractor offices. Equipment that may be in operation on site includes a compressor plant, ventilation plant, grout plant, foam plant, conveyor system, boom crane, and front end loader. The site will include a machine shop and electrical shop. Upon completion of the tunneling operations, the site will be used to support concreting of tunnels, rail installation, and mechanical and electrical finishing. The 20 foot high noise barrier wall at the perimeter of Area 3 will shield the construction noise activities at the street level of the building resulting in an average nighttime noise level of 66 dBA which is 2 dB less than the noise limit of 68 dBA (see Table 9). Since the patient rooms of the hospital overlooking the construction site are on upper floors of the building a more detailed noise assessment was prepared for this receiver.

Ambient noise readings were taken adjacent to the long-term rehabilitation facility at 2080 Century Park East and staging Area 3. Table 10 presents the one-hour measured noise levels at the two monitoring sites adjacent to the rehabilitation facility.

Table 10. One-Hour Measured Noise Levels – Leq (dBA)

| One-Hour Measurement Period Starting at: | Site E | Site F |
|---|---|---|
| 7 P.M. | 65 | 70 |
| 8 P.M. | 63 | 69 |
| 9 P.M. | 62 | 68 |
| 10 P.M. | 61 | 67 |
| 11 P.M. | 61 | 67 |
| Midnight | 58 | 63 |
| 1 A.M. | 59 | 60 |
| 2 A.M. | 63 | 59 |
| 3 A.M. | 56 | 57 |
| 4 A.M. | 60 | 59 |
| 5 A.M. | 61 | 64 |
| 6 A.M. | 70 | 69 |
| 7 A.M. | 68 | 70 |
| 8 A.M. | 70 | 71 |
| 9 A.M. | 69 | 71 |

Source: *Draft Century City Hospital Nighttime Construction Noise Assessment, Purple Line Subway Extension Memorandum* (ATS 2015)
Site E located on northwest corner of 2080 Century Park East
Site F located on southeast corner of Olympic Boulevard and Century Park East intersection

As a worst case scenario the ambient noise of Leq=56 dBA measured from 3 A.M. and 4 A.M. was used as the nighttime noise impact threshold for the hospital building. The ambient was measured at ground level and adjusted for additional height of the 3rd through the 8th floor patient levels. The adjusted ambient along with the nighttime noise impact threshold are presented in Table 11 along with the predicted noise levels from nighttime construction activities. The predicted nighttime construction noise is based on a 20 foot noise barrier wall around the perimeter of the site and the use of low noise emission equipment.

Table 11. Nighttime Construction Noise Impact Thresholds at the Century City Rehabilitation Facility

| Hospital Building Floor | Ambient Noise Level, Leq (dBA) | Los Angeles Nighttime Construction Noise Limit, Leq (dBA) | Nighttime Construction Noise, Leq (dBA) | Exceeds the Nighttime Noise Limits (Y/N) |
|---|---|---|---|---|
| Ground Level | 56 | 61 | 66 | Y |
| Patient Floor 3 | 52 | 57 | 69 | Y |
| Patient Floor 4 | 51 | 56 | 69 | Y |
| Patient Floor 5 | 51 | 56 | 69 | Y |
| Patient Floor 6 | 51 | 56 | 69 | Y |
| Patient Floor 7 | 51 | 56 | 69 | Y |
| Patient Floor 8 | 51 | 56 | 68 | Y |

Source: *Section 2 Construction Noise/Vibration Mitigation and Monitoring Plan (Draft)* (ATS 2015)

The predicted construction noise at the patient floors exceeds the nighttime noise limits of existing ambient plus 5 dB.

## Current Project-Specific or Modified Mitigation Measures:

Construction-related noise impacts will require mitigation to meet the Los Angeles CEQA noise thresholds, the specified Metro limits, and the noise ordinances for the Cities of Los Angeles and Beverly Hills. The Final EIS/EIR identified the following typical noise-control measures:

**CON-22 Hire or Retain the Services of an Acoustical Engineer**: Hire or retain the services of an acoustical engineer to be responsible for preparing and overseeing the implementation of the Noise Control and Monitoring Plans. The Noise Control and Monitoring Plan will ensure that noise levels are at or below criteria levels in Metro Baseline Specifications Section 01565, Construction Noise and Vibration Control.

**CON-23 Prepare Noise Control Plan**: Prepare a Noise Control Plan that includes an inventory of construction equipment used during daytime and nighttime hours, an estimate of projected construction noise levels, and locations and types of noise abatement measures that may be required to meet the noise limits specified in the Noise Control and Monitoring Plan.

**CON-24 Comply with the Provisions of the Nighttime Noise Variance**: In the case of nighttime construction, the contractor will comply with the provisions of nighttime noise variances issued by local jurisdictions. The variance processes for the Cities of Los Angeles and Beverly Hills require the applicant to provide a noise mitigation plan and to hold additional public meetings before granting the variance to allow work that would be performed outside the permitted working hours.

**CON-25 Noise Monitoring**: Conduct periodic noise measurements in accordance with an approved Noise Monitoring Plan, specifying monitoring locations, equipment, procedures, and schedule of measurements and reporting methods to be used.

**CON-26 Use of Specific Construction Equipment**: At night, use only construction equipment operating at the surface of the construction site under full load, are certified to meet specified lower noise level limits set in the Noise Control Plan, and specified in the noise variance application.

**CON-27 Noise Barrier Walls for Nighttime Construction**: Where nighttime construction activities are expected to occur, erect Metro designed noise barrier walls at each construction site prior to the start of

construction activities. Barriers should be designed to reduce construction site noise levels by at least 5 dBA.

**CON-28 Comply with Local Noise Ordinances**: Construction activities will comply as applicable with the City of Los Angeles, City of Beverly Hills, and County of Los Angeles.

**CON-29 Signage**: Readily visible signs indicating "Noise Control Zone" will be prepared and posted on or near construction equipment operating close to sensitive noise sites.

**CON-30 Use of Noise Control Devices**: Noise control devices that meet original specifications and performance will be used.

**CON-31 Use of Fixed Noise-Producing Equipment for Compliance**: Fixed noise-producing equipment will be used to comply with regulations in the course of LPA-related construction activity.

**CON-32 Use of Mobile or Fixed Noise-Producing Equipment**: Mobile or fixed noise producing construction equipment that are equipped to operate within noise levels will be used to the extent practical.

**CON-33 Use of Electrically Powered Equipment**: Electrically powered equipment will be used to the extent practical.

**CON-34 Use of Temporary Noise Barriers and Sound-Control Curtains**: Temporary moveable noise barriers and sound-control curtains will be erected where construction activity is predicted to exceed the noise limits and is unavoidably close to noise-sensitive receivers.

**CON-35 Distance from Noise-Sensitive Receivers**: Within each construction area, earth-moving equipment, fixed noise generating equipment, stockpiles, staging areas, and other noise producing operations will be located as far as practicable from noise-sensitive receivers.

**CON-36 Limited Use of Horns, Whistles, Alarms, and Bells**: Use of horns, whistles, alarms, and bells will be limited for use as warning devices, as required for safety.

**CON-37 Requirements for Project Equipment**: All noise-producing project equipment, including vehicles that use internal combustion engines, will be required to be equipped with mufflers and air-inlet silencers, where appropriate, and kept in good operating condition that meets or exceeds original factory specifications. Mobile or fixed "package" equipment will be equipped with shrouds and noise-control features that are readily available for that type of equipment.

**CON-38 Limited Audibility of Project Related Public Addresses or Music**: Any Project-related public address or music system will not be audible at any sensitive receiver.

**CON-39 Use of Haul Routes with the Least Overall Noise Impact**: To the extent practical, based on traffic flow, designated haul routes for construction-related traffic will be used based on the least overall noise impact.

**CON-40 Designated Parking Areas for Construction-Related Traffic**: Non-noise sensitive designated parking areas for Project-related traffic will be used.

**CON-41 Enclosures for Fixed Equipment**: Enclosures for fixed equipment, such as TBM slurry processing plants, will be required to reduce noise.

In addition, to the measures presented in the Final EIS/EIR, specific noise control measures for focused activities in Area 3 adjacent to the rehabilitation facility have been identified in order to meet the nighttime noise limits. These include the following:

- Fully enclose or surround the compressor plant, ventilation plant, grout plant, foam plant, machine shop, and electrical shop with noise barrier walls;
- Enclose motors and transfer points on the conveyor system;
- Boom crane and front end loader will be low emission equipment as required by Metro Specification Section 01 56 19, Construction Noise and Vibration Control, Parts 3.01 and 3.04, and Table 4;
- Retrofit the boom crane and front end loader to be used during night operations with a hospital grade muffler and additional damping and insulation added to the engine compartments; and
- Install an additional 16-foot noise barrier wall within the interior of Area 3 to further shield the noise from the front end loader and crane operations (see Figure 8).

With implementation of these additional measures the nighttime construction noise for the patient floors of the rehabilitation facility are predicted to not exceed the Los Angeles nighttime construction noise limits.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant noise impacts than previously addressed in the Final EIS/EIR.***

### 2.1.6 Ecological/Biological Resources

#### Applicable CEQA Thresholds of Significance

As presented in Section 4.10.5, the construction of the project would have a significant impact on ecosystems/biological resources if it would result in the following:

- The loss of individuals, or the reduction of existing habitat, of a state- or Federally listed endangered, threatened, rare, protected, or candidate species, or a Species of Special Concern, or Federally-listed critical habitat;
- The loss of individuals, the reduction of existing habitat or plant community;
- Interfere with habitat such that normal species behaviors are disturbed (e.g., from introducing noise, light) to a degree that may diminish the chances for the long-term survival of a sensitive species.

#### Final EIS/EIR Conclusions

The Westside project is located in a densely developed urban land area, including the Century City Constellation Station area. No impacts to sensitive ecological or biological resources are anticipated. Construction activities may require the removal or trimming of trees and an adverse impact could occur if an active migratory bird nest is located in trees being disturbed. This includes direct impacts through removal or pruning and indirect disturbance due to increased noise and vibration during construction

for trees within 100 feet of the construction footprint. As the majority of the project area provides low quality habitat for migratory birds, indirect impacts are not expected to be substantial with only a small number of migratory birds displaced, if any.

### Proposed Project Modifications

Construction of a new temporary Metro bus layover site in the median of Santa Monica Boulevard would require the removal of up to four small trees. In addition, if placement of the conveyor system on the east side of the AT&T building is not feasible, it would be located along the west side of the building, which may require the removal of four large trees along Century Park East. An adverse impact could occur if an active migratory bird nest is disturbed in any of these trees.

### Current Project-Specific or Modified Mitigation Measures:

Mitigation measures will be implemented to meet the requirements for compliance with the Migratory Bird Treaty Act and state migratory bird protection. The following measures will be implemented to minimize any biological impacts associated with the changes in Section 2:

**CON-66 Biological Survey**: Two biological surveys will be conducted, one 15 days prior and a second 72 hours prior to construction that will remove or disturb suitable nesting habitat.

**CON-67 – Compliance with City Regulations**: If construction or operation of the LPA requires removal or pruning of a protected tree, a removal permit will be required in accordance with applicable municipal codes and ordinances of the city in which the affected tree is located. Within the City of Los Angeles, compliance with the Native Tree Protection Ordinance will require a tree removal permit from the Los Angeles Board of Public Works. Similarly, within the City of Beverly Hills, applicable tree protection requirements, such as tree removal permits will be followed.

**CON-69 Avoidance of Migratory Bird Nesting Season**: Construction activities that involve removal or trimming will be timed to occur outside the migratory bird nesting season, which occurs generally from March 1st through August 31st and as early as February 1st for raptors.

**VIS-2 Replacement for Tree Removal**: Where mature trees are removed, replacement with landscape amenities of equal value will be incorporated into final designs, where feasible, to enhance the visual integrity of station areas.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant impacts to ecological/biological resources than previously addressed in the Final EIS/EIR.***

## 2.1.7 Cumulative Impacts

### Applicable CEQA Thresholds of Significance

Section 15355 of the CEQA Guidelines defines cumulative impacts as two or more individual effects that, when considered together, are considerable and may compound or increase other environmental impacts. Cumulative impacts can result from individually minor, but collectively significant, projects occurring over a period of time.

## Final EIS/EIR Conclusions

As stated in Section 4.17 of the Final EIS/EIR, if construction of Section 2 occurs at the same time as other projects in a particular community, cumulative effects associated with noise and vibration, street closures and traffic, aesthetics, access to businesses and public facilities, and other construction-related effects may be significant during construction. Implementation of project-related mitigation measures would lessen the effects so as not to be cumulatively considerable.

## Proposed Project Modifications

In the immediate vicinity of the Century City Constellation station there are two projects currently underway, construction of the rehabilitation facility at 2080 Century Park East and remodeling of the Westfield Century City property. It is anticipated that each of these projects will be complete before construction of the Century City Constellation Station begins. Should there be any other construction projects occurring when work begins on the station, implementation of the identified mitigation measures would ensure that there is not an increase the project-related cumulative impacts or alter the cumulative impact findings as presented in the Final EIS/EIR.

***The proposed project modifications to Section 2 of the Westside Purple Line Extension Project would not cause any new or substantially more significant cumulative impacts than previously addressed in the Final EIS/EIR.***

# 3.0 CONCLUSIONS

No substantial changes result from the proposed changes to Section 2 of the Westside Purple Line Extension Project. There is no new information of substantial importance since the Final EIS/EIR that would result in any new significant environmental effects or substantial increase in the severity of previously identified significant effects related to project impacts.

It is the finding of Metro that the previous environmental documents, as herein amended, may be used to fulfill the environmental review requirements of the current project. Because the current project meets the conditions for the application of CEQA Guidelines Section 15164, preparation of a new EIR is not required for the issue areas discussed above.

# APPENDIX A FIGURES

# APPENDIX A FIGURES

Figure 1. Project Location

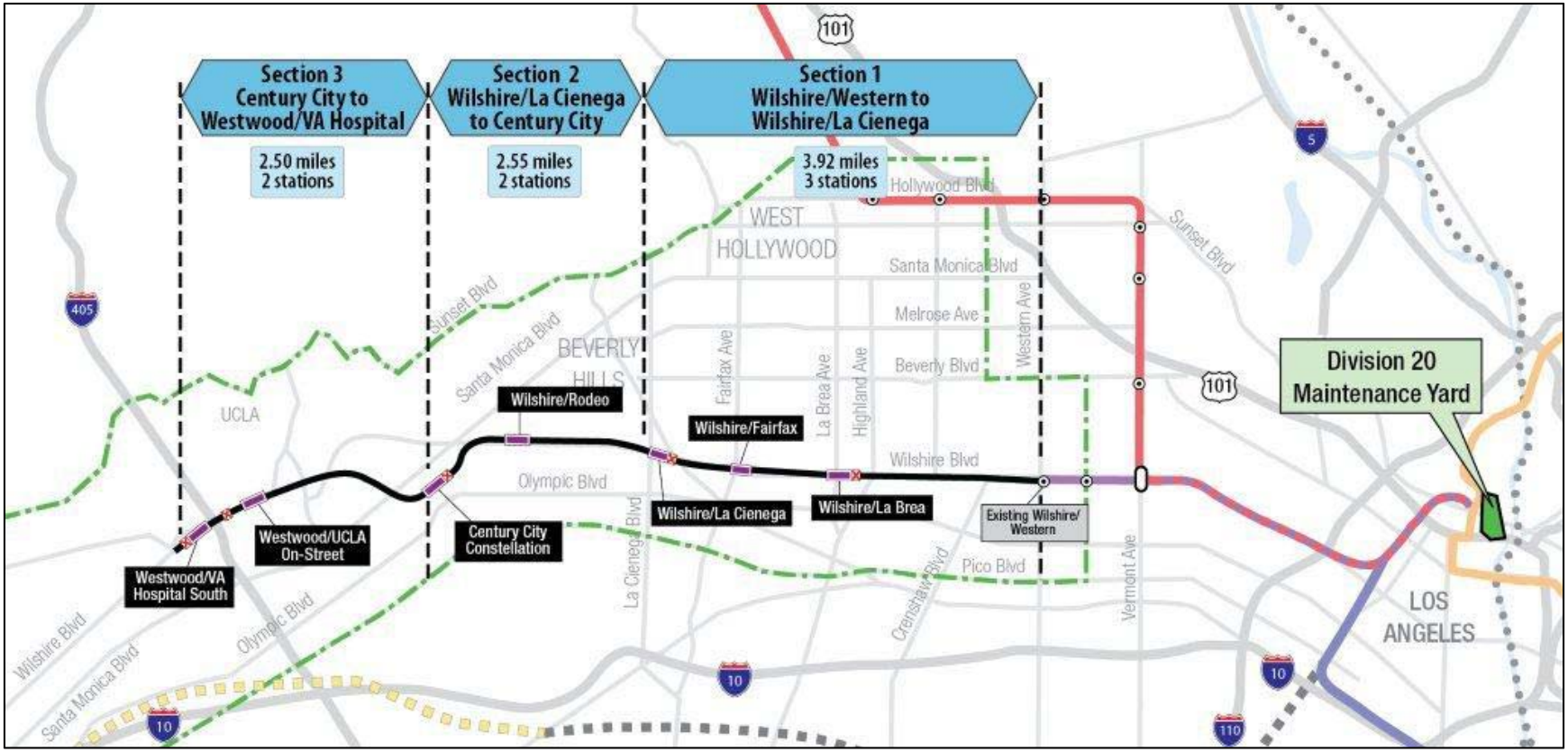


Figure 2. Century City Constellation Station Staging Areas

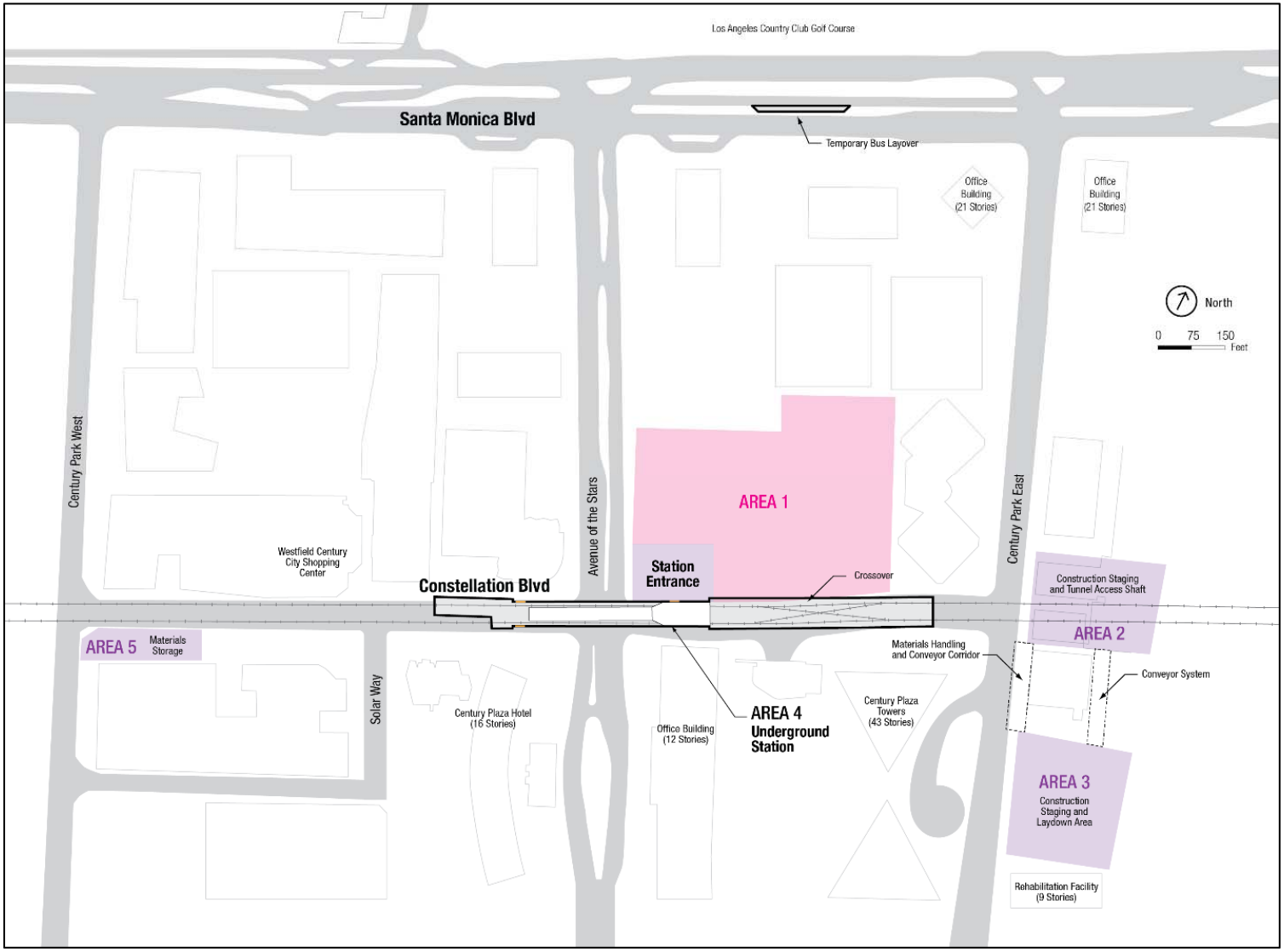


Figure 3. Typical Enclosed Conveyor



Figure 4. Potential Santa Monica Boulevard Bus Layover Design

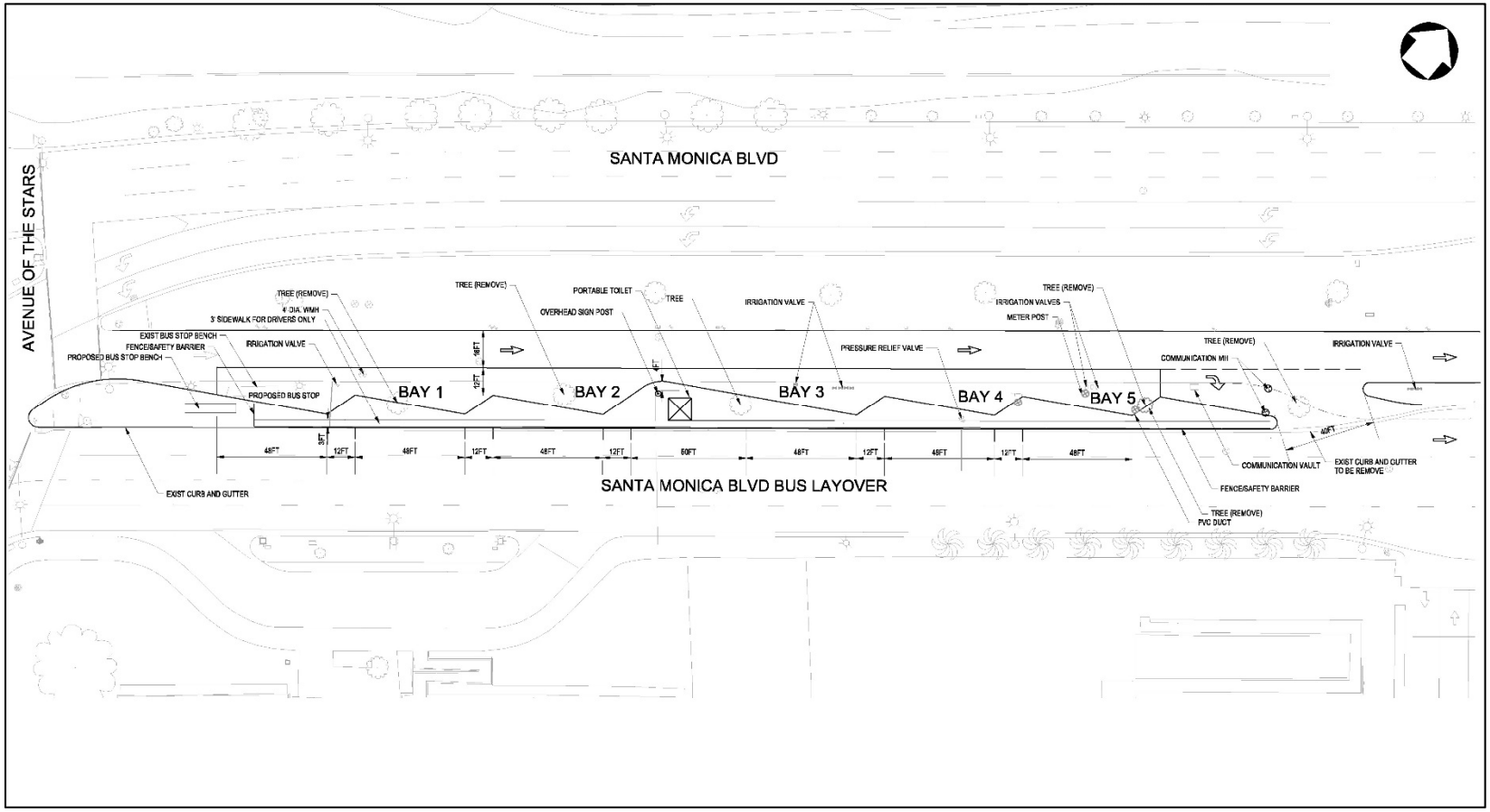


Figure 5. Ventilation/Exhaust Structures on the Westfield Century City Property

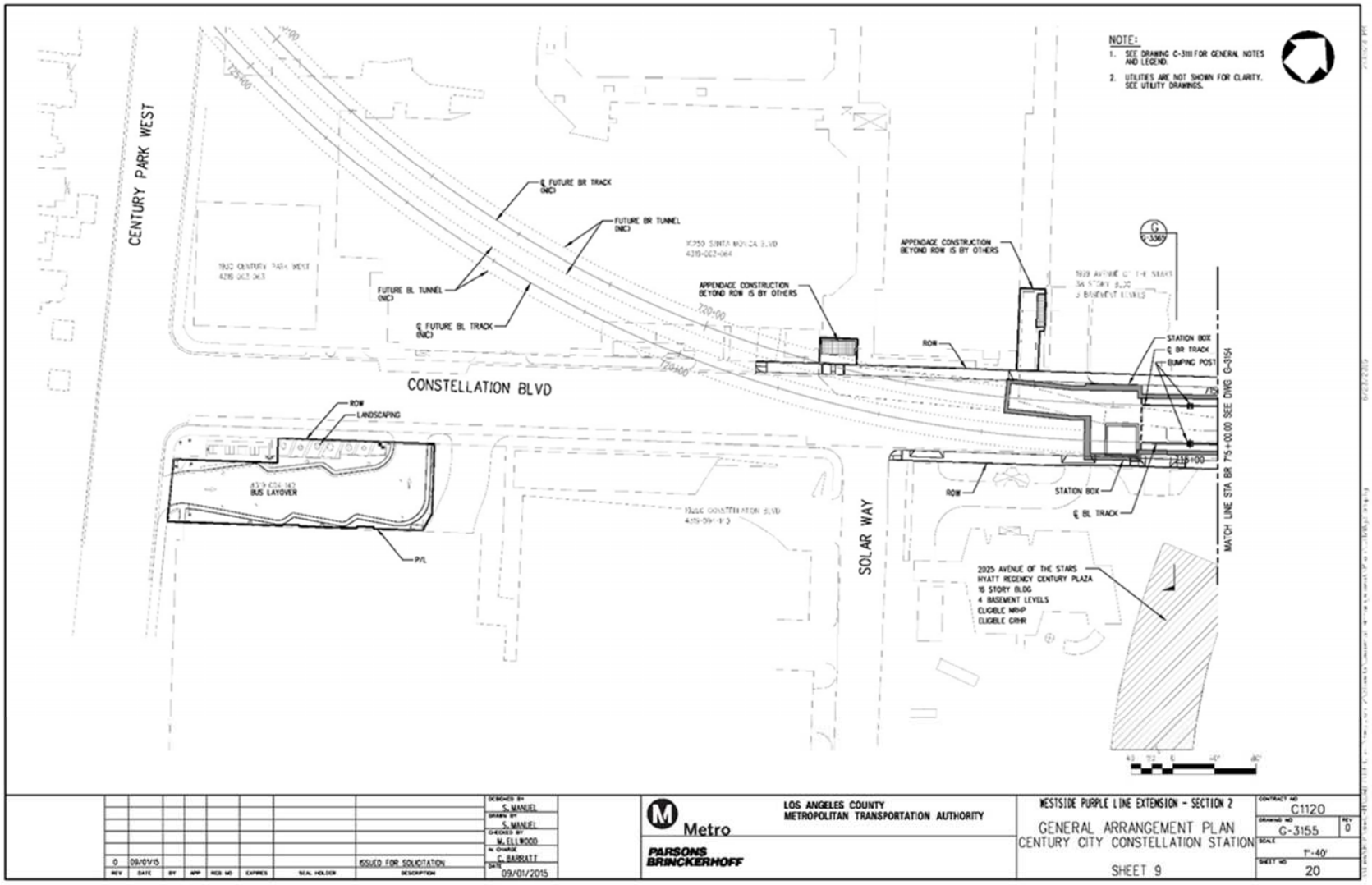


Figure 6. Wilshire/Rodeo Station Original Configuration with Cross-over

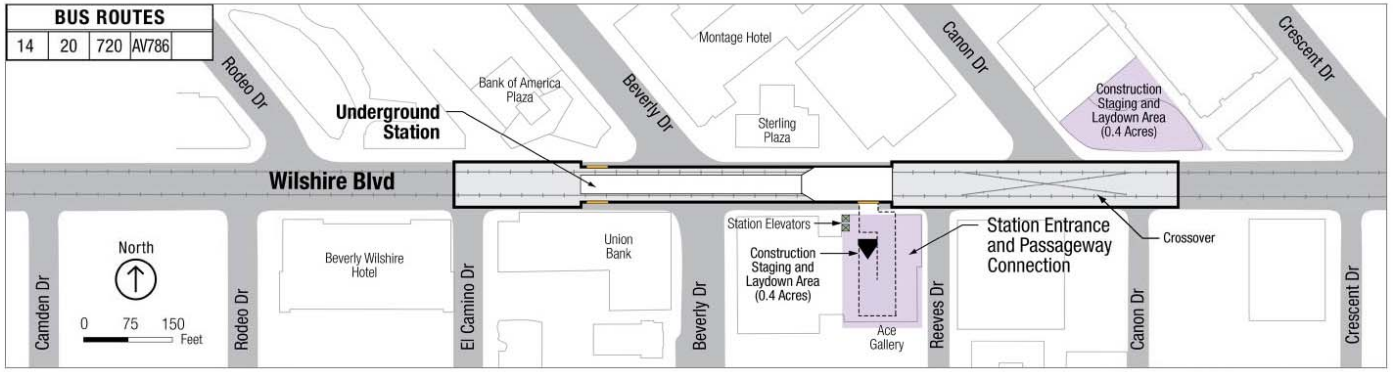


Figure 7. Wilshire/Rodeo Station without Cross-over

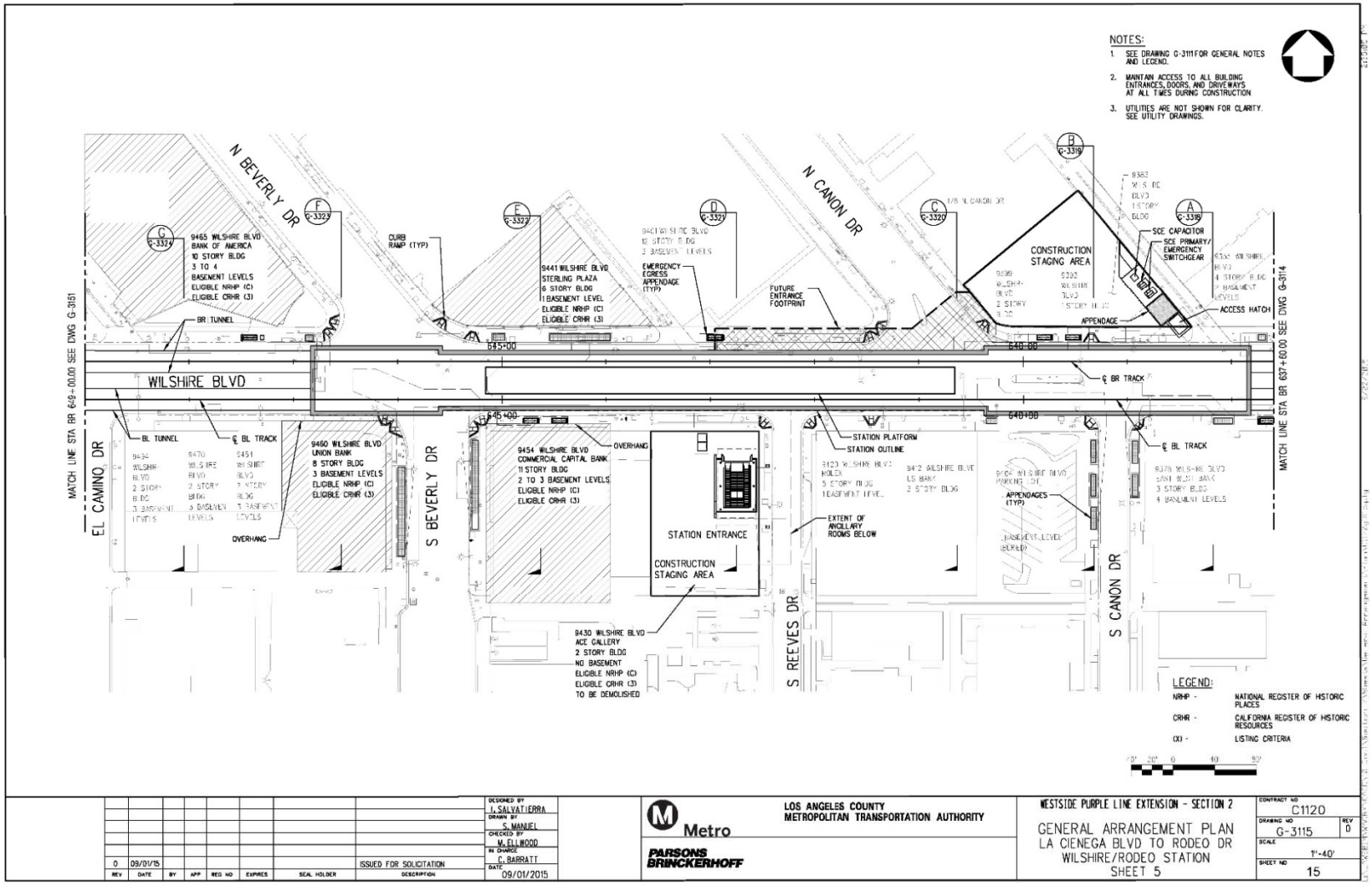
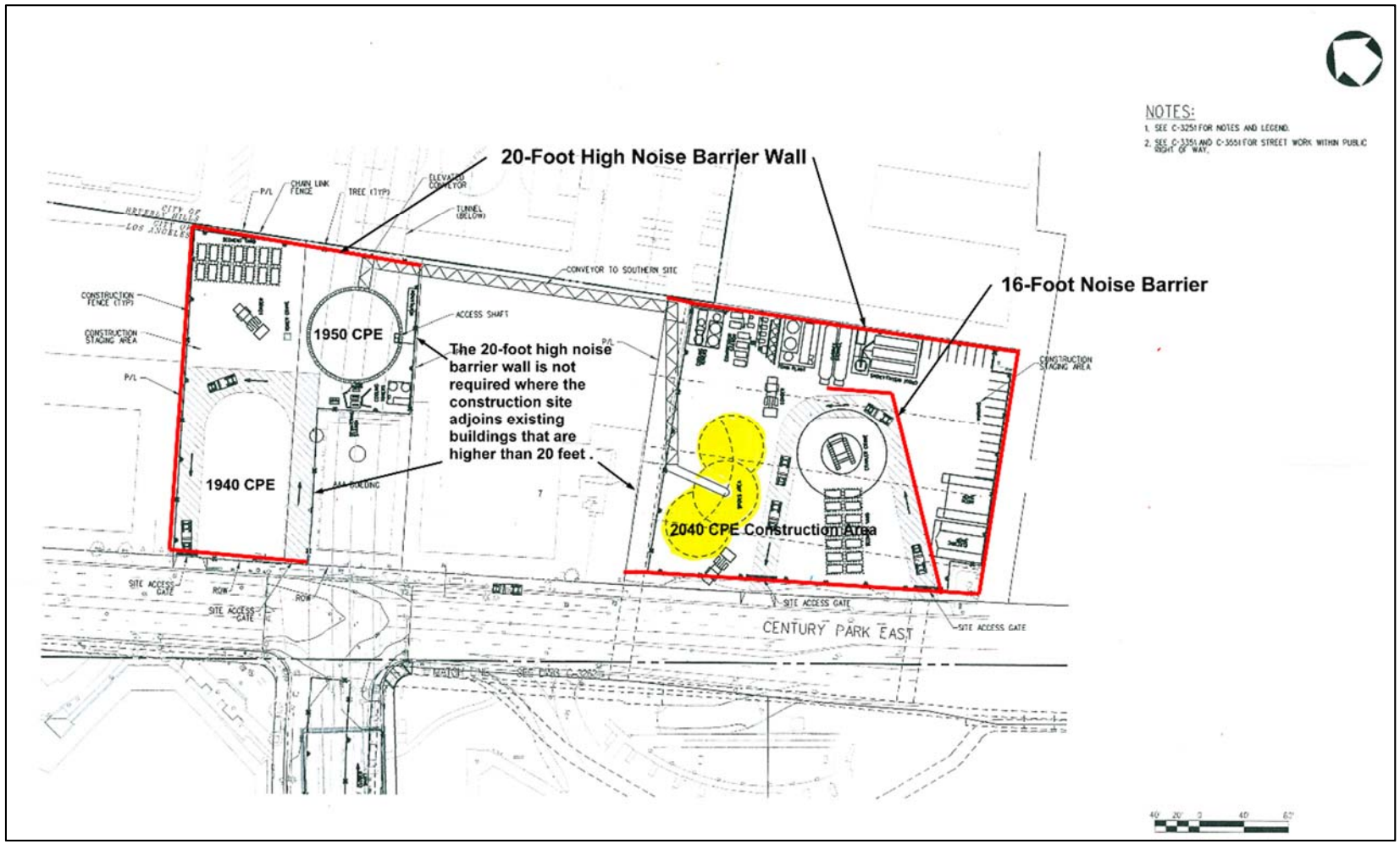


Figure 8. Staging Areas 2 and 3 Noise Barrier Walls



Los Angeles County
Metropolitan Transportation Authority

March 2012

# Westside Subway Extension

*Final Environmental Impact Statement/Environmental Impact Report—Volume 4*

APPENDIX I: *Mitigation Monitoring and Reporting Plan*




Metro

U.S. Department of Transportation
Federal Transit Administration

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The purpose of the mitigation monitoring effort is to ensure that the Mitigation Measures identified in the EIS/EIR to mitigate the potentially significant environmental effects of the project are, in fact, properly carried out. In its findings concerning the environmental effects of a project for which an EIS/EIR was prepared, a Lead Agency must also include a finding that a mitigation monitoring or reporting program has been prepared and provides a satisfactory program that will ensure avoidance or sufficient reduction of the significant effects of the project. The following mitigation monitoring plan contains a brief statement of all Mitigation Measures; identifies the monitoring action; indicates the party responsible for implementing the mitigation; and identifies the enforcement agency, monitoring agency and the monitoring phase or timing. The Los Angeles County Metropolitan Transportation Authority (Metro) shall be responsible for assuring full compliance with the provisions of this program. The Chief Executive Officer (CEO) of Metro may delegate duties and responsibilities to Metro staff, applicants, and consultants as necessary. The CEO shall also ensure that monitoring reports are filed on a timely basis and, when identified, that plan violations are corrected. Progress toward completion of the required mitigation plan, or violations thereof, shall be reported at prescribed intervals to the CEO. The reports shall be prepared using approved forms or an acceptable format. These reports will be available for public review at any time.

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| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| **Transportation** | | | |
| **Mitigation:**<br><br>T-1—Coordination with Property Owners<br>Metro will coordinate with the appropriate property owners and other relevant parties regarding permanent parking losses. All property owners will be compensated under the Uniform Relocation Assistance and Real Property Acquisition Act as described in mitigation measure CN-1 and will receive compensation for easements as described in mitigation measure CN-3. | Verify coordination | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| T-2—Parking Monitoring and Community Outreach<br>In the one-half mile area surrounding each station where unrestricted parking is located, a program will be established to monitor on-street parking activity in the area prior to the opening of service and monitor the availability of parking monthly for six months following the opening of service. Based on the available supply in each station area before the opening of service, Metro will set a performance standard that would identify a demand exceeding 100 percent of supply after opening as an impact due to the parking activity of LPA patrons. If the performance standard is met, LPA. Metro will work with the appropriate local jurisdiction (City of Los Angeles and City of Beverly Hills) and affected communities to assess the need for specific elements of a residential permit parking (RPP) program for the affected neighborhoods.<br><br>For station areas at high risk of spillover Metro will conduct outreach meetings for the affected communities to gauge the interest of residents participating in an RPP program (prior to the opening of the subway), regardless of whether parking shortages have been identified.<br><br>For the Westwood/VA Hospital Station, the majority of station-area parking supply is for the exclusive use of VA patients, visitors, doctors, and staff. Development of an RPP program for the VA is not applicable. At this station, Metro will monitor spillover parking at VA lots controlled only by decals and/or signage (i.e., no gates or other controlled access). Once the subway has opened, | Report conditions and verify plan. | Metro | – Metro<br>– Metro<br>– Operations |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| an assessment of the spillover parking magnitude will be made, and if the spillover parking is determined to be unmanageable by VA security, a parking management plan for the VA campus will be developed and implemented. # | | | |
| T-3—Residential Permit Parking Program<br>In general, RPP districts are created to ensure that neighborhood residents have access to on-street parking. These programs are in effect across the United States, including Los Angeles County. They are commonly used to address spillover parking concerns, such as those that arise when residential neighborhoods are in close proximity to commercial districts that do not provide sufficient parking. Patrons of the commercial districts, who are non-residents, tend to spill over into adjacent residential neighborhoods to find parking. The impact that spillover parking causes is adverse, and restricting parking to residents only, or limiting the time non-residents can park, is one way to mitigate these adverse impacts.<br>If the need for an RPP district has been determined through Mitigation Measure T-2, RPP programs will be implemented according to guidelines established by each local jurisdiction. Metro will reimburse local jurisdictions for costs associated with developing both the RPP programs and installing parking restriction signs in neighborhoods within a one-half mile walking distance of each affected station. Metro will not be responsible for the costs of permits for residents desiring to park on streets in RPP districts. For locations where spillover parking cannot be addressed through a RPP program, alternative mitigation options will include the implementation of parking time restrictions for non-residents. Metro will work with local jurisdictions to determine which option(s) will be preferable. | Verify funding. | Metro | – Metro<br>– Metro<br>– Operations |
| T-4—Consideration of Shared Parking Program<br>Metro will consider developing a shared parking program with operators of off-street parking facilities to accommodate the LPA's parking demand, thereby allowing subway riders to use excess capacity in these facilities. The revised off-street parking analysis conducted for the Final EIS/EIR determined that more than 100,000 off-street parking spaces serve commercial land uses within a one-half mile walking distance of the seven LPA station locations. As part of the analysis, a sampling of parking facility operators for each station location was contacted to | Report conditions and verify plan. | Metro | – Metro<br>– Metro<br>– Operations |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| determine availability of public parking in their facility on weekdays and weekends, daily parking rate, facility occupancy, and interest in partnering with Metro to make parking available to riders of the Westside Subway Extension. Based on a sample of operators at each station area, some shared parking potential for subway riders exists. However, this potential may be limited at individual facilities because many are near their capacity during weekdays.<br><br>For six months following the opening of service, Metro will monitor off-street parking activity in station areas through communication with parking operators by quantitatively assessing through surveys the effects on parking demand as a result of the LPA and revisit their interest in participating in a shared parking program. It is anticipated that the LPA will reduce parking demand in station areas, as some employees will use the subway to commute to work rather than driving. Because the development of a shared parking program will be contingent on the willingness of parking facility operators to participate, as well as the availability of parking supply at their facilities, it may be infeasible to implement this measure at some or all station areas where spillover parking impacts have been identified. | | | |
| T-5—Install Crossing Deterrents<br><br>Install appropriate signage and deterrents to prohibit crossing Wilshire Boulevard at Orange Grove Avenue. This mitigation measure would be implemented for the Wilshire/Fairfax Station South Entrance Option. | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| T-6—Install High-Visibility Crosswalk/Crossing Deterrents<br><br>Stripe a high-visibility crosswalk on the east leg of the intersection of El Camino Drive and Wilshire Boulevard. If a crosswalk is not feasible, install appropriate signage and deterrents to prohibit crossing Wilshire Boulevard on the east side of El Camino Drive. This mitigation measure would be implemented for the Wilshire/Rodeo Station Union Bank Entrance Option. | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| T-7—Install High-Visibility Crosswalk<br>Stripe a high-visibility crosswalk treatment appropriate for unsignalized intersections on the south leg of the intersection of Reeves Drive and Wilshire Boulevard. This mitigation measure would be implemented for Wilshire/Rodeo Station Ace Gallery Entrance Option. | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| T-8—Install High-Visibility Crosswalk<br>Stripe a high-visibility crosswalk treatment appropriate for unsignalized intersections on all four legs of Bonsall Avenue where it intersects with both the eastbound and westbound Wilshire Boulevard access ramps. Curb ramps fully compliant with ADA should be installed on all four corners. This mitigation measure would be implemented for the Westwood/VA Hospital Station South Entrance Option or the Westwood/VA Hospital Station North Entrance Option. | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| T-9—Provide consistency with General Plan Designation Sidewalk Width Adjacent to Metro- Controlled Parcels<br>The LPA will be designed to ensure a minimum sidewalk/parkway width is provided on the portions of streets fronting parcels controlled by Metro, as required by General Plan street classification designation for each jurisdiction where an LPA station is located. For example, the Street Designations and Standards of the Transportation Element of the City of Los Angeles General Plan require a 12-foot-wide sidewalk/parkway on a Major Highway Class II, and a 10-foot-wide sidewalk/parkway on a Secondary. Thus, sidewalks on the portions of streets designated as Major Highway Class II that front parcels controlled by Metro will need a 12-foot-wide sidewalk/parkway. | Review and verify consistency | Metro | – Metro<br>– Metro<br>– Final Design |
| T-10—Provide consistency with General Plan Designation Sidewalk Width Coordination with Jurisdictions<br>Metro will coordinate with local jurisdictions to identify sidewalks in station areas that do not meet this minimum and will encourage local agencies to widen them. Sidewalks adjacent to parcels not controlled by Metro may be less than the required minimum per general plan designation. Because sidewalks are the responsibility of local jurisdictions, Metro does not have the authority to widen | Verify coordination | Metro | – Metro<br>– Metro<br>– Prior to Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| them directly, but will encourage local jurisdictions to do so. | | | |
| T-11—Provide High Visibility Crosswalk Treatments<br>Metro will provide highly visible crosswalk treatments at intersections affected by LPA construction, following the Metro Rail Design Criteria. | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| T-12—Meet Federal, State, Local Standards for Crossing<br>Metro will coordinate with local jurisdictions to identify crossings that do not meet current ADA, CA MUTCD, and other relevant Federal, State, and Local standards and will encourage local jurisdictions to upgrade them accordingly. Beyond those directly affected by LPA construction activities, which Metro is responsible for upgrading on restoration of all streets and crossings affected by LPA construction activities, crossings that do not meet standards are the responsibility of local jurisdictions. Metro does not have the authority to upgrade them directly, but will encourage local jurisdictions to do so. | Verify identification and coordination | Metro | – Metro<br>– Metro<br>– Prior to Construction |
| T-13—Meet Metro Rail Design Criteria Minimums for Bicycle Parking<br>The LPA will provide bicycle parking to meet the minimum required number of bicycle parking spaces per the Metro Rail Design Criteria. This mitigation measure would be implemented at all LPA station entrance options where it is feasible to implement, which is expected to be at the following stations:<br>• Wilshire/La Brea (all entrance options)<br>• Wilshire/Fairfax (all entrance options except the LACMA entrance option)<br>• Wilshire/La Cienega<br>• Wilshire/Rodeo (Ace Gallery Entrance Option)<br>• Westwood/UCLA Off-Street<br>• Westwood/UCLA On-Street (Lot 36 Entrance)<br>• Westwood/VA Hospital South<br>• Westwood/VA Hospital North | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |
| T-14—Study Bicycle Parking Demand & Footprint Configuration<br>Metro will continue to assess bicycle parking demand as the project progresses through the design and construction process and size the bicycle facilities at each station accordingly. Bicycle parking demand can vary station-to-station, and the | Monitor bicycle parking demand around stations. | Metro | – Metro<br>– Metro<br>– Operations |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| footprint required to meet that demand will vary. For example, bicycle lockers are more space intensive, while secured bicycle rooms can accommodate bicycle parking in a more compact footprint. The appropriate configuration and ultimate footprint reserved for bicycle parking at each station will vary by demand levels and space constraints. The Westside Subway Extension Station Circulation Report (Metro 2011am) details footprint ranges for each station area based on configuration of bicycle parking. | | | |
| T-15— Determine Alternative Sites for Bicycle Parking<br>At LPA station entrance options that are physically constrained, Metro shall look for space for bicycle parking at an alternative site, which could include provision of secured bicycle parking in an adjacent storefront or other development, install signage to direct subway riders to bicycle parking already provided at buildings or on streets near station entrances, or provide enhanced bicycle parking facilities at an adjacent station on the LPA to meet any unsatisfied demand from this station. This mitigation measure would be implemented for the following LPA station entrance options:<br>• Wilshire/Fairfax Station–LACMA Entrance Option<br>• Wilshire/Rodeo Station–Union Bank Entrance Option<br>• Wilshire/Rodeo Station–Bank of America Entrance Option<br>• Century City Constellation Station<br>• Century City Santa Monica Boulevard Station<br>• Westwood/UCLA On-Street Station (north and south entrances at Wilshire/Westwood Boulevards) | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |
| T-16—Study Bus-Rail Interface<br>Metro will continue to assess bus-rail interface. As a result of further study Metro, working with affected jurisdictions, will relocate bus stops at some LPA stations to minimize the number of streets riders must cross to transfer between the LPA and interfacing bus lines. | Verify study completion | Metro | – Metro<br>– Metro<br>– Construction |
| TCON-1—Traffic Control Plans<br>Site-specific traffic-control plans will be developed to minimize construction impacts for each work zone location. These locations will include, but not be | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| limited to, utility relocations, stations, crossovers, laydown areas, TBM launch and removal locations, emergency exit shafts, station entrances, drop pipes, and grout injection. Traffic-control plans will follow State and local jurisdiction guidelines and standards. Traffic-control plans will be developed for Wilshire, Santa Monica, and Constellation Boulevards and north-south streets, including, but not limited to, La Brea Avenue, Fairfax Avenue, La Cienega Boulevard, Rodeo Drive, Beverly Drive, Canon Drive, Century Park East, Avenue of the Stars, Westwood Boulevard, Veteran Avenue, Sepulveda Boulevard, I-405 ramps to/from eastbound Wilshire Boulevard, and Bonsall Avenue. Traffic control plans will encompass the following:<br>• Minimum lane widths<br>• Number of available travel lanes (two lanes minimum in each direction during peak periods)<br>• Number, length, and location of temporary right and left-turn lanes<br>• Temporary street closures and detour routes<br>• Traffic-control devices (signing and striping)<br>• Temporary traffic signals and street lighting<br>• Temporary pedestrian access and routes<br>• Temporary bicycle routes<br>• Temporary driveway access<br>• Temporary business access<br>• Construction site phasing<br><br>To facilitate traffic flow and mitigate major disruption and bottlenecks due to construction, advanced traffic control will extend beyond one arterial street on each side of each station construction location. This will help disperse peak-hour traffic flows onto the adjacent arterial street network. Business owners will be interviewed to identify the type of business, delivery and shipping schedules, and critical days/times of years for the business. Traffic-control plans will incorporate this information. Specific street closures will be developed in close coordination with the local jurisdictions during the Final Design phase. | | | Construction |
| TCON-2—Designated Haul Routes | Review and verify | Contractor | – Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| Designated truck haul routes using arterial streets are intended to minimize noise, vibration, and other possible impacts to adjacent businesses, schools, major commercial developments, and residential neighborhoods. Metro will incorporate the following objectives into its truck haul route plans:<br>• Establish nighttime truck haul operations times/days for each route. Truck haul operations will not be allowed in the AM and PM peak hours, in residential neighborhoods (where feasible), during noise restriction hours and special events, holiday season restrictions, and as restricted by State and local jurisdictional mandates.<br>• Establish truck haul headways to avoid platoons of trucks upon local arterial streets and freeways. Establish a vehicle dispatching system at construction laydown areas and off-site locations to monitor and address truck headway issues as they arise.<br>• Develop truck haul routes for each site in coordination with and approved by State and local jurisdictions.<br>• Incorporate comments and issues from State and local jurisdictions into the final approved truck haul routes and truck haul operation schedules. | plans. | | – Metro<br>– Final Design and Construction |
| TCON-3—Emergency Vehicle Access<br>Emergency vehicle access will be maintained at all times to the construction work site, adjacent businesses, and residential neighborhoods. In addition, emergency vehicle access will be maintained at all times to and from fire stations, hospitals, and medical facilities near the construction sites and along the haul routes. LPA construction activities and haul route operations will be coordinated with local law enforcement representatives and fire department officials during the Final Design phase. | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and Construction |
| TCON-4—Transportation Management Plan<br>Once subway construction sequencing/phasing and the truck haul routes have been concurred upon by Metro and reviewed by local jurisdictions and Caltrans, an overall LPA Transportation Management Plan (TMP) will be developed with and approved by Metro and other appropriate agencies. The TMP will include the following: | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| • Public information (e.g., media alerts, website)<br>• Traveler information (e.g., traffic advisory radio, changeable message signs (CMS))<br>• Incident management (e.g., TMP coordination, tow truck services)<br>• Construction (e.g., detour routes, haul routes, mitigation, construction times)<br>• Demand management (e.g., carpooling, express bus service, variable work hours, parking management)<br>• Coordination with concurrent LPAs<br><br>The TMP will also address individual and overlapping haul route impacts and will impacts resulting from concurrent and overlapping station(s) and tunnel excavation work. | | | |
| TCON-5—Coordination with Planned Roadway Improvements<br>Construction of the subway and new station locations will be coordinated with local jurisdictions for future programmed projects, such as the Wilshire Bus Rapid Transit Project. | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Planning, Final Design and Construction |
| TCON-6—Temporary Bus Stops and Route Diversions<br>Construction impacts to local and regional transit operations (e.g., Metro Bus, Santa Monica Big Blue Bus, Culver City Bus, LAX Flyaway, DASH, and UCLA Campus Shuttle) will be mitigated to minimize impacts to the degree possible at each station construction location. Impacts to local and regional transit will be mitigated through, but not be limited to, the use of temporary relocated bus stops and temporary route diversions. Impacts to local and regional transit operations will be coordinated with each transit agency and/or provider. In addition, the Final Design-level mitigation proposals will be approved by the transit agency and/or provider and the local jurisdictions and incorporated into the TMP. | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and Construction |
| TCON-7—Parking Management<br>A parking management program will be developed to minimize impacts due to temporary removal of on- and off-street parking within the construction work zone. The program will incorporate appropriate parking control measures, replacement parking within a reasonable distance from the affected parking | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| locations, if available, or other transportation demand management (TDM) strategies. Development of the parking management program will be coordinated with the appropriate local jurisdictions and affected communities or property owners and be incorporated into the TMP. | | | |
| TCON-8—Parking Monitoring and Community Outreach<br>In addition, a parking monitoring and community outreach program will be established during the construction phase of the LPA to monitor on-street parking activity. If a parking shortage is identified during construction, Metro will work with the appropriate local jurisdiction and affected communities or property owners to assess the shortage level and implement mitigation as part of the parking management program. | Report conditions and verify plan. | Metro | – Metro<br>– Metro<br>– Final Design and Construction |
| TCON-9—Construction Worker Parking<br>Metro will require that all construction contractors identify adequate off-street parking for construction workers at Metro-approved locations. This will occur for each construction site to minimize additional loss of parking. Metro will work with construction contractors on implementation of adequate off-street parking for construction workers. | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and Construction |
| TCON-10—Pedestrian Routes and Access<br>Safe pedestrian routes and access will be provided through and/or adjacent to construction work areas. Pedestrian routes and access, including temporary pedestrian facilities, will comply with the requirements of the ADA and must be properly signed and lighted. Special facilities, such as handrails, fences, and walkways, will be provided for pedestrian safety. Temporary pedestrian routes and access concerns will be addressed with, but not limited to, local residents, the VA Hospital, schools, and businesses and approved by the local jurisdiction. Pedestrian routes and access will be monitored and maintained throughout construction. | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and Construction |
| TCON-11—Bicycle Paths and Access<br>Bicycle traffic (e.g., paths, lanes, and routes) will be maintained safely through and adjacent to construction work areas. If bicycle traffic cannot be maintained, then | Review and verify plans. | Contractor | – Metro<br>– Metro<br>– Final Design and |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| alternative temporary bicycle routes will be identified, signed, and lighted. These alternative routes should be on adjacent streets that can safely accommodate bicycle traffic. Development of these routes will be coordinated with bicycle groups and local jurisdictions. Temporary routes will require approval by the local jurisdiction. Bicycle access will be monitored and maintained throughout construction. | | | Construction |
| **Land Use** | | | |
| No significant impacts will result from the LPA. The LPA will not conflict with applicable land use plans and policies; therefore, no mitigation will be required. | N/A | N/A | N/A |
| **Socioeconomic Characteristics** | | | |
| **Mitigation:** The following measures will be implemented to ensure impacts related to displacements and acquisitions are avoided or further minimized.<br><br>CN-1—Relocation Assistance and Compensation<br>Metro will provide relocation assistance and compensation for all displaced businesses and residences, as required by both the Uniform Relocation Assistance and Real Property Acquisition Act and the California Relocation Assistance Act. All real property acquired by Metro will be appraised to determine its fair market value. Just compensation, which will not be less than the approved appraisal, will be made to each displaced property owner. Each business and residence displaced as a result of the LPA will be given advance written notice and will be informed of their eligibility for relocation assistance and payments under the Uniform Relocation Assistance and Property Acquisition Act. It is anticipated that most businesses will relocate and, as such, most jobs will be relocated and will not be permanently displaced. However, there are permanent job losses anticipated. Metro shall coordinate with the appropriate jurisdictions regarding business relocations. | Verify compliance | Metro | – Metro<br>– Metro<br>– Before Final Design |
| CN-2—Propose Joint-use Agreements<br>While employment loss as a result of property acquisitions will not result in an adverse effect, Metro will propose where feasible joint-use agreements for the land it will take for station entrances and construction staging to induce job | Verify coordination with owners | Metro | – Metro<br>– Metro<br>– Before Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| creation in areas to further reduce the affect any job loss. | | | |
| CN-3—Compensation for Easements<br>For easements, Metro will appraise each property to determine the fair market value of the portion that will be used either temporarily during construction or permanently above and below ground. Just compensation, which will not be less than the approved appraisal, will be made to each displaced property owner. | Verify coordination | Metro | – Metro<br>– Metro<br>– Before Final Design |
| **Environmental Justice** | | | |
| No disproportionately high and adverse impact to minorities and low-income communities will occur during operation of the Project. Therefore, no additional mitigation measures are required. | N/A | N/A | N/A |
| **Visual Quality** | | | |
| **Mitigation:** While there are no significant impacts, the mitigation measures, as listed below, are incorporated into the LPA and will ensure that impacts related to conflicts between scale and visual character, building removal and right-of-way acquisition, removal of mature vegetation, location of ancillary facilities, and introduction of new sources of light and glare are avoided or minimized.<br>VIS-1—Minimize Visual Clutter<br>To minimize visual clutter, system components should be integrated and the potential for conflicts reduced between the transit system and adjacent communities; design of the system stations and components will follow the recommendations and guidance developed in the urban design analysis conducted for the LPA (Metro 2009d). These guidelines include the following: (1) preserve and enhance the unique cultural identity of each station area and its surrounding community by implementing art and landscaping; and (2) promote a sense of place, safety, and walkability by providing street trees, walkways or sidewalks, lighting, awnings, public art, and/or street furniture. | Review and integrate guidance in system design | Metro/Contractor | – Metro<br>– Metro<br>– Before Final Design |
| VIS-2—Replacement for Tree Removal<br>Where mature trees are removed, replacement with landscape amenities of equal value will be incorporated into final designs, where feasible, to enhance visual | Have arborist prepare tree removal plan | Metro | – Metro<br>– Metro<br>– Before Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| integrity of the station area. | | | |
| VIS-3—Source Shielding in Exterior Lighting<br>Source shielding in exterior lighting at the maintenance and storage facility will be used to limit spillover light and glare. | Review and verify Final Design plans | Metro | – Metro<br>– Metro<br>– Final Design |
| VIS-4—Integrate Station Designs with Area Redevelopment Plans<br>Station designs will be integrated with area redevelopment plans. The objective is to create a unified visual setting where the station components such as entrances, complement redevelopment plans. | Verify coordination with surrounding communities | Metro | – Metro<br>– Metro<br>– Before Final Design |
| **Air Quality** | | | |
| The LPA will not exceed the National Ambient Air Quality Standards, the California Ambient Air Quality Standards, or SCAQMD significance thresholds during operation of the LPA. The LPA is predicted to result in lower emissions of some criteria pollutants; therefore, no mitigation will be required. | N/A | N/A | N/A |
| **Climate Change** | | | |
| **Mitigation:** No mitigation is required. However, Metro recognizes that climate change is a serious issue. The following measures will be implemented to further ensure beneficial impacts:<br>CC-1—Implement Pedestrian and Transit-Oriented Development at Stations<br>Metro will continue to promote and support implementation of pedestrian-oriented and transit-oriented development at stations. | Review and integrate where possible into Final Design | Metro | – Metro<br>– Metro<br>– Before Final Design |
| CC-2—Energy Conservation<br>Energy conservation will be implemented throughout design and construction. | Review and verify implementation | Metro | – Metro<br>– Metro<br>– Before and during Final Design |
| CC-3—Promote Transit Ridership<br>Metro will continue to promote transit ridership through marketing and educational programs. | Verify implementation of Public Outreach Campaign | Metro | – Metro<br>– Metro<br>– Before, during and after Final Design, |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| | | | Construction, and project implementation |
| CC-4—Green Power<br>Metro will use green power when/where available and priced competitively with other energy sources. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design |
| **Noise and Vibration** | | | |
| **Mitigation:** To mitigate the potential for ground-borne noise impacts to theatre and residential uses above the subway tunnel due to train operation along tangent track and crossover track the following mitigation measures will be included in the final design of the LPA:<br><br>VIB-1—Use of High Compliance Direct Fixation Resilient Rail Fasteners<br>A high compliance direct fixation resilient rail fasteners will be incorporated into the design of the trackwork at the location listed below, which will reduce ground-borne noise by 5 to 7 dBA:<br>• Wilshire Ebell Theatre at Site V8 (Figure 4-38)<br>• Saban Theatre at Site V25 (Figure 4-38) | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| VIB-2—Use of a Low Impact Crossover<br>A low impact crossover, such as a moveable point frog or a spring-loaded frog, will be used in the design of the following crossover, which will reduce ground-borne noise by 5 to 6 dBA:<br>• Wilshire/La Brea No. 10 Double Crossover for the apartments at Site V16 (Figure 4-38) | Review and verify plans. | Metro | – Metro<br>– Metro<br>– Final Design |
| **Energy** | | | |
| No significant impacts. LPA conditions decreases system-wide vehicle miles traveled (VMT), which results in less energy consumption as compared to the existing conditions, therefore, no mitigation will be required. | N/A | N/A | N/A |
| **Geologic Hazards** | | | |
| **Mitigation:** Construction and design will be performed in accordance with the latest Federal and State seismic and environmental requirements as well as State and local building codes. By compliance with these regulations and requirements, potential impacts from geologic hazards will be minimized. The following measures are also included to further avoid and minimize impacts.<br>GEO-1—Seismic Ground Shaking<br>Metro design criteria require probabilistic seismic hazard analyses (PSHA) to estimate earthquake loads on structures. These analyses take into account the combined effects of all nearby faults to estimate ground shaking. A site-specific PSHA will be used as the basis for evaluating the ground motion levels along the LPA. The structural elements of the LPA will be designed and constructed to resist or accommodate appropriate site-specific estimates of ground loads and distortions imposed by the design earthquakes and conform to Metro's Design Standards for the Operating and Maximum Design Earthquakes. The concrete structures are designed according to the Building Code Requirements for Structural Concrete by the American Concrete Institute (ACI 318). | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |
| GEO-2—Fault Crossing Tunnel, Fault Rupture, Tunnel Crossing<br>LPA—Century City Constellation option<br>Design will allow for the tunnels to cross the faults nearly perpendicular to limit | Verify completion of studies and incorporation of | Metro | – Metro<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| the area of potential damage and will use Metro's two level approach to assess fault offsets and the associated structural design required to accommodate the offset. During Final Design, fault crossings will be designed for the ground conditions at the crossing location and incorporate the methods used to excavate and support the tunnel. Metro design criteria require use of a probabilistic approach to determine the Maximum Design Earthquake and Operating Design Earthquake. Design must include the following:<br>• Prevent collapse of the tunnel to ensure tunnel safety<br>• Maintaining structural continuity of tunnel ring<br>• Preventing flow of water and soil<br>• Establishing the tunnel size to maintain tunnel clearances and provide a guideway for derailed trains to decelerate without impact<br>Several preliminary design approaches or combinations have been considered and will be further developed in Final Design:<br>• Steel tunnel rings with compressible material between the ring and soil to accommodate movement of the fault<br>• Flexible steel linings<br>• Articulated joints between tunnel segments for added flexibility<br>• Oversized tunnel to allow additional movement and to some extent, more rapid repair after a seismic event. This could also be accomplished using cut and cover methods. | the recommended design measure into Final Design. | | – Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| GEO-3—Operational Procedures during Earthquake<br>In addition to design measures, As Metro has implemented on the existing Red line, it will implement Standard Operating Procedures in seismic areas to detect earthquakes and will provide back-up power, lighting, and ventilation systems to increase safety during tunnel or station evacuations in the event of loss of power due to an earthquake. For example, seismographs are located in 11 of the existing Metro Red/Purple Line stations to detect ground motions and trigger Standard Operating Procedures (SOP #8 – Earthquake) by the train operators and controllers. Operating procedures are dependent on the level of earthquake and include stopping or holding trains, gas monitoring, informing passengers, communications with Metro's Central Control, and inspecting for damage. | Verify safety measures are implemented | Metro | – Metro<br>– Metro<br>– Operations |
| GEO-4—Liquefaction and Seismic Settlement<br>At liquefaction or seismic settlement prone areas, evaluations by geotechnical engineers will be performed to provide estimates of the magnitude of the anticipated liquefaction or settlement. Based on the magnitude of evaluated liquefaction, a suitable mitigation will be selected, either structural design, or ground improvement (such as deep soil mixing) or deep foundations to non liquefiable soil (such as drilled piles). Site specific design will be selected based upon the State of California Guidelines design criteria set forth in the Metro Seismic Design Criteria. | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |
| GEO-5— Hazardous Subsurface Gas Operations<br>As with the existing Metro Red and Purple Lines and the Metro Gold Line Eastside Extension, Metro will install gas monitoring and detection systems with alarms, as well as ventilation equipment to dissipate gas to safe levels according to Metro's current Design Criteria and Cal/OSHA standards for a safe work environment. Measures will include, but are not limited to, the following for both tunnel and station operation:<br>• High volume ventilation systems with back-up power sources<br>• Gas detection systems with alarms<br>• Emergency ventilation triggered by the gas detection systems | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| • Automatic equipment shut-off<br>• Maintenance and operations personnel training.<br>• Gas detection instrumentation is set to send alarms to activate ventilation systems and evacuate the structures as follows: Methane gas—Minor alarm at 10 percent of LEL (activate ventilation) and major alarms at 20 percent of LEL (evacuation of area)<br>• Hydrogen sulfide—Minor alarm at 8 ppm and major alarm at 10 ppm. | | | |
| GEO-6—Hazardous Subsurface Gas Structural Design<br>Tunnels and stations will be designed to provide a redundant protection system against gas intrusion hazard. The primary protection from hazardous gases during operations is provided by the physical barriers (tunnel and station liner membranes) that keep gas out of tunnels and stations. As with the existing Metro Red and Purple Lines and the Metro Gold Line Eastside Extension, tunnels and stations will be designed to exclude gas to below alarm levels (GEO-5) and include gas monitoring and detection systems with alarms, as well as ventilation equipment to dissipate gas.<br>• At stations in elevated gassy ground (e.g., Wilshire/Fairfax, construction will be accomplished using slurry walls—or similar methods such as continuous drilled piles—to provide a reduction of gas inflow both during and after construction than would occur with conventional soldier piles and lagging.<br>• Other station design concepts to reduce gas and water leakage will use additional barriers, compartmentalized barriers to facilitate leak sealing, and use of flexible sealants, such as poly-rubber gels, along with the high-density polyethylene-type materials that are used on Metro's underground stations.<br>• Consideration of secondary station walls to provide additional barriers or an active system (low or high pressure barrier) will also be studied further to determine if they will be incorporated into the LPA.<br>• The evaluations will include laboratory testing programs such as those conducted for the Metro Gold Line Eastside Extension during development of the double gasket system and material testing for long term exposure to the ground conditions for materials such as rubber gaskets used for tunnel segment linings. Testing programs will examine: | Review and verify plans | Metro | – Metro<br>– Metro<br>– Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| ○ Segment leakage—gasket seal under pressure before, during, and after seismic movements. This will include various gasket materials and profiles (height and width).<br>○ Gasket material properties—effective life and resistance to deterioration when subjected to man-made and natural contaminants, including methane, asphaltic materials, and hydrogen sulfide.<br>○ Alternative products to High Density Polyethylene products such as poly-rubber gels, now in use in ground containing methane in other cities.<br>○ Methods for field testing high-density polyethylene joints. These are now being used for landfill liners and water tunnels under internal water pressure. | | | |
| GEO-7—Tunnel Advisory Panel Design Review<br>The Metro Tunnel Advisory Panel (TAP) will review designs with respect to geologic hazards in areas of identified higher risk. These include the Century City area (seismic risk) and the Fairfax area (gassy ground risk). The TAP will be supplemented, as necessary, by qualified experts in seismic design, gas intrusion and ground contaminant effects on underground structures. | Verify compliance | Contractor | – *Metro*<br>– Metro<br>– Construction |
| **Hazardous Materials** | | | |
| **Mitigation :** In addition to the mitigation measures outlined for geologic hazards, measures to further ensure that any impacts are avoided or minimized for the LPA include the following:<br>HAZ-1—Disposal of Groundwater<br>Disposal of groundwater from underground structures will comply with the City of Los Angeles Industrial Wastewater Permit if there is any contaminated groundwater leakage into final structure. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction<br>– |
| HAZ-2—Emergency Response Procedure<br>In the unlikely event of a major hazardous materials release close to or in the vicinity of the LPA, Metro will develop emergency response procedures in | Verify compliance | Metro | – Metro<br>– Metro<br>– Operations |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| conformance with Federal, State, and local regulations. | | | – |
| **Ecosystems/Biological Resources** | | | |
| No significant impacts will result from the LPA, therefore no mitigation will be required. | N/A | N/A | N/A |
| **Water Quality** | | | |
| **Mitigation :** In addition to the standard Best Management Practices (BMPs) and other measures required for compliance with Federal, State, and local requirements, the following measures will be implemented to further ensure that there will be no adverse water quality or hydrology impacts.<br>WQ-1—Drainage Control Plan<br>A drainage control plan will be developed to properly convey drainage from the Study Area and to avoid *ponding on adjacent properties*. The plan will be developed to assure that the flood capacity of existing drainage or water conveyance features will not be reduced in a way that will cause ponding or flooding during storms. | Verify completion of drainage plan | Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| WQ-2—Runoff Treatment<br>During operation runoff will be treated using the most appropriate BMP as listed below to further ensure compliance Title III and Title IV of the Clean Water Act and NPDES standards as overseen by the local jurisdictions:<br>• BMP1: Infiltration basins/trenches—Infiltration basins are surface ponds that capture first-flush stormwater and treat it by allowing it to percolate into the ground and through permeable soils. Infiltration trenches are excavated trenches that have been lined with filter fabric and backfilled with stone to form an underground basin that allows runoff to infiltrate into the soil. As the water percolates through the ground, physical, chemical, and biological processes occur to remove sediments and soluble pollutants. Pollutants are trapped in the upper soil layers and the water is released to groundwater. Infiltration basins are generally dry except immediately following storms, but a low-flow channel may be necessary if a constant base flow is present.<br>• BMP2: Porous pavement— Porous pavement can be either asphalt-based | Verify compliance and implementation in final design plans | Metro | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| pavement or pre-casted permeable concrete pavers. The permeable concrete paver is a preferred feature of the City of Los Angeles' Green Street Policy. Both concrete pavers and asphalt-based paving material allows stormwater to quickly infiltrate the surface pavement layer to enter into a high-void aggregate sub-base layer. The captured runoff is stored in this "reservoir" layer until it either infiltrates into the underlying soil strata or is routed through an under drain system to a conventional stormwater conveyance system. Porous pavement is typically applicable only in low-traffic areas.<br><br>• BMP3: Vegetated Filter Planters—These are newly adopted bio-parkway or flow-through planters engineered in accordance to the City of Los Angeles' Green Street Policy. They are planters with selected vegetations and engineered soils to treat and filter storm-water from street and / or roof runoff. The design storm First-Flush polluted storm-water will be treated and filtered. At large storm events, clean storm-water will be by-passed to normal drainage facilities. These devices are most suitable to urban environment such as the current LPA corridor. | | | |
| **Safety and Security** | | | |
| **Mitigation:** These measures further describe those Metro currently uses or will implement to further ensure that there are no adverse impacts.<br>SS-1—Passenger Safety I<br>Implement public safety awareness and employee training program. | Verify coordination and Public Outreach | Metro | – Metro<br>– Metro<br>– Prior operations |
| SS-2—Passenger Safety II<br>Develop and implement a project-specific safety certification plan that will result in safety certification of all certifiable project elements | Verify compliance and implementation in Final Design Plans | Metro | – City of Los Angeles<br>– Metro<br>– Final Design/Project Implementation |
| SS-3—Construction Safety<br>Implement a Construction Safety and Security Plan which includes safety rules, procedures, and policies to protect workers and work sites during construction such as warning and/or notification signs, detours, and barriers and includes | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| compliance with OSHA standards | | | |
| SS-4—Fire Protection and Safety<br>Design in accordance with Metro fire/life safety criteria, CBC, and other applicable Federal, State, and local rules and regulations. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design |
| SS-5—Methane and Hydrogen Sulfide Gas Leak Protection<br>Design in accordance with Metro Fire/Life safety criteria, Metro ventilation criteria, and according to the findings in the *Westside Subway Extension Geotechnical and Hazardous Materials Technical Report (*Metro 2010i) and with special design, construction and operational attention to the gassy ground tunnels and stations. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design |
| SS-6—Security Preventing Criminal Activity<br>Incorporate security features, including lighting, communication devices (e.g., passenger telephones), closed circuit television, signs and other design features, and law enforcement officers to reduce criminal activities. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design |
| SS-7—Security Preventing Terrorist Attacks<br>Implementation of security features, including security education and employee training specific to terrorism awareness, lighting, communication devices (e.g., passenger telephones), closed circuit television, signs and other design features to reduce terrorism activities. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design and Project Implementation |
| SS-8—Emergency Response<br>Development and implementation of a comprehensive emergency preparedness plan, employee and emergency responders training, and system design features. | Verify compliance | Metro | – Metro<br>– Metro<br>– Final Design and Project Implementation |
| **Parklands and Community Facilities** | | | |
| **Mitigation:** The following measure will incorporated into the LPA to ensure impacts related to displacements and acquisitions are avoided or further minimized.<br>CN-1—Relocation Assistance and Compensation<br>Metro will provide relocation assistance and compensation for all displaced | Verify Compliance | Metro | – Metro<br>– Metro<br>Before Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| businesses and residences, as required by both the Uniform Relocation Assistance and Real Property Acquisition Act and the California Relocation Assistance Act. All real property acquired by Metro will be appraised to determine its fair market value. Just compensation, which will not be less than the approved appraisal, will be made to each displaced property owner. Each business and residence displaced as a result of the LPA will be given advance written notice and will be informed of their eligibility for relocation assistance and payments under the Uniform Relocation Assistance and Property Acquisition Act. It is anticipated that most businesses will relocate and, as such, most jobs will be relocated and will not be permanently displaced. However, there are permanent job losses anticipated. Metro shall coordinate with the appropriate jurisdictions regarding business relocations. | | | |
| **Historic, Archeological, and Paleontological Resources** | | | |
| **Mitigation:** For the properties that have a determination of No Adverse Effect, implementation of mitigation measure HR-1 will further ensure avoidance of adverse effects to the historic properties. In addition, implementation of mitigation measure HR-4 will ensure that inadvertent direct construction-related impacts to built historic properties within the APE do not alter the materials, features, or finishes that are important to the integrity of the property.<br><br>Implementation of mitigation measure (AR-1) will reduce construction impacts to undocumented archaeological resources, including human remains.<br><br>Implementation of the mitigation measures (PA-1) will substantially reduce the impacts to paleontological resources. During construction, implementation of mitigation measures (PA-2 through PA-7) would further reduce impacts to undocumented paleontological resources.<br><br>HR-1—Treatment to Avoid Adverse Effects<br>Design Phase Planning. The project would be designed in adherence to the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Rehabilitating Historic Buildings* and the *Guidelines for the Treatment of Cultural Landscapes* at the following four historic properties that | Verify compliance | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| will be altered by either construction staging activities or station entrances to ensure there is no adverse effect to these properties:<br>• LACMA West May Company – WSE 24 (6067 Wilshire Boulevard)<br>• Union Bank Building—WSE 14 (9460 Wilshire Boulevard)<br>• Linde (Westwood) Medical Plaza - WSE 10 (10921 Wilshire Boulevard)<br>• VA Medical Center Historic District—WSE 41 (11301 Wilshire Boulevard) including the Wadsworth Theater and Contributing Landscape Elements<br><br>Designs will ensure the preservation of the character-defining features of the historic properties, and would avoid damaging or destroying materials, features, or finishes that are important to the property, while also considering economic and technical feasibility. Metro will ensure that the SHPO has opportunity to review the design by the architectural historian.<br><br>Design Review and Monitoring. Metro will retain the services of a qualified historic preservation consultant with experience in architectural preservation to review structural designs and construction activities, and will require onsite periodic construction monitoring by a historic preservation consultant to ensure protection of historic fabric and compliance with approved designs and the *Secretary of the Interior's Standards for the Rehabilitation of Historic Properties*. | | | |
| HR-2—Treatment to Resolve Adverse Effect<br>HABS/HAER Documentation—The adverse effects of the Undertaking on the Ace Gallery will be resolved by FTA by requiring Metro to implement and complete National Park Service Historic American Building Survey (HABS) or Historic American Engineering Record (HAER) documentation, pursuant to Section 110(b) of the National Historic Preservation Act for the adversely-affected property. Prior to any action, the photo-recordation and documentation consistent with the standards of the National Park Service HABS or HAER will be prepared by a Secretary of Interior qualified professional architectural historian or historic architect. Whenever possible, HABS/HAER documentation Level 2 would be employed whenever measured drawings for a property are available. If measured drawings are not available, HABS/HAER documentation Level 1 would | Verify Compliance | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| be employed.<br><br>The HABS/HAER documentation will be forwarded by the Metro to the FTA and SHPO for review. The FTA, in consultation with Metro and SHPO, will approve the materials and permit Metro to proceed with demolition of the adversely-affected property.<br><br>Following approval of the HABS/HAER documentation, Metro will ensure that the materials are placed on file with Metro and Responsible Agencies, historical societies and preservation groups, local university and community libraries, and other appropriate national and local repositories and archives, as identified by Metro.<br><br>Public Website Development—*In connection with* HABS/HAER documentation, Metro will develop a public website linked to Metro's website concerning the history of the Ace Gallery. The website would be based on the photographs produced as part of the HABS/HAER documentation, and historic archival research previously prepared as part of the Undertaking and historic documentation. A public website, which provides historic and documentary information regarding historic properties that would be substantially altered or demolished as a result of the Undertaking, will be prepared and maintained for a ten-year period. | | | |
| HR-3—Construction Starting Beyond 2019<br>For those portions of the APE in which construction would start beyond 2019, Metro would retain the services of a Secretary of Interior professional qualified architectural historian to complete an updated historic property survey and evaluation to ensure that construction of the LPA would have no effect on eligible historic properties built after 1968 not previously inventoried during preparation of the Draft EIS/EIR or the Final EIS/EIR for the LPA. A draft and final report on the results of the survey and evaluation would be submitted to Metro, FTA, SHPO, and other signatories to the Memorandum of Agreement for review and approval prior to initiation of any beyond-2019 ground-disturbing activities within the APE for the LPA. The final report would be placed on file with | Verify compliance | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| Metro and Responsible Agencies, the South Central Coastal Information Center, and other appropriate local repositories identified by Metro within three months after the work has been completed.<br><br>If any of the newly inventoried built resources are determined to be eligible historic resources and may be adversely affected by the LPA, the FTA, with the assistance of Metro, shall review and approve appropriate mitigation measures, which shall be devised by Metro in concert with a qualified architectural historian. To the extent feasible, treatment to avoid and minimize adverse effects shall follow Mitigation Measure HR-1. In the event activities associated with the LPA cannot be implemented in a manner which meets adherence to Secretary of the Interior's Standards under HR-1, then the treatment described in Mitigation Measures HR-2 or other treatment appropriate to the specific resource(s) would be implemented. | | | |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| PA-1—Memorandum of Understanding<br>Metro will implement the Memorandum of Understanding with the George C. Page Museum of La Brea Discoveries regarding treatment of paleontological resources from asphaltic deposits. | Verify compliance | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Final Design |
| **Construction (Archaeological, Historic and Paleontological Resources)** | | | |
| **Mitigation:** The Memorandum of Agreement (MOA) sets forth measures to be implemented to reduce potential construction impacts within the APE to known archaeological historic properties and to undocumented archaeological resources, including human remains. For additional details refer to the MOA found in Appendix D. Implementation of the following measures will reduce impacts to archeological resources:<br><br>For the property that has a determination of No Adverse Effect, implementation of mitigation measure HR-1 will further ensure avoidance of adverse effects to the historic properties. In addition, implementation of mitigation measure HR-4 will ensure that inadvertent direct construction-related impacts to built historic properties within the APE do not alter the materials, features, or finishes that are important to the integrity of the property.<br><br>Even with implementation of this mitigation measure, construction of the LPA will result in an unavoidable and significant impact to a historic resource at the Wilshire/Rodeo Station to accommodate construction staging activities.<br><br>AR-1—Unanticipated Discoveries and Consultation with Native American Individuals, Tribes and Organizations and Treatment of Cultural Remains and Artifacts<br>If previous unidentified cultural resources, including human remains, are encountered during construction or earth-disturbing activities, all activities at that location shall be halted until a qualified archaeologist can examine the resources and assess their significance. If the resources are determined to be significant, Metro will notify FTA and SHPO within 48 hours of the discovery to determine the appropriate course of action. | Verify compliance with mitigation monitoring plan | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| For resources determined eligible or assumed to be eligible for the NRHP by FTA, Metro will notify the FTA, ACHP, and SHPO of those actions that it proposes to avoid, minimize, or mitigate adverse effects. Consulting parties will have 48 hours to provide their views on the proposed actions. The FTA will ensure that timely-filed recommendations of consulting parties are taken into account prior to granting approval of the measures that the Metro will implement to resolve adverse effects. Metro will carry out the approved measures prior to resuming construction activities in the location of the discovery.<br><br>Metro will ensure that the expressed wishes of Native American individuals, tribes, and organizations are taken into consideration when decisions are made regarding the disposition *of other* Native American archaeological materials and records relating to Indian tribes.<br><br>Should Indian burials and related items be discovered during construction of the project, Metro will consult with the affected Native American individuals, tribes and organization regarding the treatment of cultural remains and artifacts. These will be treated in accordance with the requirements of the California Health and Safety Code. If the county coroner/medical examiner determines that the human remains are or may be of Native American origin, then the discovery shall be treated in accordance with the provisions of §§ 5097.98 (a) - (d) of the California Public Resources Code which provides for the notification of discovery of Native American human remains, descendants; disposition of human remains and associated grave goods. | | | |
| HR-4—Geotechnical Pre-Construction Survey and Historic Land-scape Protection<br>Geotechnical Investigations. For historic properties, further geotechnical investigations will be undertaken to evaluate soil, groundwater, seismic, and environmental conditions along the alignment. This analysis will assist in the development of appropriate support mechanisms and measures for cut and fill | Hire a qualified historic preservation consultant | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| construction areas. The subsurface investigation will also identify areas that could cause differential settlement as a result of using a tunnel boring machine (TBM) in close proximity to historic properties. An architectural historian or historical architect who meets the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61) will provide input and review of final design documents prior to implementation of the mechanisms and measures. The review will evaluate whether the geotechnical investigations and support measures for cut and fill, and measures to prevent differential settlement meet the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. The evaluation of measures will be forwarded by Metro to the FTA and SHPO for review. Then FTA, in consultation with SHPO, upon the SHPO's concurrence, shall approve the evaluation and permit Metro to proceed with construction.<br><br>Historic District Contributing Historic Landscape Element Pre-Construction Survey. Metro will develop a survey of the contributing landscape elements of the VA Medical Center Historic District located within 20 feet of the Westwood/VA Hospital North and South Station portal-related cut-and-cover and construction staging areas during Final Design. The survey will be prepared by a qualified architectural historian and historic landscape architect and/or qualified arborist with the assistance of a technician/surveyor using high-resolution GPS equipment. The survey will establish an inventory of each mature historic tree species and the precise location of each individual tree in the survey area. The inventory survey will also assess the feasibility of temporarily removing and then replanting the extant trees in their original location, including how the trees should be moved and temporarily stored.<br><br>A report on the results of the inventory will be submitted to FTA, Metro, and SHPO for review and will be placed on file with Metro.<br><br>Historic District Contributing Historic Landscape Element Landscape Protection Measures. The results of the pre-construction survey will be used for marking | | | – Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| trees to be avoided during construction, for implementation of relocation recommendations as necessary if avoidance of any of the trees is infeasible, and for onsite use during construction activities to ensure the historic trees remaining in place are protected.<br><br>Should any trees that are temporarily removed not survive a reasonable period after they are replanted, as determined by a qualified arborist, Metro will obtain and plant adult-aged replacement trees of the same species to rehabilitate the historic landscape.<br><br>Historic District Contributing Historic Landscape Element Construction Monitoring. Metro will retain the services of a qualified historic preservation consultant with experience in the preservation of historic landscapes. The consultant will review the existing landscape designs and proposed construction activities, and develop a plan for onsite periodic construction monitoring to ensure protection of historic fabric and compliance with the *Guidelines for the Treatment of Cultural Landscapes*. | | | |
| PA-2—Early Fossil Recovery<br>Metro will seek early approval to begin fossil recovery in advance of construction if feasible. | Seek early approval from California Department of Parks and Recreation Office of Historic Preservation | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Prior to construction |
| PA-3—Retain the Services of a Qualified Principal Paleontologist<br>Metro will retain the services of a qualified principal paleontologist (minimum of graduate degree, 10 years of experience as a principal investigator and specialty in vertebrate paleontology) to oversee execution of mitigation measures. | Verify compliance and completion of monitoring report | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| PA-4—Development of a Paleontological Resources Monitoring and Mitigation Plan (PRMMP)<br>Metro's qualified principal paleontologist will develop a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) acceptable to the collections manager of the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County and the collection manager of the Page Museum of La Brea Discoveries. Metro will implement the PRMMP during construction. The plan will clearly demarcate the areas to be monitored and specify criteria. At the completion of paleontological monitoring for the LPA, a paleontological resources monitoring report will be prepared and submitted to the Page Museum of La Brea Discoveries and the Natural History Museum of Los Angeles County to document the results of the monitoring activities and summarize the results of any paleontological resources encountered. | Verify completion of PRMMP and compliance with PRMMP | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |
| PA=5—Required Activities for Recovered Fossils in the PRMMP<br>The PRMMP will include specifications for processing, stabilizing, identifying, and cataloging any fossils recovered on the LPA. For any tar pit deposits encountered, this will include chemical removal of asphalt from matrix and specimens. Cleaned matrix will require microscopic examination for small fossils, including invertebrates and plants, by a qualified paleontologist. | Verify compliance with PRMMP | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |
| PA-6—Preparation of a Report on Paleontological Resources Recovered<br>Metro's qualified principal paleontologist will prepare a report detailing the paleontological resources recovered, their significance, and arrangements made for their curation at the conclusion of the monitoring effort. | Verify report has been prepared | Metro | – California Department of Parks and Recreation Office of Historic Preservation<br>– Metro<br>– Construction |
| PA-7—Curation of Identified and Prepared Fossils<br>Metro will provide the resources necessary to curate the identified and prepared fossils as specified in the Memorandum of Understanding between Metro, FTA, | Verify compliance | Metro | – California Department of Parks and Recreation |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| and the George C. Page Museum of Rancho La Brea Discoveries. Those fossils recovered from asphaltic deposits will be curated at the George C. Page Museum. All other fossils will be curated at the Natural History Museum of Los Angeles County. | | | Office of Historic Preservation<br>– Metro<br>– Construction |
| **Growth Inducing** | | | |
| No significant impacts, therefore, no mitigation will be required. | N/A | N/A | N/A |
| **Cumulative Impacts** | | | |
| **Mitigation:** The implementation of mitigation measures T-1, T-2, T-3, and T-4 will help reduce the magnitude of parking impacts. | Verify compliance | Metro | – Metro<br>– Metro<br>Final Design and Prior to Construction |
| **Construction (Land Use)** | | | |
| **Mitigation:** Implementation of mitigation measures TCON-1, TCON-10 and TCON-11 will further ensure that traffic and pedestrian circulation and access will be maintained throughout construction. | Review and verify plans. | Contractor | – Metro<br>– Metro<br>Final Design and Construction |
| **Construction (Community and Neighborhoods)** | | | |
| CON-1—Signage<br>Signage to indicate accessibility to businesses will be used in the vicinity of construction activity.<br>In addition, implementation of mitigation measures TCON-1, TCON-2, TCON-3, T-CON-4, TCON-7, TCON-8, TCON-10 and TCON-11 will reduce construction impacts to communities and neighborhoods. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| **Construction (Environmental Justice)** | | | |
| Construction will not result in disproportionate adverse impacts to environmental justice communities. No additional measures will be required | N/A | N/A | N/A |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| **Construction(Visual and Aesthetics)** | | | |
| **Mitigation:** To ensure impacts related to construction activities are minimized, the following mitigation measures will be implemented:<br><br>CON-2—Timely Removal of Erosion-Control Devices<br>Visually obtrusive erosion-control devices, such as silt fences, plastic ground cover, and straw bales, will be removed as soon as the area is stabilized. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-3—Location of Construction Materials<br>Stockpile areas will be located in less visibly sensitive areas and, whenever possible, not be visible from the road or to residents and businesses. Limits on heights of excavated materials will be developed during design based on the specific area available for storage of material and visual impact. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-4—Construction Lighting<br>Lighting will be directed toward the interior of the construction staging area and be shielded so that it will not spill over into adjacent residential areas. In addition, temporary sound walls of Metro approved design will be installed at station and work areas. These will block direct light and views of the construction areas from residences. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-5—Screening of Construction Staging Areas<br>Construction staging areas will be screened where possible, to reduce visual effects on adjacent viewers | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| **Construction(Air Quality)** | | | |
| **Mitigation:** These mitigation measures will help to reduce air quality particulate matter impacts, but it is unlikely—given the current construction plan—that these levels, especially NO, will be below the SCAQMD threshold during construction. Therefore, adverse effects will remain after mitigation.<br><br>CON-6—Meet Mine Safety (MSHA) Standards | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| Tunnel locomotives (hauling spoils and other equipment to the tunnel heading) will be approved by Metro to meet mine safety (MSHA) standards. | | | |
| CON-7—Meet SCAQMD Standards<br>Metro and its contractors will set and maintain work equipment and standards to meet SCAQMD standards, including NOx. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-8—Monitoring and Recording of Air Quality at Worksites<br>Monitoring and recording of air quality at the worksites will be conducted. In areas of gassy soil conditions (Wilshire/La Brea and Wilshire/Fairfax work sites), air quality will be continuously monitored and recorded. Construction will be altered as required to maintain a safe working atmosphere. The working environment will be kept in compliance with Federal, State, and local regulations, including SCAQMD and Cal/OSHA standards. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-9—No Idling of Heavy Equipment<br>Metro specifications will require that contractors not unnecessarily idle heavy equipment. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-10—Maintenance of Construction Equipment<br>Metro will require its contractors to maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies. Metro will also require periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-11—Prohibit Tampering of Equipment<br>Metro will prohibit its contractors from tampering with engines and require continuing adherence to manufacturer's recommendations. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-12—Use of Best Available Emissions Control Technologies<br>Metro will encourage its contractors to lease new, clean equipment meeting the | Verify compliance | Metro | – Metro<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| most stringent of applicable Federal or State standards (e.g., Tier 3 or greater engine standards) or best available emissions control technologies on all equipment. | | | – Construction |
| CON-13—Placement of Construction Equipment<br>Construction equipment and staging zones will be located away from sensitive receptors and fresh air intakes to buildings and air conditioners. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-14—Measures to Reduce the Predicted $PM_{10}$ Levels<br>Mitigation measures such as watering, the use of soil stabilizers, etc. will be applied to reduce the predicted $PM_{10}$ levels to below the SCAQMD daily construction threshold levels. A watering schedule will be established to prevent soil stockpiles from drying out. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-15—Reduce Street Debris<br>At truck exit areas, wheel washing equipment will be installed to prevent soil from being tracked onto city streets, and followed by street sweeping as required to clean streets. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-16—Dust Control During Transport<br>Trucks will be covered to control dust during transport of spoils. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-17—Fugitive Dust Control<br>To control fugitive dust, wind fencing and phase grading operations, where appropriate, will be implemented along with the use of water trucks for stabilization of surfaces under windy conditions. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-18—Street Watering<br>Surrounding streets at construction sites will be watered by trucks as needed to eliminate air-borne dust. In keeping with Metro's prior policy on the Eastside Gold Line, the contractor will water streets in the station area impacted by dust not less than once a day and more often if needed. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| CON-19—Spillage Prevention for Non-Earthmoving Equipment<br>Provisions will be made to prevent spillage when hauling materials and operating non-earthmoving equipment. Additionally, speed will be limited to 15 mph for these activities at construction sites. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-20—Spillage Prevention for Earthmoving Equipment<br>Provisions will be made to prevent spillage when hauling materials and operating earth-moving equipment. Additionally, speed will be limited to 10 mph for these activities at construction sites. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-21—Additional Controls to Reduce Emissions<br>EPA-registered particulate traps and other appropriate controls will be used where suitable to reduce emissions of particulate matter and other pollutants at the construction site. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| **Construction (Climate Change)** | | | |
| **Mitigation:** Implementation of air quality mitigation measures CON-6 through CON-13 will further reduce climate change impacts due to construction. | Verify compliance | Metro/Contractor | – Metro<br>– Metro<br>Construction |
| **Construction (Noise and Vibration)** | | | |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| **Mitigation:** Noise impacts from construction of the LPA will require mitigation to meet the Los Angeles CEQA noise thresholds, the Metro specified limits, and the noise ordinances for Los Angeles County and the cities of Los Angeles and Beverly Hills. The final determination of construction noise impacts will depend on the equipment and activities used by the contractor to construct the LPA. Since this information on means and methods of construction is not available now, noise mitigation is presented as typical noise-control measures that have been used on other similar construction projects. Metro Baseline Specifications Section 01565, Construction Noise and Vibration Control, require that the contractor shall, among other provisions:<br><br>CON-22—Hire or Retain the Services of an Acoustical Engineer<br>Hire or retain the services of an Acoustical Engineer to be responsible for preparing and overseeing the implementation of the Noise Control and Monitoring Plans. Noise Control and Monitoring Plan will ensure that noise levels are at or below criteria levels in Metro Baseline Specifications Section 01565, Construction Noise and Vibration Control. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-23—Prepare a Noise Control Plan<br>Prepare a Noise Control Plan that includes an inventory of construction equipment used during daytime and nighttime hours, an estimate of projected construction noise levels, and locations and types of noise abatement measures that may be required to meet the noise limits specified in the Noise Control and Monitoring Plan. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-24—Comply with the Provisions of the Nighttime Noise Variance<br>In the case of nighttime construction, the contractor will comply with the provisions of the nighttime noise variance issued by local jurisdictions. The variance processes for the Cities of Los Angeles and Beverly Hills and the County of Los Angeles require the applicant to provide a noise mitigation plan and to hold additional public meetings before granting the variance to allow work that would be performed outside of the permitted working hours. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-25—Noise Monitoring<br>Conduct periodic noise measurement in accordance with an approved Noise | Verify compliance | Contractor | – Metro<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| Monitoring Plan, specifying monitoring locations, equipment, procedures, and schedule of measurements and reporting methods to be used. | | | – Construction |
| CON-26—Use of Specific Construction Equipment<br>At night, use only construction equipment operating at the surface of the construction site under full load, are certified to meet specified lower noise level limits set in the Noise Control Plan, and specified in the noise variance application. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-27—Noise Barrier Walls for Nighttime Construction<br>Where nighttime construction activities are expected to occur, erect Metro-designed noise barrier walls at each construction site prior to the start of construction activities. Barriers should be designed to reduce construction site noise levels by at least 5 dBA. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-28—Comply with Local Noise Ordnances<br>The LPA will comply as applicable with the City of Los Angeles, City of Beverly Hills, and County of Los Angeles noise ordinances during construction hours. Compliance with City of Los Angeles, City of Beverly Hills, and County of Los Angeles standards for short-term operation of mobile equipment and long-term construction operations of stationary equipment, including noise levels and hours of operation, also will occur. Hours of construction activity will be varied to meet special circumstances and restrictions. Municipal and building codes of each city in the Study Area include restrictions on construction hours. The City of Los Angeles limits construction activity to 8 a.m. to 6 p.m. on Monday through Friday and 9 a.m. to 5 p.m. on Saturdays, with no construction on Sundays and Federal holidays. The City of Beverly Hills identifies general construction hours of 8:00 a.m. to 6:00 p.m. from Monday through Saturday. For all the cities in the Study Area, construction is prohibited on Sundays and city holidays. Construction outside of these working periods will require a variance from the applicable city. The variance processes for the Cities of Los Angeles and Beverly Hills and the County of Los Angeles require the applicant to provide a noise mitigation plan and hold additional public meeting, | Verify compliance | Contractor | – City of Los Angeles<br>City of Beverly Hills<br>City of Santa Monica<br>City of West Hollywood, and<br>County of Los Angeles<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| CON-29—Signage<br>Readily visible signs indicating "Noise Control Zone" will be prepared and posted on or near construction equipment operating close to sensitive noise sites. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-30—Use of Noise Control Devices<br>Noise-control devices that meet original specifications and performance will be used. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Project implementation |
| CON-31—Use of Fixed Noise-Producing Equipment for Compliance<br>Fixed noise-producing equipment will be used to comply with regulations in the course of LPA-related construction activity. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-32—Use of Mobile or Fixed Noise-Producing Equipment<br>Mobile or fixed noise-producing construction equipment that are equipped to operate within noise levels will be used to the extent practical. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-33—Use of Electrically Powered Equipment<br>Electrically powered equipment will be used to the extent practical. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-34—Use of Temporary Noise Barriers and Sound-Control Curtains<br>Temporary noise barriers and sound-control curtains will be erected where LPA-related construction activity is unavoidably close to noise-sensitive receivers. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-35—Distance from Noise-Sensitive Receivers<br>Within each construction area, earth-moving equipment, fixed noise-generating equipment, stockpiles, staging areas, and other noise-producing operations will be located as far as practicable from noise-sensitive receivers. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-36—Limited Use of Horns, Whistles, Alarms, and Bells | Verify compliance | Contractor | – Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| Use of horns, whistles, alarms, and bells will be limited for use as warning devices, as required for safety. | | | – Metro<br>– Construction/Project Implementation |
| CON-37—Requirements on Project Equipment<br>All noise-producing project equipment, including vehicles that use internal combustion engines, will be required to be equipped with mufflers and air-inlet silencers, where appropriate, and kept in good operating condition that meets or exceeds original factory specifications. Mobile or fixed "package" equipment (e.g., arc- welders, air compressors) will be equipped with shrouds and noise-control features that are readily available for that type of equipment. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-38—Limited Audibility of Project Related Public Addresses or Music<br>Any LPA-related public address or music system will not be audible at any adjacent sensitive receiver. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-39—Use of Haul Routes with the Least Overall Noise Impact<br>To the extent practical, based on traffic flow, designated haul routes for construction-related traffic will be used based on the least overall noise impact. For example, heavily loaded trucks will be routed away from residential streets if possible. Where no alternatives are available, haul routes will take into consideration streets with the fewest noise-sensitive receivers. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-40—Designated Parking Areas for Construction-Related Traffic<br>Non-noise-sensitive designated parking areas for LPA-related traffic will be used. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-41—Enclosures for Fixed Equipment<br>Enclosures for fixed equipment, such as TBM slurry processing plants, will be required to reduce noise. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| **Mitigation:** To ensure that noise and vibration impacts associated with construction are below threshold levels, Metro's plans, specifications, and estimates ("bid") documents will include the following measures: | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| CON-42—Phasing Ground Impacting Operations<br>Demolition, earth moving, and ground impacting operations will be phased so as not to occur in the same time period. | | | |
| CON-43—Alternatives to Impact Pile Driving<br>Impact pile driving will be avoided. Drill piles or sonic or vibratory drivers will be used where the geological conditions permit their use and where ground vibration damage risk criteria are satisfied. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-44—Alternative Demolition Methods<br>Demolition methods will be selected to minimize noise and vibration impact where possible. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-45—Restriction on Use of Vibratory Rollers and Packers<br>Use of vibratory rollers and packers will be avoided near vibration sensitive areas. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-46—Metro Ground-Born Noise and Ground-Born Vibration Limits<br>If the Metro ground-borne noise limits or ground-borne vibration limits are exceeded, the contractor will be required to take action to reduce vibrations to acceptable levels. Such action could include reducing the muck train speed, additional rail and tie isolation, and more frequent rail and wheel maintenance. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| **Construction (Energy)** | | | |
| No mitigation required. However, to further ensure there is no a wasteful, inefficient, or unnecessary energy usage, Metro will require the construction contractor to implement energy conserving BMPs in accordance with Metro's Energy and Sustainability Policy | Verify Compliance | Metro | – Metro<br>– Metro<br>– Construction |
| **Construction (Geologic Hazards)** | | | |
| **Mitigation:** The following measures will be implemented to reduce impacts related to subsidence and settlement due to tunneling. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| CON-47—Use of Pressurized-Face TBMs for Tunnel Construction<br>To optimize control of the ground overlying and surrounding the tunnels and limit ground settlement to acceptable levels, pressurized-face TBMs will be used for tunnel construction, which will allow the tunnel lining to be installed and grout to be injected into the annulus between the lining and the ground immediately behind the TBM concurrently and without having to lower groundwater levels by dewatering. | | | |
| CON-48—Preconstruction Survey, Instrumentation, and Monitoring<br>Preconstruction Survey, Instrumentation, and Monitoring: As added protection to detect tunneling-induced settlement and settlement induced by other excavation activities, pre-construction surveys will be performed to document the existing conditions of buildings along the alignment before tunneling begins, and instrumentation will be installed to monitor structures. During construction, instrumentation (e.g., ground surface and building monitoring programs) will be in place to measure movements and provide information to the resident engineer and contractor on tunneling performance, as well as to document that the settlement specifications are met. If measurements indicate settlement limits could be exceeded, the contractor will be required to change or add methods and/or procedures to comply with those limits. Construction work will be reassessed if settlements exceed action (warning) levels. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-49—Additional Geotechnical Exploration<br>During the design phases, additional geotechnical exploration and analysis will be undertaken to confirm areas where dewatering will be required and if it will cause significant subsidence. If these conditions are found, methods to prevent lowering of the groundwater outside of the excavation will be employed. These methods could include use of slurry walls, secant pile walls, or other methods for the construction of the station walls to reduce the settlement impacts due to groundwater lowering. | Verify completion of research | Metro | – Metro<br>– Metro<br>– Final Design |
| CON-50—Additional Methods to Reduce Settlement<br>Where conditions warrant (for example, more shallow tunnels directly below | Verify compliance | Metro | – Metro<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| sensitive structures or at cross-passages), additional methods to reduce settlement will be specified. Such methods could include the following:<br>• Permeation grouting to improve the ground prior to tunneling<br>• Compaction grouting to consolidate the ground above the tunnel<br>• Compensation grouting as the tunnel is excavated<br>• Underpinning the structure's foundation | | | – Construction |
| CON-51—Techniques to Lower the Risk of Exposure to Hydrogen Sulfide<br>In areas where hydrogen sulfide is encountered, several techniques could be used to lower the risk of exposure. The primary measures to prevent exposure to hydrogen sulfide gas are separation of materials from the tunnel environment, and increased ventilation capacity to dilute gases to safe levels as defined by Cal/OSHA. Secondary measures could include pre-treatment of groundwater containing hydrogen sulfide by displacing and oxidation of the hydrogen sulfide by injecting water (possibly containing dilute hydrogen peroxide) into the ground and groundwater in advance of the tunnel excavation. This "in-situ oxidation" method reduces hydrogen sulfide levels even before the ground is excavated. This pre-treatment method is unlikely to be necessary where a slurry-face TBM is used, but may be implemented at tunnel-to-station connections or at cross-passage excavation areas and where open excavation and limited dewatering may be conducted such as emergency exit shafts and low-point sump excavations.<br>When needed to reduce hydrogen sulfide to safe levels for slurry treatment; additives could be mixed with the bentonite (clay) slurry during the tunneling and/or prior to discharge into the slurry separation plant. For example, zinc oxide could be added to the slurry as a "scavenger" to precipitate dissolved hydrogen sulfide when slurry hydrogen sulfide levels get too high. Gas levels will be maintained in accordance with Cal/OSHA requirements for safe working environments. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-52—Measures to Reduce Cas Inflows<br>For the stations in elevated gas zones, the use of relatively impermeable lagging, use of diaphragm or slurry walls or equivalent will be implemented to reduce of gas inflows both during and after construction. The slurry wall provides a thick | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| (typically 3 to 4 feet) concrete barrier against water and gas intrusion, and significantly reduces the need for dewatering the station during construction. Grout tubes can be pre-placed within slurry wall panels to be used in the event leakage occurs. Slurry walls present a challenge in accommodating existing utilities, and typically more utility relocation is required for slurry wall systems. Additional ventilation, continuous monitoring, and worker training for exposure to hazardous gases will also be required during station construction. In extreme cases, some work may require temporary use of personal protective equipment, such as fitted breathing apparatus. | | | |
| CON-53—Further Research on Oil Well Locations<br>Prior to construction, more detailed research on oil well locations will be conducted. Detection of oil wells will include use of magnetic devices to sense oil well casings within the tunnel alignment. Where the tunnel alignment cannot be adjusted to avoid well casings, the California Department of Conservation (Department of Oil, Gas and Geothermal Resources) will be contacted to determine the appropriate method to re-abandon the well. Oil Well abandonment must proceed in accordance with California Laws for Conservation of Petroleum and Gas (1997), Division 3. Oil and gas, Chapter 1. Oil and Gas Conservation, Article 4, Sections 3228, 3229, 3230, and 3232. The requirements include written notification of the State Department of Oil, Gas and Geothermal Resources (DOGGR), protection of adjacent property, and before commencing any work to abandon any well, obtaining approval by the DOGGR. Abandonment work including sealing off oil/gas bearing units, pressure grouting etc, must be performed by a state-licensed contractor under the regulatory oversight and approval of DOGGR. Similarly, during construction if an unknown well is encountered, the contractor will notify Metro, Cal/OSHA, and the Gas and Geothermal Resources for well abandonment, and proceed in accordance with state requirements. | Verify completion of research on oil locations | Metro | – Metro<br>– Metro<br>– Prior to Construction |
| CON-54—Worker Safety for Gassy Tunnels<br>Although not specifically required for gassy tunnels, workers will be supplied with oxygen-supply-type self-rescuers (breathing apparatus required for safety during | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| evacuation during fires). | | | |
| **Construction (Hazardous Waste and Materials)** | | | |
| **Mitigation:** In addition to the measures implemented as required by applicable regulations the following mitigation measures will be implemented so there will be no impact associated with hazardous waste and materials due to construction activities .<br><br>CON-55—Site Assessments<br><br>As detailed design-level plans are prepared, and precise LPA excavation limits defined, a more detailed Environmental Site Assessment (Phase II) will be conducted prior to construction in areas of impacted soil. A base line soil sampling protocol will be established with special attention to those areas of environmental concern. The soil will be assessed for constituents likely to be present in the subsurface including, but not limited to, total petroleum hydrocarbons, volatile and semi-volatile organic compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, pesticides, lead arsenates, and Title 22 metals. The depth of the sampling will be based on the depth of excavation or type of construction activities. In addition, in areas where groundwater will be encountered, samples will also be analyzed for suspected contaminants prior to dewatering to ensure that National Pollutant Discharge Elimination System discharge requirements are satisfied. | Verify completion of ESA and sampling | Metro | – Metro<br>– Metro<br>– Prior to Construction |
| CON-56—Soil Reuse<br><br>As detailed design-level plans are prepared, and precise LPA excavation dimensions defined, a soil mitigation plan will be prepared showing the extent of soil excavation during construction. The soil mitigation plan will use Metro's Standard Specifications for soil reuse criteria, which include a sampling plan for stockpiled materials, and the disposition of materials that do not satisfy the reuse criteria. It will specify guidelines for imported materials. The plan will include provisions for soil screening for contamination during grading or excavation activities. | Verify compliance | Metro | – Metro<br>– Metro<br>– Prior to Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| CON-57—Sampling During Construction<br>Metro will sample soil suspected of contamination and analyze the excavated soil for the purpose of classifying material and determining disposal requirements. If excavated soil is suspected or known to be contaminated, the contractor to perform the following operations:<br>• Segregate and stockpile the material in a way that will facilitate measurement of the stockpile volume.<br>• Spray the stockpile with water or an SCAQMD-approved vapor suppressant and cover the stockpile with a heavy-duty plastic (e.g., Visqueen) to prevent soil volatilization to the atmosphere or exposure to nearby workers. | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-58—Soil Testing<br>Soil samples that are suspected of contamination will be analyzed for suspected chemicals by a California certified laboratory. If contaminated soil is found, it will be removed, transported to an approved disposal location and remediated or disposed according to state and federal laws. Where contaminated levels can be diluted to acceptable levels soils may be re-used on-site. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-59—Personal Protection<br>The contractor will provide qualified and trained personnel and personal protective equipment (PPE) to perform operations that require the disturbance of contaminated substances including excavation of stations, slurry/tunnel material processing, segregation, stockpiling, loading and hauling. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-60—Contaminated Groundwater<br>Groundwater contamination encountered during subsurface construction activities may be treated on-site to acceptable local and state criteria and then discharged into the sanitary sewer. If on-site treatment is not feasible due to the type and severity of the contamination identified, the contaminated ground water may need to be disposed of by recycling in a permitted facility. If unanticipated contaminated groundwater (not included in the health and safety plan) is encountered during construction, the contractor will stop work in the vicinity, cordon off the area, and contact Metro and the appropriate hazardous waste coordinator and maintenance hazardous spill coordinator at Metro and will | Verify completion of testing of suspect contaminated groundwater | Metro/Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
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| immediately notify the Certified Unified Program Agencies (City of Los Angeles Fire Department, County of Los Angeles Fire Department, and Los Angeles Regional Water Quality Control Board [LARWQCB]) responsible for hazardous materials and wastes. In coordination with the LARWQCB, an investigation and remediation plan will be developed in order to protect public health and the environment. Any hazardous or toxic materials will be disposed according to local, state, and federal regulations. | | | |
| CON-61—Health and Safety Plan<br>A health and safety plan will be required by LPA specifications. The plan will include response to exposure of personnel to constituents of concern identified in the Phase II Environmental Site Assessment. | Verify completion of health and safety plan and compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-62—Storage of Contaminated Materials<br>Hazardous or contaminated materials will be properly stored to prevent contact with precipitation and runoff. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-63—Monitoring the Environment<br>An effective monitoring and cleanup program will be developed and implemented for spills and leaks of hazardous materials | Verify compliance | Metro | – Metro<br>– Metro<br>– Construction |
| CON-64—Equipment Repair and Maintenance<br>Equipment to be repaired or maintained will be placed in covered areas on a pad of absorbent material to contain leaks, spills, or small discharges | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-65—Removal of Chemical Residue<br>Any significant chemical residue on the construction sites will be removed. | Verify compliance | Contractor | – Metro<br>– Metro<br>– construction |
| **Construction (Ecosystems/ Biological Resources)** | | | |
| **Mitigation:** Mitigation measures will be required for compliance with the Migratory Bird Treaty Act and State migratory bird protection and to avoid and minimize impacts to bird species that may utilize trees that could be removed or disturbed during construction of the LPA. | Verify completion of biological surveys | Metro | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| CON-66—Biological Survey<br>Two biological surveys will be conducted, one 15 days prior and a second 72 hours prior to construction that will remove or disturb suitable nesting habitat. The surveys will be performed by a biologist with experience conducting breeding bird surveys. The biologist will prepare survey reports documenting the presence or absence of any protected native bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (within 500 feet for raptors). If a protected native bird is found, surveys will be continued in order to locate any nests. If an active nest is located, construction within 300 feet of the nest (500 feet for raptor nests) will be postponed until the nest is vacated and juveniles have fledged and when there is no evidence of a second attempt at nesting. | | | |
| CON-67—Compliance with City Regulations<br>If construction or operation of the LPA requires removal or pruning of a protected tree, a removal permit will be required in accordance with applicable municipal codes and ordinances of the city in which the affected tree is located. Within the City of Los Angeles, compliance with the Native Tree Protection Ordinance will require a tree removal permit from the Los Angeles Board of Public Works. Similarly, within the City of Beverly Hills, applicable tree protection requirements, such as tree removal permits, will be followed. Tree removal permits may require replanting of protected trees within the Study Area or at another location to mitigate for the removal of these trees. | Verify compliance | Metro/Contractor | – Metro<br>– Metro<br>– Construction |
| CON-68—Tree Pruning<br>If construction or operation will entail pruning of any protected tree, the pruning will be performed in a manner that does not cause permanent damage or adversely affect the health of the trees. | Verify compliance | Metro/Contractor | – Metro<br>– Metro<br>– Construction |
| CON-69—Avoidance of Migratory Bird Nesting Season<br>Construction activities that involve tree removal or trimming will be timed to occur outside the migratory bird nesting season, which occurs generally from March 1st through August 31st and as early as February 1st for raptors. | Verify compliance | Metro/Contractor | – Metro<br>– Metro<br>– Construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| **Construction (Hydrology and Water Resources)** | | | |
| **Mitigation:** In addition to the measures identified for geologic hazards and hazardous wastes and materials, the following measures are recommended to avoid and minimize impacts to water resources and water quality as they relate to groundwater.<br>CON-70—Methods to Control Contaminated Groundwater<br>In the event contaminated groundwater is encountered in test borings and it is determined that contamination is likely to spread, this concern will be mitigated during design and engineering. For example, perched contaminated groundwater in upper levels of the excavation could be allowed to contaminate groundwater in lower levels of an excavation. Methods to control this could include isolation of dewatering systems or/and use of groundwater barriers. | Verify mitigation is completed during project design and engineering. | Metro | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Final Design |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| CON-71—Plan if Contaminated Groundwater is Encountered<br>If contaminated groundwater is encountered during construction, the contractor will stop work in the vicinity, cordon off the area, and contact the appropriate hazardous waste coordinator and maintenance hazardous spill coordinator at Metro and immediately notify the Certified Unified Program Agencies (City of Los Angeles Fire Department, County of Los Angeles Fire Department, and Los Angeles RWQCB) responsible for hazardous materials and wastes. Through coordination with the Los Angeles RWQCB, an investigation and remediation plan will be developed to protect public health and the environment. The contractor will treat or dispose of any hazardous or toxic materials according to local, State, and Federal regulations. | Verify compliance | Metro/Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| **Mitigation**: In addition to the measures identified for geologic hazards and hazardous wastes and materials, the following measures are recommended to avoid and minimize impacts to water resources and water quality as they relate to drainage:<br><br>CON-72—Erosion and Sediment Control Plan<br>An erosion and sediment control plan will be established prior to construction. The plan will include the following BMPs as appropriate:<br>• Use of natural drainage, detention ponds, sediment ponds, or infiltration pits to allow runoff to collect and to reduce or prevent erosion<br>• Use of barriers to direct and slow the rate of runoff and to filter out large-sized sediments<br>• Use of down drains or chutes to carry runoff from the top of a slope to the bottom;<br>• Control of the use of water for irrigation so as to avoid off-site runoff | Monitor compliance | Metro | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-73—Landscape and Construction Debris<br>Landscape and construction debris will be periodically and consistently removed. | Monitor compliance | Metro | – California State Water Resources Control Board (SWRCB)<br>– Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| | | | – Final Design |
| CON-74—Use of Non-Toxic Herbicides or Fertilizers<br>Non-toxic alternatives will be employed for any necessary applications of herbicides or fertilizers. | Monitor compliance | Metro | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-75—Use of Temporary Detention Basins<br>Temporary detention basins will be installed to remove suspended solids by settlement. | Verify compliance | Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-76—Water Quality Monitoring<br>Water quality of runoff will be periodically monitored before discharge from the site and into the storm drainage system | Verify compliance | Metro/Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| **Mitigation:** BMPs for tunnel construction activities will include, but are not limited to, the following measures.<br><br>CON-77—Use of Stormwater Runoff BMPs<br>Construction sites will have BMPs to divert stormwater runoff from entering the construction area. Containment around the site will include use of temporary measures such as fiber rolls to surround the construction areas to prevent any spills of slurry discharge or spoils recovered during the separation process. Downstream drainage inlets will also be temporarily covered to prevent discharge from entering the storm drain system. | Verify compliance | Metro/Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-78—Measures to Reduce the Tracking of Sediment and Debris | Verify compliance | Metro/Contractor | – California State |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| Construction entrances/exits will be properly set up so as to reduce or eliminate the tracking of sediment and debris offsite. Appropriate measures will include measures such as grading to prevent runoff from leaving the site, and establishing "rumble racks" or wheel water points at the exit to remove sediment from construction vehicles. | | | Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-79—Cleaning of Equipment<br>Onsite rinsing or cleaning of any equipment will be performed in contained areas and rinse water will be collected for appropriate disposal. | Verify compliance | Metro/Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-80—Construction Site Water Collection<br>A tank will be required on work sites to collect the water for periodic offsite disposal. Since the slurry production is a closed-loop system in which the water separated from the discharge slurry is continually recycled, minimal and infrequent water discharges are anticipated. These discharges could be accommodated in a tank onsite to collect the water and disposed of periodically. | Verify compliance | Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| CON-81—Soil and Building Material Storage<br>Soil and other building materials (e.g., gravel) stored onsite must be contained and covered to prevent contact with stormwater and offsite discharge. | Verify compliance | Contractor | – California State Water Resources Control Board (SWRCB)<br>– Metro<br>– Construction |
| **Construction (Parks and Community Facilities)** | | | |
| **Mitigation:** In addition to the measures for communities and neighborhoods, the following measures will avoid and minimize impacts to parks and community facilities.<br>CON-82—Communication with Schools<br>School districts and private school institutions along the alignment will be informed of changes to Metro bus routes, school bus routes, and pedestrian | Verify coordination | Metro | – Metro<br>– Metro<br>– Prior to construction |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| crossings prior to construction. | | | |
| CON-83—Work with Transportation, Police, Public Works, and Community Service Departments<br>Metro will work with transportation, police, public works, and community services departments of jurisdictions along the alignment to implement mutually agreed upon measures, such as posting of clearly marked signs, pavement markings, lighting as well as implementing safety instructional programs, to enhance the safety of pedestrians, particularly in the vicinity of schools and access routes to hospitals. The measures will be developed to conform to Metro Rail Transit Design Criteria and Standards, Fire/Life Safety Criteria, Volume IX. | Verify coordination and compliance | Metro | – Metro<br>– Metro<br>– Prior to Construction |
| CON-84—Instructional Rail Safety Programs for Schools<br>Metro will provide at no charge to school districts an instructional rail safety program with materials to all affected elementary middle and high schools. | Verify coordination and implementation of Public Outreach Program | Metro | – City of Los Angeles<br>– Metro<br>– Prior to Construction and project implementation |
| CON-85—Informational Program to Enhance Safety<br>Metro will provide an on-going informational program to nearby medical facilities, senior centers, and parks if requested by these facilities, to enhance safety. The program will be similar to that described for the schools except the information and materials provided will be geared toward senior citizens. | Verify coordination and implementation of Public Outreach Program | Metro | – Metro<br>– Metro<br>– Construction |
| CON-86—Traffic Control<br>Contractors will be required to control traffic during construction by following the City of Los Angeles Work Area Traffic Control Manual; City of Los Angeles Bureau of Engineering Standard Plan S-610-12 (Notice to Contractors-Comprehensive); and the Bureau of Engineering Standard Specifications for Public Works Construction. Comparable standards will be enforced for work conducted in the other jurisdictions along the alignment. | Verify compliance | Contractor | – Metro<br>– Metro<br>– Construction |
| CON-87—Designation of Safe Emergency Vehicle Routes | Verify coordination | Metro | – Metro |

| Mitigation Measures | Monitoring Action | Party Responsible for Implementing Mitigation | – Enforcement Agency<br>– Monitoring Agency<br>– Timeframe |
|---|---|---|---|
| Safe emergency vehicle routes will be designated around construction sites. The identification of the routes will be coordinated with other agencies. | | | – Metro<br>– Prior to Construction |
| **Construction (Economic and Fiscal)** | | | |
| CON-88—Minimize Disruption of Access to Businesses<br>Both standard and site-specific mitigation measures will be developed to minimize disruption of pedestrian access to businesses and disruption of general vehicular traffic flow or access to specific businesses.<br>Implementation of mitigation measures CON-1, TCON-1, T-CON-4, TCON-7, TCON-8, TCON-10, and TCON-11 will further reduce construction impacts to businesses. | Verify inclusion into project design and implementation | Metro | – Metro<br>– Metro<br>– Construction |

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

# WESTSIDE SUBWAY EXTENSION PROJECT
# ENGINEERING MANAGEMENT SERVICES

**Contract No. PS-4350-2000**









# Traffic Management Plan (Draft)

*Prepared for:*

Metro

*Prepared by:*

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October 6, 2015

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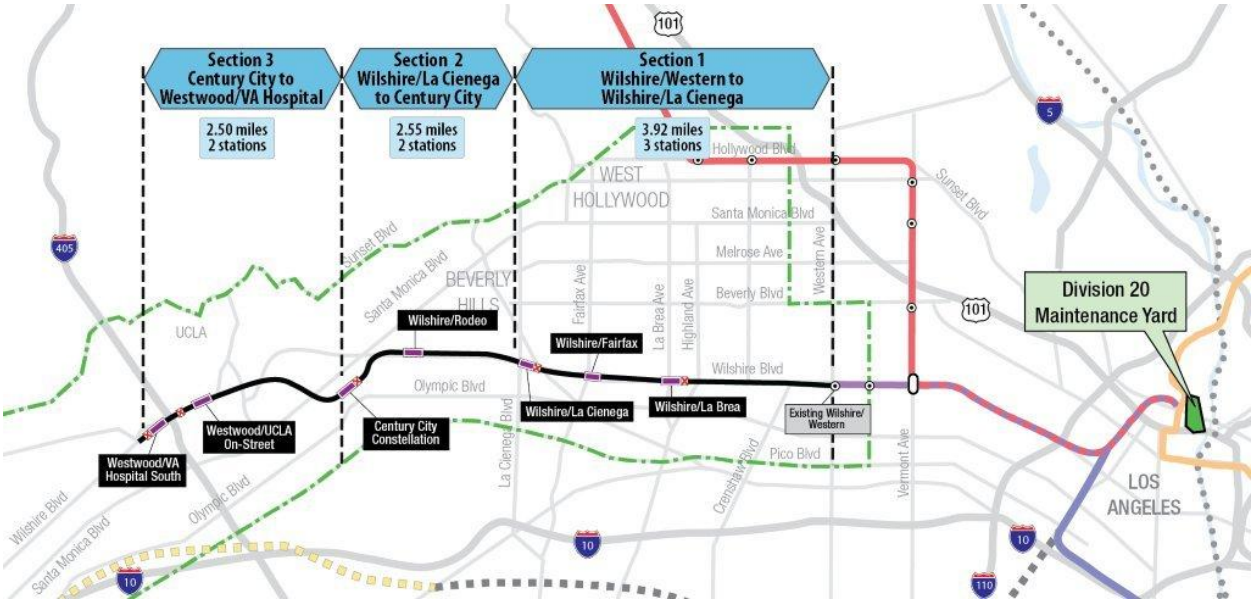
# 1.0 PROJECT DESCRIPTION & PURPOSE OF TRAFFIC MANAGEMENT PLAN (TMP)

## 1.1 Project Description

The Westside Subway Extension is an extension of the Metro Purple Line along the Wilshire Boulevard corridor in Los Angeles County. Section 2 of the Project extends approximately 2.55 miles underground beneath Wilshire Boulevard and Constellation Boulevard from the west end of the La Cienega Station tail tracks in the vicinity of the intersection of Wilshire Boulevard and Stanley Drive. Section 2 lies within two local jurisdictions – the City of Los Angeles, and the City of Beverly Hills and follows an east-west alignment with one underground station located beneath Wilshire Boulevard near Rodeo Drive before heading southwest to Constellation Boulevard with one underground station located beneath Constellation Boulevard at Avenue of the Stars – see Figure 1-1. Each Station will be constructed by cut and cover within the street right of way. Soldier piles and lagging have been assumed for excavation support but the eventual shoring system will be determined by the Contractor. The station excavations will be decked over to maintain traffic during tunneling and the station construction.

**Figure 1-1: Project Map**




## 1.2 Purpose of TMP

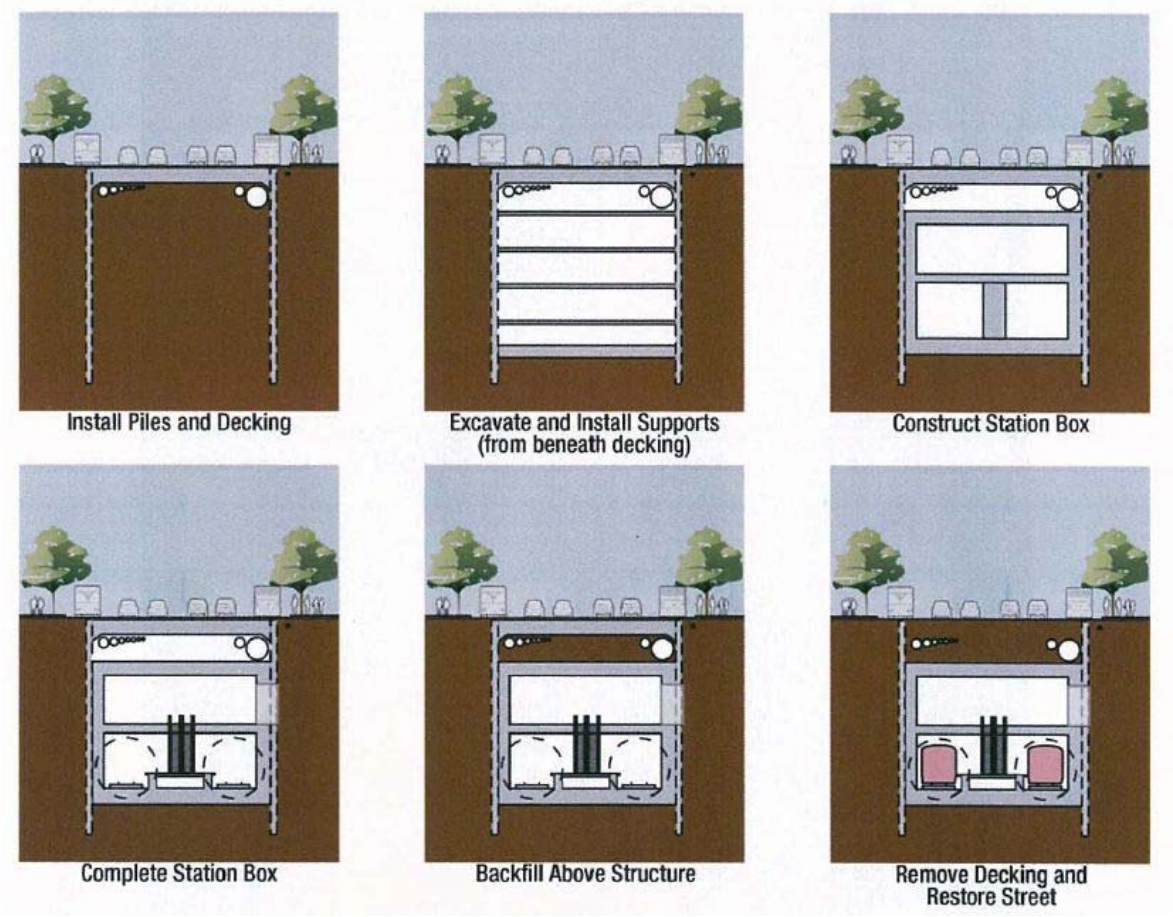
Due to the significant time required to set up traffic control, mobilize large pile drilling rigs and supporting equipment and restore streets on a daily basis, it is impractical to mobilize and demobilize equipment each day to keep all traffic lanes open for peak hour traffic. Metro is submitting this Traffic Management Plan, including work area traffic control plans (WTCP), and Temporary Signal Plans to obtain peak hour exemption permits for soldier pile installation. Permits from both City of Los Angeles and the City of Beverly Hills are needed prior to February of 2016, the close of the bid period for Contract C1120 - Section 2 Design Build.

# 2.0 CONSTRUCTION APPROACH FOR SOLDIER PILE INSTALLATION

The construction approach is to install the soldier piles in stages, closing one side of the street at a time to create a construction work site of sufficient size to position the piling rig and supporting equipment whilst maintaining one lane of traffic in each direction. The exception to this approach is during pile installation at the street intersections. For major intersections the piles will be installed across the intersection in stages during weekends, maintaining traffic in both directions and along intersecting streets, but with some restrictions on left and right turns. For minor intersections, the intersection will be temporarily closed during pile installation and a restriction will be placed on entering or exiting adjoining streets via Constellation Boulevard. For driveways and entrances to parking garages, pile installation will be phased where possible to allow the driveway to remain in service, or carried out during times (nights and weekends) when driveways can be closed.

Once the piles are installed, the street will be partially excavated to a depth of approximately 8 to 12 feet and the street will be decked over. The decking installation will be performed in stages during weekend closures with the street reopened for Monday morning traffic. A typical cut and cover construction approach is shown in Figure 2-1.

**Figure 2-1: Cut and Cover Construction Approach**



# 3.0 CENTURY CITY CONSTELLATION STATION

Tunneling lies on the Critical Path for the project. Advancing the excavation of the east end of the station box permits tunneling to begin earlier. To do so, the most easterly 250 feet of the station box, called the Launch Box, will be excavated first to expedite launching of the TBM. To clear the Launch Box pile corridor, advanced utility relocations will be undertaken. While piling of the Launch Box is under way, utility relocations for the remainder of the station box will continue concurrently.

Once utility relocations west of the Launch Box are complete, piling and street decking for the remainder of the Constellation Station will proceed.

## 3.1 Construction Durations

The construction durations for soldier pile installation are based on obtaining peak hour exemptions. Due to the size of equipment and the extensive traffic control required to set up the necessary lane closures, it is not practical to perform the pile drilling without peak hour exemptions. It is assumed that pile drilling will be conducted during normal City of Los Angeles Work hours with the peak hour exemption. Construction durations for pile drilling at Century City/Constellation in the City of Los Angeles are based on the following work hours.

- Pile drilling - Monday through Friday. 07:00 to 21:00 with other work continuing beyond 21:00 under a night-time noise variance.
- Pile drilling Saturday. Pile drilling Sundays. 08:00 to 18:00 with other work continuing on beyond 18:00 under a night-time noise variance. Pile drilling and pile installation in the intersection of Constellation Boulevard with Avenue of the Stars and across major underground parking garage entrances is assumed to occur during weekends with continuous work authorized between 21:00 on Friday through 06:00 on the following Monday morning.

Construction durations also depend on the productivity achieved in drilling piles, which can vary greatly depending on the nature of the ground, obstructions encountered, ground water inflow and other unforeseen conditions. Ten hours drilling per pile has been assumed for the Launch Box. Fifteen hours drilling per pile has been assumed for the longer piles required in the Station Box.

# 4.0 STAGES OF CONSTRUCTION FOR SOLDIER PILE INSTALLATION

Installation of the soldier piles and decking along Constellation Boulevard at the Century City/Constellation Station will take place during ten major construction stages. The following sections present a description of each major construction stage at each construction site location. The traffic control plan exhibits showing details of the proposed stages of construction are presented in Appendix A.

The traffic control elements common to all stages of work will include:

- Removal of conflicting signage and striping.
- Installation of K-rails and crash cushions per approved.
- Installation of channelizers, delineators and barricades per approved.
- Installation of signs, advance warning devices, flashing arrow boards and portable changeable signs as required.

## 4.1 Constellation Station

The construction stages for soldier pile installation at Century City/Constellation Station are shown in Figure 4-1. The anticipated sequence of soldier pile installation and durations at Century City/Constellation Station is summarized in Figure 4-2. Activity durations are based on 10 hours drilling time per pile for launch box piles and 15 hours per pile for the station piles

**Figure 4-1: Soldier pile construction stages at Century City/Constellation Station**

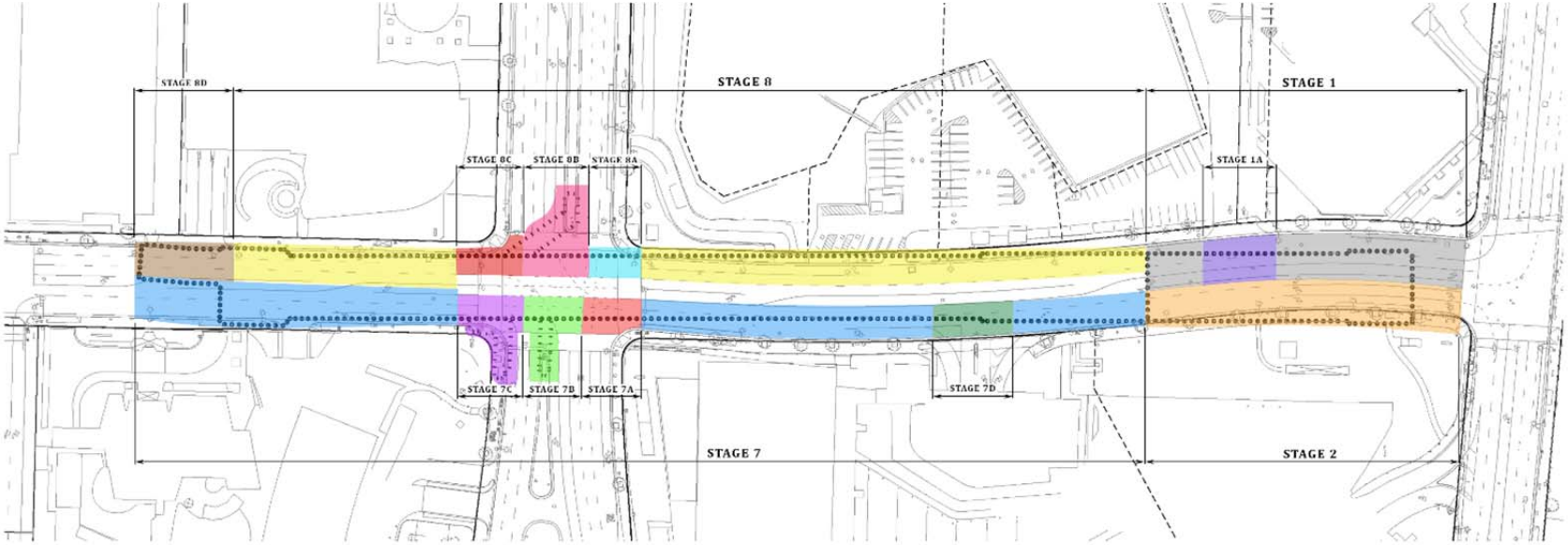
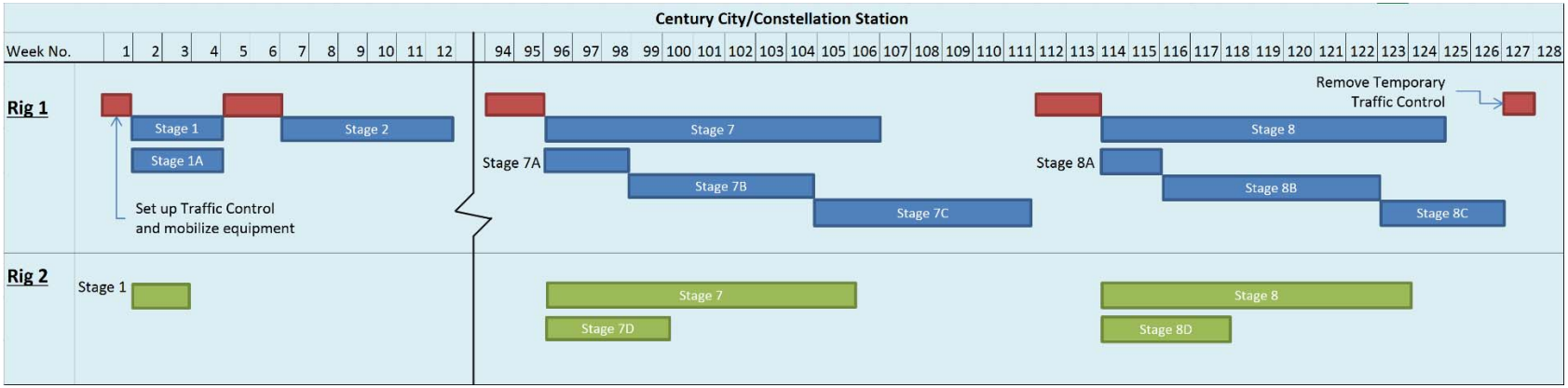



**Figure 4-2: Soldier Pile installation schedule at Century City/Constellation Station**



### 4.1.1 Work in Advance of Piling and Decking

The advance work will serve to clear utilities out of the pile corridor and decking for the Launch Box. In the first phase, telecommunication lines will be moved into a single joint trench. In the second phase, water and gas lines will be relocated concurrently with AT&T cable pulling and splicing at the joint trench. Work on both can be completed concurrently by closing the north lanes and maintaining traffic flow on the south of the street with two lanes in each direction. The water and SCG lines will connect to the existing service lines once clear of the Launch Box. Power relocations will follow the completion of water and SCG relocations. Both phases only require Watch Manual for traffic control and will not require the use of K-rail.

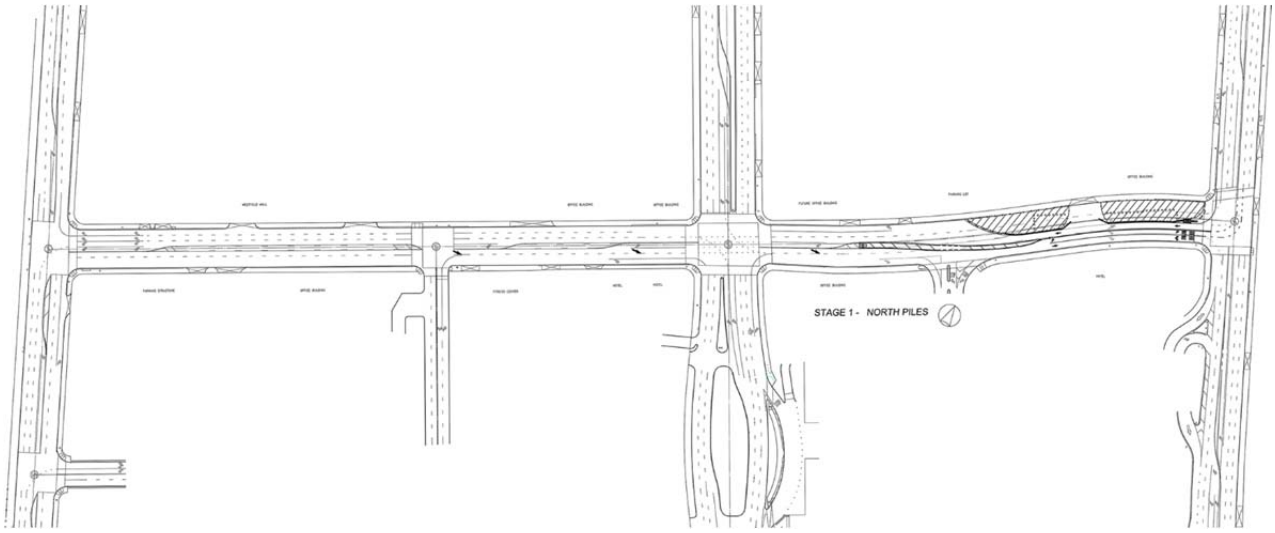
### 4.1.2 Stage 1: Launch Box Piling – North Side

Work area during this stage will be along the north side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard. Traffic will be moved to the south side of Constellation Boulevard. The affected travel control zone will extend from Solar Way to Century Park East. Due to the size of the pile drilling and support equipment, the work area will remain in-place for an extended period of time, requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along the east end of Constellation Boulevard and with a left turn pocket to northbound Century Park East
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of bus stops within work areas
- Maintain local access to businesses at all times.
- Maintain pedestrian access on north and south sides of the street at all times.

All pile drilling performed during this stage will occur during normal working hours; Monday – Friday 07:00 to 21:00 and Saturday from 08:00 to 18:00. Metro will request a night time noise variance to work additional hours at the end of these shifts for non-drilling activities such as pile setting, concreting, trenching. The proposed staging is presented in Figure 4-3.

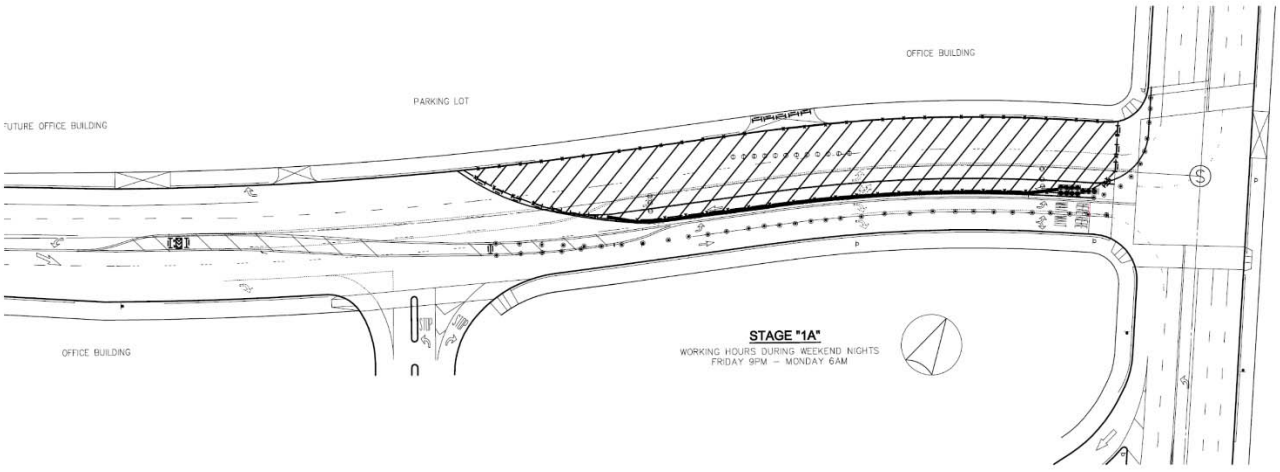
**Figure 4-3: Closure for Launch Box Piling, North Side at Constellation/Century City Station**




### 4.1.3 Stage 1A: Launch Box Piling – North Side

Work area during this stage (Figure 4-4) will be along the north side of Constellation Boulevard across the entrance to the Watt Plaza alley. The work during this stage will require the closure of the Constellation Boulevard entrance to the Watt Plaza alley. An alternate entrance on Century Park East will remain open. Pedestrian access will be maintained on both sides of Constellation Boulevard throughout this stage. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with access to the alley from Constellation Boulevard becoming available on Monday 6:00 am. Constellation Boulevard will have minimum of one travel lane available in each direction.

**Figure 4-4: Closure for Launch Box Piling, North Side at Constellation/Century City Station**




### 4.1.4 Stage 2: Launch Box Piling – South Side and Utility Relocations

Work area during this stage will be along the south side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard for pile installation, and along the north side of Constellation Boulevard between the Watt Plaza alley at 10131

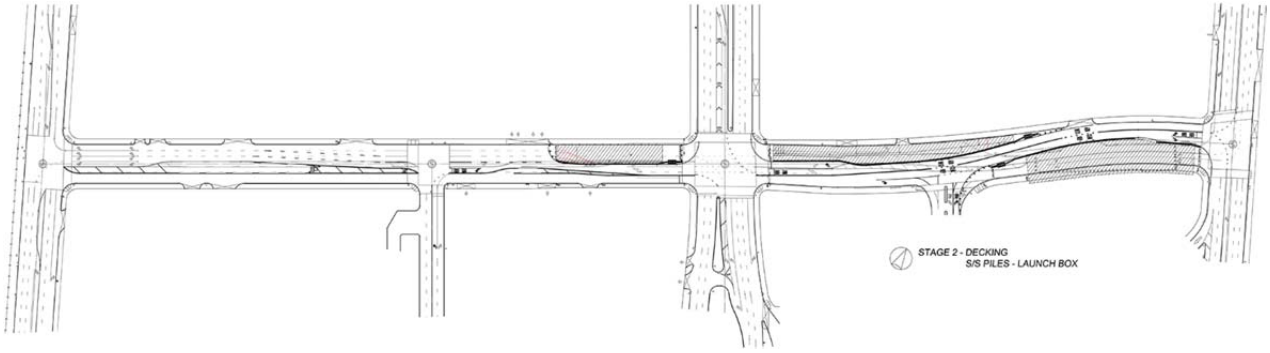
Constellation Boulevard and Solar Way for utility relocation work. The affected travel control zone will extend between Century Park West and Century Park East. Due to the size of the pile drilling and support equipment, the work area will remain in-place for an extended period of time, requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and Century Park East.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of bus stops within work areas.
- Maintain local access to businesses at all times.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Maintain pedestrian access on north side of the street at all times.
- With the exception of the section of sidewalk along the south of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, maintain pedestrian access on south side of the street at all times. Pedestrian access to the south of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard shall be restored upon completion of pile construction work on the sidewalk.

All pile drilling performed during this stage will occur during normal working hours; Monday – Friday 07:00 to 21:00 and Saturday from 08:00 to 18:00. Metro will request a night time noise variance to work additional hours at the end of these shifts for non-drilling activities such as pile setting, concreting, trenching.

While piling is underway in the work zone on the south of Constellation Boulevard near the Century Park East intersection, utility relocations will be taking place in the work zone on the north of Constellation Boulevard between Solar Way and the Watt Plaza alley at 10131 Constellation Boulevard to clear the remainder of the pile corridor. The proposed staging is presented in Figure 4-5.

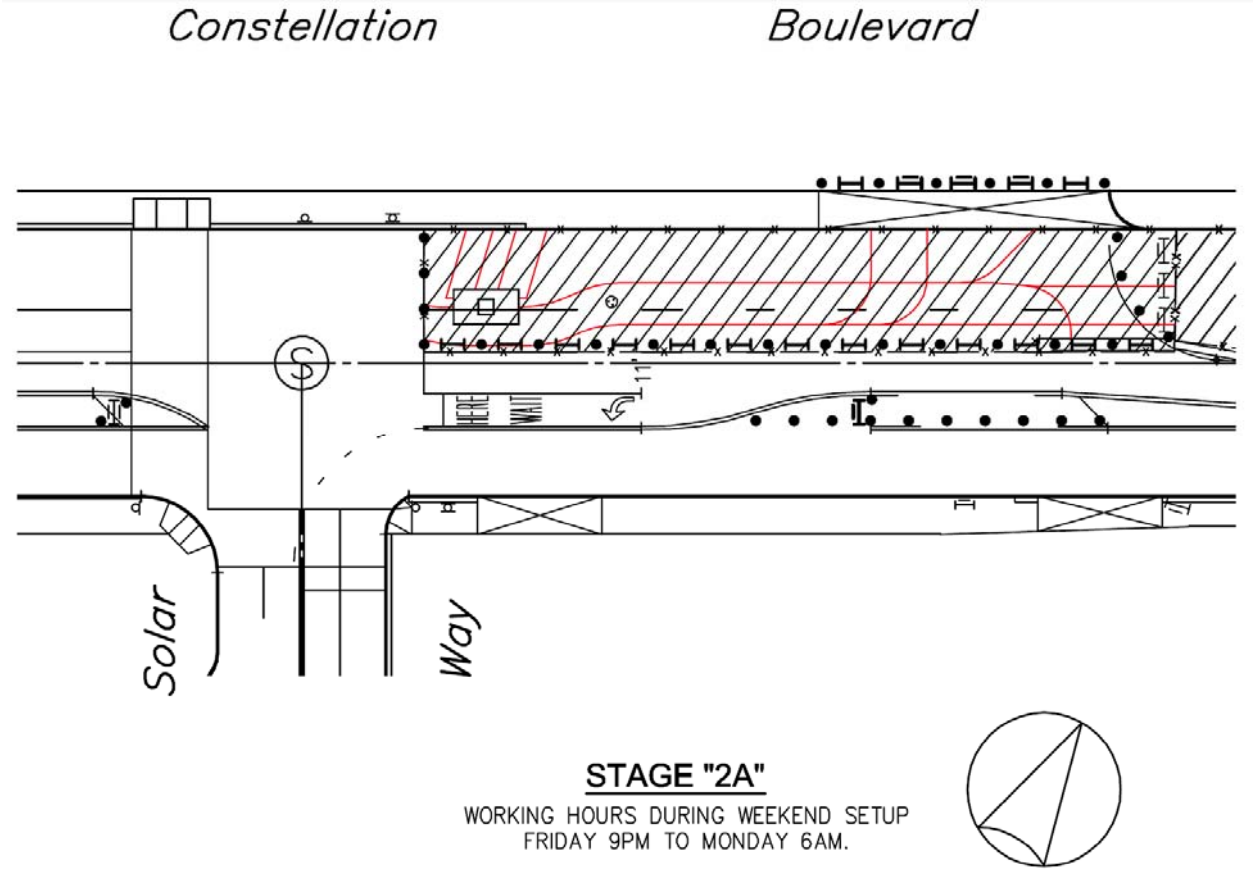
**Figure 4-5: Closure for Launch Box Piling, South Side at Constellation/Century City Station**



### 4.1.5 Stage 2A: Launch Box Piling – South Side and Utility Relocations with Weekend Closure

Work area during this stage (Figure 4-6) will be along Constellation Boulevard between Solar Way and the parking garage entrance to 1999 Avenue of the Stars and will require a weekend closure of this section of Constellation Boulevard. The work during this stage will require the closure of the underground parking garage at 1999 Avenue of the Stars for utility relocations. Pedestrian access will be maintained on the north side of Constellation Boulevard throughout this stage. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with access to the parking garage from Constellation Boulevard becoming available on Monday 6:00 am.

**Figure 4-6: Closure for Launch Box Piling, South Side and Utility Relocations with Weekend Closure**



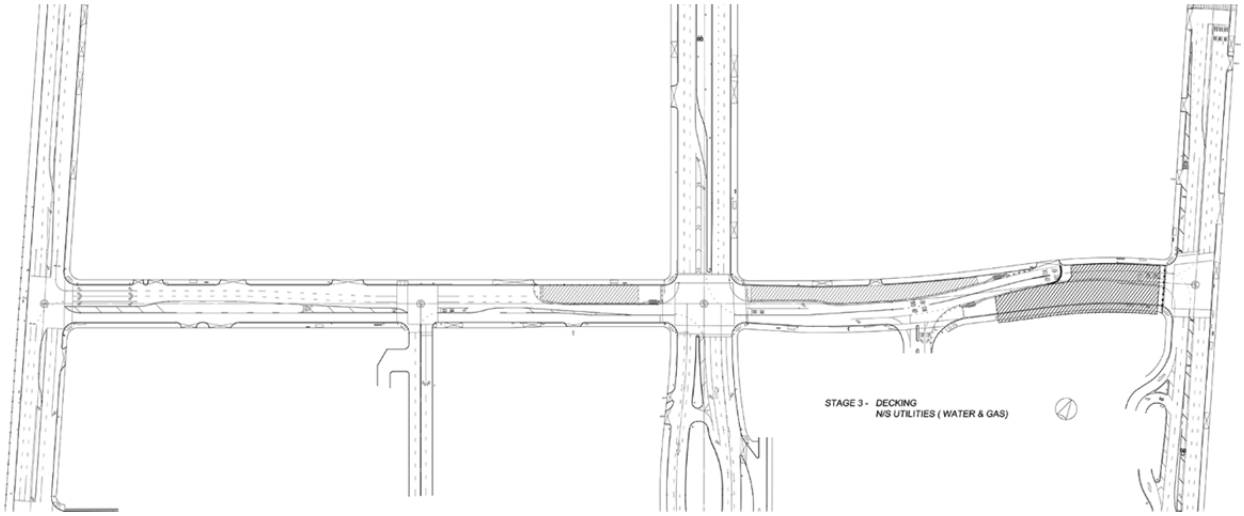

### 4.1.6 Stage 3: Launch Box Decking

Work area during this stage will be the full width of Constellation Boulevard between Century Park East and the Watt Plaza at 10131 Constellation Boulevard and extending on the south side of Constellation Boulevard to the entrance to the underground parking structure at 10100 Constellation Boulevard for decking installation, and along the north side of Constellation Boulevard between the Watt Plaza alley at 10131 Constellation Boulevard and Solar Way for utility relocation work. The affected travel control zone will extend from Century Park West to Century Park East. Eastbound traffic on Constellation Boulevard will be detoured before crossing Avenue of the Stars, with only local access traffic permitted to continue straight through Avenue of the Stars to the underground parking garage at 10100

Constellation Boulevard. The proposed staging is presented in Figure 4-7. Access will be maintained to all driveways, alleys, and garage entrances. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and Watt Plaza Alley.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Prohibition of turns onto Constellation Boulevard from Century Park East.
- Maintain local access to businesses at all times.
- Maintain pedestrian access on both sides of the street at all times except for the south sidewalk between Century Park East and 10100 Constellation Boulevard, which will be closed.

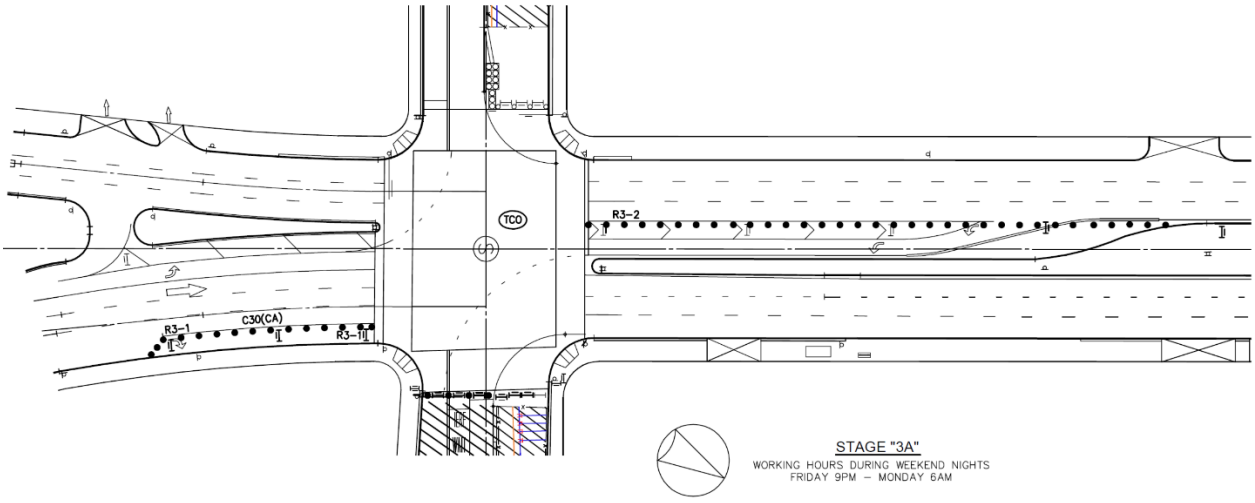
**Figure 4-7: Full Closure for TBM Assembly and Launch at Constellation/Century City Station**




### 4.1.7 Stage 3A: Launch Box Decking – Weekend Closure

Work area during this stage (Figure 4-8) will be along Constellation Boulevard between Avenue of the Stars and Century Park East and will require the full closure of this section of Constellation Boulevard. The work during this stage will require the closure of the Constellation Boulevard entrance to the Watt Plaza alley and the entrance to the underground parking garage at 10100 Constellation Boulevard. Pedestrian access will be maintained on the north side of Constellation Boulevard throughout this stage. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with access to the alley from Constellation Boulevard becoming available on Monday 6:00 am.

**Figure 4-8: Full Closure for TBM Assembly and Launch at Constellation/Century City Station**




### 4.1.8 Stage 4: Launch Box Excavation

Work area during this stage will be along the south side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, as well as along the north side of Constellation Boulevard between the Watt Plaza alley at 10131 Constellation Boulevard and Solar Way. The affected travel control zone will extend between Century Park West and Century Park East. Due to the usage of heavy equipment, intense effort, continual production requirement in limited space during this stage, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and Century Park East.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of bus stops within work areas.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Maintain local access to businesses at all times.
- Maintain pedestrian access on north and south sides of the street at all times, except for the south sidewalk on Constellation Boulevard between 10100 Constellation Boulevard and Century Park East, which will be closed during this stage.

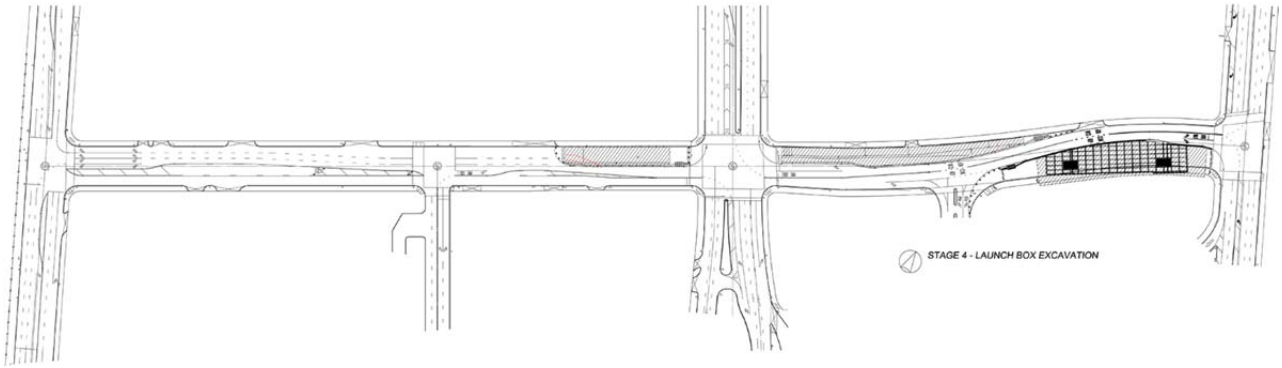
Excavation activities performed during this stage will occur during normal working hours; Monday – Friday 07:00 to 21:00 and Saturday from 08:00 to 18:00. Metro will request a night time noise variance to work additional hours at the end of these shifts.

While Launch Box excavation is underway in the work zone on the south of Constellation Boulevard near the Century Park East intersection, utility relocations will be taking place in the work zone on the north

of Constellation Boulevard between Solar Way and the Watt Plaza alley at 10131 Constellation Boulevard to clear the remainder of the pile corridor.

Haul trucks will enter the construction zone just to the east of 10100 Constellation Boulevard to be loaded with excavated material. They will leave through the east end of the construction zone and turn left onto Century Park East. The proposed staging is presented in Figure 4-9.

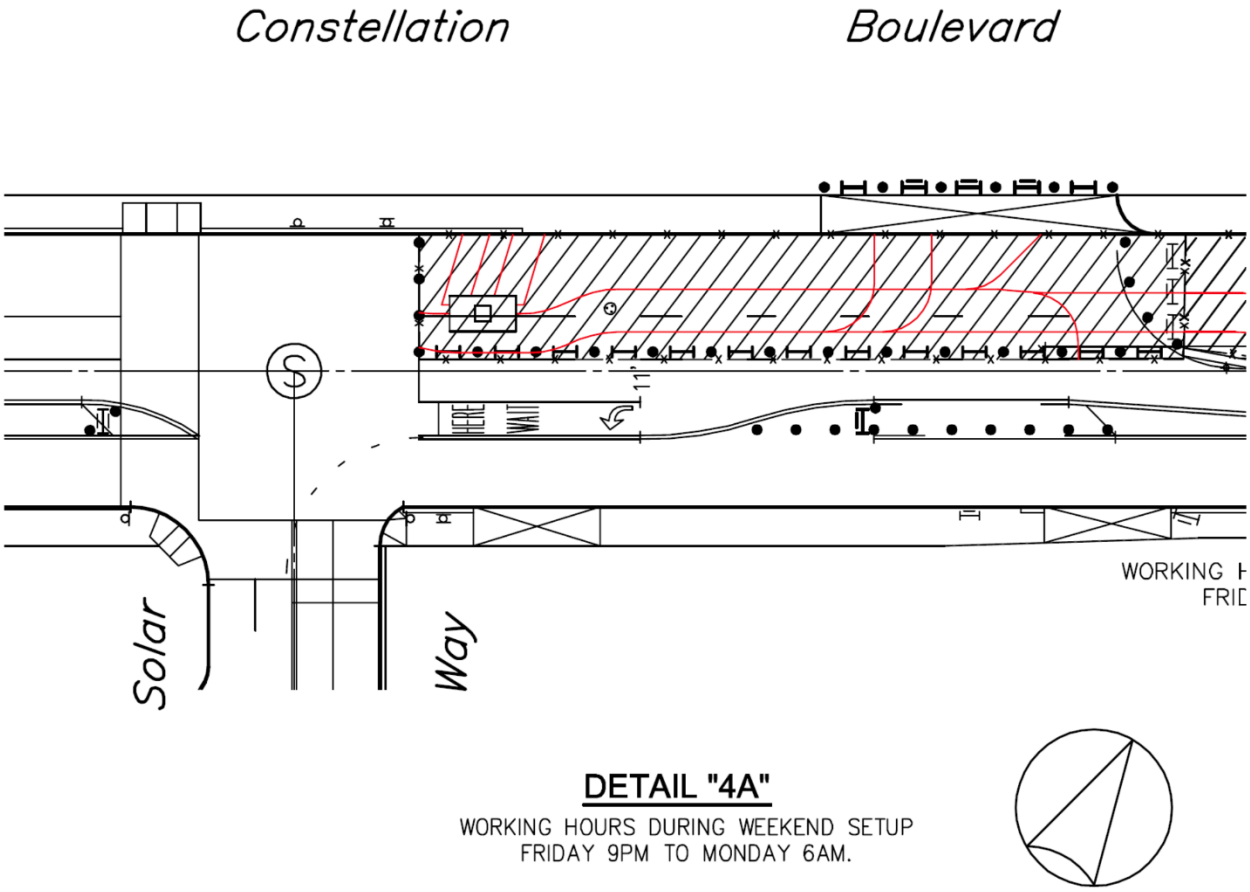
**Figure 4-9: Closure for Launch Box Excavation at Constellation/Century City Station**




### 4.1.9 Stage 4A: Launch Box Excavation – Weekend Closure

Work during this stage will consist of utility relocations at the parking garage entrance to 1999 Avenue of the Stars. The work area will extend into three eastbound lanes requiring shifting of traffic Lanes to the south side of Constellation Boulevard and restriction of all turns into and out of the parking garage. Pedestrian access will remain open along the North of Constellation Boulevard throughout this stage. All work performed during this stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Constellation Boulevard will have a minimum of one travel lane available in each direction. Left turns onto Solar Way will be maintained. The proposed staging is presented in Figure 4-10.

**Figure 4-10: Full Closure for TBM Assembly and Launch at Constellation/Century City Station**




### 4.1.10 Stage 5: TBM Launch

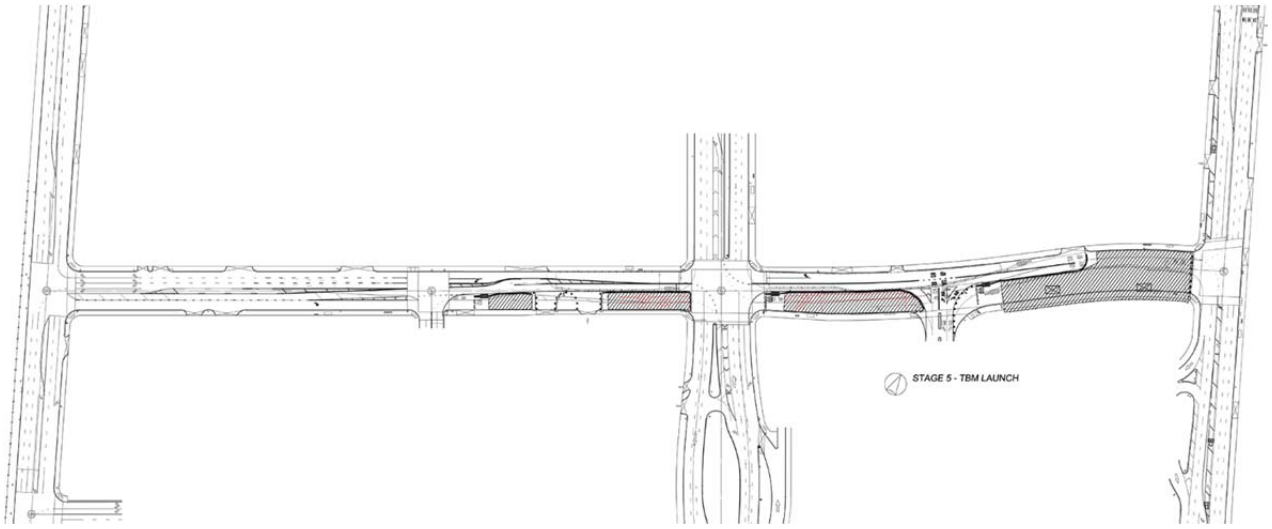
Work area during this stage (Figure 4-11) will be the full width of Constellation Boulevard between Century Park East and Watt Plaza alley and extending on the south side of Constellation Boulevard to the parking garage entrance to 10100 Constellation Boulevard. The south side of Constellation Boulevard between the underground parking garage entrance to 10100 Constellation Boulevard and Solar Way will also be closed during this stage for utility relocations.

Constellation Boulevard east of Avenue of the Stars will be closed to through traffic. Eastbound traffic on Constellation Boulevard will be detoured before crossing Avenue of the Stars, although local access only will be permitted to continue straight through Avenue of the Stars until having to enter the parking garage at 10100 Constellation Boulevard and Watt Plaza alley. Access will be maintained to all driveways, alleys, and garage entrances at all times.

The affected travel control zone will extend between Century Park West and Century Park East. Due to the usage of heavy equipment, intense effort, continual production requirement in limited space during this stage, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Full closure of Constellation Boulevard east of Watt Plaza alley.
- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and 10100 Constellation Boulevard.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Prohibition of turns onto Constellation Boulevard from Century Park East.
- Relocation of bus stops within work areas.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Maintain local access to businesses at all times.
- Maintain pedestrian access on both sides of the street at all times except for the south sidewalk on Constellation Boulevard between 10100 Constellation Boulevard and Century Park East, which will be closed.

**Figure 4-11: Full Closure for TBM Launch at Constellation/Century City Station**



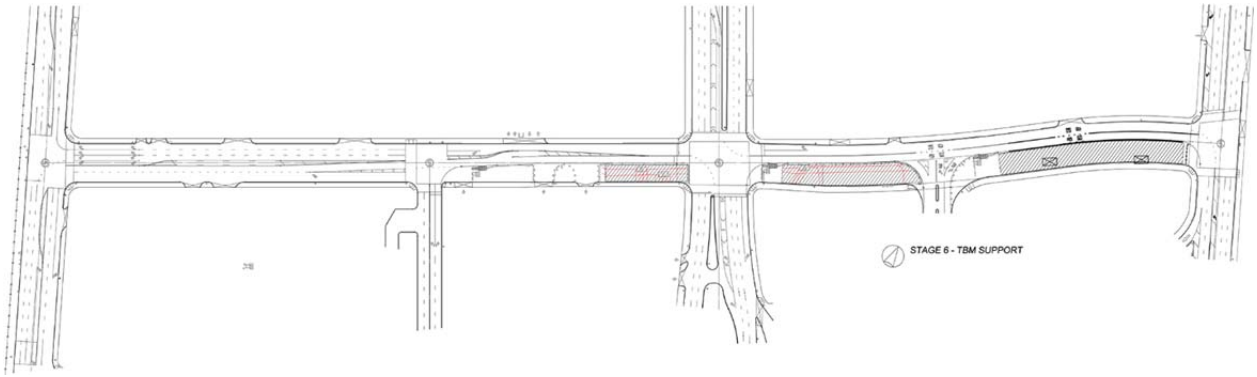

### 4.1.11 Stage 6: TBM Support

Work area during this stage (Figure 4-12) will be along the south side of Constellation Boulevard between Century Park East and the parking garage entrance to 10100 Constellation Boulevard. The south side of Constellation Boulevard between the underground parking garage entrance to 10100 Constellation Boulevard and Solar Way will also be closed during this stage for utility relocations. This will require moving traffic lanes over to the north side of Constellation Boulevard. The affected travel control zone will extend between Century Park West and Century Park East. Due to the usage of heavy equipment, intense effort, continual production requirement in limited space during this stage, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours.

The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and Century Park East.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Relocation of bus stops within work areas.
- Maintain local access to businesses at all times.
- Maintain pedestrian access on both sides of Constellation Boulevard at all times.
- TBM Support work performed during this stage will 24 hours per day Monday through Saturday and on Sundays from 08:00 to 18:00. Metro will request a night time noise variance for work beyond regular work hours.

**Figure 4-12: Full Closure for TBM Launch at Constellation/Century City Station**



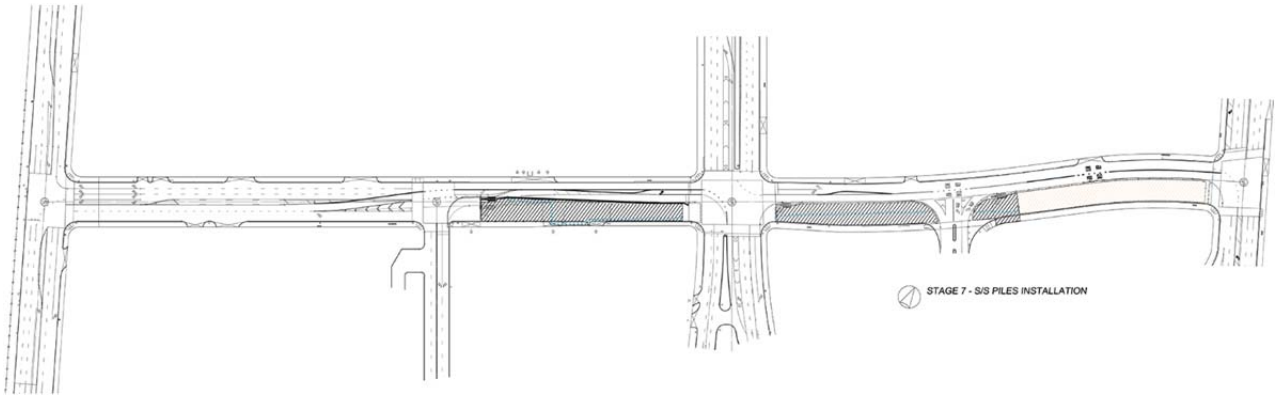

### 4.1.12 Stage 7: Station Box Piling – South Side

Work area during this stage (Figure 4-13) will be setup along the south side of Constellation Boulevard between Century Park East and Solar Way. This will require moving traffic lanes over to the north side of Constellation Boulevard. The affected travel control zone will extend along Constellation Boulevard between Century Park East and Century Park West. Due to the size of the pile drilling and support equipment, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park West and Century Park East.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Relocation of bus stops within work areas.
- Closure of the Constellation Boulevard vehicle entrance to the Century Plaza Hotel.
- Closure of the eastern vehicle entrance to the Equinox Gym.

- Maintain local access to businesses at all times.
- Maintain pedestrian access on north side of the street at all times.
- Pedestrian access on the south sidewalk of Constellation Boulevard between Solar Way and Avenue of the Stars will be closed. All pile drilling performed during this stage will occur during normal working hours; Monday – Friday 07:00 to 21:00 and Saturday from 08:00 to 18:00. Metro will request a night time noise variance to work additional hours at the end of these shifts for non-drilling activities such as pile setting, concreting, trenching.

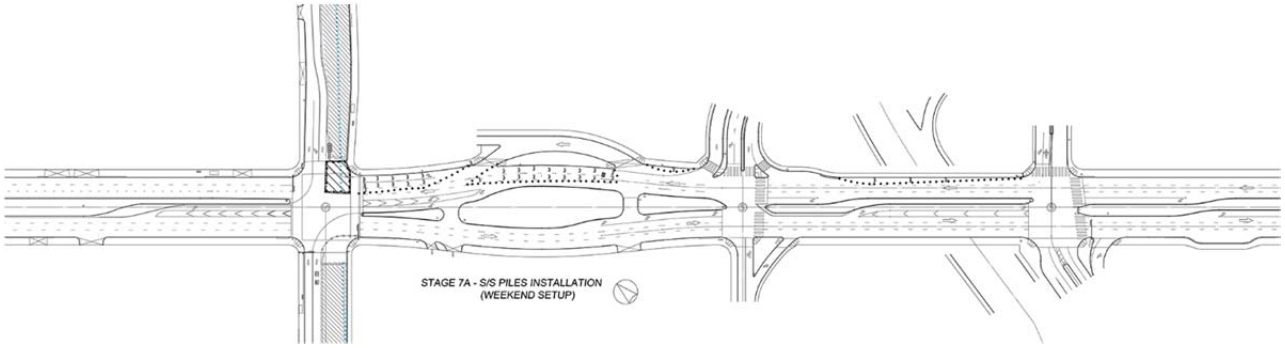
**Figure 4-13: Closure for Station Box Piling, South Side at Constellation/Century City Station**




### 4.1.13 Stage 7A

Work during this stage will consist of pile installation at the southeast corner of the intersection of Avenue of the Stars and Constellation Boulevard. Stage one work area will extend into two northbound lanes and one right turn lane, requiring shifting of traffic Lanes along Avenue of the Stars. The affected travel control zone will extend along Avenue of the Stars between Constellation Boulevard and the ramps to eastbound Olympic Boulevard. Right turns from Avenue of the Stars onto Constellation Boulevard will be prohibited during this stage. The east leg crosswalk will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite side of street for crossing Constellation Boulevard. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction. The proposed staging is presented in Figure 4-14.

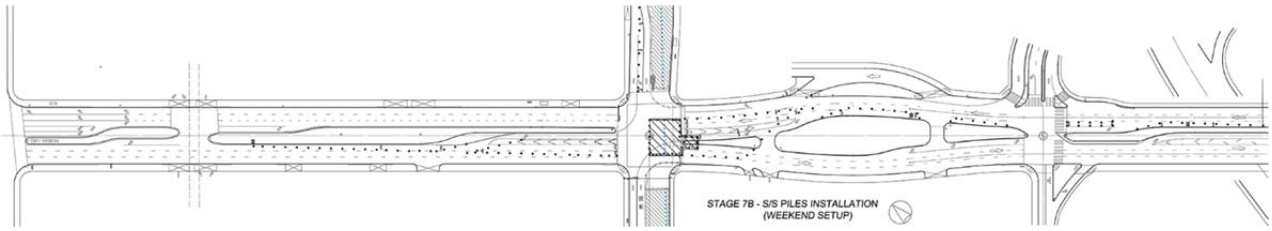
**Figure 4-14: Closure for Station Box Piling, South Side at Constellation/Century City Station**



### 4.1.14 Stage 7B

Work during this stage will consist of pile installation within the intersection of Constellation Boulevard and Avenue of the Stars in the middle lanes on Avenue of the Stars and the southern lanes of Constellation Boulevard. Northbound traffic on Avenue of the Stars will be directed toward the east side of the work area while southbound traffic will traverse on the west side of the work area. The affected travel control zone will extend along Avenue of the Stars between Santa Monica Boulevard and the ramps to eastbound Olympic Boulevard. Left turn movement for northbound Avenue of the Stars will be prohibited in addition to the prohibition of left turns onto Avenue of the Stars from westbound traffic on Constellation Boulevard. The south leg crosswalk will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite side of street for crossing Avenue of the Stars. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction. The proposed staging is presented in Figure 4-15.

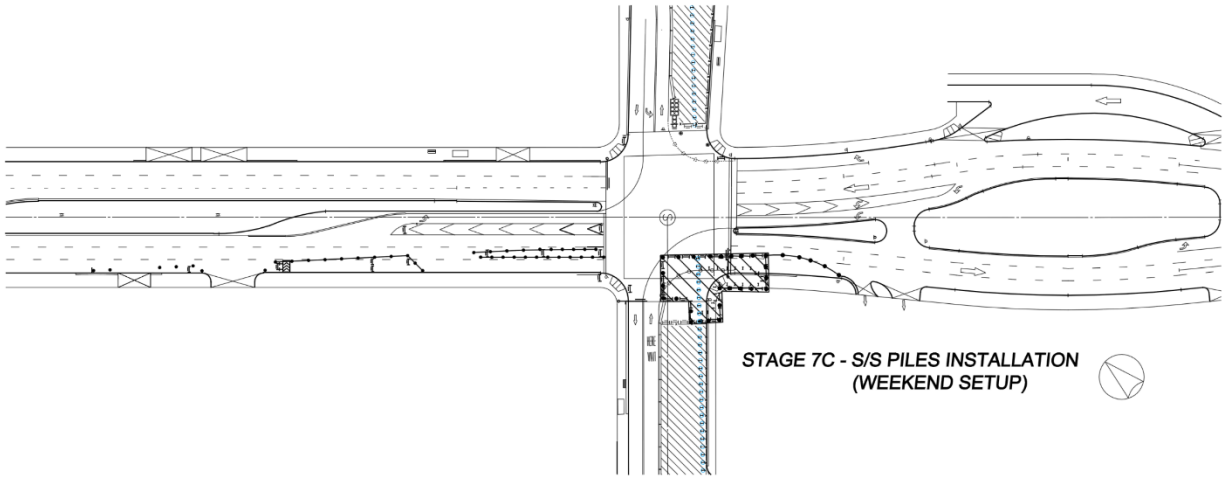
**Figure 4-15: Closure for Station Box Piling, South Side at Constellation/Century City Station**




### 4.1.15 Stage 7C

Work during this stage will consist of pile installation at the southwest corner of the intersection Avenue of the Stars and Constellation Boulevard. The work area will extend into two southbound lanes on Ave of the Stars requiring shifting of traffic Lanes along Avenue of the Stars and restriction of right turns from eastbound Constellation Boulevard onto southbound Avenue of the Stars. The affected travel control zone will extend along Avenue of the Stars between Santa Monica Boulevard and Constellation Boulevard. The west leg and south leg crosswalks will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite sides of the street for crossing Avenue of the Stars and Constellation Boulevard. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction. The proposed staging is presented in Figure 4-16.

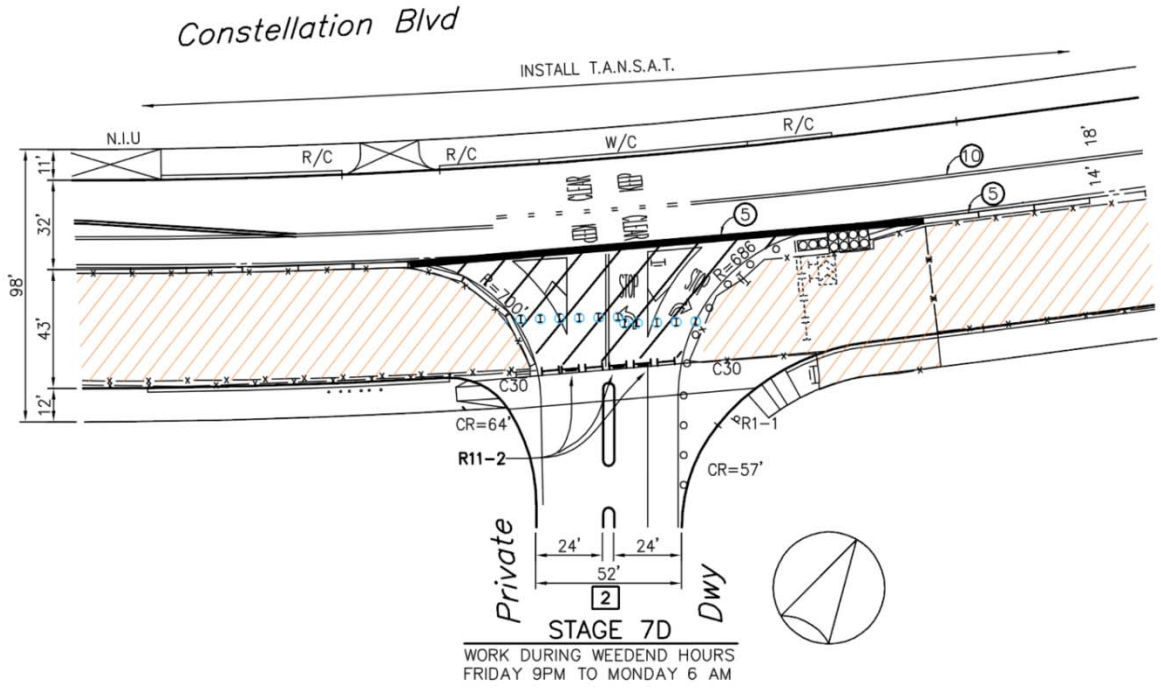
**Figure 4-16: Closure for Station Box Piling, South Side at Constellation/Century City Station**




### 4.1.16 Stage 7D

Work during this stage (Figure 4-17) will consist of pile installation at the parking garage entrance to 10100 Constellation Boulevard. The work area will extend into three eastbound lanes requiring shifting of traffic Lanes to the north side of Constellation Boulevard and restriction of all turns into and out of the parking garage. Pedestrian access will be restricted at the Work area, but the sidewalk along the north of Constellation Boulevard will be open. All work performed during this stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Constellation Boulevard will have a minimum of one travel lane available in each direction.

**Figure 4-17: Closure for Station Box Piling, South Side at Constellation/Century City Station**



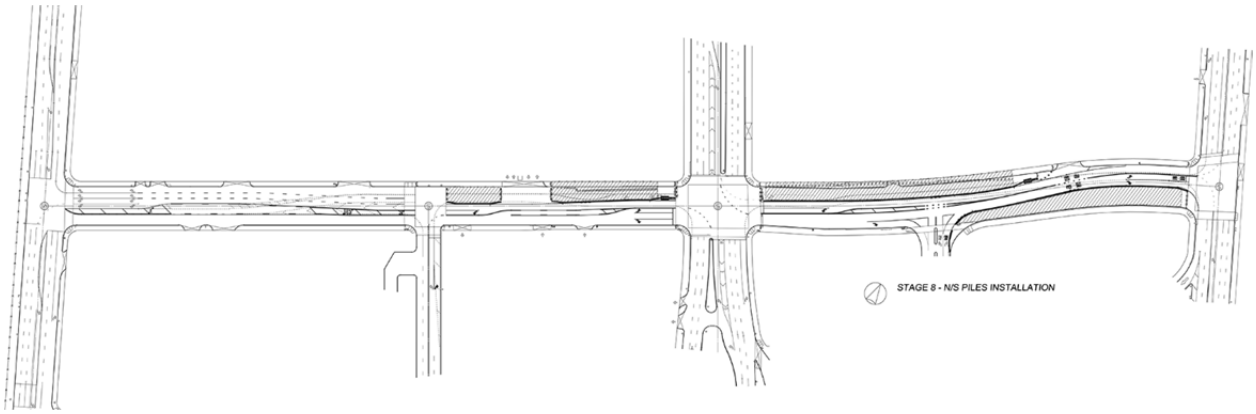
### 4.1.17 Stage 8: Station Box Piling – North Side

Work area during this stage (Figure 4-18) will be setup along the north side of Constellation Boulevard between Solar Way and the Watt Plaza alley, as well as along the south side of Constellation Boulevard between the parking garage entrance at 10100 Constellation Boulevard and Century Park East. This will require moving traffic lanes over to the south side of Constellation Boulevard between Solar Way and the parking garage entrance at 10100 Constellation Boulevard, and to the north side of Constellation Boulevard between Watt Plaza alley and Century Park East. The affected travel control zone will extend between Century Park East and Century Park West. Due to the size of the pile drilling and support equipment, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park East and Solar Way.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Relocation of bus stops within work areas.
- Maintain local access to businesses at all times.
- Maintain pedestrian access on south side of the street at all times.
- With the exception of the section of the sidewalk section between Avenue of the Stars and the Watt Plaza Alley and the sidewalk between Solar Way and Avenue of the Stars, maintain pedestrian access on north side of the street at all times. Pedestrian access to the impacted sections of sidewalk shall be restored upon completion of pile construction work.

All pile drilling performed during this stage will occur during normal working hours; Monday – Friday 07:00 to 21:00 and Saturday from 08:00 to 18:00. Metro will request a night time noise variance to work additional hours at the end of these shifts for non-drilling activities such as pile setting, concreting and trenching.

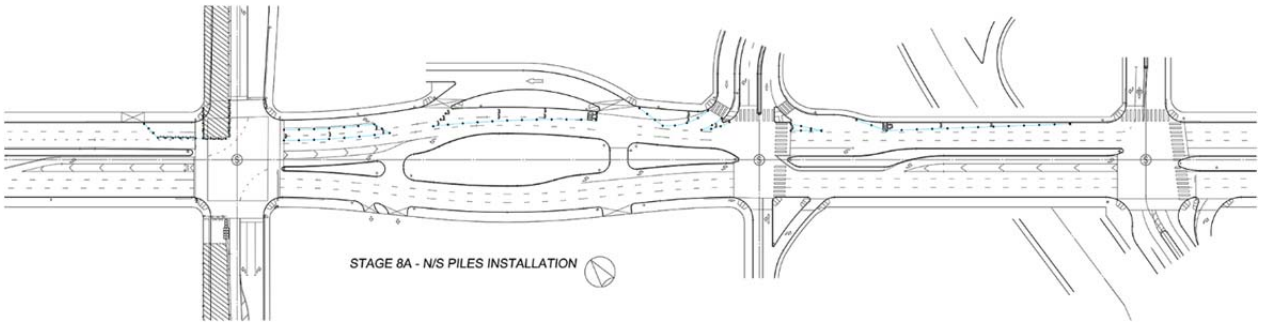
**Figure 4-18: Closure for Station Box Piling, North Side at Constellation/Century City Station**



### 4.1.18 Stage 8A

Work during this stage (Figure 4-19) will consist of pile installation at the northeast corner of Avenue of the Stars and Constellation Boulevard. The work area will extend into two northbound lanes on Avenue of the Stars requiring shifting of traffic Lanes along Avenue of the Stars. The affected travel control zone will extend along Avenue of the Stars between Constellation Boulevard and the ramps to eastbound Olympic Boulevard. Right turns from westbound Constellation Boulevard onto northbound Avenue of the Stars will be prohibited during this stage. The east and north legs of the crosswalk will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite sides of the street to cross Avenue of the Stars and Constellation Boulevard. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction.

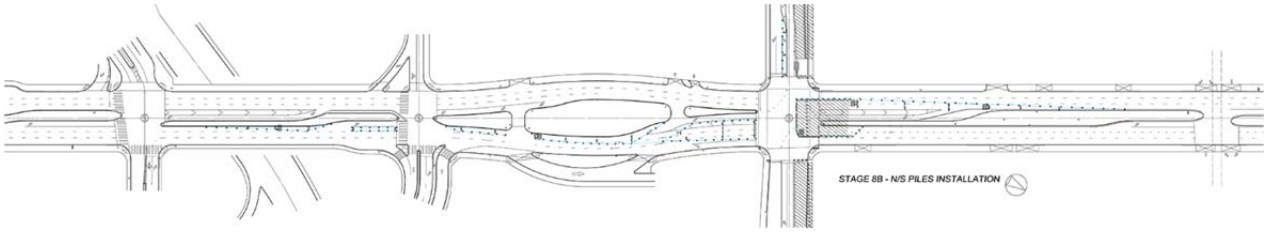
**Figure 4-19: Closure for Station Box Piling, North Side at Constellation/Century City Station**




### 4.1.19 Stage 8B

Work during this stage (Figure 4-20) will consist of installing piles within the intersection of Constellation Boulevard and Avenue of the Stars in the middle lanes on Avenue of the Stars and the northern lanes of Constellation Boulevard. Southbound traffic on Avenue of the Stars will be directed toward the west side of the work area while northbound traffic will traverse on the east side of the work area. The affected travel control zone will extend along Avenue of the Stars between Santa Monica Boulevard and the ramps to eastbound Olympic Boulevard. Left turn movement for southbound Avenue of the Stars will be prohibited in addition to the prohibition of left turns for eastbound Constellation Boulevard at the intersection. In addition the north leg crosswalk will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite side of street to cross Avenue of the Stars. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction.

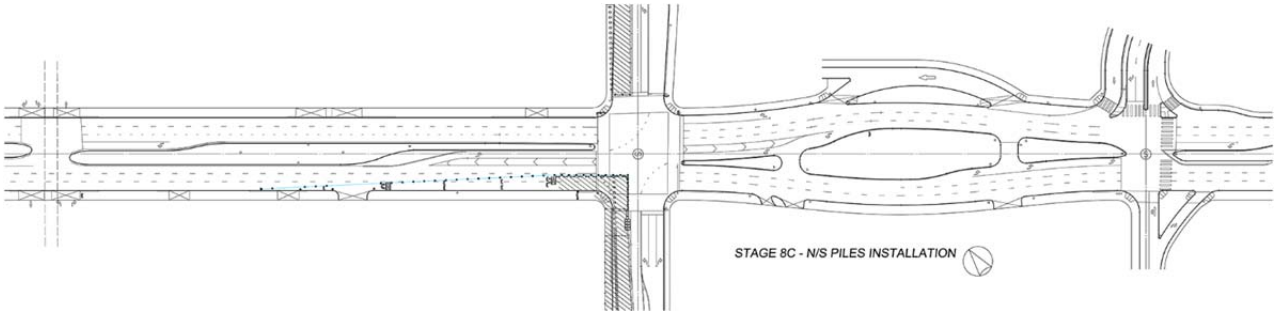
**Figure 4-20: Closure for Station Box Piling, North Side at Constellation/Century City Station**



### 4.1.20 Stage 8C

Work during this stage (Figure 4-21) will consist of pile installation at the northwest corner of the intersection of Avenue of the Stars and Constellation Boulevard. The work area will extend into two southbound lanes of Avenue of the Stars, requiring shifting of traffic lanes along Avenue of the Stars and restriction of all right turns onto westbound Constellation Boulevard. The affected traffic control zone will extend along Avenue of the Stars between Santa Monica Boulevard and Constellation Boulevard. The north and west leg crosswalks will be closed during this stage to accommodate the required work area. Pedestrian access will still be possible using the opposite sides of street to cross Avenue of the Stars and Constellation Boulevard. All work performed during stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday 6:00 am. Both Avenue of the Stars and Constellation Boulevard will have minimum of one travel lane available in each direction.

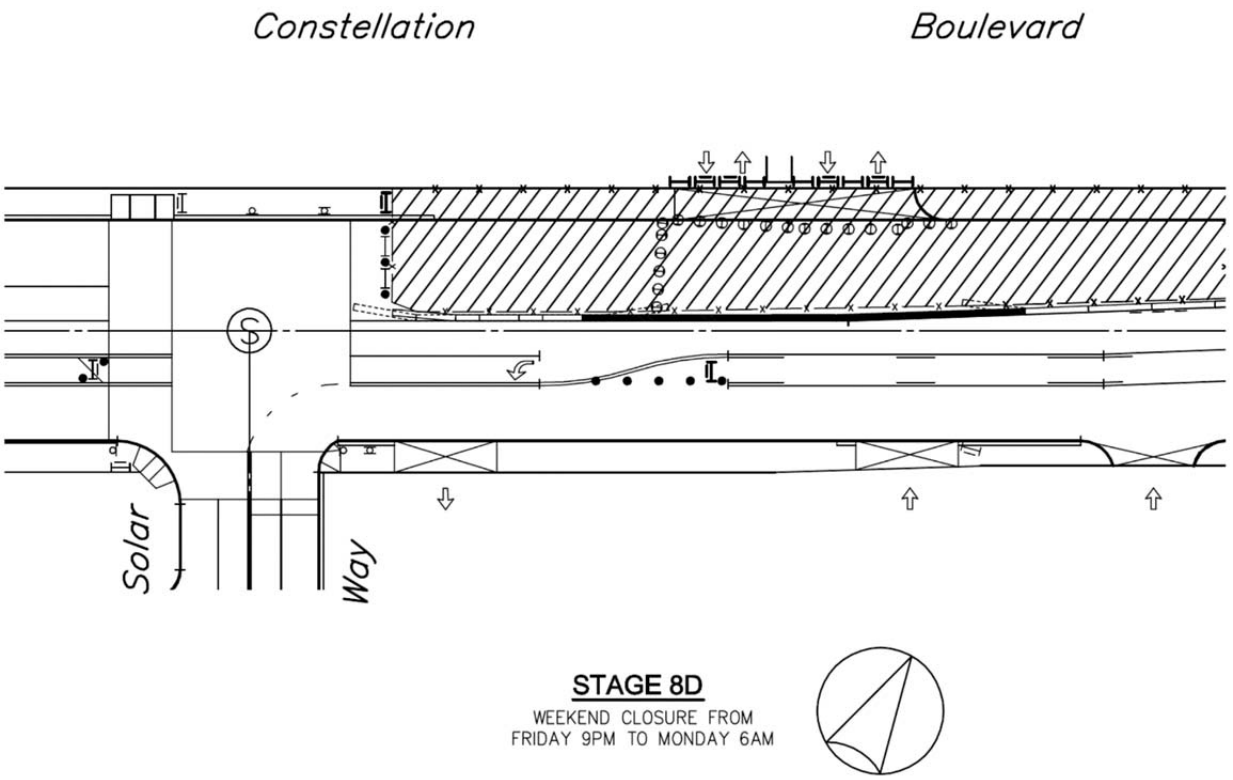
**Figure 4-21: Closure for Station Box Piling, North Side at Constellation/Century City Station**




### 4.1.21 Stage 8D

Work during this stage (Figure 4-22) will consist of pile installation at the parking garage entrance to the Sun America Building at 1999 Avenue of the Stars and the service ramp for Westfield Mall. The Stage 8 work area will be temporarily extended across the parking garage entrance and service ramp during weekend closures. Pedestrian access will be restricted at the Work area, but the sidewalk along the south of Constellation Boulevard will remain open. All work performed during this stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with the parking garage entrance and service ramp becoming operational on Monday 6:00 am. Constellation Boulevard will have a minimum of one travel lane available in each direction.

**Figure 4-22: Closure for Station Box Piling, North Side at Constellation/Century City Station**



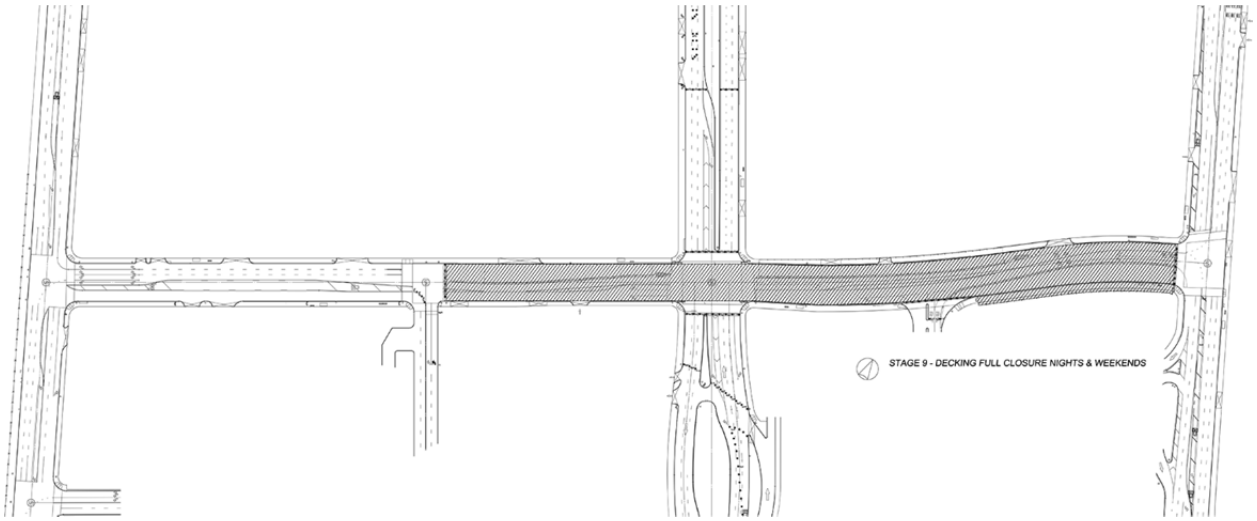

### 4.1.22 Stage 9: Station Box Decking

Work area during this stage (Figure 4-23) will be the full width of Constellation Boulevard between Century Park East and Solar Way. This will require a full closure of Constellation Boulevard during decking installation which will occur in a series of full street weekend closures. Closures will begin at 9:00 pm on Friday night and finish at 6:00 am on the following Monday morning.

The affected travel control zone will extend from Century Park West to Century Park East along Constellation Boulevard and along Avenue of the Stars between Santa Monica Boulevard and Olympic Boulevard. Eastbound traffic on Constellation Boulevard will be detoured before reaching the work area. Access will be maintained to all driveways, alleys, and garage entrances outside the full street closure zone. The traffic control elements in this stage will include:

- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Prohibition of turns onto Constellation Boulevard from Century Park East, Avenue of the Stars, and Solar Way.
- Maintain local access to businesses at all times, except those in the full street closure zone.
- Maintain pedestrian access on both sides of the street at all times except near the work area.

**Figure 4-23: Closure for Station Box Decking at Constellation/Century City Station**




### 4.1.23 Stage 9A

Once decking installation west of and within the intersection of Avenue of the Stars and Constellation Boulevard is complete, the Stage 9 work area will be reduced to between Century Park East and Avenue of the Stars. The work area between Avenue of the Stars and Solar Way will be immediately configured to the Stage 10 layout.

### 4.1.24 Stage 10: Station Box Excavation and Construction

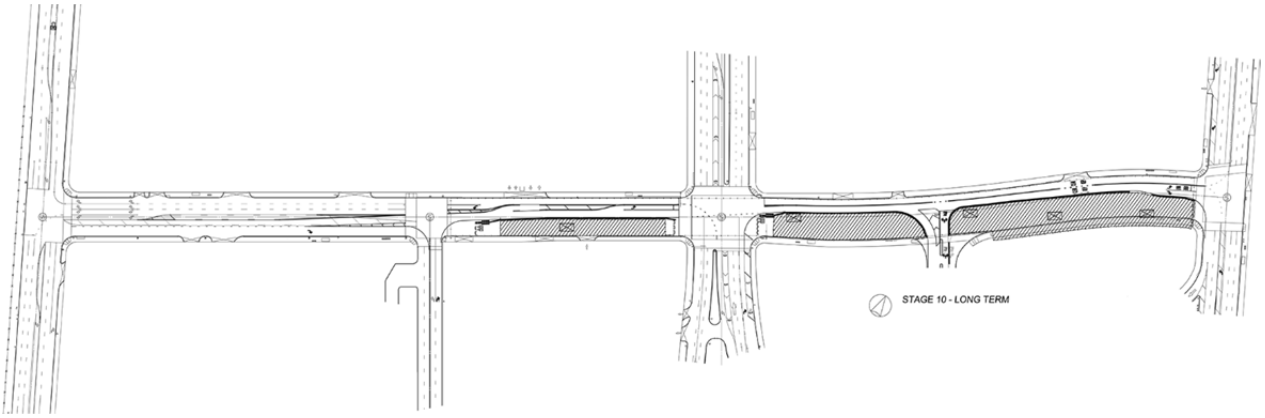
Work during this stage will include the excavation of the station box and station construction. Materials will be moved into and out of the station through shafts located within Constellation Boulevard. There are no construction staging areas available immediately adjacent to the station box so these activities must occur in the street. The work area during this stage will be setup in Constellation Boulevard between Century Park East and Solar Way. This will require moving traffic lanes over to the north side of Constellation Boulevard. There will be one lane in each direction along Constellation Boulevard between Solar Way and Century Park East. The affected travel control zone will extend between Century Park East and Century Park West. The proposed staging is presented in Figure 4-24. The traffic control elements in this stage will include:

- Reconfiguration of travel lanes to one lane each direction along Constellation Boulevard between Century Park East and Solar Way.
- Left turns from westbound Constellation Boulevard onto southbound Avenue of the Stars will be restricted.
- Elimination of parking on both sides of Constellation Boulevard within the work area limits.
- Relocation of valet parking for Craft Restaurant at 10100 Constellation Boulevard to Avenue of the Stars.
- Relocation of bus stops within work areas.
- Closure of the Century Plaza Hotel parking garage entrance on Constellation Boulevard.
- Closure of one entrance to the Equinox Gym at 10220 Constellation Boulevard.

- Pedestrian access will be maintained along the north and south of Constellation Boulevard at all times, except for that section of south sidewalk east of the parking garage entrance to 10100 Constellation Boulevard to Century Park East.
- Access to local businesses will be maintained at all times.

Due to the usage of heavy equipment, intense effort, continual production requirement in limited space during this stage, the work area will remain in-place for an extended period of time thus requiring an exemption from L.A.M.C. 62.61 from the Bureau of Engineering (LABOE) for work performed during peak hours.

**Figure 4-24: Closure for Station Box Excavation & Construction at Constellation/Century City Station**



# 5.0 TRAFFIC MANAGEMENT STRATEGIES

## 5.1 Public Information / Public Awareness Campaign (PAC)

The primary goal of a PAC is to educate motorists, merchants, residents, elected officials and governmental agencies about construction activities and associated impacts. The PAC is an important tool for reaching target audiences with important construction project information.

With an effective PAC, public acceptance, tolerance and cooperation will be enhanced. In addition, this element is expected to reduce the traffic demand in the construction zone by encouraging motorists to take alternate routes or to travel outside of closure hours.

In general, the PAC is designed to meet the following objectives:

- Identify all target audiences who will be impacted by construction activities;
- Serve as the focal point for project related questions regarding construction activities, road closures, noise, dust, and other construction related activities;
- Inform the public about the construction project and how the project could affect their travel; and
- Promote alternate modes of transportation and alternate routes.

Specific elements that may be used to accomplish these objectives include press releases/special alerts to news outlets and traffic reports which will be sent to inform motorists about construction activities. Paid advertising may also be used to inform motorists about construction activities.

Residents, businesses and schools within the project vicinity should be notified of the project and closures anticipated as a result of the construction work. The PAC should pay particular attention to informing emergency services of alternate routes available during closures of local roadways. These are discussed under “Alternate Route Strategies.”

Specific components of the PAC are described in the following sections.

## 5.2 Brochures and Mailers

Brochures and other project notices will be prepared by Los Angeles County Metropolitan Transportation Authority (Metro) staff, in coordination with Caltrans and the DB Contractor, to keep the public (residents, businesses, travelers, etc.) informed about the project and anticipated closures and impacts.

In addition, meeting notices/agendas (in English and Spanish) will be prepared and distributed in advance of public meetings related to the project.

## 5.3 Press Releases/Media Alerts

Press releases and media alerts will be prepared and distributed by Metro staff in coordination with Caltrans and the DB Contractor, as required or needed throughout the length of project. Writing press releases includes, but is not limited to, research/writing, editing and distribution of information to cover any/all new developments, closures, detours, etc. Press releases will be distributed via e-mail or fax to media outlets and/or emergency services in the vicinity.

Press releases and media alerts will be prepared and distributed by Metro staff; therefore, the associated costs are not included in the TMP.

## 5.4 Paid Advertisement

Advertisements for public meetings regarding the project will be printed in a number of publications and distributed throughout the cities surrounding the project areas. These publications may include:

- Los Angeles Times
- LA Downtown News
- LA Weekly
- La Opinion
- Korea Daily
- Los Angeles Sentinel
- Beverly Hills Courier
- Beverly Hills Weekly
- Westside Today

It is assumed that two rounds of paid advertising for printed advertisements will occur for each set of public meetings, assuming one set of public meetings at the beginning of the project and one set of public meetings during the project.

## 5.5 Public Meetings/ Hearings

Public meetings will be held to provide information about the project and anticipated closures/impacts to any and all interested parties including, political offices, residents, motorists, community groups, school districts, developers, truckers, etc.

## 5.6 Project Website

The Metro project website (www.metro.net) will be the primary information source for up-to-date project information. The project website will contain information such as traffic alerts, current schedule, news related to the project, alternatives developed by the community, past and future meetings/hearings, frequently asked questions (FAQs), and links to major stakeholders of the project.

## 5.7 Motorist Information

The effective implementation of a Motorist Information System during construction is crucial to enabling motorists to make informed decisions about their travel plans and options with real-time traffic information. The key components of this system considered in this TMP include CMS, PCMS, and ground mounted signs, that will provide real time traffic information to motorists approaching the construction zone.

## 5.8 Portable Changeable Message Signs

PCMS are considered one of the best methods to alert motorists of construction activities, expected closures, delays, and possible detours prior to reaching the construction zone.

The project will require PCMS's at various locations during construction. PCMS's should be placed and operated as needed to inform motorists of construction activities and closures. Additional PCMS's should be made available during the project and may be placed and operated as deemed necessary by the DB Contractor.

During construction, all PCMS's should be checked nightly and fixed or replaced as needed to ensure that they are in a proper working condition and that their visibility is not compromised.

Suitable locations and messages for the PCMS's will be determined by the DB Contractor.

## 5.9 Temporary Motorist Information Signs

Ground mounted signs are another effective method of getting information to motorists about construction activities and detours.

Signs will be used during the construction of the project and these signs shall be placed at appropriate locations as specified by the DB Contractor to guide motorists through the construction zones and detour routes.

Ground mounted signs shall be maintained and updated to keep information current and accurate.

Ground mounted signs shall also provide advance warnings to motorists of future intersection closures. It is the responsibility of the DB Contractor to provide and maintain ground mounted signs.

# 6.0 EXISTING PEAK HOUR TRAFFIC VOLUMES

The existing AM and PM peak hour turning movement traffic volumes for the roadways surrounding the Constellation Station construction area are taken from the traffic study that was prepared as part of the environmental impact report for the Century City Center project. The counts that were taken for Century City Center project were collected in 2011. These counts were more recent than the ones that were collected in Fall 2008 and Spring 2009 for the Westside Subway Extension environmental document. The actual 2011 count data is presented in Appendix B. To represent the existing 2015 traffic conditions, a 0.5% annual growth rate was applied to the 2011 turning movement traffic volumes. The resulting 2015 AM and PM peak hour turning movement traffic volumes, at each one of the ten study intersections around the Constellation Station, are presented in Figure 6-1.

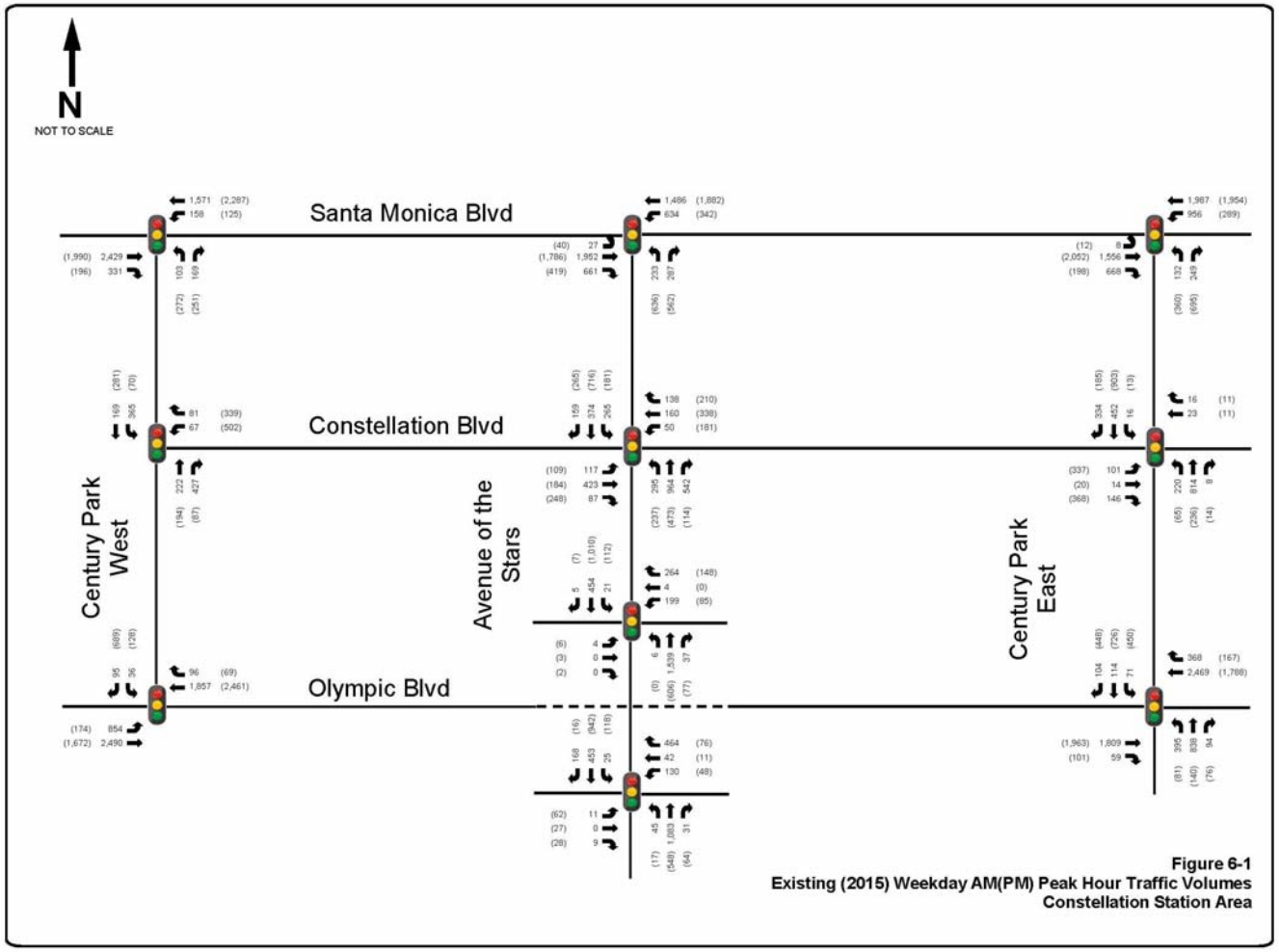
A total of ten (10) intersections were evaluated in the vicinity of the Constellation Station construction area. The AM and PM peak hour existing conditions level of service (LOS) are presented in Appendix C. Results at these intersection locations are presented in Table 6-1.

**Table 6-1: Existing (2015) Level of Service Results**

| Intersection | Existing Conditions (2015) | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 141.9 | F | 117.9 |
| Century Park East/Constellation Blvd | C | 30.0 | D | 39.4 |
| Century Park East/Olympic Blvd | D | 52.6 | D | 53.3 |
| Avenue of the Stars/Santa Monica Blvd | F | 143.3 | F | 115.0 |
| Avenue of the Stars/Constellation Blvd | D | 35.8 | C | 31.7 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.9 |
| Avenue of the Stars/EB Olympic Blvd | D | 41.7 | C | 30.5 |
| Century Park West/Santa Monica Blvd | F | 139.1 | F | 145.6 |
| Century Park West/Constellation Blvd | A | 9.1 | C | 35.0 |
| Century Park West/Olympic Blvd | F | 82.6 | E | 79.5 |

All three intersections along Santa Monica Boulevard are currently operating at LOS F during both the AM and PM peak hours. In addition, the intersection of Century Park West and Olympic Boulevard is operating at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining six study intersections are operating at LOS D or better during both peak hours.

**Figure 6-1: Existing (2015) Weekday AM (PM) Peak Hour Traffic Volumes**



# 7.0 TRAFFIC EVALUATION

This section of the report presents an evaluation of traffic operations at the intersections surrounding the Constellation Station, during the morning and afternoon peak periods, due to the construction of the station box, the soldier piles, and the decking installation at the Section 2 station area of the Purple Line Extension. The following sections provide an overview of the traffic operational status during these construction activities at the Constellation Station. The existing AM and PM peak hour level of service at the intersection locations being evaluated during the construction activity were presented in the previous section. This information was developed from the latest available set of traffic counts, which were taken from the Century City Center project environmental document.

## 7.1 Constellation Station

The Constellation station is located in Century City below Constellation Boulevard and Avenue of the Stars. Construction of the station extends from Century Park East to Solar Way, which is located at the mid-block of the Constellation Boulevard segment between Avenue of the Stars and Century Park West. Constellation Boulevard is a 4-lane east/west collector street that is classified in the Transportation Element of the City of Los Angeles General Plan as a Divided Secondary Highway. Within the study area, there are two travel lanes in each direction and a painted two-way left turn median. In addition, dedicated left turn and right turn lanes are provided at the Avenue of the Stars intersection. Avenue of the Stars is a 6-lane major north/south arterial that is classified as a Divided Major Class II Highway. In the study area, there are three travel lanes in each direction and a raised landscaped median. In addition, dedicated left turn lanes are provided at the signalized intersections and at building access locations.

Construction of the station box, the soldier piles, and the decking installation along Constellation Boulevard will take place during ten major construction stages. A description of each construction stage was presented in Section 3 of this document. The following sections present an evaluation of traffic operations for each major construction stage. The traffic control plan exhibits showing details of the proposed stages of construction are presented in Appendix A.

### 7.1.1 Stage 1

Work area during this stage is focused on the roadway segment along the north side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard. The proposed work consists of piling on the north side of the street to construct the TBM launch box. This will require moving traffic lanes over to the south side of the street. The affected travel control zone will extend from approximately Solar Way to the west and Century Park East to the east. The work area will remain in-place for an extended period of time due to the size of the pile drilling and support equipment.

Adjacent to the construction area, one lane of traffic will be open in each direction and access to and from the Century Park East and Constellation Boulevard intersection would be maintained. Table 7-1 presents the level of service (LOS) results when the number of lanes along Constellation Boulevard at the Century Park East intersection are reduced to one lane in each direction. However, the eastbound approach at Constellation Boulevard will be configured to accommodate a left turn only lane and a shared left and right turn lane.

**Table 7-1: Stage 1 Level of Service Results**

| Intersection | Stage 1 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 141.9 | F | 142.9 |
| Century Park East/Constellation Blvd | C | 28.1 | D | 42.3 |
| Century Park East/Olympic Blvd | D | 52.6 | D | 47.8 |
| Avenue of the Stars/Santa Monica Blvd | F | 143.3 | F | 118.3 |
| Avenue of the Stars/Constellation Blvd | D | 36.5 | D | 37.0 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.5 |
| Avenue of the Stars/EB Olympic Blvd | D | 41.7 | C | 31.8 |
| Century Park West/Santa Monica Blvd | F | 139.1 | F | 146.1 |
| Century Park West/Constellation Blvd | A | 9.1 | D | 35.7 |
| Century Park West/Olympic Blvd | F | 82.6 | E | 79.2 |

As shown in Table 7-1, traffic operating conditions will predominantly remain the same as the existing traffic conditions. All the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. In addition, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining six study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.2 Stage 2

Work area during this stage will be along the south side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, as well as along the north side of Constellation Boulevard between the Watt Plaza alley at 10131 Constellation Boulevard and Solar Way. The proposed work consists of pile installation on the south side of the street to continue the construction of the TBM launch box and utility relocation work along the north side of the street. This will require moving traffic lanes over to the north and south sides of the streets. The affected travel control zone will extend from approximately Century Park West to the west and Century Park East to the east.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park East and the Century Park West intersections. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-2 presents the level of service results during this stage.

**Table 7-2: Stage 2 Level of Service Results**

| Intersection | Stage 2 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 133.7 | F | 120.7 |
| Century Park East/Constellation Blvd | C | 27.7 | C | 21.6 |
| Century Park East/Olympic Blvd | D | 52.6 | D | 51.6 |
| Avenue of the Stars/Santa Monica Blvd | F | 145.5 | F | 117.0 |
| Avenue of the Stars/Constellation Blvd | F | 96.0 | E | 57.2 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.0 |
| Avenue of the Stars/EB Olympic Blvd | D | 48.9 | D | 45.0 |
| Century Park West/Santa Monica Blvd | F | 138.2 | F | 148.4 |
| Century Park West/Constellation Blvd | B | 10.6 | C | 21.4 |
| Century Park West/Olympic Blvd | F | 81.8 | E | 76.1 |

As shown in Table 7-2, with one traffic lane in each direction of Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining five study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.3 Stage 3

Work area during this stage will be across the full width of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, as well as the north side of Constellation Boulevard between the Watt Plaza alley at 10131 Constellation Boulevard and Solar Way. During this stage, the construction activity consists of decking installation of the TBM launch box and utility relocation work along the north side of the street. This will require a full closure of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard. The affected travel control zone will extend from approximately Century Park West to the west and Century Park East to the east.

During this stage, northbound and southbound traffic turning westbound onto Constellation Boulevard from Century Park East would be diverted around the construction area and use Avenue of the Stars to get to their destination. Similarly, eastbound traffic on Constellation Boulevard will be detoured before crossing Avenue of the Stars, although local access traffic destined to the buildings along this segment of Constellation Boulevard will be permitted to continue straight through Avenue of the Stars until reaching the entrance of the underground parking garage at 10100 Constellation Boulevard. Access will be maintained to all driveways, alleys, and garage entrances at all times.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park West intersection. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Table 7-3 presents the level of service results during this stage.

**Table 7-3: Stage 3 Level of Service Results**

| Intersection | Stage 3 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 102.8 | F | 204.7 |
| Century Park East/Constellation Blvd | A | 7.5 | A | 6.1 |
| Century Park East/Olympic Blvd | E | 65.7 | D | 49.0 |
| Avenue of the Stars/Santa Monica Blvd | F | 190.5 | F | 133.9 |
| Avenue of the Stars/Constellation Blvd | F | 127.6 | F | 93.7 |
| Avenue of the Stars/WB Olympic Blvd | C | 32.5 | A | 8.7 |
| Avenue of the Stars/EB Olympic Blvd | F | 103.5 | E | 73.2 |
| Century Park West/Santa Monica Blvd | F | 136.9 | F | 157.8 |
| Century Park West/Constellation Blvd | B | 11.5 | D | 37.3 |
| Century Park West/Olympic Blvd | F | 81.0 | E | 79.8 |

During Stage 3, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F during both the AM and PM peak hours. Also, the LOS at the intersection of Century Park East and Olympic Boulevard would deteriorate to LOS E during the AM peak hour. Similarly, the LOS at the intersection of Avenue of the Stars and EB Olympic Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. Furthermore, all the three intersections along Santa Monica Boulevard and the intersection of Century Park West and Olympic Boulevard will continue to operate at LOS E or worse during both peak hours. The remaining three study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.4 Stage 4

Work area during this stage will be along the south side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, as well as along the north side of Constellation Boulevard between the Watt Plaza alley at 10131 Constellation Blvd and Solar Way. The proposed work consist of excavating for the construction of the TBM launch box. This will require moving traffic lanes over to the north and south side of the street. The affected travel control zone will extend from approximately Century Park West to the west and Century Park East to the east.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at

the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park East and the Century Park West intersections. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-4 presents the level of service results during this stage.

**Table 7-4: Stage 4 Level of Service Results**

| Intersection | Stage 4 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 133.7 | F | 120.7 |
| Century Park East/Constellation Blvd | C | 27.7 | C | 21.6 |
| Century Park East/Olympic Blvd | D | 52.6 | D | 51.6 |
| Avenue of the Stars/Santa Monica Blvd | F | 145.5 | F | 117.0 |
| Avenue of the Stars/Constellation Blvd | F | 96.0 | E | 57.2 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.0 |
| Avenue of the Stars/EB Olympic Blvd | D | 48.9 | D | 45.0 |
| Century Park West/Santa Monica Blvd | F | 138.2 | F | 148.4 |
| Century Park West/Constellation Blvd | B | 10.6 | C | 21.4 |
| Century Park West/Olympic Blvd | F | 81.8 | E | 76.1 |

As shown in Table 7-4, with one traffic lane in each direction of Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining five study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.5 Stage 5

Work area during this stage will be across all of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard, as well as the south side of Constellation Boulevard between the underground parking garage entrance to 10131 Constellation Boulevard and Solar Way for utility relocation. This stage will be used to launch the TBM and will require a full closure of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Boulevard. The affected travel control zone will extend from approximately Century Park West to the west and Century Park East to the east.

Northbound and southbound traffic turning westbound onto Constellation Boulevard from Century Park East would be diverted around the construction area and use Avenue of the Stars to get to their destination. Eastbound traffic on Constellation Boulevard will be detoured before crossing Avenue of the Stars, although local access traffic destined to the buildings along this segment of Constellation

Boulevard will be permitted to continue straight through Avenue of the Stars until reaching the entrance of the underground parking garage at 10100 Constellation Boulevard. Access will be maintained to all driveways, alleys, and garage entrances at all times. The affected travel control zone will extend from approximately Century Park West to the west and Century Park East to the east. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic traveling in and out of the AT&T building driveway across from Constellation Boulevard will be maintained.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park West intersection. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Table 7-5 presents the level of service results during this stage.

**Table 7-5: Stage 5 Level of Service Results**

| Intersection | Stage 5 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 102.8 | F | 204.7 |
| Century Park East/Constellation Blvd | A | 1.3 | A | 1.9 |
| Century Park East/Olympic Blvd | E | 66.0 | D | 48.8 |
| Avenue of the Stars/Santa Monica Blvd | F | 190.5 | F | 133.9 |
| Avenue of the Stars/Constellation Blvd | F | 127.6 | F | 93.7 |
| Avenue of the Stars/WB Olympic Blvd | C | 32.5 | A | 8.7 |
| Avenue of the Stars/EB Olympic Blvd | F | 103.5 | E | 73.2 |
| Century Park West/Santa Monica Blvd | F | 136.9 | F | 157.8 |
| Century Park West/Constellation Blvd | B | 11.5 | D | 37.3 |
| Century Park West/Olympic Blvd | F | 81.0 | E | 79.8 |

During Stage 5, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F during both the AM and PM peak hours. Also, the LOS at the intersection of Century Park East and Olympic Boulevard would deteriorate to LOS E during the AM peak hour. Similarly, the LOS at the intersection of Avenue of the Stars and EB Olympic Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. Furthermore, all the three intersections along Santa Monica Boulevard and the intersection of Century Park West and Olympic Boulevard will continue to operate at LOS E or worse during both peak hours. The remaining three study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.6 Stage 6

Work area during this stage will be along the south side of Constellation Boulevard between Century Park East and the underground parking garage entrance to 10100 Constellation Blvd to accommodate TBM support activities. The south side of Constellation Boulevard between the underground parking garage entrance to 10100 Constellation Boulevard and Solar Way will also be closed during this stage for utility relocations. This will require moving traffic lanes over to the north side of the street. The affected travel control zone will extend from approximately Solar Way to the west and Century Park East to the east. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic traveling in and out of the AT&T building driveway across from Constellation Boulevard will be maintained.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park East and the Century Park West intersections. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-6 presents the level of service results during this stage.

**Table 7-6: Stage 6 Level of Service Results**

| Intersection | Stage 6 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 133.7 | F | 120.7 |
| Century Park East/Constellation Blvd | C | 29.0 | C | 21.5 |
| Century Park East/Olympic Blvd | D | 52.7 | D | 52.0 |
| Avenue of the Stars/Santa Monica Blvd | F | 145.5 | F | 117.0 |
| Avenue of the Stars/Constellation Blvd | F | 105.1 | E | 56.4 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.0 |
| Avenue of the Stars/EB Olympic Blvd | D | 48.9 | D | 45.0 |
| Century Park West/Santa Monica Blvd | F | 138.2 | F | 148.4 |
| Century Park West/Constellation Blvd | B | 10.4 | C | 21.5 |
| Century Park West/Olympic Blvd | F | 81.8 | E | 76.1 |

As shown in Table 7-6, with one traffic lane in each direction of Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining five study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.7 Stage 7

Work area during this stage will be setup along the south side of Constellation Boulevard between Century Park East to the east and Solar Way to the west to drill the south station box piles. This will require moving traffic lanes over to the north side of the street. The affected travel control zone will extend along Constellation Boulevard from approximately Century Park East to the east and Century Park West to the west. In addition, the traffic control zone will extend along Avenue of the Stars from the Olympic Boulevard eastbound on/off ramp to Constellation Boulevard during the night time and weekend hours. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic traveling in and out of the AT&T building driveway across from Constellation Boulevard will be maintained.

In addition, eastbound and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park East and the Century Park West intersections. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-7 presents the level of service results during this stage.

**Table 7-7: Stage 7 Level of Service Results**

| Intersection | Stage 7 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 133.7 | F | 120.7 |
| Century Park East/Constellation Blvd | C | 29.0 | C | 21.5 |
| Century Park East/Olympic Blvd | D | 52.7 | D | 52.0 |
| Avenue of the Stars/Santa Monica Blvd | F | 145.5 | F | 117.0 |
| Avenue of the Stars/Constellation Blvd | F | 105.1 | E | 56.4 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 7.0 |
| Avenue of the Stars/EB Olympic Blvd | D | 48.9 | D | 45.0 |
| Century Park West/Santa Monica Blvd | F | 138.2 | F | 148.4 |
| Century Park West/Constellation Blvd | B | 10.4 | C | 21.5 |
| Century Park West/Olympic Blvd | F | 81.8 | E | 76.1 |

As shown in Table 7-7, with one traffic lane in each direction of Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F in the AM peak hour and LOS E in the PM peak hour. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining five study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.8 Stage 8

Work area during this stage will be setup along the north side of Constellation Boulevard between Century Park East to the east and Solar Way to the west to drill the north station box piles. This will require moving traffic lanes over to the south side of the street. The affected travel control zone will extend from approximately Century Park East to the east and Century Park West to the west. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic traveling in and out of the AT&T building driveway across from Constellation Boulevard will be maintained.

There are no left turn restrictions from Constellation Boulevard onto northbound and southbound Avenue of the Stars. In addition, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-8 presents the level of service results during this stage.

**Table 7-8: Stage 8 Level of Service Results**

| Intersection | Stage 8 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 141.9 | F | 142.9 |
| Century Park East/Constellation Blvd | C | 24.2 | B | 18.4 |
| Century Park East/Olympic Blvd | D | 52.7 | D | 48.8 |
| Avenue of the Stars/Santa Monica Blvd | F | 143.3 | F | 118.3 |
| Avenue of the Stars/Constellation Blvd | F | 71.0 | F | 107.5 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.1 | A | 6.8 |
| Avenue of the Stars/EB Olympic Blvd | D | 41.7 | C | 31.3 |
| Century Park West/Santa Monica Blvd | F | 139.1 | F | 146.1 |
| Century Park West/Constellation Blvd | A | 8.6 | D | 32.0 |
| Century Park West/Olympic Blvd | F | 82.6 | E | 79.1 |

As shown in Table 7-8, with one traffic lane in each direction of Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F during both peak hours. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The remaining five study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.9 Stage 9

Stage 9 consists of a continuous full closure of Constellation Boulevard from Century Park East to Solar Way to install the station box decking. The north/south movement of traffic along Avenue of the Stars

would remain open at Constellation Boulevard; however, any turns would be prohibited for the duration of the full closure. Alternate access to businesses along Constellation Boulevard would be identified and provided during the duration of this full closure. All traffic along this segment of Constellation Boulevard would be diverted to adjacent roadways such as Century Park West, Avenue of the Stars, and Century Park East. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic will traveling in and out of the AT&T building driveway straight across from Constellation Boulevard will be maintained. All work performed during this stage will occur over weekends from Friday 9:00 pm to Monday 6:00 am, with lanes becoming operational on Monday at 6:00 am. However, if there is a change in this proposed schedule and the full closure extends to the weekday AM and/or PM peak hours, then the level of service results of the intersection operating conditions due to the a full closure along Constellation Boulevard are presented in Table 7-9.

**Table 7-9: Stage 9 Level of Service Results**

| Intersection | Stage 9 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 221.0 | F | 202.6 |
| Century Park East/Constellation Blvd | A | 1.4 | A | 2.2 |
| Century Park East/Olympic Blvd | E | 68.5 | D | 46.2 |
| Avenue of the Stars/Santa Monica Blvd | F | 147.1 | F | 163.7 |
| Avenue of the Stars/Constellation Blvd | N/A | N/A | N/A | N/A |
| Avenue of the Stars/WB Olympic Blvd | C | 22.8 | D | 37.2 |
| Avenue of the Stars/EB Olympic Blvd | E | 72.3 | D | 51.1 |
| Century Park West/Santa Monica Blvd | F | 199.9 | F | 197.5 |
| Century Park West/Constellation Blvd | B | 16.3 | B | 14.9 |
| Century Park West/Olympic Blvd | E | 66.9 | F | 107.6 |

During the Stage 9 construction period, with a proposed peak period full closure of Constellation Boulevard from Century Park East to Solar Way, traffic operations at the intersections of Century Park East and Olympic Boulevard and Avenue of the Stars and EB Olympic Boulevard would deteriorate to LOS E in the AM peak hour and continue to operate at LOS D in the PM peak hour. In addition, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. Also, the intersection of Century Park West and Olympic Boulevard would operate at LOS E in the AM peak hour and LOS F in the PM peak hour. The remaining four study intersections would continue to operate at LOS D or better during both peak hours.

### 7.1.10 Stage 10

Work area during this stage will be setup along the south side of Constellation Boulevard between Century Park East to the east and Solar Way to the west. The construction work during this stage will consist of excavating the station box and delivering materials for station construction through shafts

located within Constellation Boulevard. There are no construction staging areas available immediately adjacent to the station box so these activities must occur in the street. This will require moving the traffic lanes over to the north side of the street. The affected travel control zone will extend from approximately Century Park East to the east and Century Park West to the west. Pedestrian access will be maintained along the north and south of Constellation Boulevard at all times. This stage also includes the closure of one northbound lane on Century Park East, across from the Constellation Boulevard intersection, to allow construction traffic to travel back and forth between the 1940 Century Park East and the 2040 Century Park East staging sites. Traffic traveling in and out of the AT&T building driveway across from Constellation Boulevard will be maintained.

In addition, eastbound left turns from Constellation Boulevard onto Avenue of the Stars would be permitted and westbound left turns from Constellation Boulevard onto Avenue of the Stars would be restricted during this construction stage. As a result of the proposed westbound left turn restrictions at the Avenue of the Stars intersection, it is anticipated that motorists will perform their left turn maneuver at the Century Park East and the Century Park West intersections. Furthermore, the dual northbound and southbound left turn lanes from Avenue of the Stars onto Constellation Boulevard will be reduced to one left turn lane in each direction. Local access to businesses on the south side of the roadway will be maintained. Table 7-10 presents the level of service results during this stage.

**Table 7-10: Stage 10 Level of Service Results**

| Intersection | Stage 10 | | | |
|---|---|---|---|---|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay | LOS | Delay |
| Century Park East/Santa Monica Blvd | F | 141.9 | F | 142.9 |
| Century Park East/Constellation Blvd | C | 24.2 | B | 18.4 |
| Century Park East/Olympic Blvd | D | 52.7 | D | 50.3 |
| Avenue of the Stars/Santa Monica Blvd | F | 143.3 | F | 118.3 |
| Avenue of the Stars/Constellation Blvd | F | 85.6 | F | 178.3 |
| Avenue of the Stars/WB Olympic Blvd | B | 17.4 | A | 6.6 |
| Avenue of the Stars/EB Olympic Blvd | D | 52.7 | E | 70.6 |
| Century Park West/Santa Monica Blvd | F | 139.1 | F | 146.1 |
| Century Park West/Constellation Blvd | A | 9.3 | C | 29.7 |
| Century Park West/Olympic Blvd | F | 82.1 | E | 78.9 |

As shown in Table 7-10, with one traffic lane in each direction along Constellation Boulevard, traffic operations at the intersection of Avenue of the Stars and Constellation Boulevard would deteriorate to LOS F during both peak hours and the LOS for the intersection of Avenue of the Stars and EB Olympic Boulevard would deteriorate to LOS E in the PM peak hour. Also, all the three intersections along Santa Monica Boulevard would continue to operate at LOS F during both the AM and PM peak hours. The intersection of Century Park West and Olympic Boulevard would continue to operate at LOS F in the AM peak hour and at LOS E in the PM peak hour. The remaining four study intersections would continue to operate at LOS D or better during both peak hours.

# APPENDIX A TRAFFIC CONTROL PLANS

# APPENDIX A TRAFFIC CONTROL PLANS

(Under Separate Cover)

## WORKSITE TRAFFIC CONTROL NOTES

1. EXPECTED START DATE IS JANUARY 2018. STAGE DURATION WILL BE DETERMINED UPON THE AWARD OF CONSTRUCTION CONTRACT AND COORDINATED BY THE CONTRACTOR.

2. CONTACT _________________FOR "MTA" PERSONNEL RESPONSIBLE FOR WTCP IMPLEMENTATION/MAINTENANCE.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LABOR AND MATERIAL INVOLVED IN THE REMOVAL, INSTALLATION, AND MAINTENANCE OF ALL STRIPING, PAVEMENT MARKINGS, SIGNING, BARRICADING, DELINEATORS, ETC SHOWN ON THESE DETOUR PLANS AND AS CONSTRUCTION STAGING NECESSITATES.

4. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE LADOT TEMPORARY TRAFFIC MANAGEMENT SECTION (EMAIL: Edgar.Rodriguez@lacity.org) AT LEAST FIVE (5) WORKING DAYS PRIOR TO CONSTRUCTION WITH THE DATE(S) OF IMPLEMENTATION & TYPE OF TEMPORARY TRAFFIC CONTROL IMPLEMENTATION (INCLUDE ACCEPTANCE DATE ON PLAN & SHEET NUMBER) & BRIEF DESCRIPTION OF WORK. DEPARTMENT OF TRANSPORTATION RESERVES THE RIGHT TO OBSERVE THESE CONTROL PLANS IN USE AND TO MAKE NECESSARY CHANGES AS FIELD CONDITIONS WARRANT. ANY CHANGES SHALL SUPERSEDE THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PLACEMENT OF ANY ADDITIONAL TRAFFIC CONTROL DEVICES NECESSARY TO ASSURE PUBLIC SAFETY AT ALL TIMES DURING CONSTRUCTION. LADOT SHALL APPROVE MARK OUT PRIOR TO IMPLEMENTATION OF LONG TERM TEMPORARY PAVEMENT STRIPING.

5. ALL CONSTRUCTION RELATED WARNING SIGNS SHALL BE IN BLACK LEGEND WITH ORANGE BACKGROUND AND IN CONFORMANCE WITH THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

6. THE STRIPING AND SIGNING SHOWN FOR REMOVAL ON THESE PLANS MAY BE DIFFERENT THAN WHAT EXISTS AT TIME OF INSTALLATION OF A CONSTRUCTION STAGE. THE CONTRACTOR SHALL REMOVE ALL CONFLICTING SIGNING AND STRIPING, WHETHER OR NOT IT IS DEPICTED ACCURATELY ON THESE PLANS.

7. CONTRACTOR SHALL NOTIFY METRO AT (213) 922-4632 OR ANY OTHER AFFECTED TRANSIT SERVICES AT LEAST FIVE (5) WORKING DAYS PRIOR TO CONSTRUCTION.

8. ALL TRAFFIC CONTROL DEVICES SHALL BE KEPT IN THEIR PROPER POSITION AT ALL TIMES, AND SHALL BE REPAIRED, REPLACED OR CLEANED AS NECESSARY TO PRESERVE THEIR APPEARANCE AND CONTINUITY.

9. CONTRACTORS SHALL PROVIDE FLAGGERS AS DEEMED NECESSARY BY CITY. A FLAGGER SHALL USE THE APPROVED OCTAGONAL STOP/SLOW PADDLE, SHALL WEAR AN ORANGE SAFETY VEST (PADDLE AND VEST MUST BE REFLECTORIZED FOR NIGHT WORK) AND HARD HAT, AS REQUIRED BY THE WATCH MANUAL AND MUST BE PROPERLY TRAINED BY THE CONTRACTOR PERFORMING THE WORK SAFELY. APPROPRIATE ADVANCE SIGNS MUST ALSO BE INSTALLED, PER THE WATCH MANUAL.

10. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED FOLLOWING COMPLETION OF EACH CONSTRUCTION STAGE AND THE PERMANENT TRAFFIC CONTROL DEVICES SHALL BE RESTORED BY THE CONTRACTOR UPON REMOVAL OF DETOUR STRIPING.

11. ALL SIGNS, DELINEATORS, BARRICADES, ETC., SHALL CONFORM TO THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, "WATCH MANUAL" LATEST EDITION, THE LATEST EDITION OF THE CALIFORNIA MUTCD, AND NOTICE TO CONTRACTORS – COMPREHENSIVE, STANDARD PLAN S-610 (LATEST EDITION).

12. CONTRACTOR SHALL NOTIFY LADOT WESTERN SIGNAL MAINTENANCE SUPERVISOR AT (213) 485-6790 FIVE (5) WORKING DAYS PRIOR TO ANY EXCAVATION OR CONSTRUCTION WITHIN 10-FEET OF EXISTING TRAFFIC SIGNAL DETECTOR LOOPS, CONDUIT, INTERCONNECTS, OR ATSAC FIBER OPTIC CABLE.

13. ANY DAMAGE TO TRAFFIC SIGNAL DETECTOR LOOPS, CONDUITS, INTERCONNECTS, OR FIBER OPTIC CABLE SHALL BE REPAIRED OR REPLACED IMMEDIATELY BY THE CONTRACTOR AT THEIR OWN EXPENSE. DELAYS IN REPAIR OF INTERCONNECT OR ATSAC FIBER OPTIC CABLE WILL REQUIRE THE PAYMENT OF LIQUIDATION DAMAGES TO THE CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTATION. IMMEDIATELY NOTIFY LADOT WESTERN SIGNAL MAINTENANCE SUPERVISOR AT (213) 485-6790 OF ANY DAMAGES.

14. FOR THE TEMPORARY "TOW AWAY NO STOPPING ANY TIME" SIGNS, CONTRACTOR SHALL CONTACT THE SPECIAL TRAFFIC CONTROLS OFFICE AT (213) 485-2298 AT FIVE (5) WORKING DAYS IN ADVANCE OF EACH NEW CONSTRUCTION STAGE. THE INSTALLATION OF THE TEMPORARY "TOW AWAY NO STOPPING ANYTIME". FOR WTCP IMPLEMENTATION DURATION OF MORE THAN ONE (1) MONTH, THE CONTRACTOR SHALL FURNISH AND INSTALL "TOW AWAY NO STOPPING ANYTIME" SIGNS PER CITY SPECIFICATION (METAL & REFLECTORIZED). CONTACT TEMPORARY TRAFFIC MANAGEMENT AT (Email: edgar.rodriguez@lacity.org) FOR SAMPLES.

15. THERE SHALL BE NO STORAGE OF CONSTRUCTION MATERIALS OR EQUIPMENT OUTSIDE THE DESIGNATED WORK AREA AS INDICATED IN THE WTCP. STORAGE OF CONSTRUCTION MATERIALS OR EQUIPMENT WITHIN THE DESIGNATED AREA SHALL BE DONE IN A MANNER NOT TO CREATE VISIBILITY OBSTRUCTIONS TO THE MOTORING PUBLIC.

16. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES AND SHALL COORDINATE WITH RESIDENTS/BUSINESSES ANY CLOSURE/LIMITED ACCESS TO THEIR DRIVEWAYS.

17. CONTRACTOR SHALL COORDINATE WORK WITH FACILITY MANAGEMENT FOR THE "MTA" DURING CONSTRUCTION HOURS.

18. CONTRACTOR SHALL PERFORM WORK IN ONLY ONE STAGE AT A TIME. THE CONTRACTOR SHALL ONLY UTILIZE THAT PORTION OF THE DESIGNATED "WORK AREA" WHICH IS NEEDED FOR CONSTRUCTION AT ANY GIVEN TIME.

19. THE CROSSWALKS ACROSS THREE LEGS OF ANY SIGNALIZED INTERSECTION SHALL BE MAINTAINED AT ALL TIMES. "NO PED CROSSING" (R9-3) SIGNS SHALL BE INSTALLED WHEN A PAINTED CROSSWALK IS UNAVAILABLE FOR USE DUE TO CONSTRUCTION.

20. CONTRACTOR SHALL INSTALL R3-18 (NO LEFT AND NO U-TURN) SIGNS AT INTERSECTIONS WHERE THE LEFT TURN LANE HAS BEEN CLOSED FOR CONSTRUCTION. SIGNS SHOULD BE INSTALLED ON MAST ARMS AND FAR LEFT OF THE INTERSECTION OR AT LOCATIONS WHERE THEY WILL BE CLEARLY VISIBLE BY THE THRU TRAFFIC.

21. CONTRACTOR SHALL PROVIDE CHANGEABLE MESSAGE SIGNS AS FIELD CONDITIONS/DETOURS WARRANT AND AS DEEMED NECESSARY BY LADOT, EVEN IF THEY ARE NOT SHOWN ON THESE PLANS.

* 22. WORKING HOURS FOR STAGING WILL BE LIMITED TO THE HOURS OF 7AM TO 11PM MONDAY THRU FRIDAY AND SATURDAY 7AM TO 11PM.

23. WORKSITE TRAFFIC CONTROL IS FOR THE INSTALLATION OF SOLDIER PILES FOR THE TEMPORARY SUPPORT SYSTEM SHORING.

24. LADOT PARKING METER DIVISION MUST BE NOTIFIED AT (213) 473-8270 AT LEAST TEN (10) WORKING DAYS PRIOR TO START OF CONSTRUCTION WHENEVER PARKING METERS WILL BE AFFECTED. LADOT PARKING METER DIVISION WILL COORDINATE THE REMOVAL OF METERS, POSTS AND SIGNS AS NEEDED AND, UPON COMPLETION OF THE PROJECT, THE REINSTALLATION OF METERS, POSTS, SIGNS AND/OR PAINT AS NEEDED. FAILURE TO NOTIFY LADOT PARKING METER DIVISION EITHER PRIOR TO OR UPON COMPLETION OF CONSTRUCTION WILL RESULT IN THE IMPOSITION OF A PENALTY AND MAKE THE CONTRACTOR LIABLE FOR THE COST OF ANY MISSING OR DAMAGED METERS, POSTS, SIGNS, ETC. THAT DEPARTMENT RECORDS INDICATE WERE PRESENT.

## WORKSITE TRAFFIC CONTROL NOTES (CONT'D)

25. UNLESS K-RAILS AND CRASH CUSHIONS ARE INSTALLED, CONTRACTOR SHALL PROVIDE MIN. 5-FOOT SHOULDER FROM ANY OPEN EXCAVATION.

26. ALL K-RAIL ENDS, PLATFORMS, AND FIXED OBJECTS WITHIN THE ROADWAY SHALL BE PROTECTED BY CRASH CUSHIONS OR BY AN APPROVED ATTENUATION SYSTEM, UNLESS THEY ARE PLACED AT LEAST 15 FEET AWAY FROM EDGE OF TRAVELED WAY. AT A DRIVEWAY, FOR A 20-FOOT K-RAIL THE HORIZONTAL OFFSET SHALL NOT EXCEED 5 FEET (MAX. TAPER RATE SHALL NOT EXCEED 4:1).

27. NOTIFY FILM LA (JOSH MINGO) AT (213) 977-8600 AT LEAST FIVE (5) WORKING DAYS PRIOR TO CONSTRUCTION TO COORDINATE WITH FILMING ACTIVITIES.

28. ALL TEMPORARY SIGNAGE INSTALLED ADJACENT TO PEDESTRIAN TRAVEL WAY MUST ALLOW FOR ADA-COMPLIANT PASSAGEWAYS.

29. CONCRETE K-RAIL SECTIONS TO BE CONTINUOUSLY CONNECTED. IN AREAS WITH LESS THAN 2-FEET TO EDGE OF EXCAVATION, SECURE K-RAIL TO PAVEMENT PER CALTRANS SPECIFICATIONS.

30. ANY CHANGES TO WORK AREAS, WORK HOURS, AND/OR APPROVED PLANS SHALL BE SUBMITTED TO LADOT FOR REVIEW AND APPROVAL.

31. THE CONTRACTOR SHALL BE RESPONSIBLE FOR STRIPING (PROPOSED AND EXISTING) SHOWN ON THIS WTCP TO BE IN GOOD CONDITION AND VISIBLE. THE CONTRACTOR SHALL REPAINT ANY FADED EXISTING STRIPING AS DIRECTED BY THE LADOT ENGINEER.

32. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY MISSING OR DAMAGED SIGNS (DUE TO CONSTRUCTION) ACCORDING TO THE LATEST LADOT SPECIFICATIONS.

33. BOARD OF PUBLIC WORKS OR THEIR DESIGNEE (BUREAU OF STREET SERVICES) SHALL APPROVE ALL STREET AND SIDEWALK CLOSURES. AN EXEMPTION OF THE MAYOR'S DIRECTIVE #2 (RUSH HOUR CONSTRUCTION ON ANY CITY STREETS) MUST BE APPROVED BY BUREAU OF ENGINEERING FOR ALL PEAK HOUR LANE CLOSURES ON ARTERIAL STREETS.

34. THE CONTRACTOR SHALL NOTIFY LOS ANGELES FIRE DEPARTMENT (LAFD) CAPTAIN IN CHARGE, OPERATIONS CONTROL DIVISION AT (213) 485-6185 AND APPROPRIATE LOCAL FIRE STATION NOT LESS THAN 72-HOURS PRIOR TO IMPLEMENTING ANY STREET CLOSURE.

35. THE CONTRACTOR SHALL NOTIFY LOS ANGELES POLICE DEPARTMENT (LAPD) AT (213) 485-2651 AND APPROPRIATE LOCAL POLICE DIVISION NOT LESS THAN 72-HOURS PRIOR TO IMPLEMENTING ANY STREET CLOSURE.

36. THE CONTRACTOR SHALL INSTALL SIDE REFLECTORS WITH CUBE-CORNER LENSES OR TOP-MOUNTED REFLECTORS (FACING THE DRIVER) ON ALL K-RAIL BARRIERS.

37. TRUCK HAUL ROUTES SHALL NOT USE LOCAL OR COLLECTOR STREETS. ALL TRUCK ROUTES SHALL BE APPROVED BY THE BUREAU OF STREET SERVICES AND ADOPTED BY THE TCTMC.

38. IF CONFLICT WILL OCCUR BETWEEN THIS STAGE OF CONSTRUCTION AND THE WILSHIRE BRT STRIPING, THE CONTRACTOR SHALL SUBMIT NEW PLANS AND OBTAIN APPROVALS FROM LADOT BEFORE PROCEEDING TO IMPLEMENTATION.

39. CONTRACTOR SHALL NOT CLOSE TRAFFIC LANES UNTIL READY TO START WORK WITHIN THE LANE CLOSURE. TRAFFIC LANE CLOSURES SHALL BE REMOVED IF WORK WITHIN THE CLOSURE IS NOT BEING ACTIVELY PURSUED.

## TEMPORARY STRIPING NOTES

1. REMOVE ALL CONFLICTING STRIPING PRIOR TO INSTALLATION OF TCP.

2. WHEN REMOVAL IS REQUIRED BY CONSTRUCTION, CROSSWALK MARKINGS AND PEDESTRIAN SIGNAL HEADS SHALL BE REMOVED SIMULTANEOUSLY.

3. BUBBLE NOTES: SEE PLAN SHEETS.

4. WHEN REQUIRED BY CONSTRUCTION, THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH METRO, OR THE APPROPRIATE TRANSIT OPERATION, FOR THE TEMPORARY RELOCATION OF BUS STOPS/ZONE. COORDINATE RELOCATION WITH LADOT FOR INSTALLATION OF "TEMPORARY TOW AWAY NO STOPPING-BUS ZONE" SIGNS.

5. CONTRACTOR SHALL PROVIDE REFLECTORIZED CONES AT TYPE III BARRICADE SUPPORTS TO ALERT PEDESTRIANS TO THE BARRICADE SUPPORT.

6. FIELD CONDITIONS MAY VARY FROM THOSE SHOWN ON THE TCP. IN THE EVENT FIELD CONDITIONS ARE DIFFERENT, THE CONTRACTOR SHALL COORDINATE WITH LADOT AND THE AUTHORITY BEFORE IMPLEMENTING THE TCP. THE CONTRACTOR MAY BE REQUIRED TO SUBMIT A REVISED TCP TO LADOT AND THE AUTHORITY FOR APPROVAL PRIOR TO IMPLEMENTATION.

## RESTORATION STRIPING NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LABOR AND MATERIAL INVOLVED IN THE MARKOUT AND INSTALLATION OF ALL RESTORATION STRIPING/PAVEMENT MARKING. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE REMOVAL OF ALL CONFLICTING DETOUR, STRIPING, SIGNING, AND OTHER DETOUR-RELATED TRAFFIC CONTROL DEVICES PRIOR TO THE INSTALLATION OF THE FINAL STRIPING.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAINTING OF ALL EXISTING STRIPING THAT HAS BEEN DAMAGED DURING THE CONSTRUCTION PROCESS.

3. MARKOUT SHALL BE HEAVY PAINT BRUSH MARKINGS OVER A PULLED ROPE IN THE RESPECTIVE WHITE AND YELLOW COLORS OF THE PROPOSED STRIPING. STRIPING AND PAVEMENT MARKING SHALL BE IN HOT APPLIED ALKYD THERMOPLASTIC IN ACCORDANCE WITH LADOT SPECIFICATION NO. S.51-005-10 AND 76-012-15.

4. THE CONTRACTOR SHALL CONTACT LADOT TEMPORARY TRAFFIC MANAGEMENT SECTION (Email: edgar.rodriguez@lacity.org) AT LEAST (5) WORKING DAYS BEFORE BEGINNING OF MARKOUT, THE CONTRACTOR SHALL CORRECT ALL ERRORS IN MARKOUT REQUESTED BY LADOT. THE INSTALLATION OF THERMOPLASTIC STRIPING MAY PROCEED ONLY AFTER APPROVAL OF MARKOUT BY THE LADOT ENGINEER.

5. TEMPORARY REFLECTIVE RAISED PAVEMENT MARKERS SHALL BE MAINTAINED ADJACENT TO ANY TEMPORARY CENTERLINE, MARKOUT CENTERLINE, OR A SCAR OF A SANDBLASTED CENTERLINE, AS APPLICABLE, AS PER LAYOUT STANDARD PLAN NO. S-453.0 IF CONTRACTOR IS UNABLE TO RESTORE STRIPING AS PLANNED.

## STEEL PLATE NOTES:

1. WHEN BACK FILLING OPERATIONS OF AN EXCAVATION IN THE TRAVELED WAY, WHETHER TRANSVERSE OR LONGITUDINAL, CANNOT BE PROPERLY COMPLETED WITHIN A WORKDAY, PROVIDE STEEL PLATE BRIDGING WITH A NONSKID SURFACE AND SHORING TO PRESERVE UNOBSTRUCTED TRAFFIC FLOW. IN SUCH CASES, THE FOLLOWING CONDITIONS SHALL APPLY:

A. STEEL PLATES USED FOR BRIDGING SHALL EXTEND A MINIMUM OF 12 INCHES BEYOND THE EDGES OF THE TRENCH.
B. INSTALL STEEL PLATE BRIDGING TO OPERATE WITH MINIMUM NOISE.
C. SHORE THE TRENCH TO SUPPORT THE BRIDGING AND TRAFFIC LOADS.
D. USE TEMPORARY PAVING WITH COLD ASPHALT CONCRETE TO FEATHER THE EDGES OF THE PLATES.

## WORKZONE NOTES:

1. SOLDIER PILES SHOWN ARE SUGGESTIVE AND SUBJECT TO CHANGE UPON COMPLETION OF EXCAVATION SUPPORT SYSTEM DESIGN.

## TEMPORARY STRIPING NOTES:

(1) 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
(2) 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
(3) 4"X1' WHITE CAT TRACK @ 6' GAP
(4) 12" WHITE CROSSWALK OR STOP BAR
(5) 4" WHITE EDGE LINE
(6) 8" WHITE BARRIER LINE
(7) 12" WHITE DIAGONAL
(8) 12" WHITE CHEVRON
(9) 4"X1' YELLOW CAT TRACK @ 6' GAP
(10) 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
(11) 12" YELLOW CROSSWALK
(12) 4" YELLOW EDGE LINE
(13) 12" YELLOW DIAGONAL
(14) TWO WAY LEFT TURN YELLOW LANE (4" SOLID LINE AND 4"X12' @ 36' GAP WITH 3" CLEARANCE)

LADOT HAS DETERMINED THAT THERE WILL BE SIGNIFICANT IMPACT TO TRAFFIC CIRCULATION DUE TO THE REQUESTED EXEMPTION FOR LANE CLOSURES DURING PEAK PERIODS. LADOT'S ACCEPTANCE OF THIS WORKSITE PLAN DOES NOT CONSTITUTE A MITIGATION FOR SUCH AN IMPACT.

* CONTRACTOR TO OBTAIN PROPER APPROVALS FOR NOISE VARIANCE FROM LAPD BEYOND THE NORMAL WORKING HOURS AUTHORIZED IN THE LOS ANGELES MUNICIPAL CODE.

SETUP OF TRAFFIC CONTROL (K-RAILS AND STRIPING) SHALL BE DONE ON WEEKENDS ONLY.

CENTURY CITY CONSTELLATION STATION

| REVIEWED ______ Transportation Engineer | ACCEPTED ______ Senior Transportation Engineer |
|---|---|

| INSTALLATION DATES | CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTATION SELETA J. REYNOLDS, GENERAL MANAGER |
|---|---|
| MARKOUT BEGAN: ______ MARKOUT COMPLETED: ______ STRIPING COMPLETED: ______ References: FIELD CHECK A- | TRAFFIC CONTROL PLAN CENTURY CITY CONSTELLATION STATION GENERAL NOTES, LEGEND AND DETAILS |

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E | W | PCR____ | TF-1500 | 1 / 39 |

REVIEWED:________________ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

60% SUBMITTAL

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro — LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
GENERAL NOTES

CONTRACT NO
DRAWING NO TF-1500
REV
SCALE NO SCALE
SHEET NO

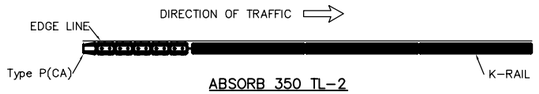
1"=20' ORIGINAL MAP SCALE 1"=40'
0 10 20 … 100 FEET / 0 20 40 … 200 FEET

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1500.dwg Oct 01, 2015 2:23pm __SantosC

# LEGEND

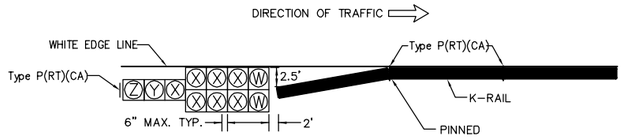
| PROPOSED | EXISTING | EXISTING TO BE REMOVED | |
|---|---|---|---|
| | | | CONSTRUCTION AREA |
| | Ⓢ | | SIGNALIZED INTERSECTION |
| R/C | R/C | R/C | RED CURB |
| | | | STRIPING AND MARKING |
| | | | 2'x20' K-RAIL (INTERCONNECTED) |
| | | | TYPE II BARRICADE/WITH SIGN AS NOTED |
| | | | TYPE III BARRICADE/WTH SIGN AS NOTED |
| | | | SIGN AND POST |
| | | | SIGN ON EXISTING POLE |
| | | | 30" EPOXIED SURFACE MOUNT DELINEATOR WITH REFLECTIVE SHEETING |
| | | | 28" PORTABLE DELINEATOR |
| | | | PORTABLE FLASHING ARROW BOARD (FAB) |
| | | | DRIVEWAY |
| | | | SIGN ON TEMPORARY SIGNAL STANDARD |
| | | | SIGN ON TEMPORARY SIGNAL MAST ARM |
| CMS | CMS | CMS | PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) |
| | | | CRASH CUSHION ARRAY "TS-11" |
| | | | PORTABLE DIAMOND FLASHING BOARD |
| | | | FLAGGER |
| | | | HIGH LEVEL WARNING DEVICES |
| | | | ABSORB 350 TL-2 |
| | | | FENCE WITH SCREEN |

100 FEET 200 FEET
80 160
60 120
20 40
0 0
10 20
20 40
1"=20' ORIGINAL MAP SCALE 1"=40'



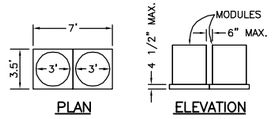

ABSORB 350 TL-2

NON-DIRECTIVE, GATING, CRASH CUSHION
Maximum Speed of 70 km/h (43 mph)
DETAIL A

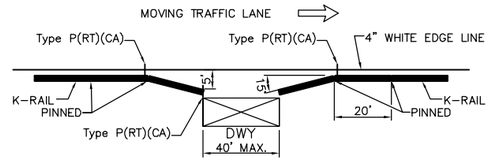



WEIGHT OF SAND
(W=2,100 LBS.)
(X=1,400 LBS.)
(Y=700 LBS.)
(Z=400 LBS.)

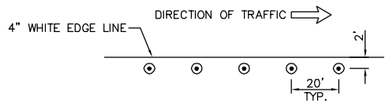
TYPICAL INSTALLATION OF CRASH CUSHIONS
40 MPH MAXIMUM INTERSECTIONS
DETAIL B



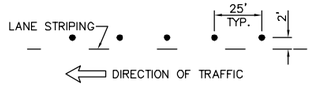

CRASH CUSHION PALLET DETAIL
DETAIL C
(TO BE USED AT THE DISCRETION OF THE CONTRACTOR)




TYPICAL INSTALLATION OF K-RAILS
NON-INTERSECTIONS
DETAIL E




TYPICAL INSTALLATION OF SURFACE MOUNT DELINEATORS
DETAIL D




TYPICAL INSTALLATION OF PORTABLE DELINEATORS
DETAIL E

## STATION CONSTRUCTION SEQUENCING CONCEPT

| CONSTRUCTION PHASING | CONSTRUCTION ACTIVITY | SHEET(S) | ANTICIPATED DURATION |
|---|---|---|---|
| STAGE-1 | SOLDIER PILE CONSTRUCTION FIRST 250' + NORTH SIDE OF CONSTELLATION BLVD | 3,4 | 15 WORKING DAYS |
| STAGE-1A | SOLDIER PILE CONSTRUCTION FIRST 250' + NORTH SIDE OF CONSTELLATION BLVD WEEKEND DRIVEWAY CLOSURE SET UP | 3 | 3 WEEKENDS |
| STAGE-2 | SOLDIER PILE CONSTRUCTION FIRST 350' + SOUTH SIDE OF CONSTELLATION BLVD UTILITIES ON THE NORTH SIDE OF CONSTELLATION (WATER, GAS & POWER) | 5,6 | 30 WORKING DAYS |
| STAGE-3 | DECKING FIRST 250' + UTILITIES N/S (WATER & GAS) | 7,8,9 | 4 WEEKENDS |
| STAGE-4 | LAUNCH BOX EXCAVATION UTILITIES N/S (WATER, GAS & POWER) | 11,12 | 100 WORKING DAYS |
| STAGE-5 | TBM LAUNCH UTILITIES S/S (POWER) | 13,14,15 | 9 MONTHS |
| STAGE-6 | TBM SUPPORT UTILITIES S/S (POWER) | 16,17 | 5 MONTHS |
| STAGE-7 | S/S PILING UTILITIES S/S (POWER) | 18,19 | 35 WORKING DAYS |
| STAGE-7A | S/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 20,21 | 2 WEEKENDS |
| STAGE-7B | S/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 22,23 | 4 WEEKENDS |
| STAGE-7C | S/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 24,25 | 5 WEEKENDS |
| STAGE-7D,7E | S/S PILING CROSSING AVENUE OF THE STARS WEEKEND DRIVEWAY CLOSURE SET-UP | 18,19 | 3 WEEKENDS |
| STAGE-8 | N/S PILING UTILITIES N/S (WATER, GAS & POWER) | 26,27 | 40 WORKING DAYS |
| STAGE-8A | N/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 28,29 | 2 WEEKENDS |
| STAGE-8B | N/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 30,31 | 4 WEEKENDS |
| STAGE-8C | N/S PILING CROSSING AVENUE OF THE STARS WEEKEND SET-UP | 32,33 | 3 WEEKENDS |
| STAGE-8D | N/S PILING CROSSING AVENUE OF THE STARS WEEKEND DRIVEWAY CLOSURE SET-UP | 27 | 4 WEEKENDS |
| STAGE-9 | DECKING FULL CLOSURE (NIGHTS/WEEKENDS) | 34,35,36 | |
| STAGE-10 | LONGTERM STAGING | 38,39 | 3 YEARS |

CENTURY CITY CONSTELLATION STATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
LEGEND AND DETAILS

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1501 | 2 / 39 |

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618 T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
LEGEND AND DETAILS

CONTRACT NO
DRAWING NO TF-1501 REV
SCALE NO SCALE
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WAGBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1501.dwg Oct 01, 2015 2:21pm SantosC

| | | | |
|---|---|---|---|
| MAJOR CONST AT CONSTEL- | | CONSTEL- LATION AT CPE | |
| EXPECT DELAYS | | REDUCED TO ONE LANE | |
| DATE TO DATE | | DATE TO DATE | |

PCMS "A" 7 DAYS PRIOR TO CONSTRUCTION

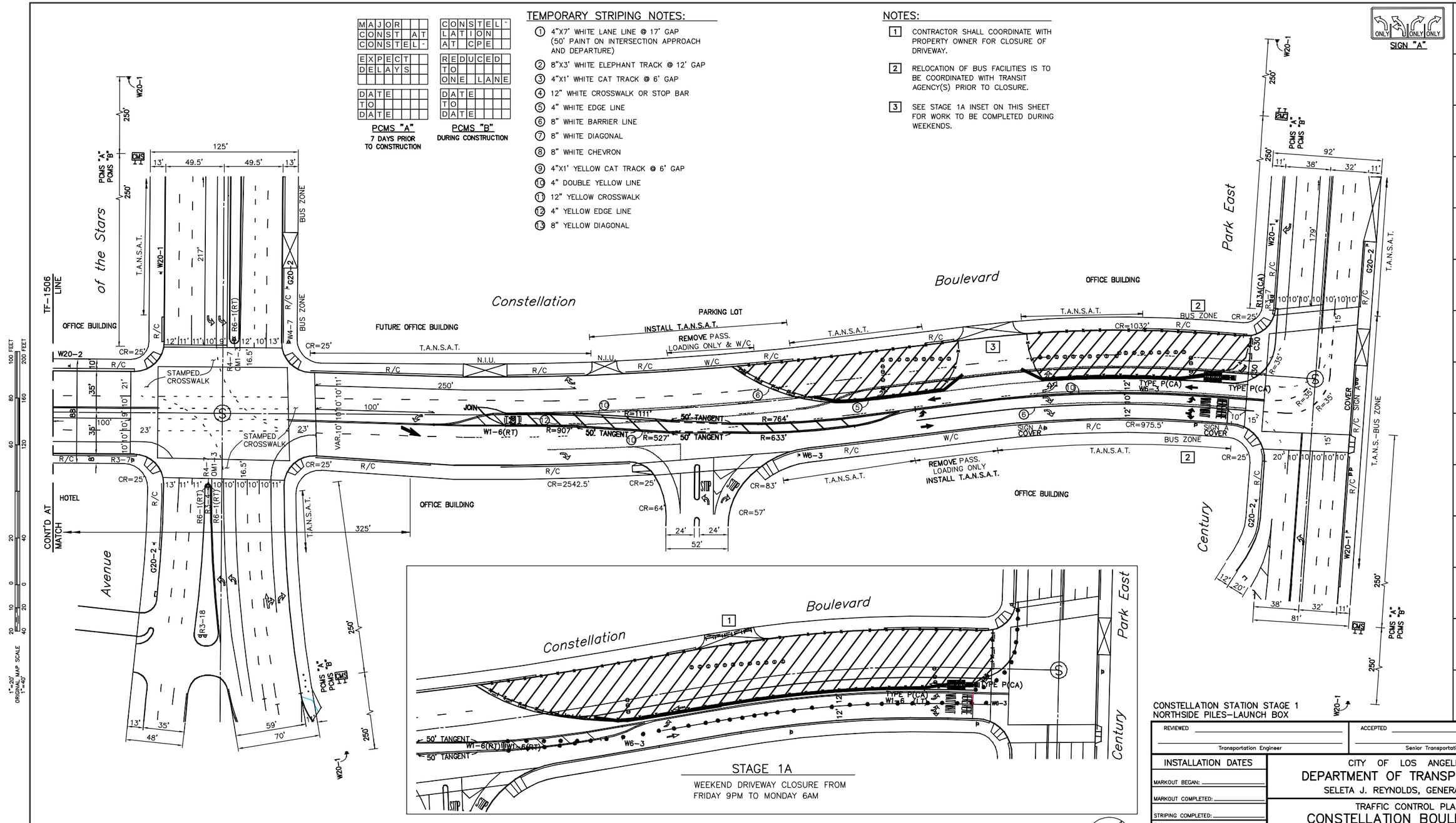
PCMS "B" DURING CONSTRUCTION

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 8" WHITE DIAGONAL
8. 8" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 8" YELLOW DIAGONAL

## NOTES:

1. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.
2. RELOCATION OF BUS FACILITIES IS TO BE COORDINATED WITH TRANSIT AGENCY(S) PRIOR TO CLOSURE.
3. SEE STAGE 1A INSET ON THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.




CONSTELLATION STATION STAGE 1
NORTHSIDE PILES–LAUNCH BOX

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

| INSTALLATION DATES |
|---|
| MARKOUT BEGAN: |
| MARKOUT COMPLETED: |
| STRIPING COMPLETED: |
| References: FIELD CHECK A-5150 |

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
FROM CENTURY PARK EAST
TO CENTURY PARK WEST

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1505 | 3 / 39 |

REVIEWED: _____ 20 ___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

| | |
|---|---|
| DESIGNED BY | T. SAADALLA |
| DRAWN BY | T. SAADALLA |
| CHECKED BY | K. DERDERIAN |
| IN CHARGE | K. DERDERIAN |
| DATE | 10/02/2015 |

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CONSTELLATION STATION
STAGE 1 – SHEET 1

| | |
|---|---|
| CONTRACT NO | |
| DRAWING NO | TF-1505 |
| REV | |
| SCALE | 1"=40' |
| SHEET NO | |

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\195_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXX1505.dwg Sep 30, 2015 2:48pm SantosC

| MAJOR CONST AT CONSTEL- |
|---|
| EXPECT DELAYS |
| DATE TO DATE |

PCMS "A"
7 DAYS PRIOR TO CONSTRUCTION

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
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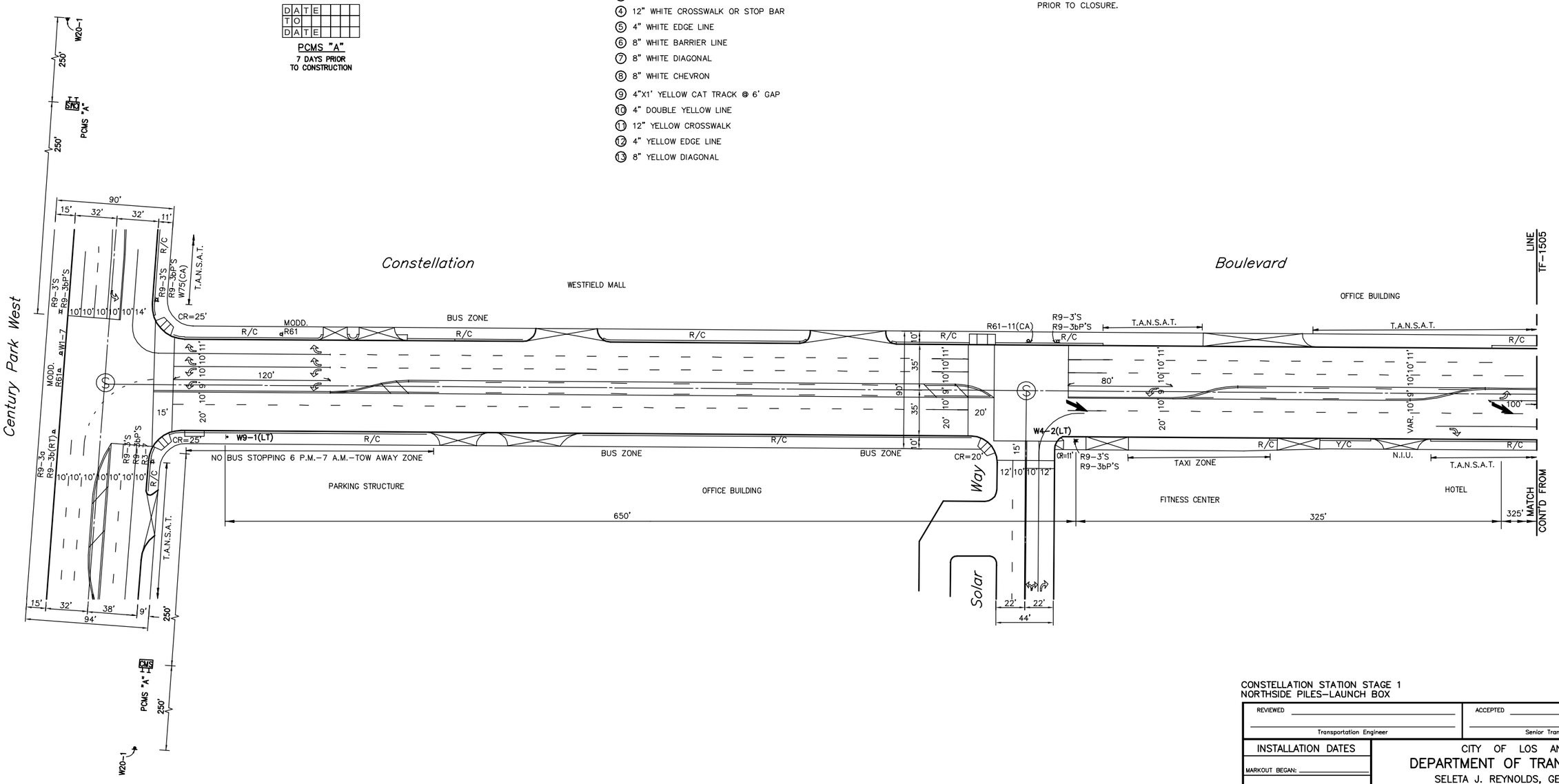
6. 8" WHITE BARRIER LINE
7. 8" WHITE DIAGONAL
8. 8" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 8" YELLOW DIAGONAL

## NOTES:

1. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.
2. RELOCATION OF BUS FACILITIES IS TO BE COORDINATED WITH TRANSIT AGENCY(S) PRIOR TO CLOSURE.

MODD. R61




CONSTELLATION STATION STAGE 1
NORTHSIDE PILES–LAUNCH BOX

REVIEWED: _____ 20 ___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK A-5150

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1506 | 4 / 39 |

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY T. SAADALLA
DRAWN BY T. SAADALLA
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

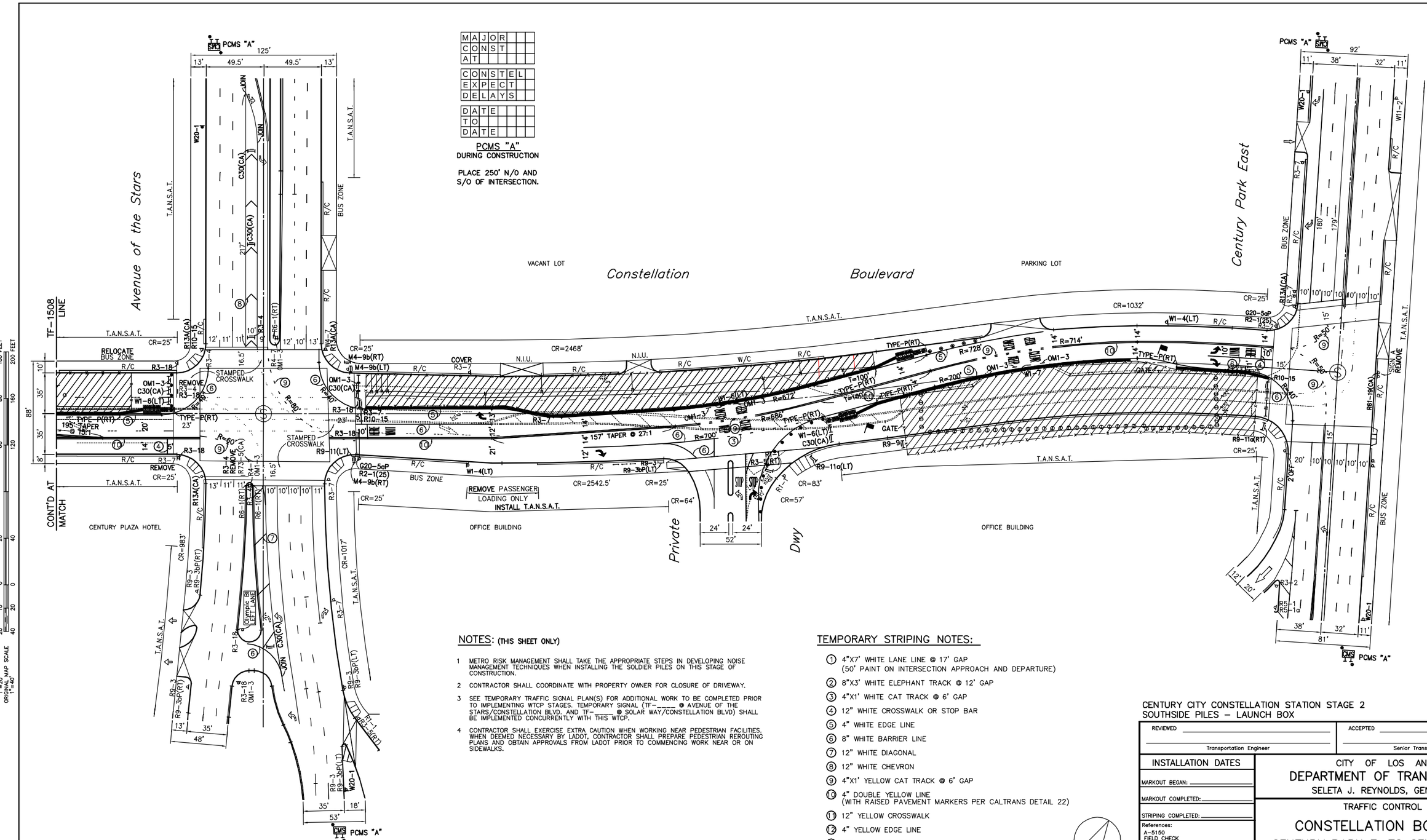
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CONSTELLATION STATION
STAGE 1 – SHEET 2

CONTRACT NO
DRAWING NO TF-1506 REV
SCALE 1"=40'
SHEET NO

ORIGINAL MAP SCALE 1"=20' 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1505.dwg Sep 30, 2015 2:49pm SantosC



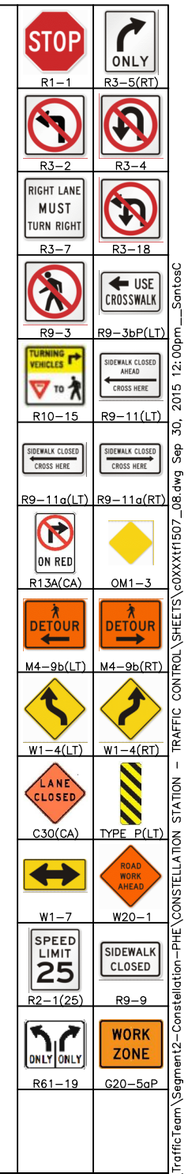

## NOTES: (THIS SHEET ONLY)

1. METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.
3. SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.
4. CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'




CENTURY CITY CONSTELLATION STATION STAGE 2
SOUTHSIDE PILES – LAUNCH BOX

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1507 | 5/39 |

REVIEWED: _____ 20 ___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

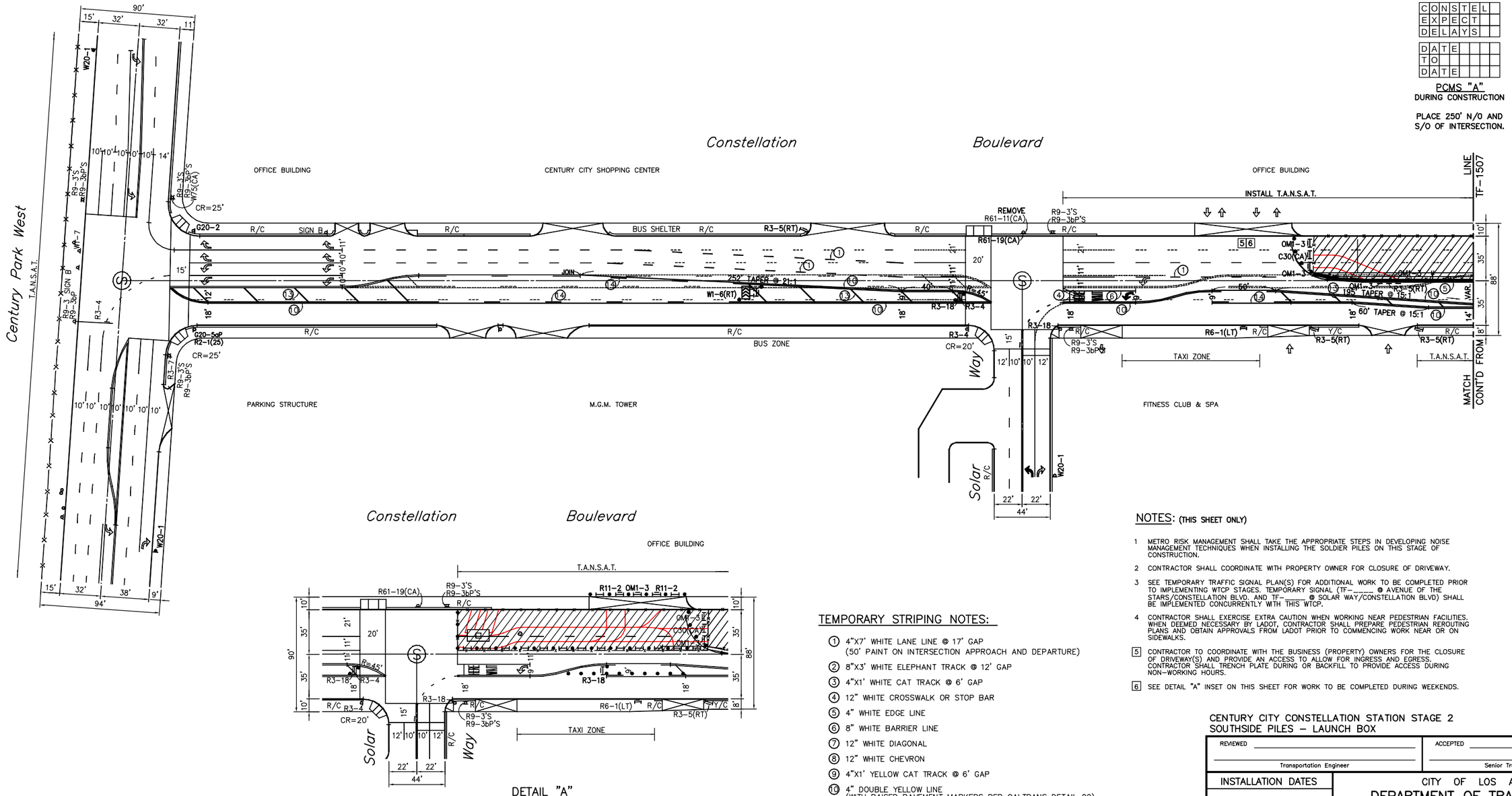
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618 T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 2 – SHEET 1

CONTRACT NO
DRAWING NO TF-1507 REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1507_08.dwg Sep 30, 2015 12:00pm Santosc




| MAJOR CONST |
|---|
| CONSTEL EXPECT DELAYS |
| DATE TO DATE |

PCMS "A"
DURING CONSTRUCTION

PLACE 250' N/O AND S/O OF INTERSECTION.

SPEED LIMIT 25 R2-1(25) | ONLY R3-5(RT)
R3-4 | R3-18
ONLY ONLY R61-19 | END ROAD WORK G20-2
WORK ZONE G20-5aP | W1-6(RT)
W4-2(LT) | ROAD WORK AHEAD W20-1
OM1-3 | LANE CLOSED C30(CA)
ONE WAY R6-1(RT) | ROAD CLOSED R11-2

## NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

4 CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

5 CONTRACTOR TO COORDINATE WITH THE BUSINESS (PROPERTY) OWNERS FOR THE CLOSURE OF DRIVEWAY(S) AND PROVIDE AN ACCESS TO ALLOW FOR INGRESS AND EGRESS. CONTRACTOR SHALL TRENCH PLATE DURING OR BACKFILL TO PROVIDE ACCESS DURING NON-WORKING HOURS.

6 SEE DETAIL "A" INSET ON THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL
14. 4" YELLOW TWO-WAY LEFT TURN LANE LINE

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 2
SOUTHSIDE PILES – LAUNCH BOX

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1508 | 6 / 39 |

REVIEWED: _____ 20 ___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

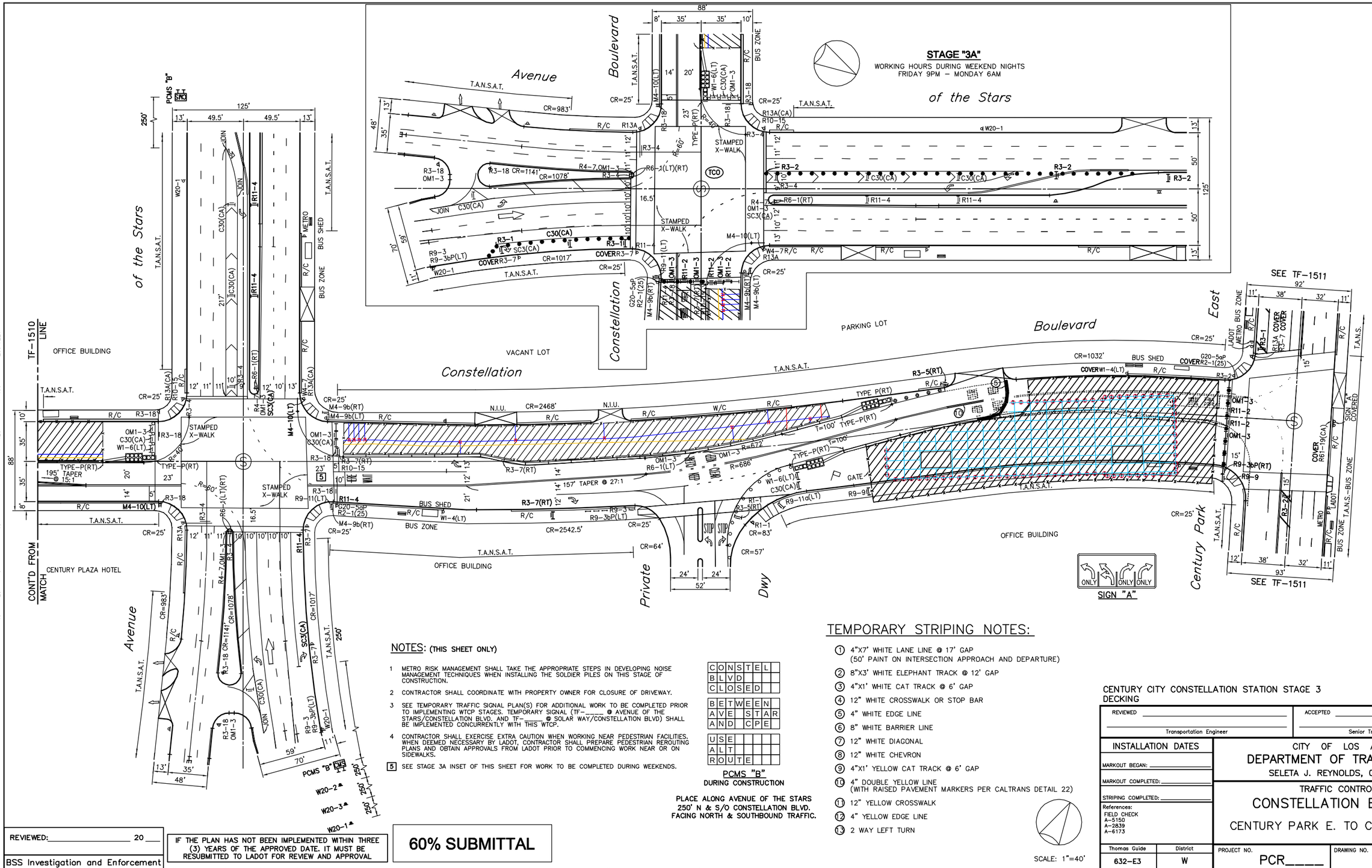
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 2 – SHEET 2

CONTRACT NO
DRAWING NO TF-1508 REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1507_08.dwg Sep 30, 2015 12:05pm Santosc




## NOTES: (THIS SHEET ONLY)

1. METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.
3. SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.
4. CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

[5] SEE STAGE 3A INSET OF THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C | O | N | S | T | E | L | |
| B | L | V | D | | | | |
| C | L | O | S | E | D | | |
| B | E | T | W | E | E | N | |
| A | V | E | | S | T | A | R |
| A | N | D | | C | P | E | |
| U | S | E | | | | | |
| A | L | T | | | | | |
| R | O | U | T | E | | | |

PCMS "B"
DURING CONSTRUCTION

PLACE ALONG AVENUE OF THE STARS 250' N & S/O CONSTELLATION BLVD. FACING NORTH & SOUTHBOUND TRAFFIC.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 3 DECKING

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

REVIEWED _____ ACCEPTED _____
Transportation Engineer | Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1509 | 7/39 |

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

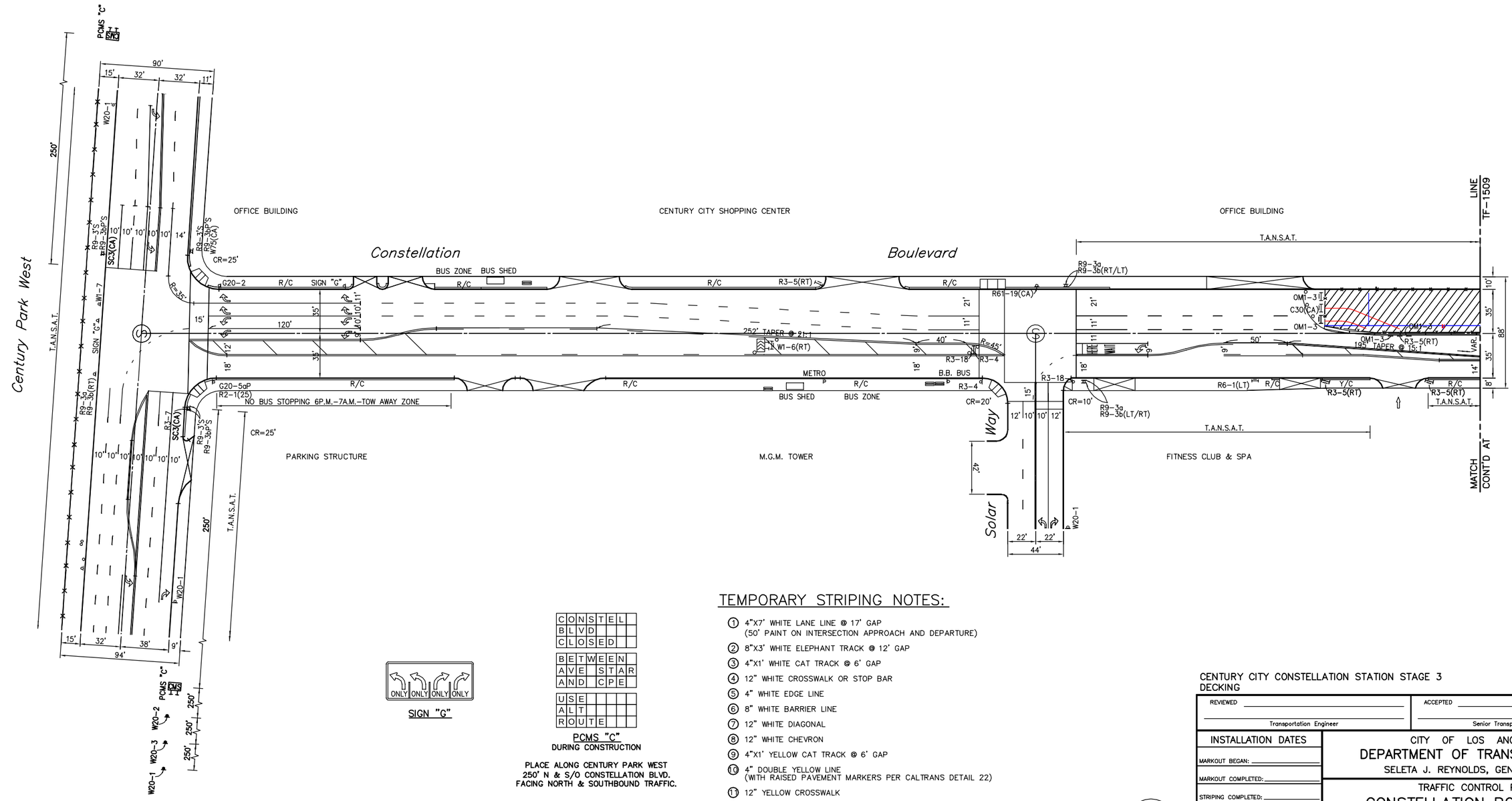
WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 3 – SHEET 1

CONTRACT NO
DRAWING NO TF-1509 REV
SCALE 1"=40'
SHEET NO

R3-1 | R3-2
R3-5(LT) ONLY | R3-7(RT) RIGHT LANE MUST TURN RIGHT
R11-2 ROAD CLOSED | R11-4 ROAD CLOSED TO THRU TRAFFIC
OM1-3 | C30(CA) LANE CLOSED
M4-10(LT) DETOUR | M4-10(RT) DETOUR
W20-1 ROAD WORK AHEAD | W20-2 DETOUR AHEAD
W20-3 ROAD CLOSED AHEAD | SC3(CA) DETOUR
R9-9 SIDEWALK CLOSED | R9-3bP(RT) USE CROSSWALK
R3-7 RIGHT LANE MUST TURN RIGHT

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\cOXXXtf1509.dwg Sep 30, 2015 11:35am Santosc







SIGN "G"



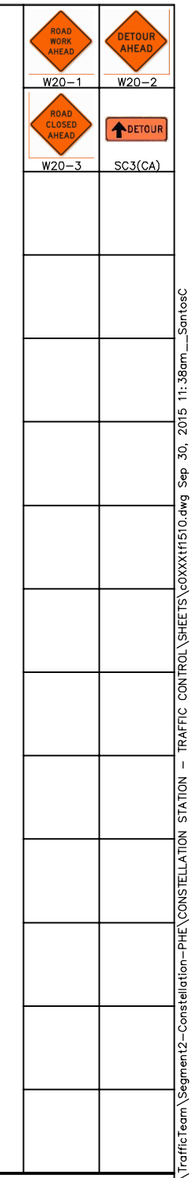

PCMS "C"
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK WEST
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

SCALE: 1"=40'




CENTURY CITY CONSTELLATION STATION STAGE 3
DECKING

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1510 | 8/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

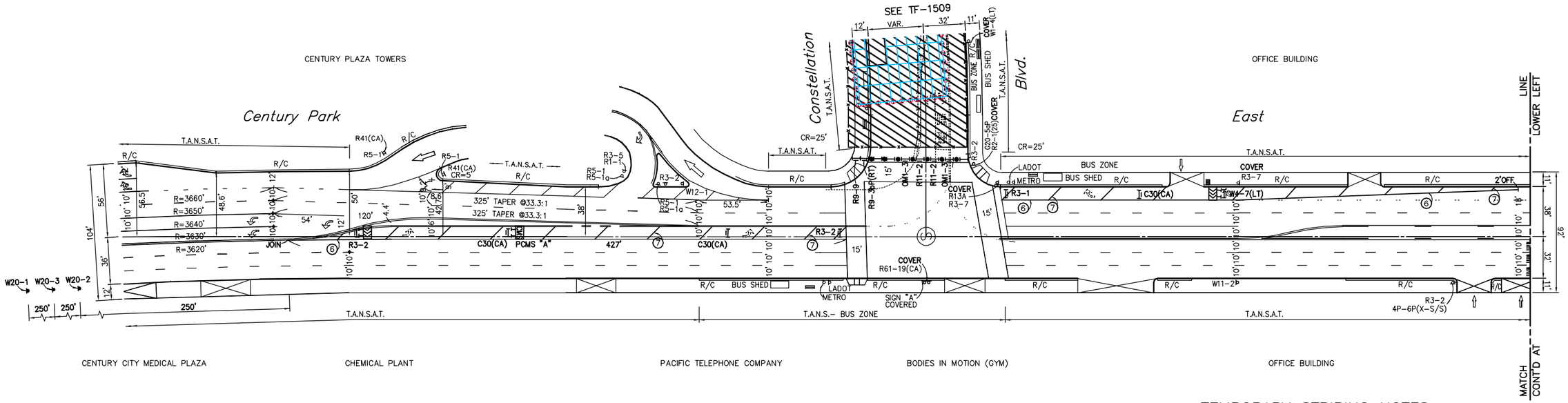
PARSONS BRINCKERHOFF

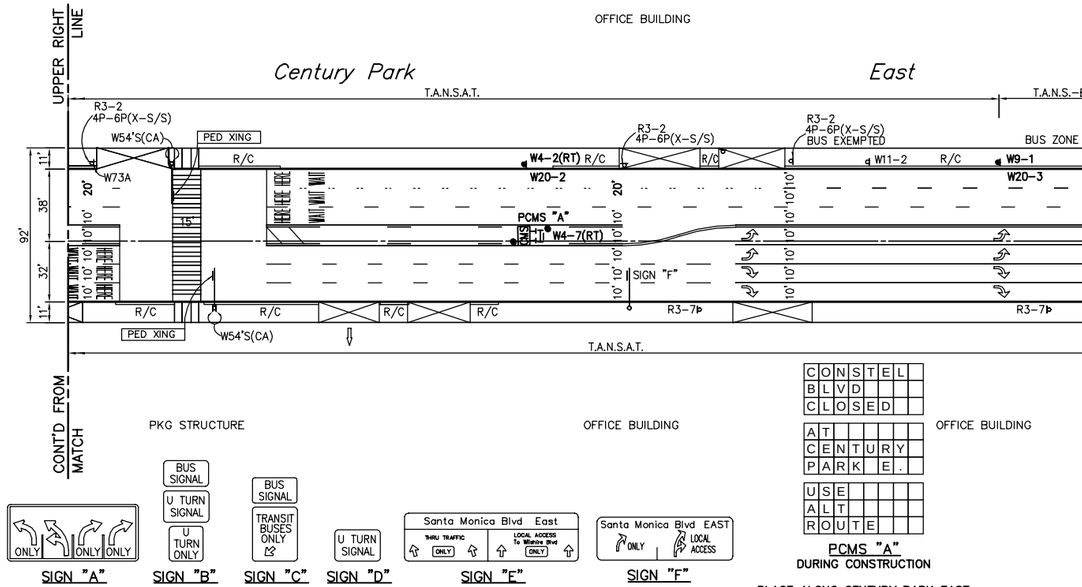
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

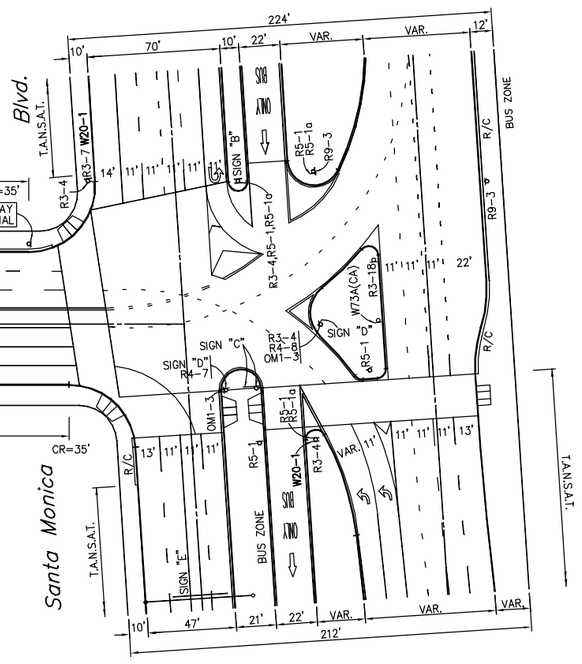
WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 3 - SHEET 2

CONTRACT NO
DRAWING NO TF-1510
REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1510.dwg Sep 30, 2015 11:38am__SantosC




## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 3 DECKING

| | |
|---|---|
| REVIEWED: _____ Transportation Engineer | ACCEPTED: _____ Senior Transportation Engineer |

**INSTALLATION DATES**

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1511 | 9/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

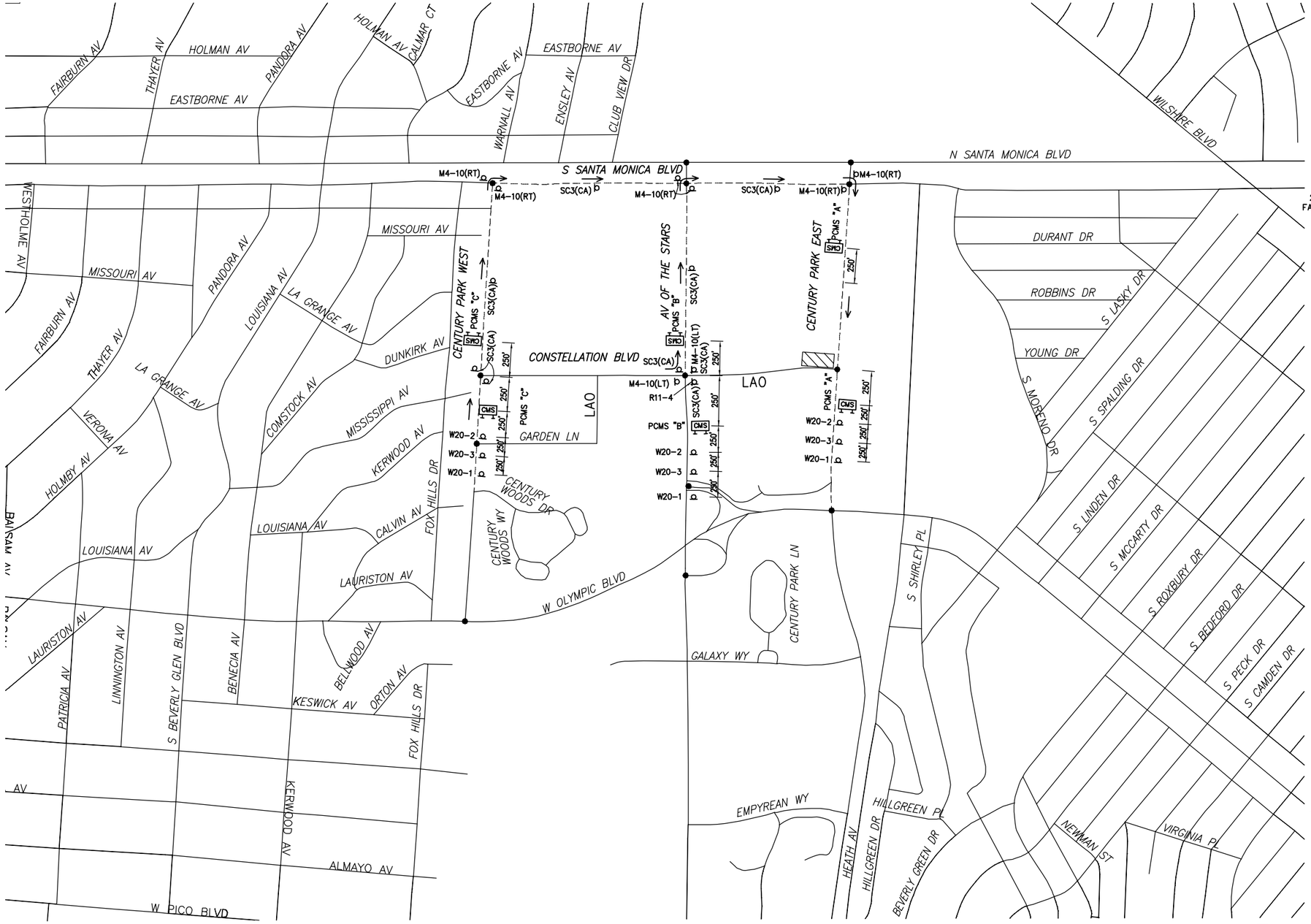
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 3 – SHEET 3

CONTRACT NO
DRAWING NO TF-1511 REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1511.dwg Sep 30, 2015 11:39am SantosC




CONSTEL BLVD CLOSED
AT CENTURY PARK E.
USE ALT ROUTE

**PCMS "A"**
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK EAST 250' N & S/O CONSTELLATION BLVD. FACING NORTH & SOUTHBOUND TRAFFIC.

CONSTEL BLVD CLOSED
BETWEEN AVE STAR AND CPE
USE ALT ROUTE

**PCMS "B"**
DURING CONSTRUCTION

PLACE ALONG AVENUE OF THE STARS 250' N & S/O CONSTELLATION BLVD. FACING NORTH & SOUTHBOUND TRAFFIC.

CONSTEL BLVD CLOSED
BETWEEN AVE STAR AND CPE
USE ALT ROUTE

**PCMS "C"**
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK WEST 250' N & S/O CONSTELLATION BLVD. FACING NORTH & SOUTHBOUND TRAFFIC.

LEGEND:

- ● – SIGNALIZED INTERSECTION
- ▨ – PROPOSED WORK AREA
- ◂ – PROPOSED DETOUR SIGN
- PCMS – PROPOSED CHANGEABLE MESSAGE SIGN (PCMS)
- TCO – TRAFFIC CONTROL OFFICER
- LAO – LOCAL ACCESS ONLY

NOTES: (THIS SHEET ONLY)

1. SEE DRAWING TF-xxxx FOR ALL WTCP SIGNS ASSOCIATED WITH THIS DETOUR.

ROAD CLOSED TO THRU TRAFFIC R11-4 | DETOUR M4-10(LT)
DETOUR M4-10(RT) | ROAD WORK AHEAD W20-1
DETOUR AHEAD W20-2 | ROAD CLOSED AHEAD W20-3
DETOUR SC3(CA)

CENTURY CITY CONSTELLATION STATION STAGE 3 & 5
DECKING & TBM LAUNCH DETOUR

SCALE: 1"=40'

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
EASTBOUND CLOSURE-STAGE 3 & 5

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| – | – | PCR____ | TF-1512 | 10/39 |

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

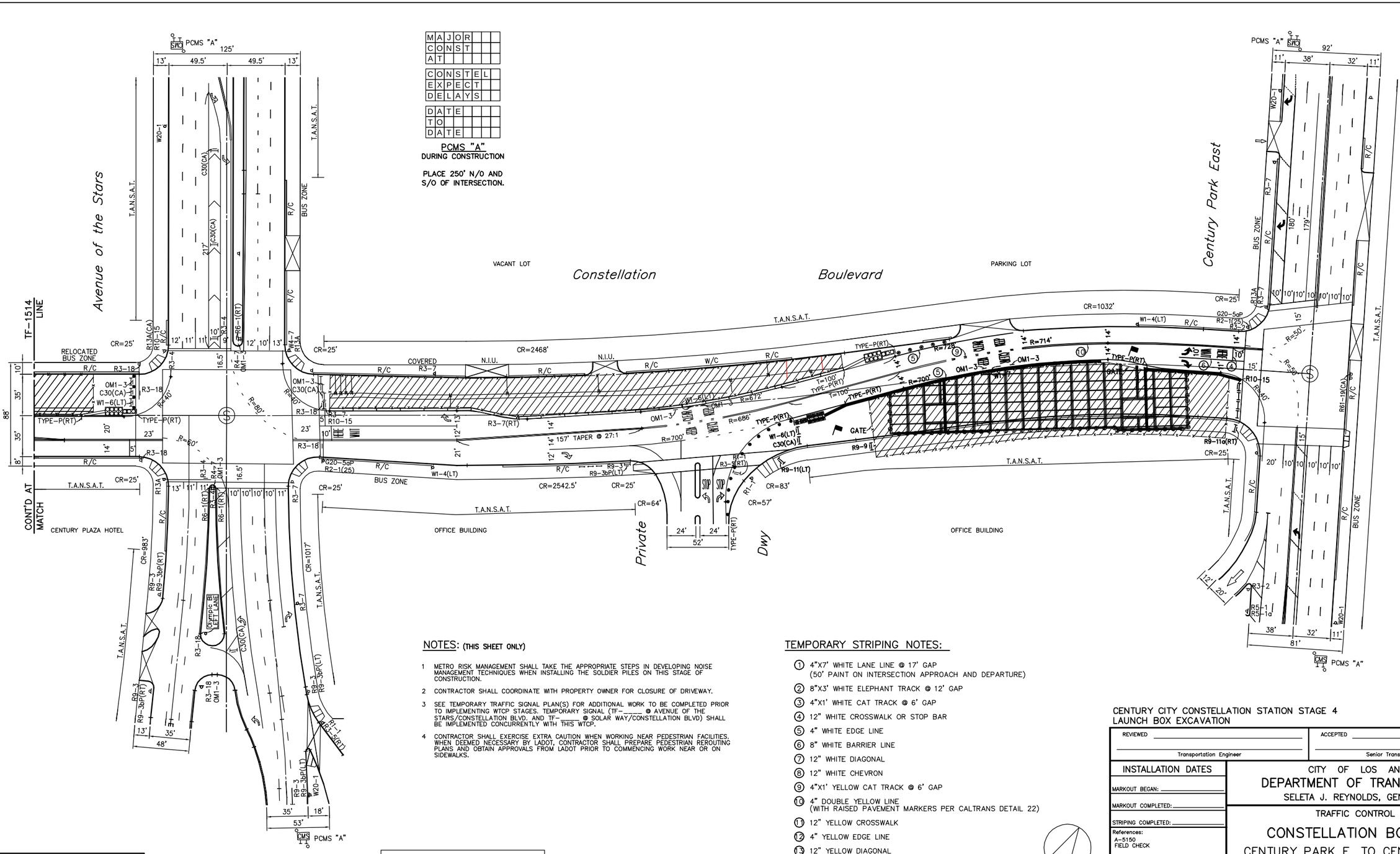
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
TRAFFIC DETOUR PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 3 & 5 – SHEET 4

CONTRACT NO
DRAWING NO TF-1512 REV
SCALE 1"=40'
SHEET NO

ORIGINAL MAP SCALE 1"=20' 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\cOXXXtf1512.dwg Sep 30, 2015 11:44am SantosC




NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

4 CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
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10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

R10-15 | OM1-3
W1-7 | TYPE P(RT)
R9-9 | W1-6(LT)
C30(CA) | R9-11a(RT)
R9-11(LT)

1"=20' ORIGINAL MAP SCALE 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 4 LAUNCH BOX EXCAVATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1513 | 11/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

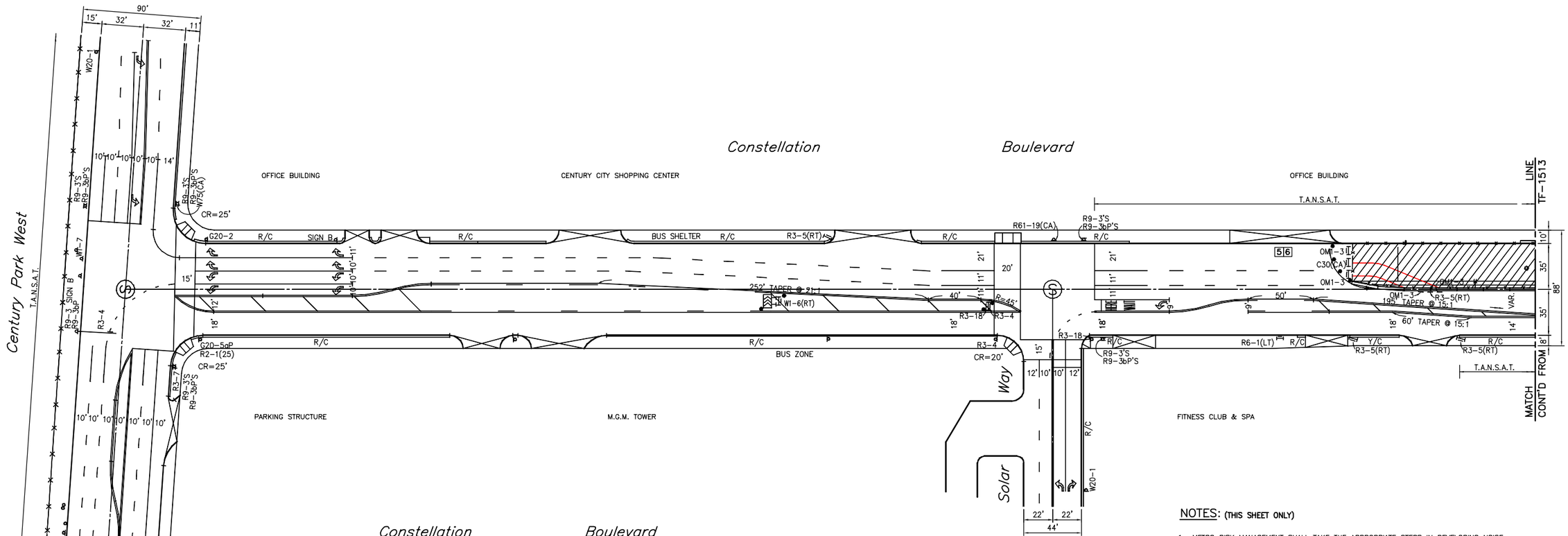
PARSONS BRINCKERHOFF

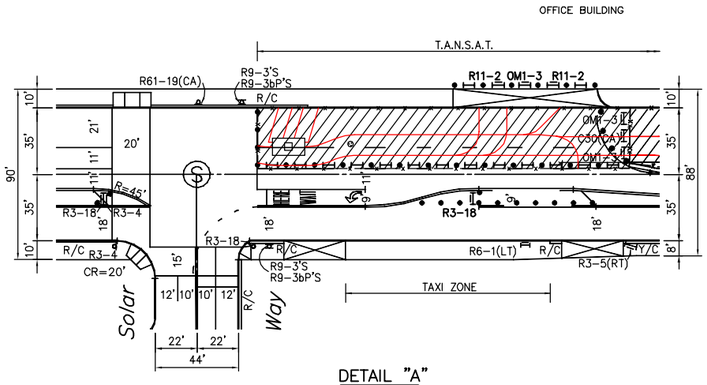
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 4 – SHEET 1

CONTRACT NO
DRAWING NO TF-1513 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1513_14.dwg Sep 30, 2015 12:08pm ___SantosC




ROAD CLOSED R11-2 | OM1-3 | R3-18

## NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-_____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-_____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

4 CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

[5] CONTRACTOR TO COORDINATE WITH THE BUSINESS (PROPERTY) OWNERS FOR THE CLOSURE OF DRIVEWAY(S) AND PROVIDE AN ACCESS TO ALLOW FOR INGRESS AND EGRESS. CONTRACTOR SHALL TRENCH PLATE DURING OR BACKFILL TO PROVIDE ACCESS DURING NON-WORKING HOURS.

[6] SEE DETAIL "A" INSET ON THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL
14. 4" YELLOW TWO-WAY LEFT TURN LANE LINE

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 4
LAUNCH BOX EXCAVATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References: A-5150 FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1514 | 12/39 |

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

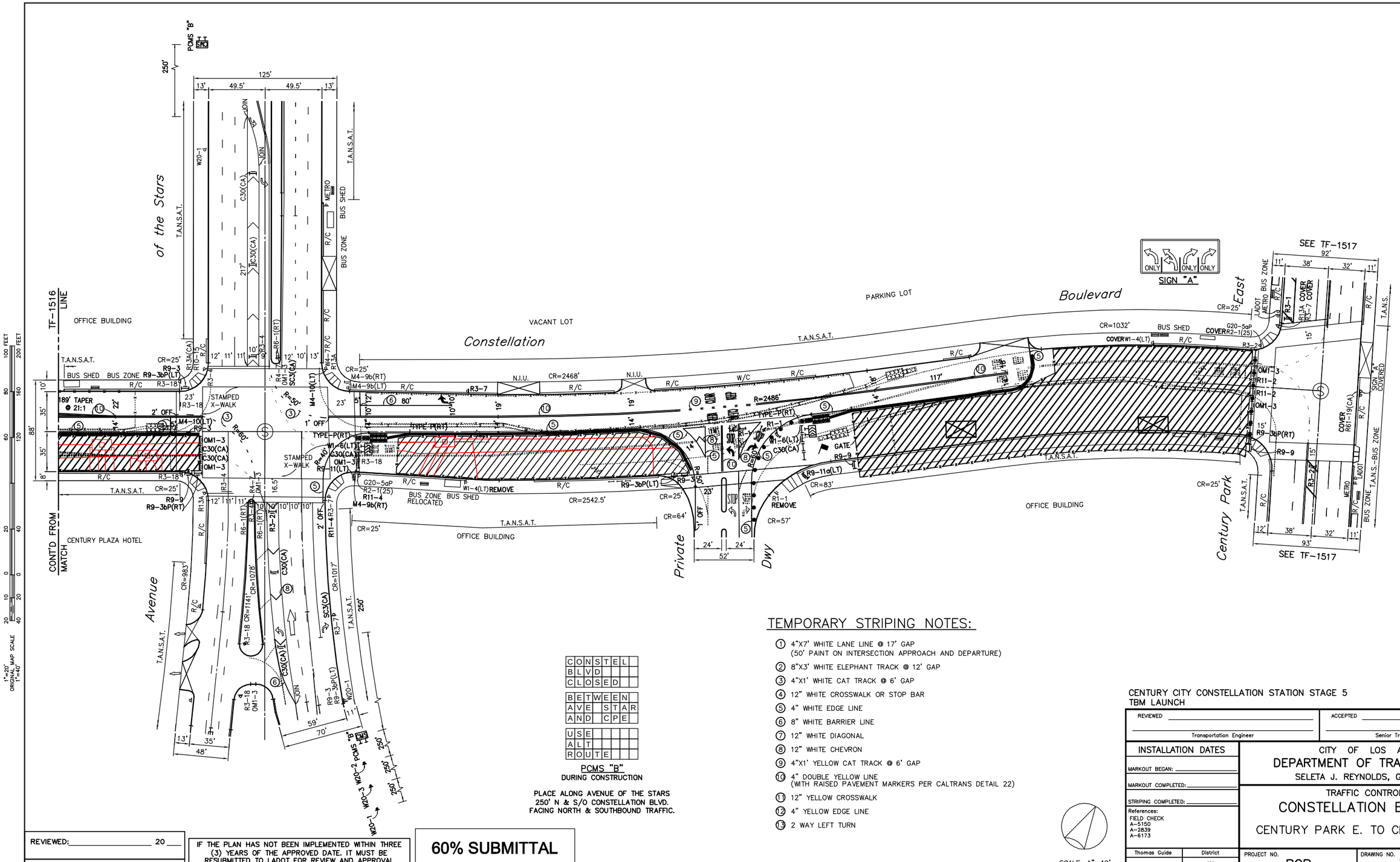
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 4 – SHEET 2

CONTRACT NO
DRAWING NO TF-1514 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1513_14.dwg Sep 30, 2015 12:13pm__SantosC

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7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

SCALE: 1"=40'

R3-1 | R3-2

R3-5(LT) | R3-7(RT)

R11-2 | R11-4

OM1-3 | C30(CA)

M4-10(LT) | M4-10(RT)

W20-1 | W20-2

W20-3 | SC3(CA)

R9-9 | R9-3bP(RT)

R9-11a(RT)

CONSTRUCTION STATION – TRAFFIC CONTROL \SHEETS\c0XXXtf1515.dwg Sep 30, 2015 11:44am Santosc

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION S

CENTURY CITY CONSTELLATION STATION STAGE 5
TBM LAUNCH

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1515 | 13/39 |

REVIEWED: _____ 20 ___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

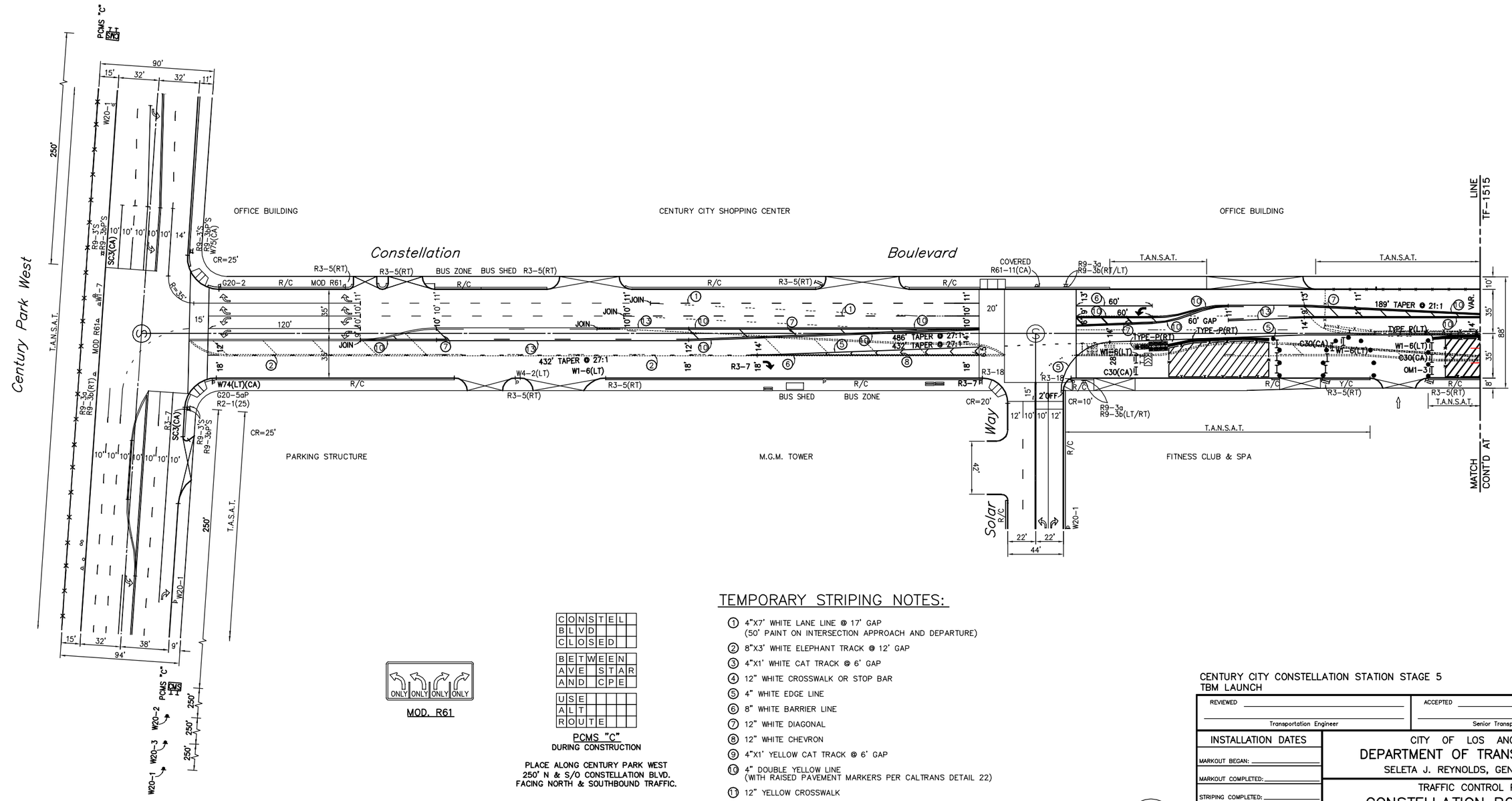
Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 5 – SHEET 1

CONTRACT NO
DRAWING NO TF-1515 REV
SCALE 1"=40'
SHEET NO







MOD. R61

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C | O | N | S | T | E | L | |
| B | L | V | D | | | | |
| C | L | O | S | E | D | | |
| B | E | T | W | E | E | N | |
| A | V | E | | S | T | A | R |
| A | N | D | | C | P | E | |
| U | S | E | | | | | |
| A | L | T | | | | | |
| R | O | U | T | E | | | |

PCMS "C"
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK WEST
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
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10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 5
TBM LAUNCH

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1516 | 14/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

60% SUBMITTAL

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

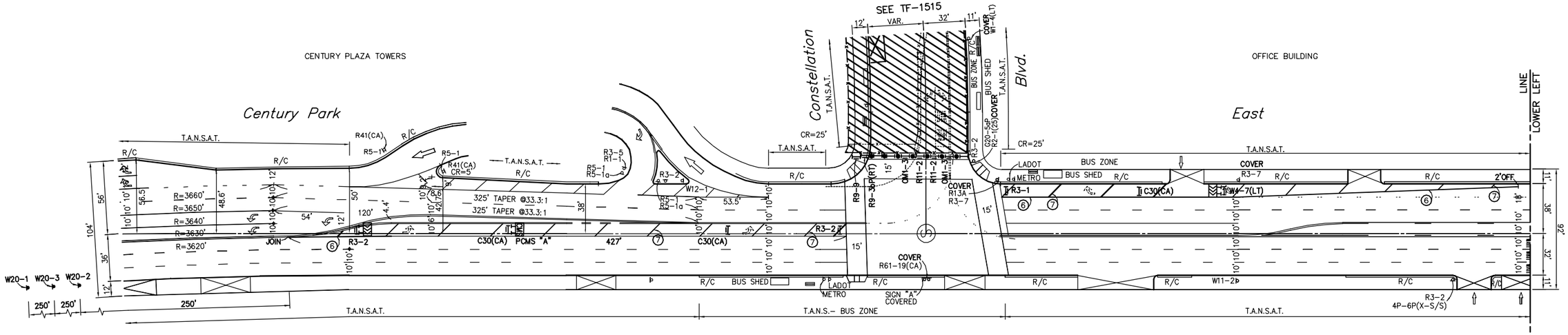
PARSONS BRINCKERHOFF

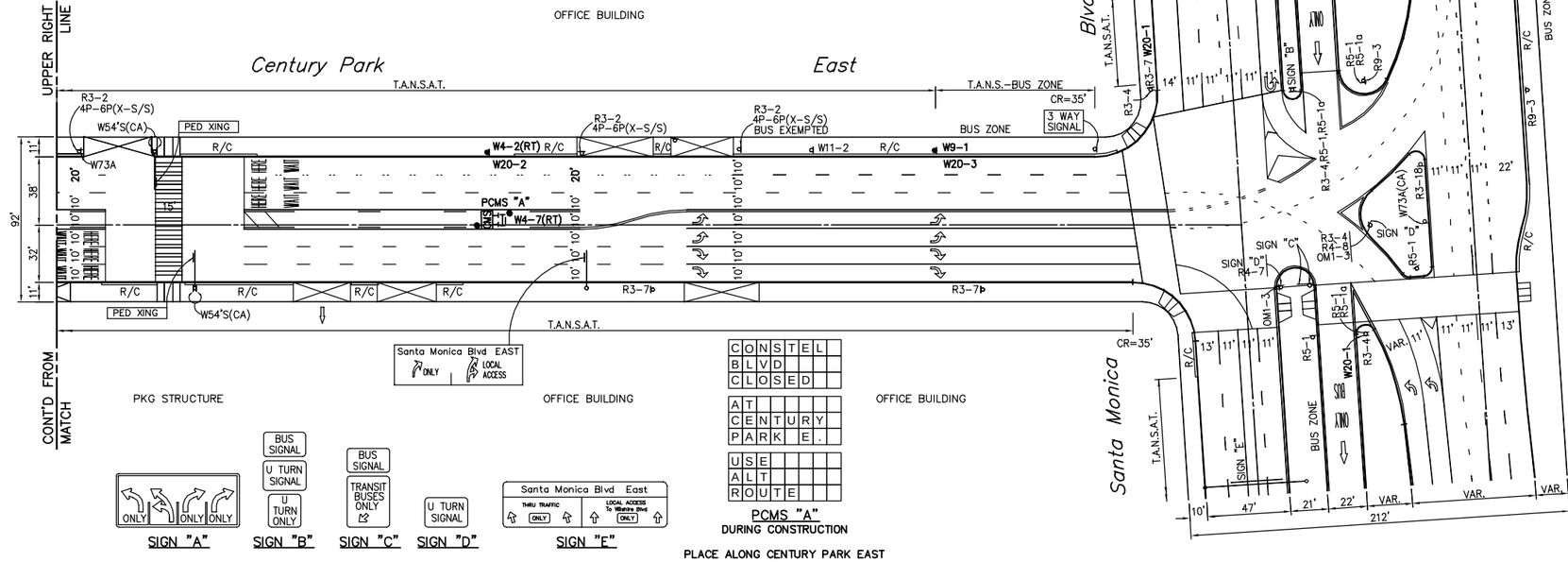
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 5 - SHEET 2

CONTRACT NO
DRAWING NO TF-1516 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1516.dwg Sep 30, 2015 11:46am__SantosC







## TEMPORARY STRIPING NOTES:

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12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 5
TBM LAUNCH

| R3-1 | R3-2 |
|---|---|
| ROAD CLOSED R11-2 | LANE CLOSED C30(CA) |
| OM1-3 | W4-2(RT) |
| THRU TRAFFIC MERGE RIGHT W4-7(RT) | THRU TRAFFIC MERGE LEFT W4-7(LT) |
| RIGHT LANE ENDS W9-1(RT) | ROAD WORK AHEAD W20-1 |
| DETOUR AHEAD W20-2 | ROAD CLOSED AHEAD W20-3 |
| SIDEWALK CLOSED R9-9 | USE CROSSWALK R9-3bP(RT) |

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

**INSTALLATION DATES**
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1517 | 15/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

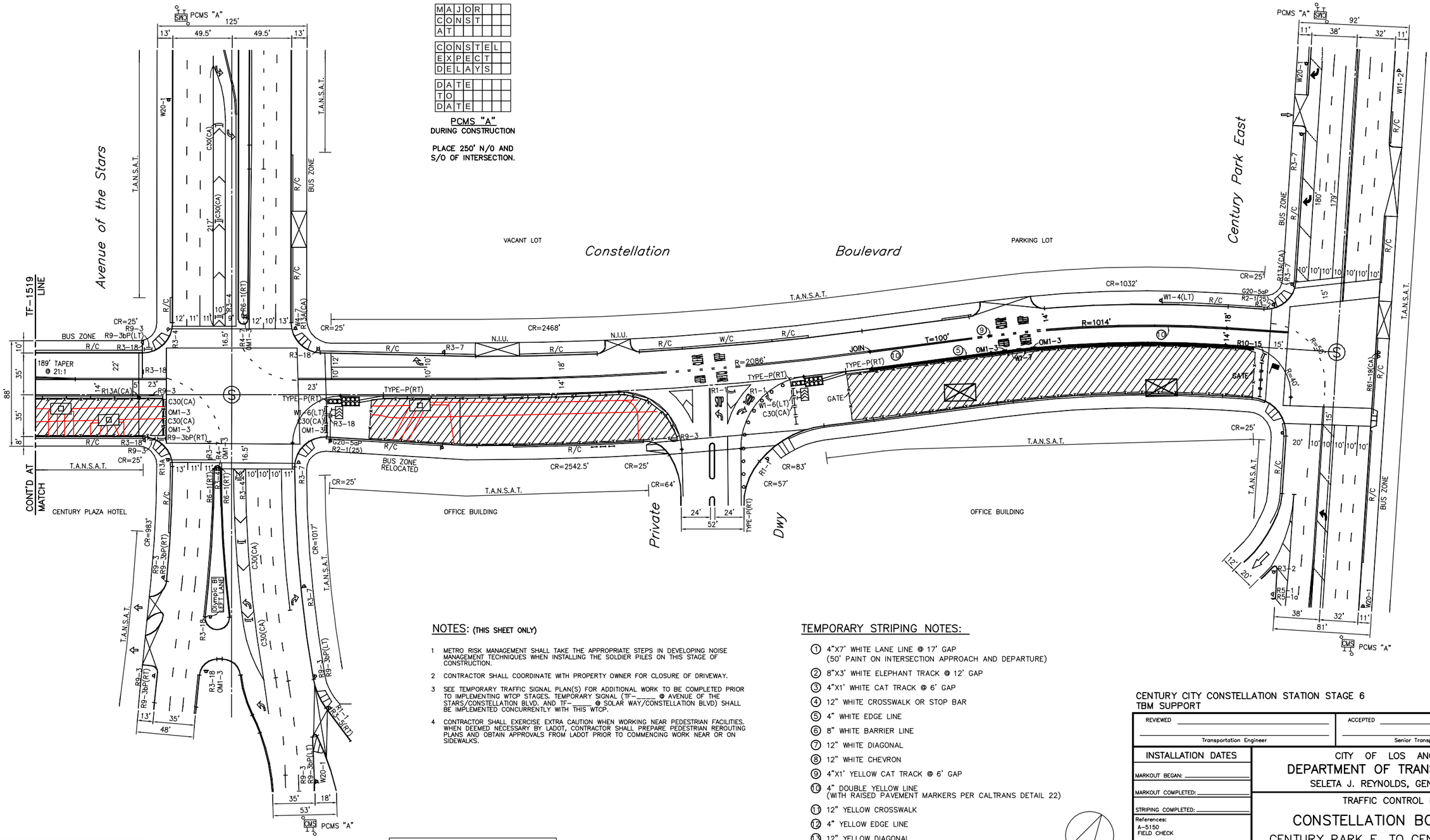
Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
PARSONS BRINCKERHOFF
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618 T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 5 – SHEET 3

CONTRACT NO
DRAWING NO TF-1517 REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1517.dwg Sep 30, 2015 11:47am Santosc




1"=20' ORIGINAL MAP SCALE 1"=40'

## NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-_____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-_____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

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## TEMPORARY STRIPING NOTES:

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10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 6 TBM SUPPORT

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References: A-5150 FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1518 | 16/39 |

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

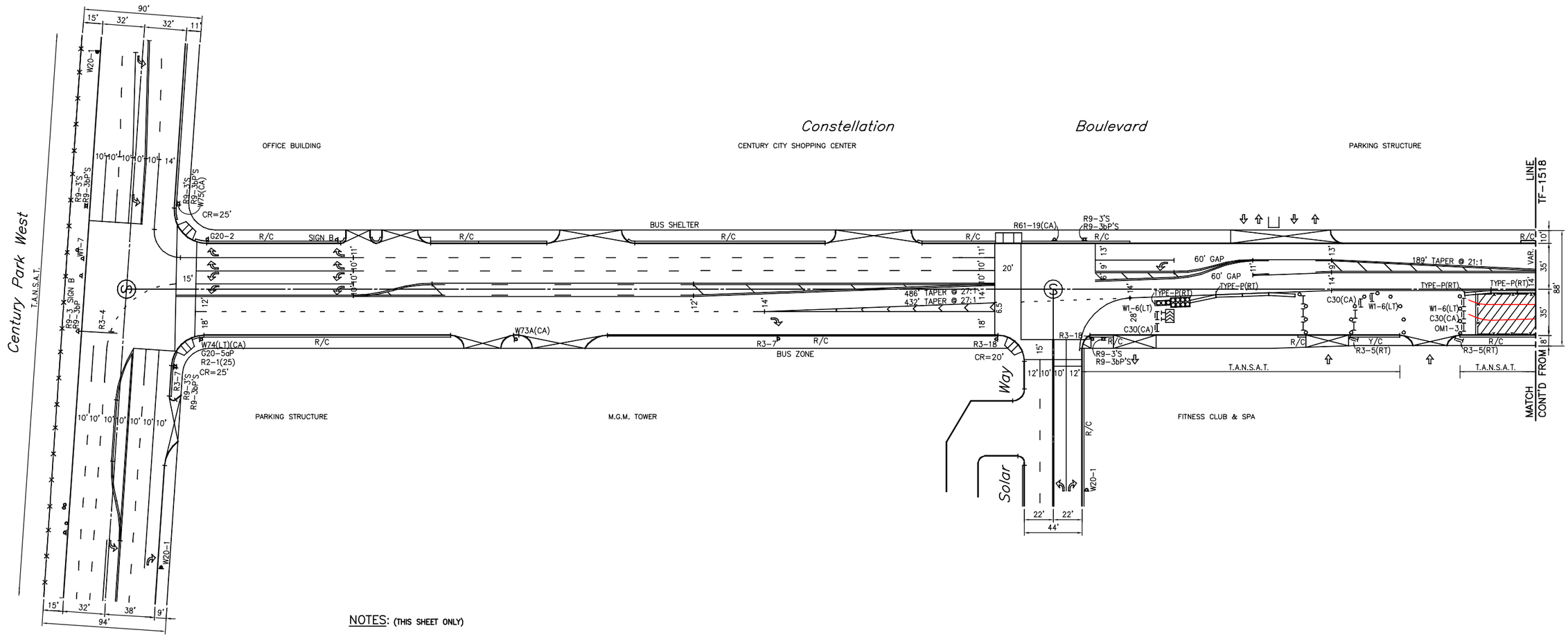
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION WORKSITE TRAFFIC CONTROL PLAN CENTURY CITY CONSTELLATION STATION STAGE 6 – SHEET 1

CONTRACT NO
DRAWING NO TF-1518 REV
SCALE 1"=40'
SHEET NO

TURNING VEHICLES TO R10-15 | W1-7 | OM1-3

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1518_19.dwg Sep 30, 2015 1:04pm Santosc




NOTES: (THIS SHEET ONLY)

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1"=20' ORIGINAL MAP SCALE 1"=40'

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 6
TBM SUPPORT

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN

CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1519 | 17 / 39 |

REVIEWED:_____ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 6 – SHEET 2

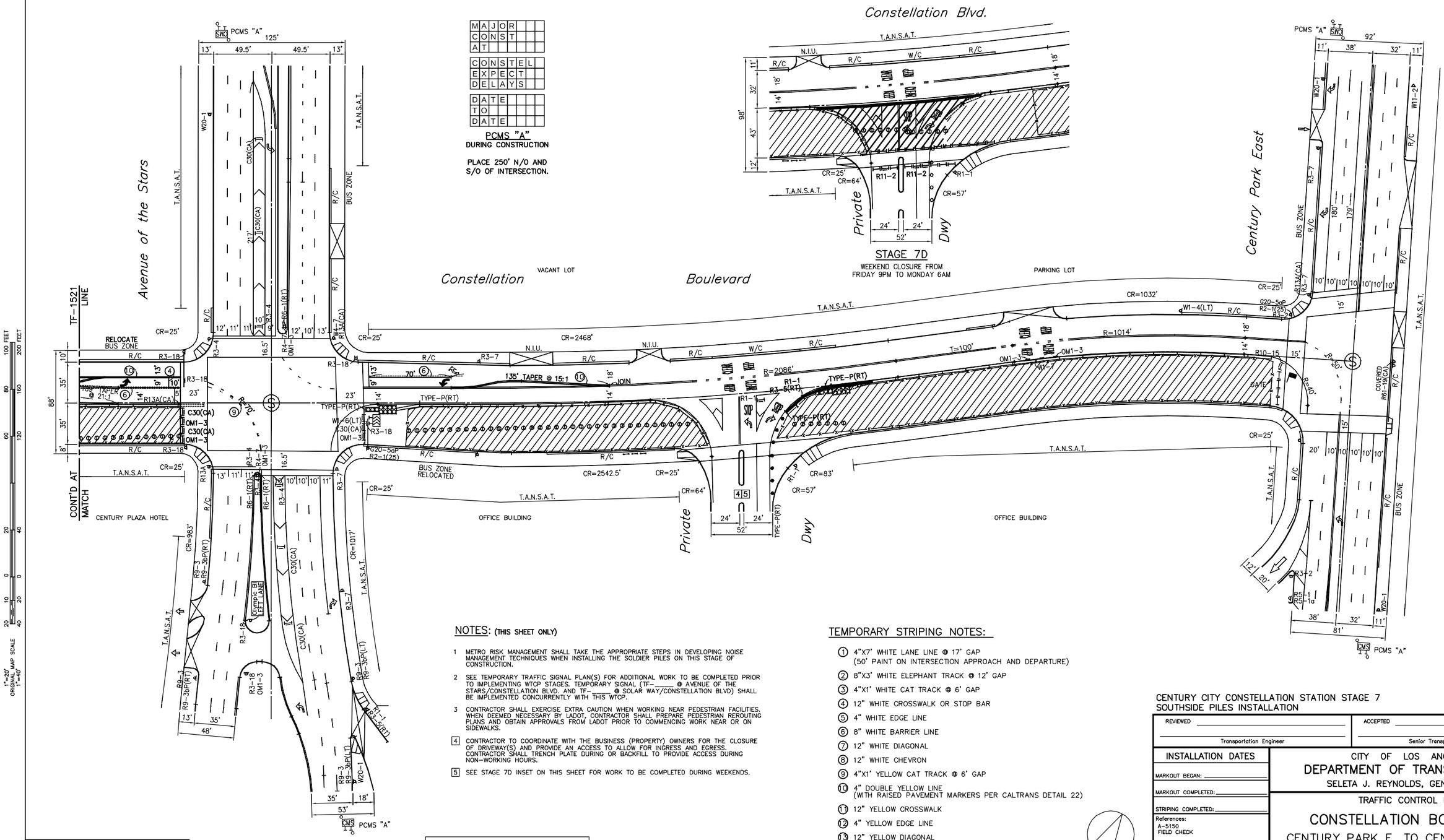
CONTRACT NO

DRAWING NO TF-1519 REV

SCALE 1"=40'

SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WAGBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\cOXXXtf1518_19.dwg Sep 30, 2015 1:06pm ___Santosc




NOTES: (THIS SHEET ONLY)

1. METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.
2. SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.
3. CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.
4. CONTRACTOR TO COORDINATE WITH THE BUSINESS (PROPERTY) OWNERS FOR THE CLOSURE OF DRIVEWAY(S) AND PROVIDE AN ACCESS TO ALLOW FOR INGRESS AND EGRESS. CONTRACTOR SHALL TRENCH PLATE DURING OR BACKFILL TO PROVIDE ACCESS DURING NON-WORKING HOURS.
5. SEE STAGE 7D INSET ON THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.

TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

STOP R1-1 | ONLY R3-5(RT) | TYPE P(RT) | ROAD CLOSED R11-2 | LANE CLOSED C30(CA) | OM1-3 | ROAD CLOSED R11-2

1"=20' ORIGINAL MAP SCALE 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 7
SOUTHSIDE PILES INSTALLATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1520 | 18/39 |

REVIEWED: _____ 20 ___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

60% SUBMITTAL

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

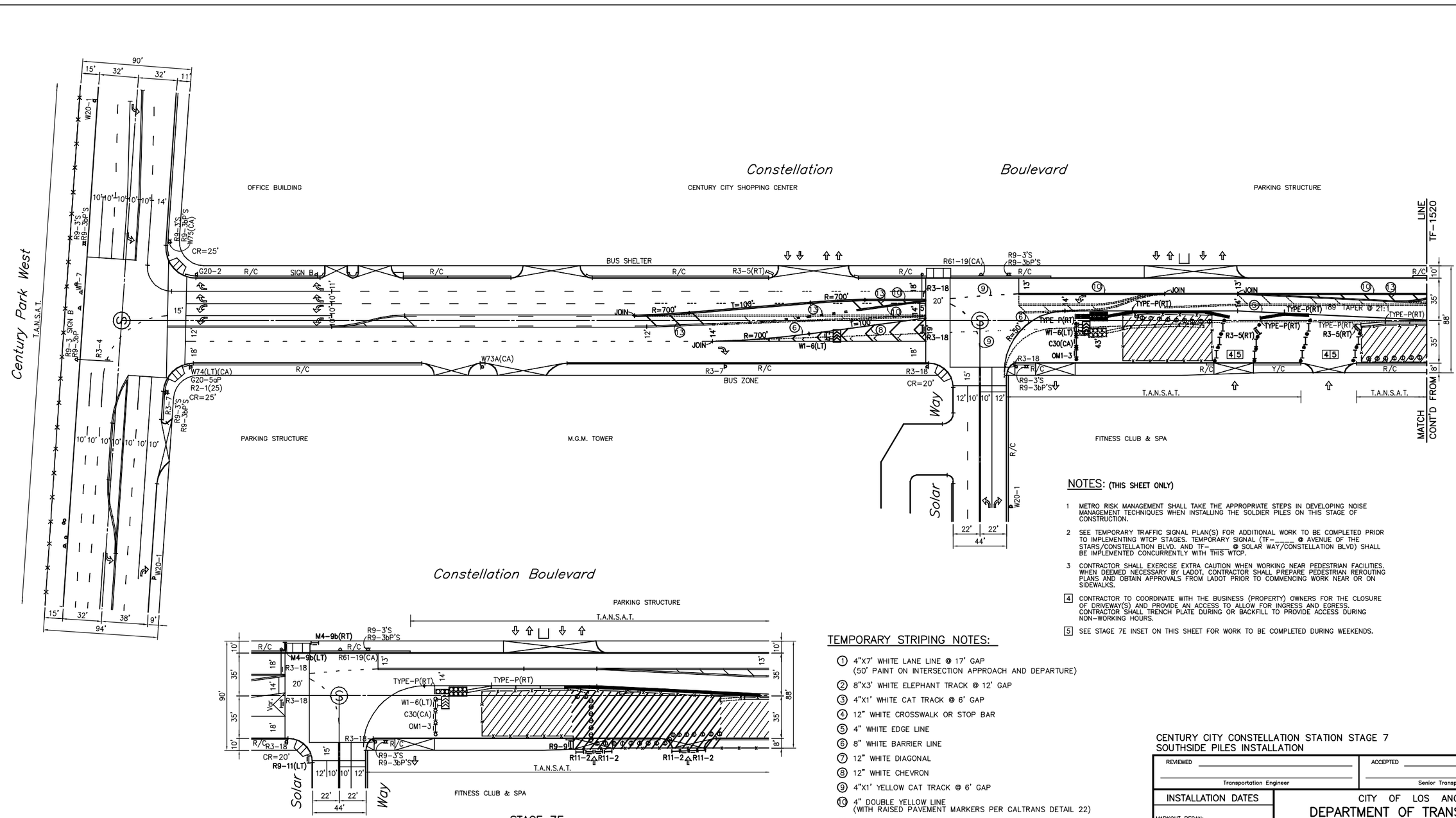
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7 – SHEET 1

CONTRACT NO
DRAWING NO TF-1520 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1520_21a.dwg Oct 01, 2015 12:51pm Santosc







## STAGE 7E

WORK DURING WEEKEND HOURS
FRIDAY 9PM TO MONDAY 6AM

## NOTES: (THIS SHEET ONLY)

1. METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.
2. SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.
3. CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.
4. CONTRACTOR TO COORDINATE WITH THE BUSINESS (PROPERTY) OWNERS FOR THE CLOSURE OF DRIVEWAY(S) AND PROVIDE AN ACCESS TO ALLOW FOR INGRESS AND EGRESS. CONTRACTOR SHALL TRENCH PLATE DURING OR BACKFILL TO PROVIDE ACCESS DURING NON-WORKING HOURS.
5. SEE STAGE 7E INSET ON THIS SHEET FOR WORK TO BE COMPLETED DURING WEEKENDS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'

| | |
|---|---|
| ONLY R3-5(RT) | ROAD CLOSED R11-2 |
| LANE CLOSED C30(CA) | W1-6(LT) |
| OM1-3 | TYPE P(RT) |
| SIDEWALK CLOSED R9-9 | SIDEWALK CLOSED AHEAD CROSS HERE R9-11(LT) |
| ROAD CLOSED R11-2 | R3-18 |
| DETOUR M4-9b(LT) | DETOUR M4-9b(RT) |

1"=20' ORIGINAL MAP SCALE 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 7
SOUTHSIDE PILES INSTALLATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN

CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1521 | 19/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

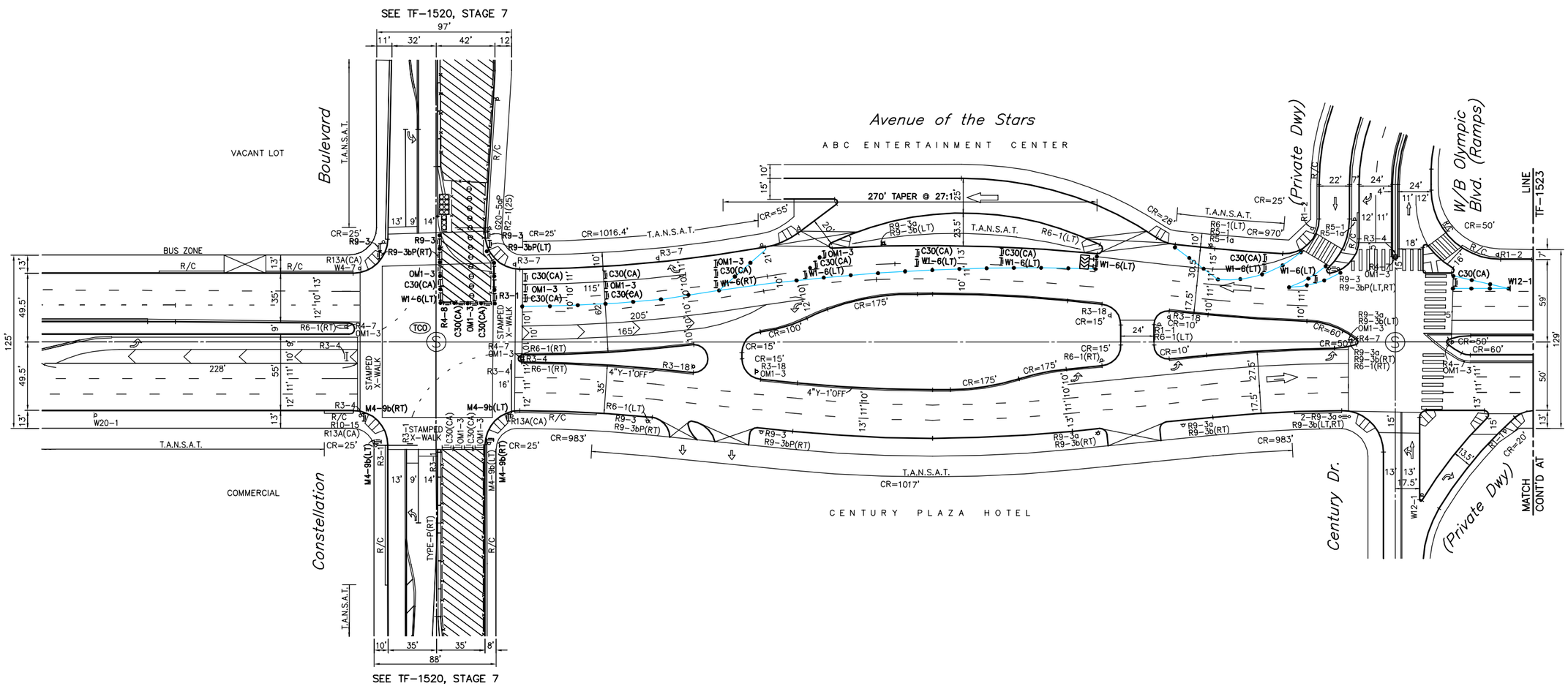
PARSONS BRINCKERHOFF

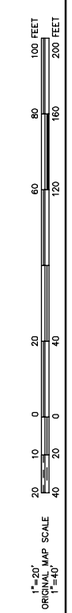
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618
T 949-753-9010 F 949-753-9014

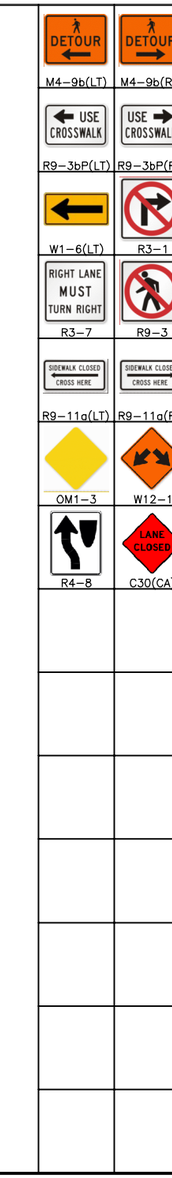
WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7 – SHEET 2

CONTRACT NO
DRAWING NO TF-1521 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1520_21a.dwg Oct 01, 2015 12:52pm Santosc




CENTURY CITY CONSTELLATION STATION STAGE 7A
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1522 | 20/39 |

SCALE: 1"=40'

REVIEWED: _____ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

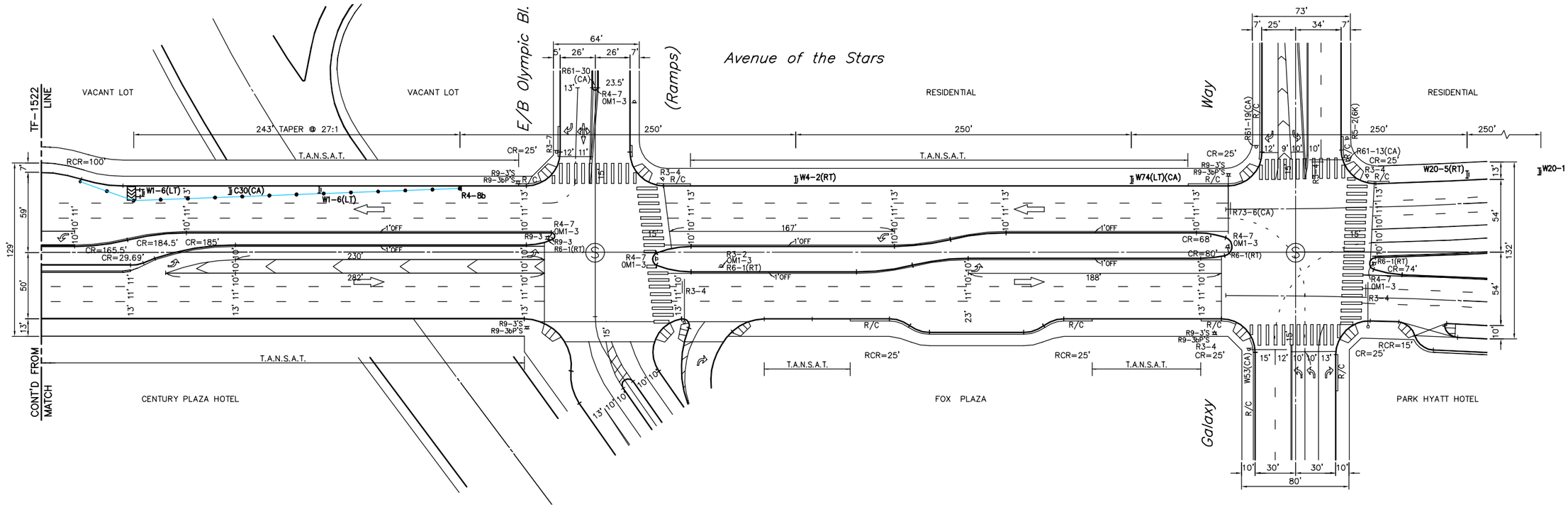
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7A - SHEET 1

CONTRACT NO
DRAWING NO TF-1522
REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1522_23a.dwg Oct 01, 2015 12:57pm__SantosC




SCALE: 1"=40'

1"=20' ORIGINAL MAP SCALE 1"=40'

| | |
|---|---|
| KEEP LEFT R4-8b | W1-6(LT) |
| LANE CLOSED C30(CA) | W4-2(RT) |
| RIGHT LANE CLOSED AHEAD W20-5(RT) | THRU TRAFFIC MERGE LEFT W74(LT)(CA) |

CENTURY CITY CONSTELLATION STATION STAGE 7A
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1523 | 21/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
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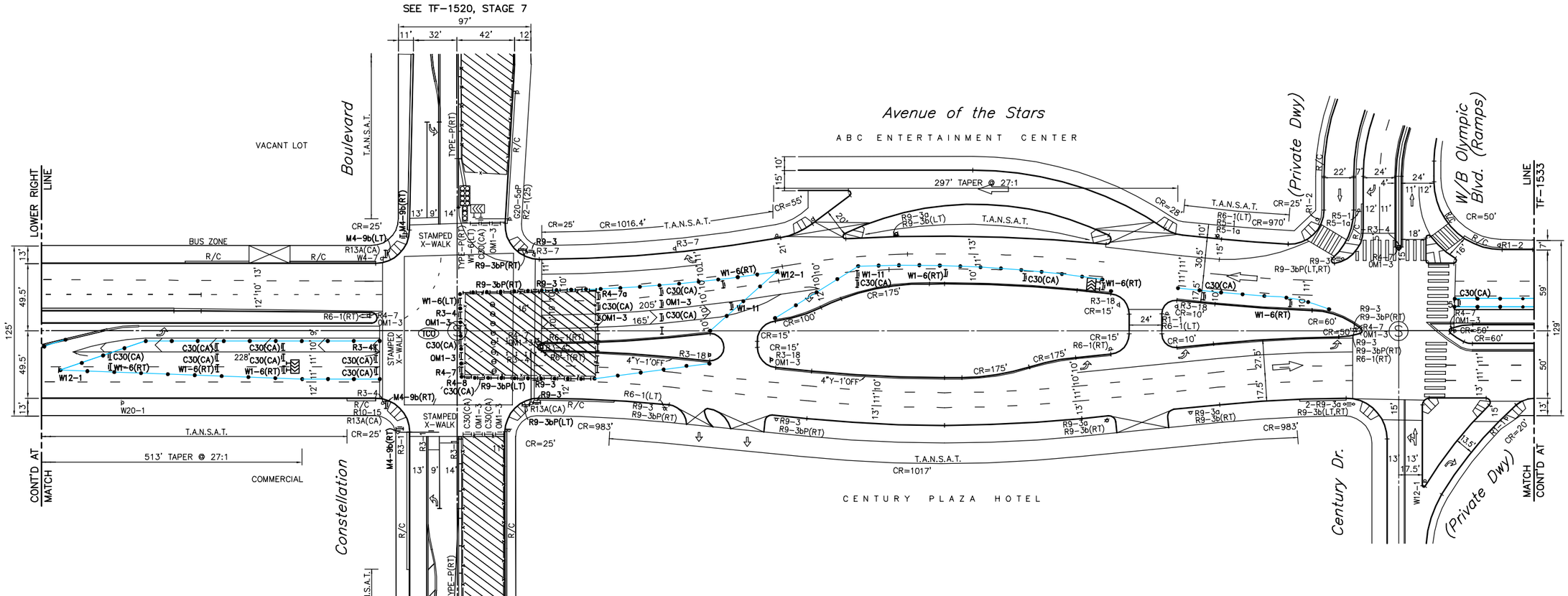
F 949-753-9014

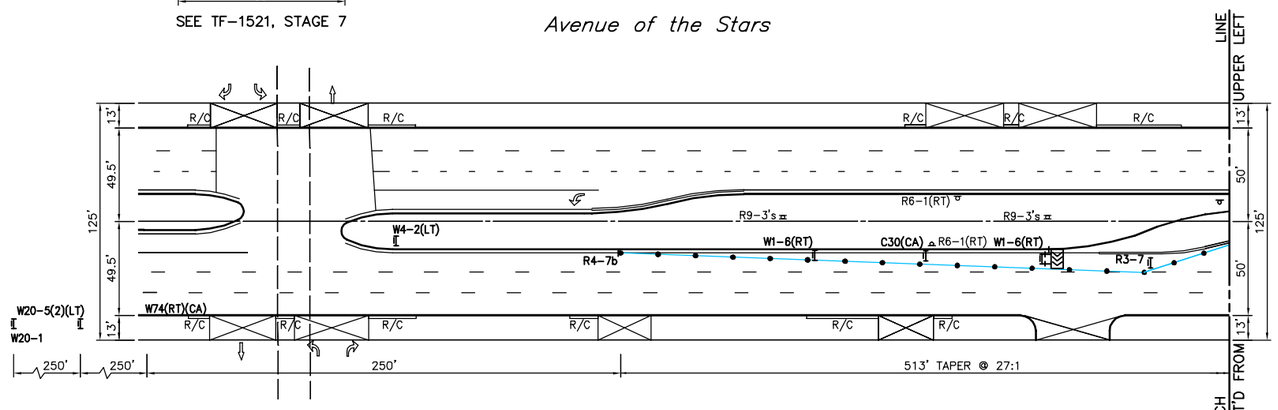
**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7A – SHEET 2

CONTRACT NO
DRAWING NO TF-1523 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1522_23a.dwg Oct 01, 2015 12:57pm___SantosC

SEE TF-1520, STAGE 7




SCALE: 1"=40'

| | |
|---|---|
| M4-9b(LT) | M4-9b(RT) |
| R9-3bP(LT) | R9-3bP(RT) |
| W1-6(LT) | W1-6(RT) |
| R3-7a | R9-3 |
| R9-11a(LT) | R9-11a(RT) |
| OM1-3 | W12-1 |
| W4-2(LT) | C30(CA) |
| R4-7b | W74(RT)(CA) |
| W20-5(RT) | R4-7a |
| R4-8 | W1-11 |
| R4-7 | R3-4 |

CENTURY CITY CONSTELLATION STATION STAGE 7B
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1524 | 22 / 39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

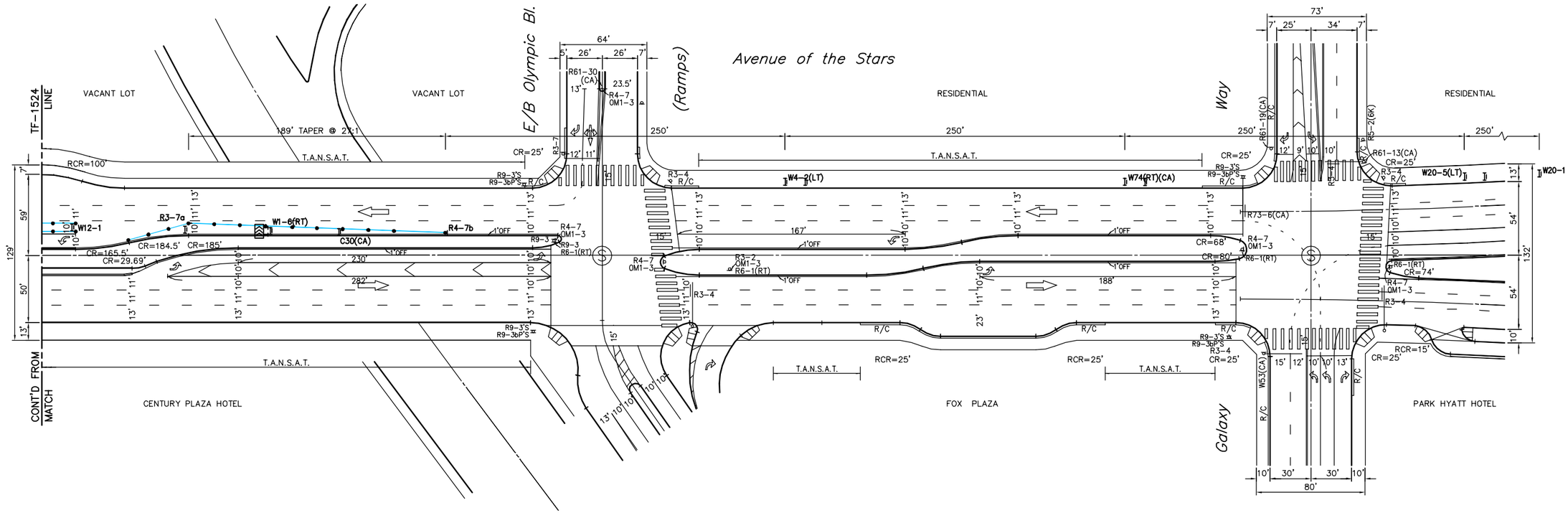
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7B – SHEET 1

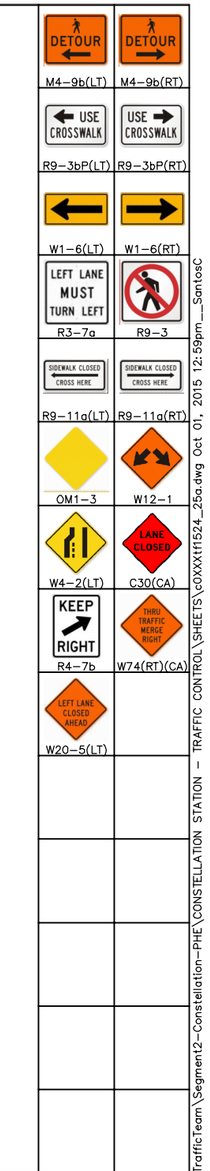
CONTRACT NO
DRAWING NO TF-1524 REV
SCALE 1"=40'
SHEET NO

ORIGINAL MAP SCALE 1"=20' 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1524_25a.dwg Oct 01, 2015 12:59pm___SantosC




CENTURY CITY CONSTELLATION STATION STAGE 7B
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)




REVIEWED: _____ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

SCALE: 1"=40'

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1525 | 23/39 |

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

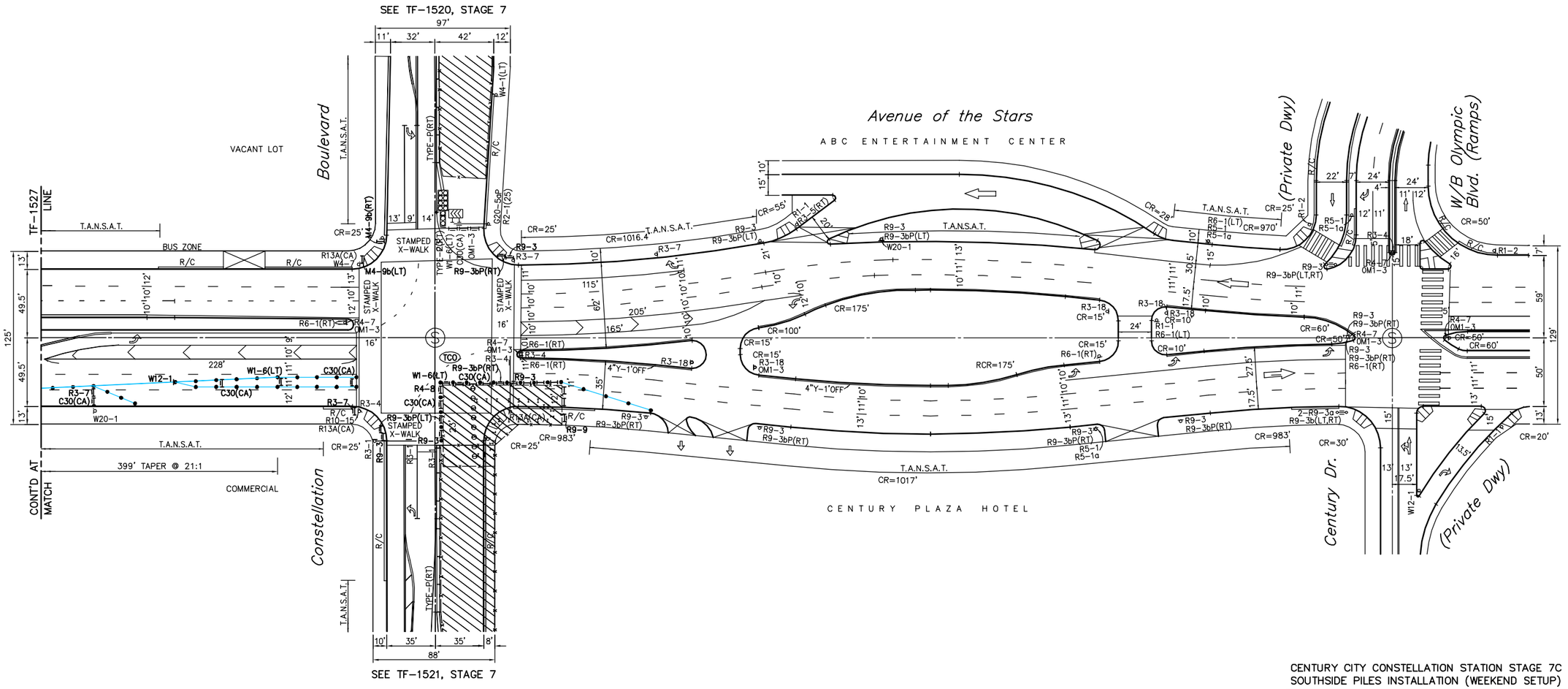
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7B – SHEET 2

CONTRACT NO
DRAWING NO TF-1525
REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1524_25a.dwg Oct 01, 2015 12:59pm__SantosC




1"=20' ORIGINAL MAP SCALE 1"=40'

SCALE: 1"=40'

| | |
|---|---|
| M4-9b(LT) | M4-9b(RT) |
| R3-1 | R4-8 |
| R9-3bP(LT) | R9-3bP(RT) |
| R9-3 | R9-9 |
| R9-11a(LT) | R9-11a(RT) |
| OM1-3 | C30(CA) |
| W1-6(LT) | W12-1 |
| R3-7 | |

CENTURY CITY CONSTELLATION STATION STAGE 7C
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

| Thomas Guide | District |
|---|---|
| 632-E3 | W |

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

PROJECT NO. PCR____ | DRAWING NO. TF-1526 | 24/39

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

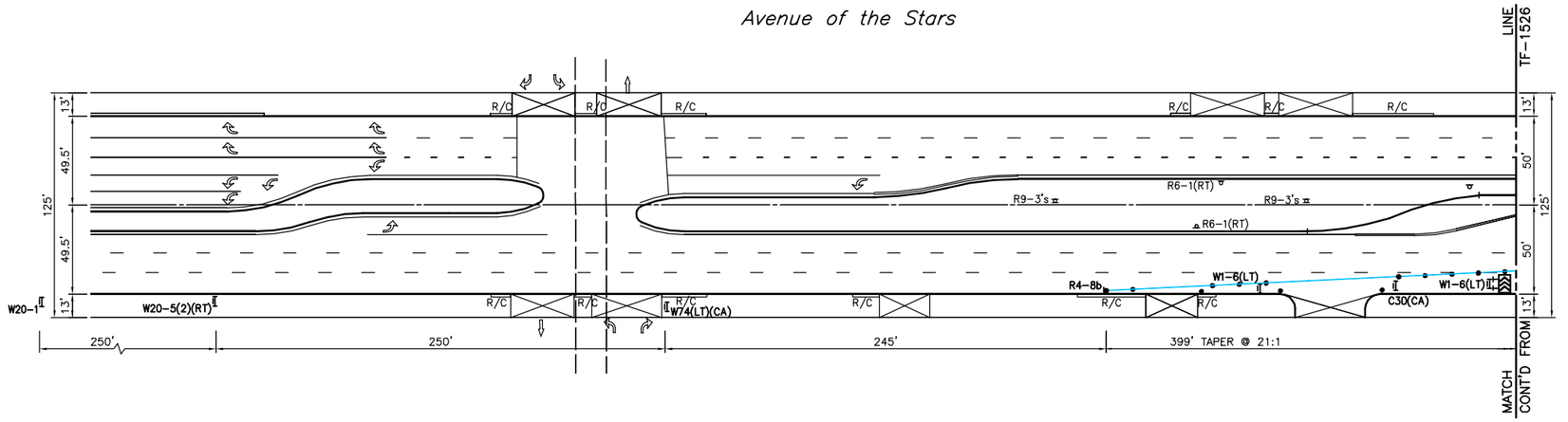
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7C – SHEET 1

CONTRACT NO
DRAWING NO TF-1526 | REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1526_27a.dwg Oct 01, 2015 2:13pm__SantosC










R4-8b



W1-6(LT)



W4-2(RT)




W20-1




W20-5(RT)




W74(LT)(CA)




C30(CA)

CENTURY CITY CONSTELLATION STATION STAGE 7C
SOUTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

| Thomas Guide | District |
|---|---|
| 632-E3 | W |

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

PROJECT NO. PCR____ | DRAWING NO. TF-1527 | 25/39



SCALE: 1"=40'

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

60% SUBMITTAL

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY L. GASTON
DRAWN BY L. GASTON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

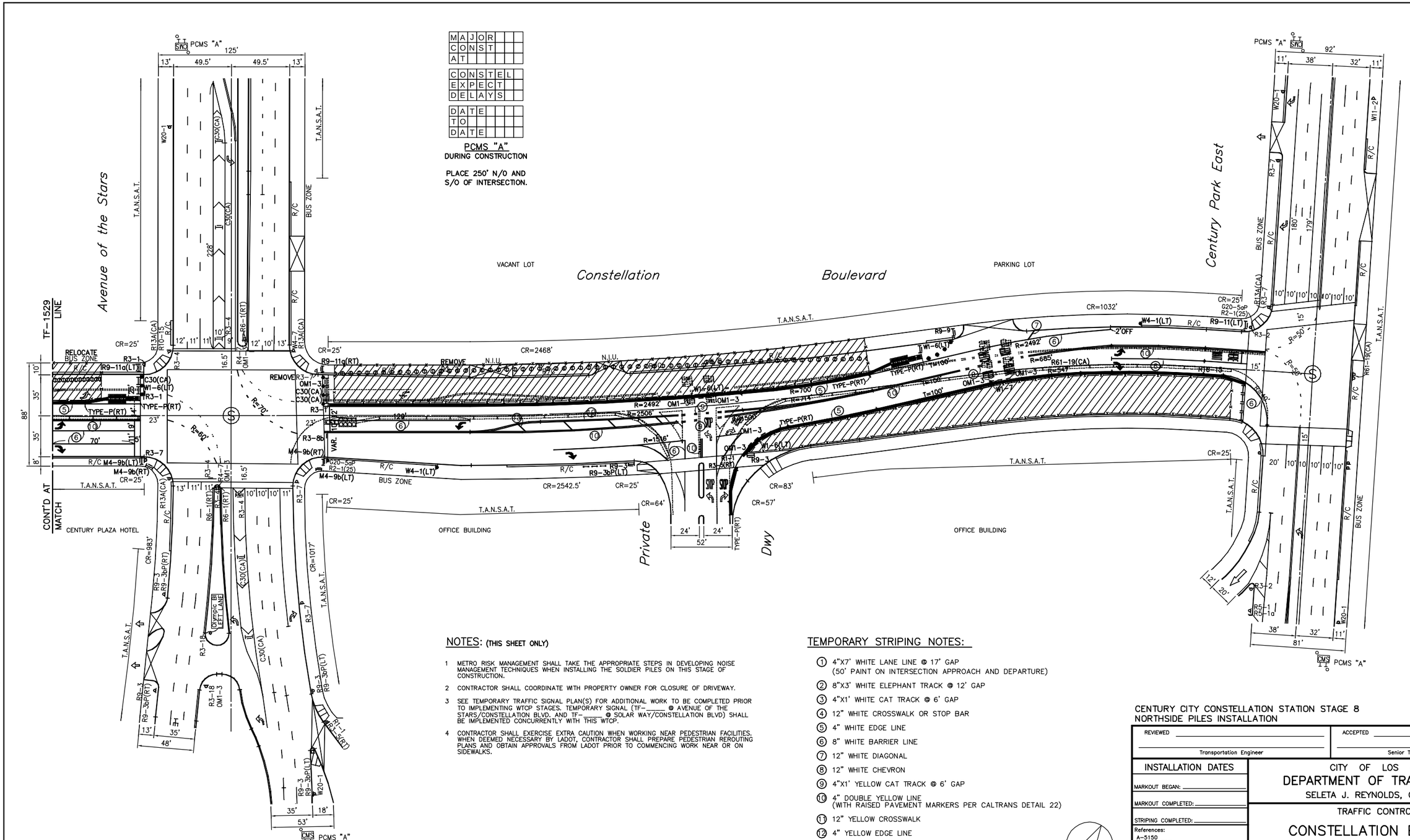
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 7C – SHEET 2

CONTRACT NO
DRAWING NO TF-1527 | REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1526_27a.dwg Oct 01, 2015 2:13pm__SantosC



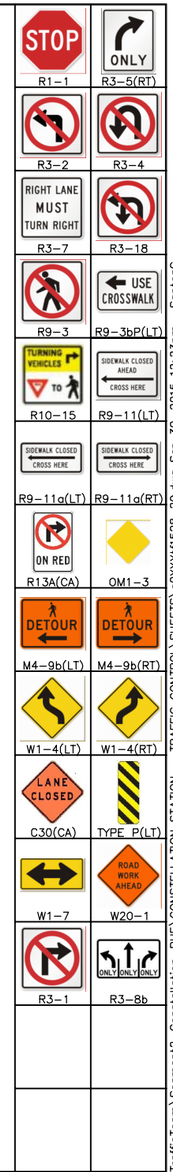

## NOTES: (THIS SHEET ONLY)

1. METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.
3. SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-_____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-_____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.
4. CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL

SCALE: 1"=40'




CENTURY CITY CONSTELLATION STATION STAGE 8
NORTHSIDE PILES INSTALLATION

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1528 | 26/39 |

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

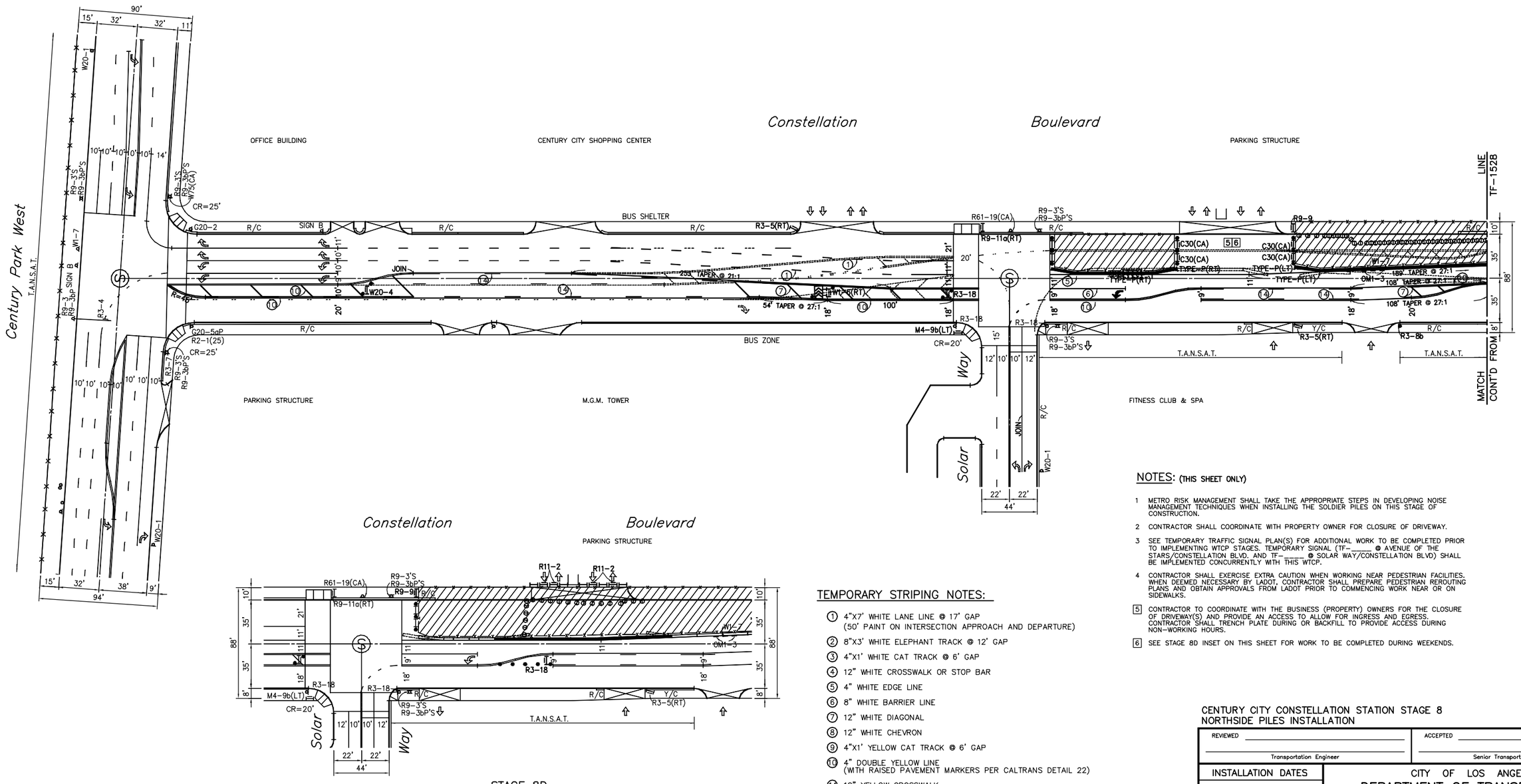
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8 – SHEET 1

CONTRACT NO
DRAWING NO TF-1528 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1528_29.dwg Sep 30, 2015 12:23pm Santosc




## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL
13. 4"x12' YELLOW TWLTL @ 36' GAP

SCALE: 1"=40'

R2-1(25) SPEED LIMIT 25 | R3-5(RT) ONLY
R3-4 | R3-18
R61-19 ONLY ONLY | G20-2 END ROAD WORK
G20-5aP WORK ZONE | W1-6(RT)
W1-7 | W20-1 ROAD WORK AHEAD
OM1-3 | C30(CA) LANE CLOSED
M4-9b(LT) DETOUR | M4-9b(RT) DETOUR
R9-11a(RT) SIDEWALK CLOSED CROSS HERE | W20-4 ONE LANE ROAD AHEAD
TYPE P(LT) | TYPE P(RT)
R9-9 SIDEWALK CLOSED | R11-2 ROAD CLOSED
R3-8b ONLY ONLY ONLY

CENTURY CITY CONSTELLATION STATION STAGE 8
NORTHSIDE PILES INSTALLATION

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
A-5150
FIELD CHECK

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1529 | 27/39 |

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

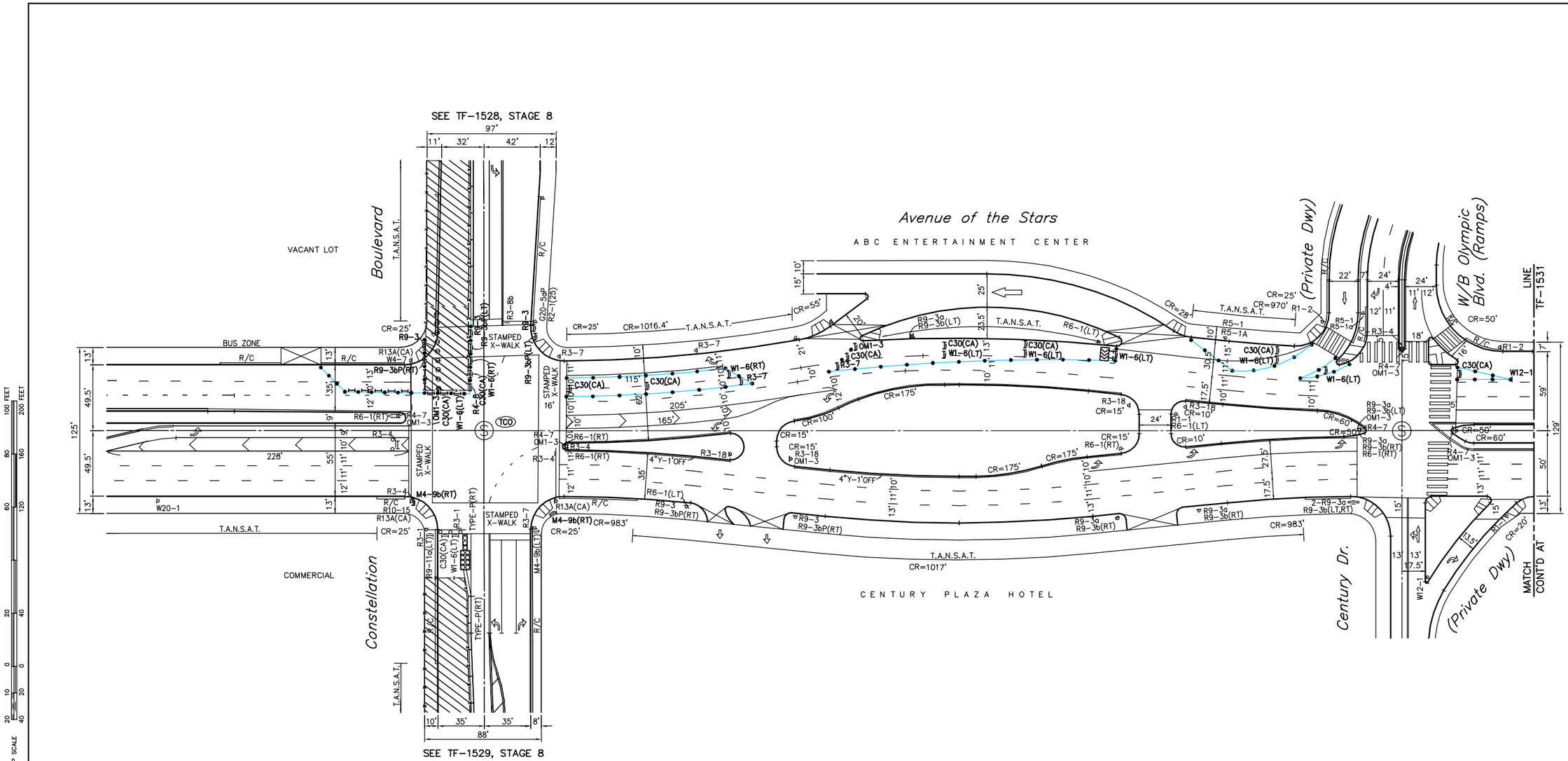
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8 - SHEET 2

CONTRACT NO
DRAWING NO TF-1529 REV
SCALE 1"=40'
SHEET NO

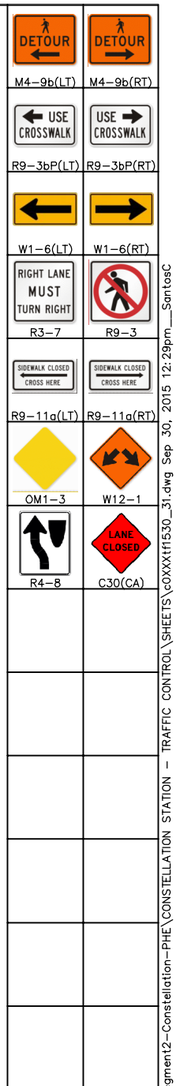
1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: C:\LAWSBIM\WACBM\CADD\95_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1528_29.dwg Sep 30, 2015 12:25pm_Santosc










CENTURY CITY CONSTELLATION STATION STAGE 8A
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1530 | 28/39 |

SCALE: 1"=40'

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

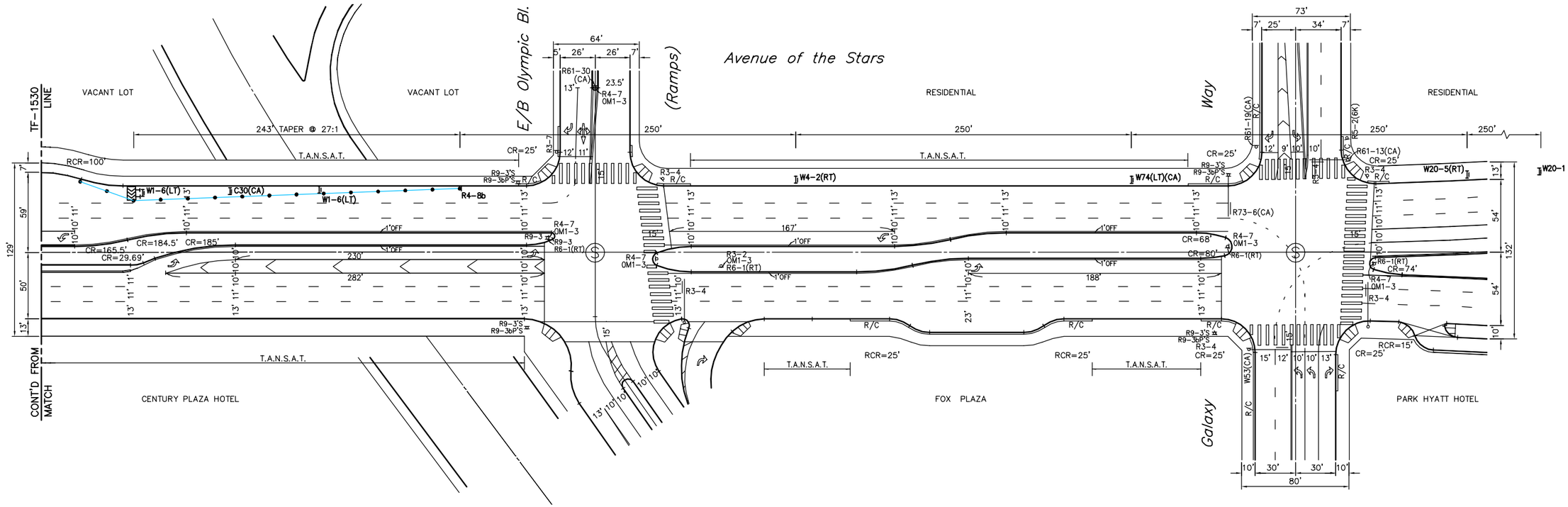
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8A – SHEET 1

CONTRACT NO
DRAWING NO TF-1530 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1530_31.dwg Sep 30, 2015 12:29pm Santosc




| | |
|---|---|
| KEEP LEFT<br>R4-8b | W1-6(LT) |
| LANE CLOSED<br>C30(CA) | W4-2(RT) |
| RIGHT LANE CLOSED AHEAD<br>W20-5(RT) | THRU TRAFFIC MERGE LEFT<br>W74(LT)(CA) |

1"=20'
ORIGINAL MAP SCALE
1"=40'

SCALE: 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 8A
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1531 | 29/39 |

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

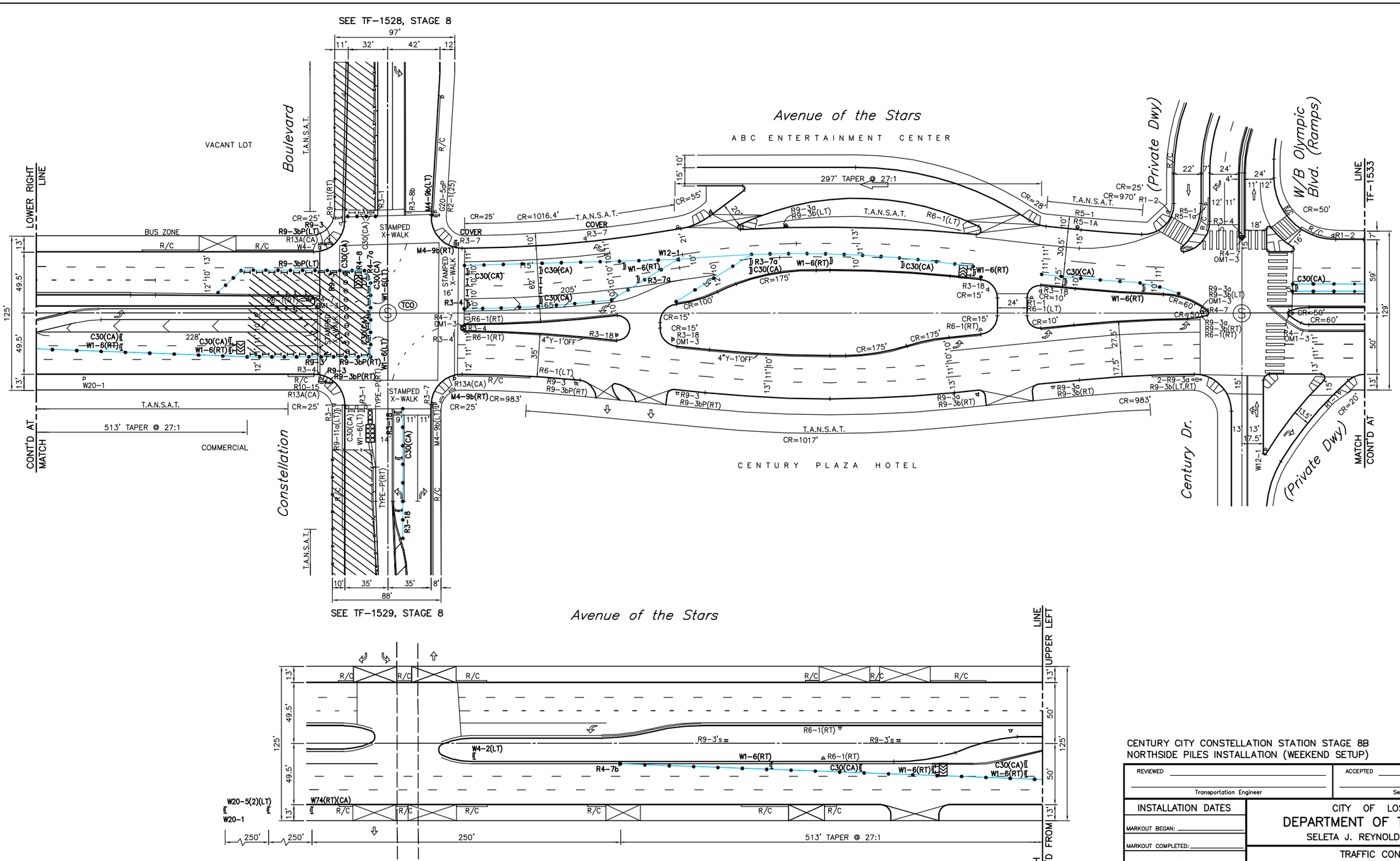
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8A – SHEET 2

CONTRACT NO
DRAWING NO TF-1531 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION_STATION_-_TRAFFIC_CONTROL\SHEETS\c0XXXtf1530_31.dwg Sep 30, 2015 12:31pm__SantosC




1"=20' ORIGINAL MAP SCALE 1"=40'

CENTURY CITY CONSTELLATION STATION STAGE 8B
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY: J. BANZON
DRAWN BY: J. BANZON
CHECKED BY: K. DERDERIAN
IN CHARGE: K. DERDERIAN
DATE: 10/02/2015

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8B – SHEET 1

CONTRACT NO
DRAWING NO: TF-1532
REV
SCALE: 1"=40'
SHEET NO

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

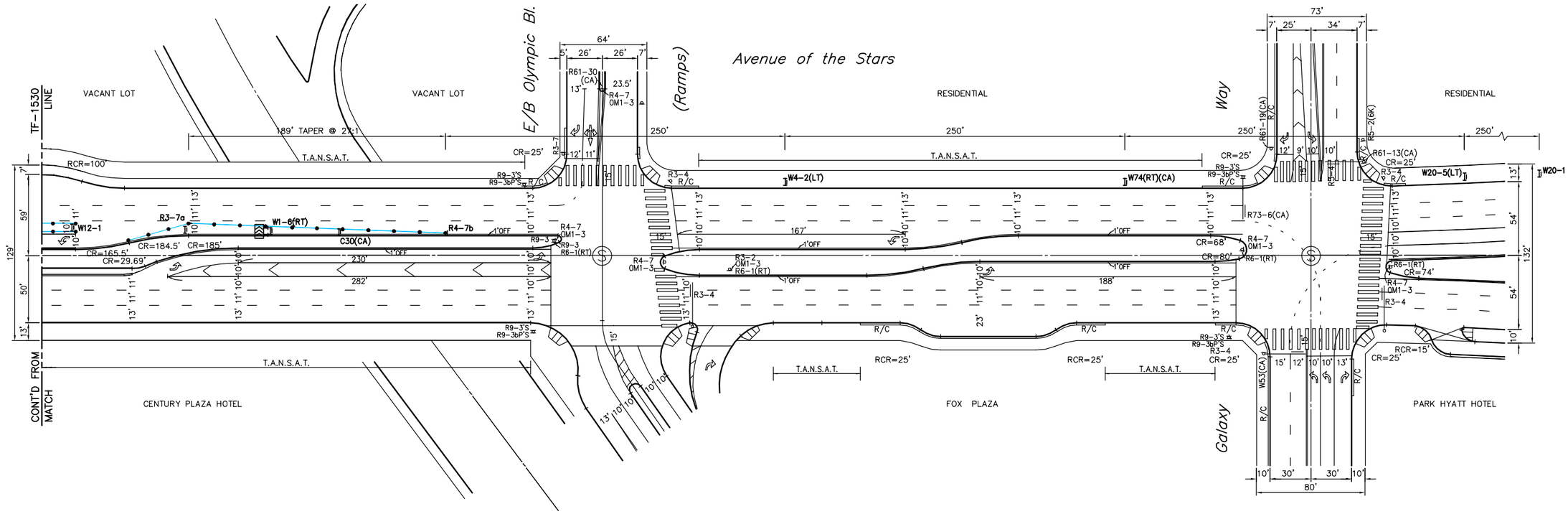
CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1532 | 30/39 |

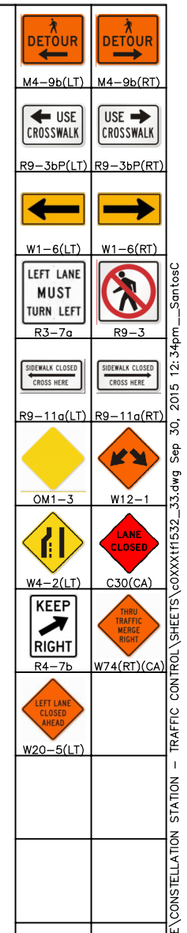
M4-9b(LT) DETOUR
M4-9b(RT) DETOUR
R9-3bP(LT) USE CROSSWALK
R9-3bP(RT) USE CROSSWALK
W1-6(LT)
W1-6(RT)
R3-7a LEFT LANE MUST TURN LEFT
R9-3
R9-11a(LT) SIDEWALK CLOSED CROSS HERE
R9-11a(RT) SIDEWALK CLOSED CROSS HERE
OM1-3
W12-1
W4-2(LT)
C30(CA) LANE CLOSED
R4-7b KEEP RIGHT
W74(RT)(CA) THRU TRAFFIC MERGE RIGHT
W20-5(RT) RIGHT LANE CLOSED AHEAD
R4-7a KEEP RIGHT
R4-8

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\Traffic Team\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1532_33.dwg Sep 30, 2015 12:33pm Santosc




1"=20'
ORIGINAL MAP SCALE
1"=40'

SCALE: 1"=40'




CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION_STATION_-_TRAFFIC_CONTROL\SHEETS\c0XXXtf1532_33.dwg Sep 30, 2015 12:34pm Santosc

CENTURY CITY CONSTELLATION STATION STAGE 8B
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1533 | 31/39 |

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

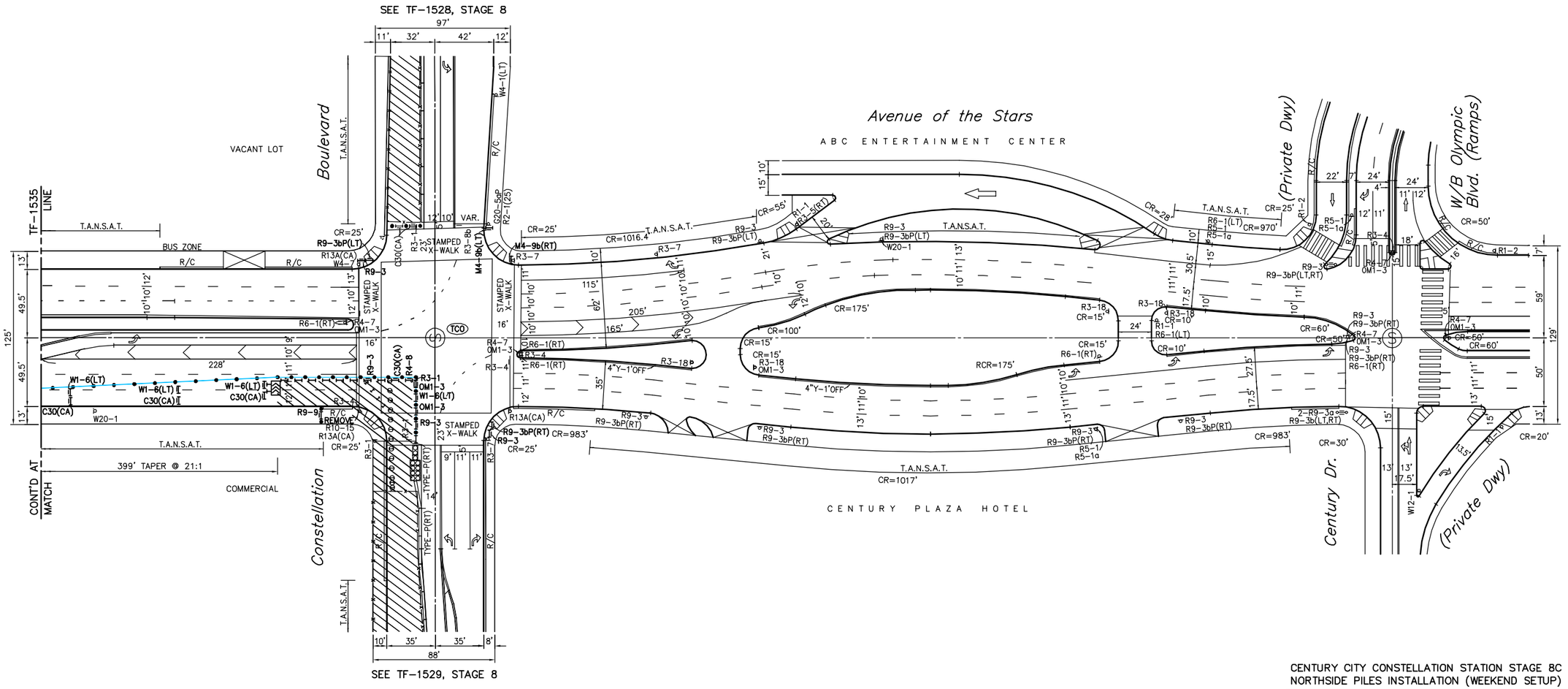
**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8B – SHEET 2

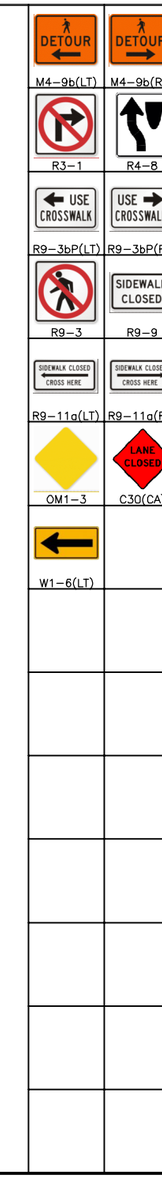
CONTRACT NO

| DRAWING NO | REV |
|---|---|
| TF-1533 | |

SCALE 1"=40'

SHEET NO




CENTURY CITY CONSTELLATION STATION STAGE 8C
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1534 | 32/39 |

SCALE: 1"=40'

REVIEWED: _____ 20 ___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

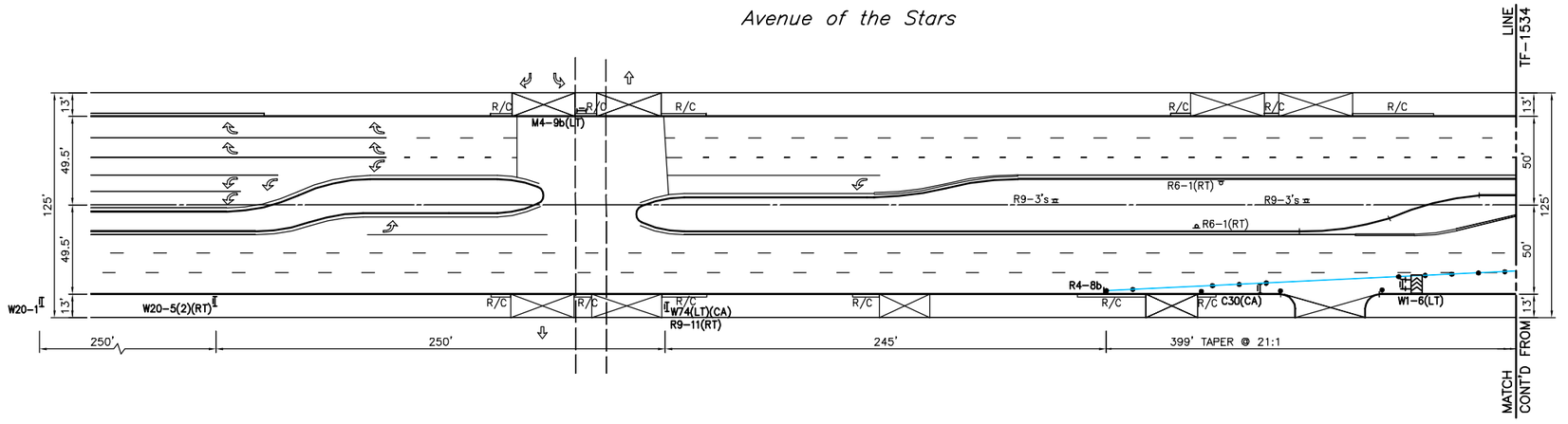
PARSONS BRINCKERHOFF

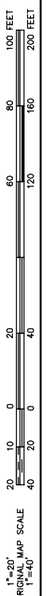
INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

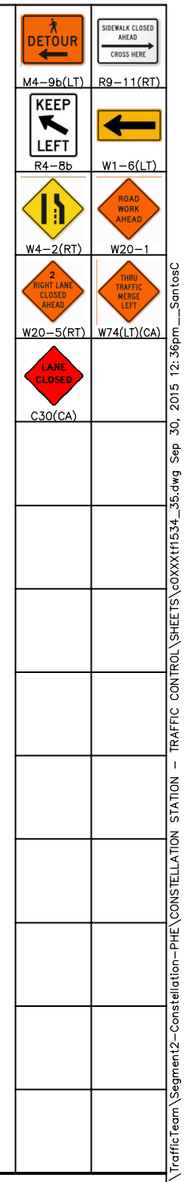
**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8C – SHEET 1

CONTRACT NO
DRAWING NO TF-1534 REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1534_35.dwg Sep 30, 2015 12:36pm__SantosC




CENTURY CITY CONSTELLATION STATION STAGE 8C
NORTHSIDE PILES INSTALLATION (WEEKEND SETUP)

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

| Thomas Guide | District |
|---|---|
| 632-E3 | W |

SCALE: 1"=40'

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

PROJECT NO. PCR____ | DRAWING NO. TF-1535 | 33/39

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

DESIGNED BY J. BANZON
DRAWN BY J. BANZON
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

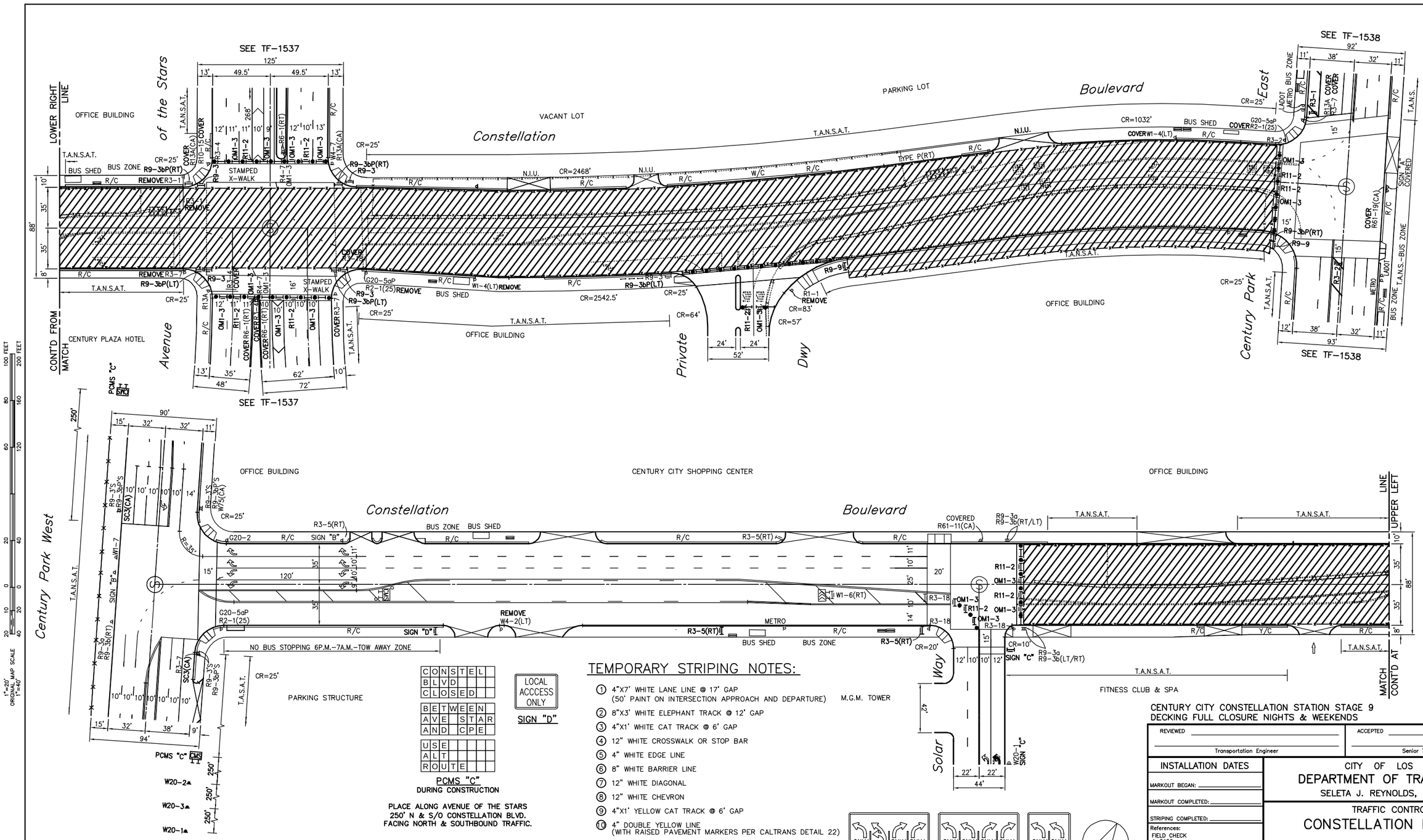
PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 8C – SHEET 2

CONTRACT NO
DRAWING NO TF-1535 | REV
SCALE 1"=40'
SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1534_35.dwg Sep 30, 2015 12:36pm SantosC




## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

M.G.M. TOWER

SIGN "A" SIGN "B" SIGN "C"

REVIEWED: _____ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

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|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR. SUITE 470 IRVINE, CA 92618 T 949-753-9010 F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 9 - SHEET 1

CONTRACT NO
DRAWING NO TF-1536 REV
SCALE 1"=40'
SHEET NO

CENTURY CITY CONSTELLATION STATION STAGE 9
DECKING FULL CLOSURE NIGHTS & WEEKENDS

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

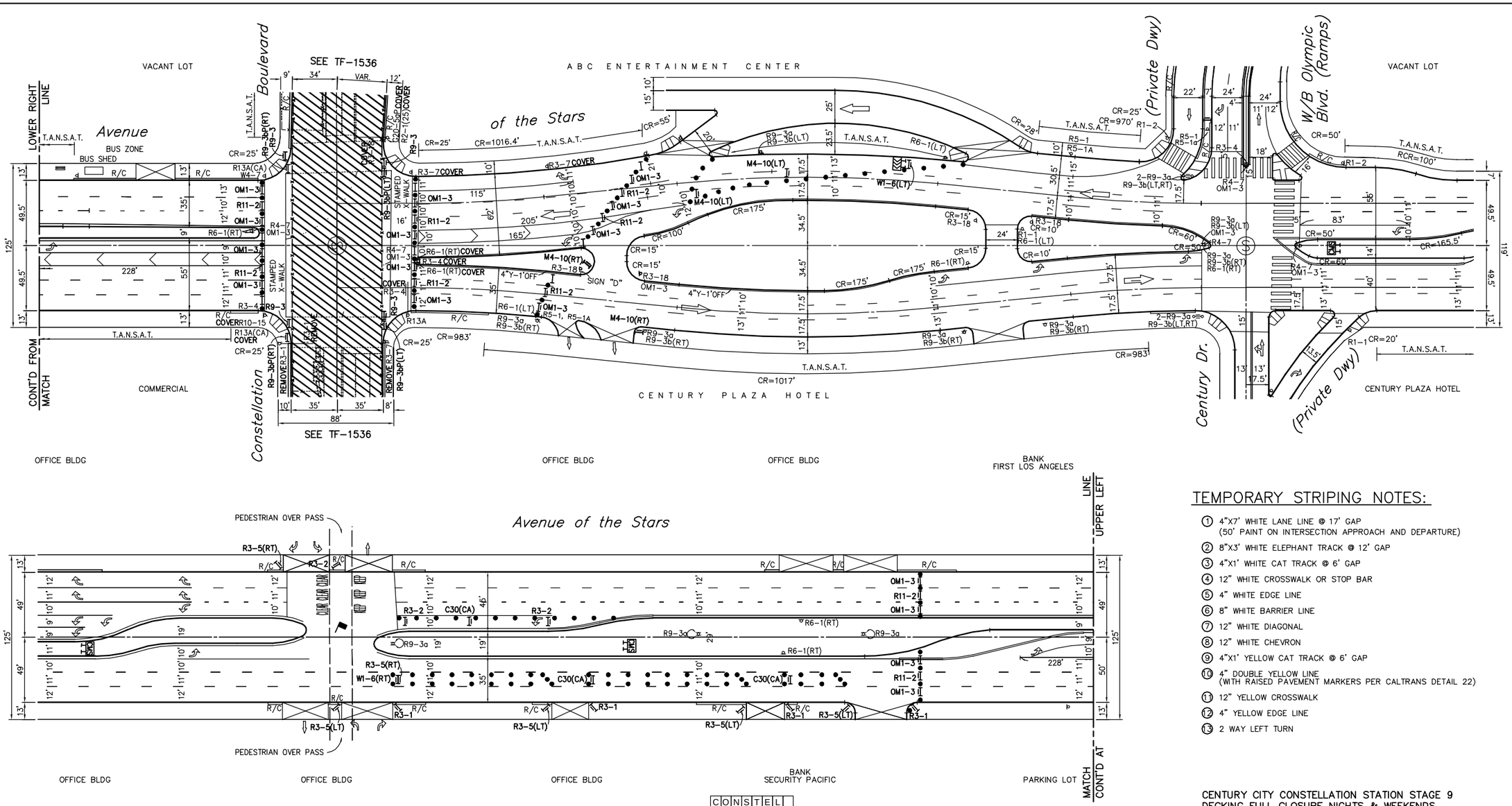
CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1536 | 34/39 |

R3-1 R3-2
R3-5(LT) R3-7(RT)
R11-2 R11-4
OM1-3 C30(CA)
M4-10(LT) M4-10(RT)
W20-1 W20-2
W20-3 SC3(CA)
R9-9 R9-3bP(RT)
R9-3bP(LT) R9-3
R3-5(RT)

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1536.dwg Sep 30, 2015 11:48am Santosc

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12. 4" YELLOW EDGE LINE
13. 2 WAY LEFT TURN

CENTURY CITY CONSTELLATION STATION STAGE 9
DECKING FULL CLOSURE NIGHTS & WEEKENDS

R3-1 | R3-2
R3-5(RT) | R3-5(LT)
R9-3 | R9-3bP(LT)
R9-3bP(RT) | R11-2
M4-10(RT) | M4-10(LT)
OM1-3 | W1-6(LT)
C30(CA)

Olympic Bl
LEFT LANE
SIGN "D"

CONSTEL
BLVD
CLOSED

BETWEEN
AVE STAR
AND CPE

USE
ALT
ROUTE

PCMS "B"
DURING CONSTRUCTION

PLACE ALONG AVENUE OF THE STARS
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

SCALE: 1"=40'

REVIEWED: _____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

Thomas Guide: 632-E3 | District: W

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

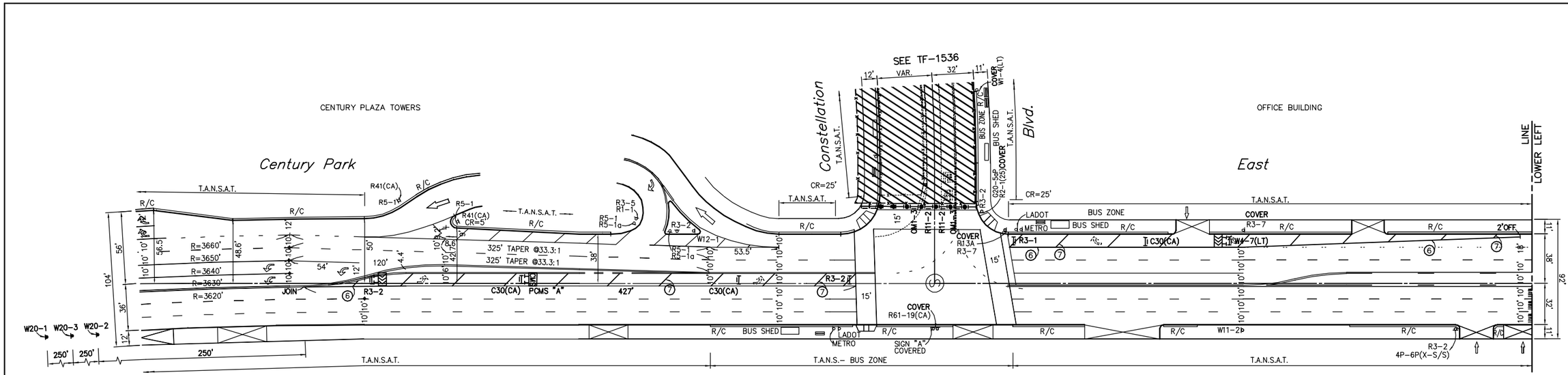
PROJECT NO. PCR____
DRAWING NO. TF-1537
35/39

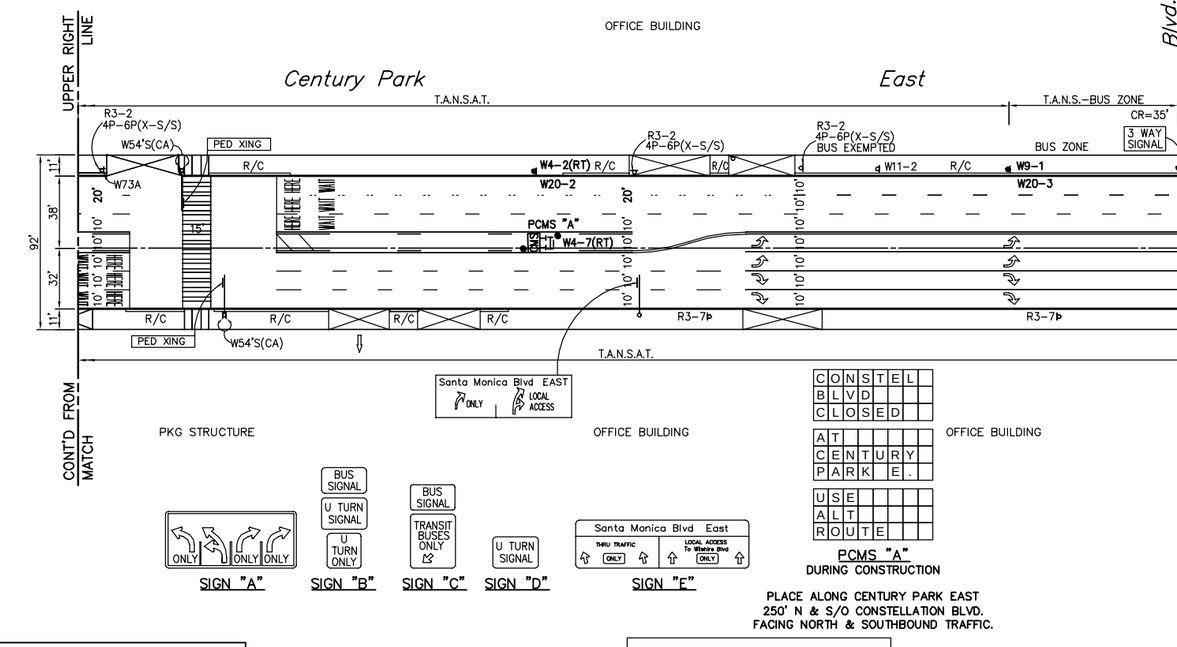
**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 9 – SHEET 2

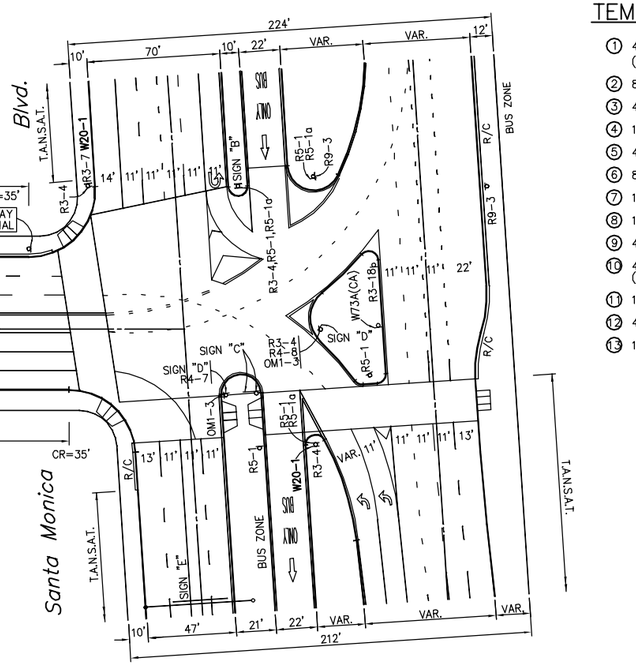
CONTRACT NO
DRAWING NO TF-1537 | REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1537.dwg Sep 30, 2015 11:49am SantosC




## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
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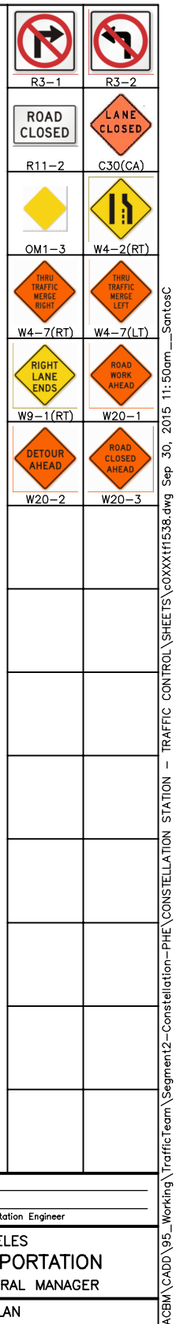
13. 12" YELLOW DIAGONAL

CENTURY CITY CONSTELLATION STATION STAGE 9
DECKING FULL CLOSURE NIGHTS & WEEKENDS

SCALE: 1"=40'




REVIEWED:_____ 20___

BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE. IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

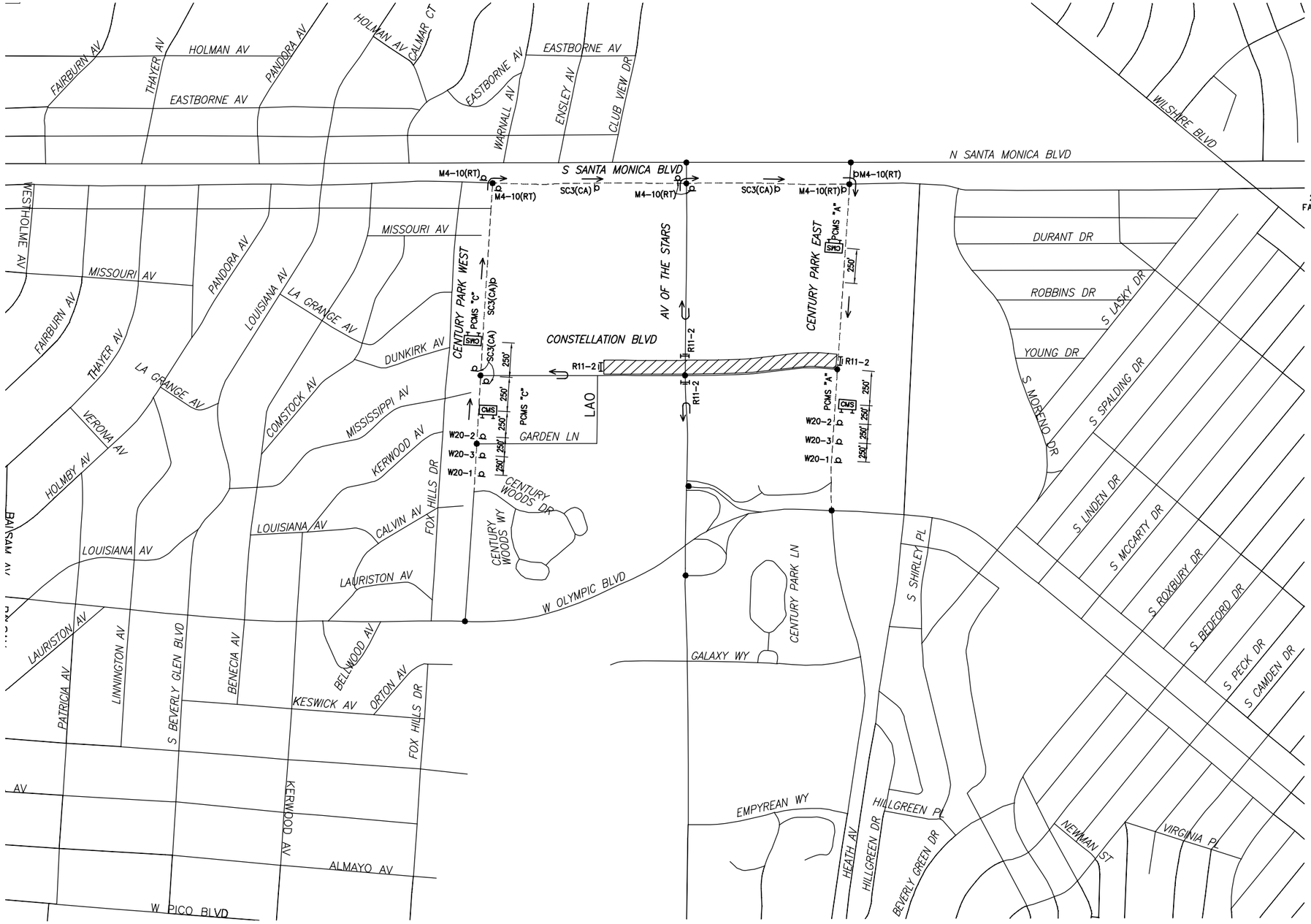
| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR____ | TF-1538 | 36/39 |

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 9 – SHEET 3

CONTRACT NO
DRAWING NO TF-1538 REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE

CADD PROJECT FILE NAME: L:\LAWSBM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1538.dwg Sep 30, 2015 11:50am SantosC




CONSTEL BLVD CLOSED
AT CENTURY PARK E.
USE ALT ROUTE

**PCMS "A"**
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK EAST
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

CONSTEL BLVD CLOSED
BETWEEN AVE STAR AND CPE
USE ALT ROUTE

**PCMS "B"**
DURING CONSTRUCTION

PLACE ALONG AVENUE OF THE STARS
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

CONSTEL BLVD CLOSED
BETWEEN AVE STAR AND CPE
USE ALT ROUTE

**PCMS "C"**
DURING CONSTRUCTION

PLACE ALONG CENTURY PARK WEST
250' N & S/O CONSTELLATION BLVD.
FACING NORTH & SOUTHBOUND TRAFFIC.

LEGEND:

- ● – SIGNALIZED INTERSECTION
- ▨ – PROPOSED WORK AREA
- ◂ – PROPOSED DETOUR SIGN
- TCO – TRAFFIC CONTROL OFFICER
- LAO – LOCAL ACCESS ONLY

NOTES: (THIS SHEET ONLY)

1. SEE DRAWING TF-xxxx FOR ALL WTCP SIGNS ASSOCIATED WITH THIS DETOUR.

ROAD CLOSED TO THRU TRAFFIC R11-4 | DETOUR M4-10(LT)
DETOUR M4-10(RT) | ROAD WORK AHEAD W20-1
DETOUR AHEAD W20-2 | ROAD CLOSED AHEAD W20-3
DETOUR SC3(CA)

CENTURY CITY CONSTELLATION STATION STAGE 9
DECKING/DECKING REMOVAL FULL CLOSURE NIGHTS/WEEKENDS

SCALE: 1"=40'

REVIEWED: _____ 20___
BSS Investigation and Enforcement

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**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

REVIEWED _____ Transportation Engineer
ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____
References:

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN
CONSTELLATION BOULEVARD
EASTBOUND CLOSURE–STAGE 9

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| – | – | PCR____ | TF-1539 | 37/39 |

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

**WESTSIDE PURPLE LINE EXTENSION - SECTION 2**
STATION SHORING & EXCAVATION
TRAFFIC DETOUR PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 9 – SHEET 4

CONTRACT NO
DRAWING NO TF-1539 | REV
SCALE 1"=40'
SHEET NO

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION - TRAFFIC CONTROL\SHEETS\c0XXXtf1539.dwg Sep 30, 2015 11:52am SantosC

## NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-_____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-_____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

4 CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
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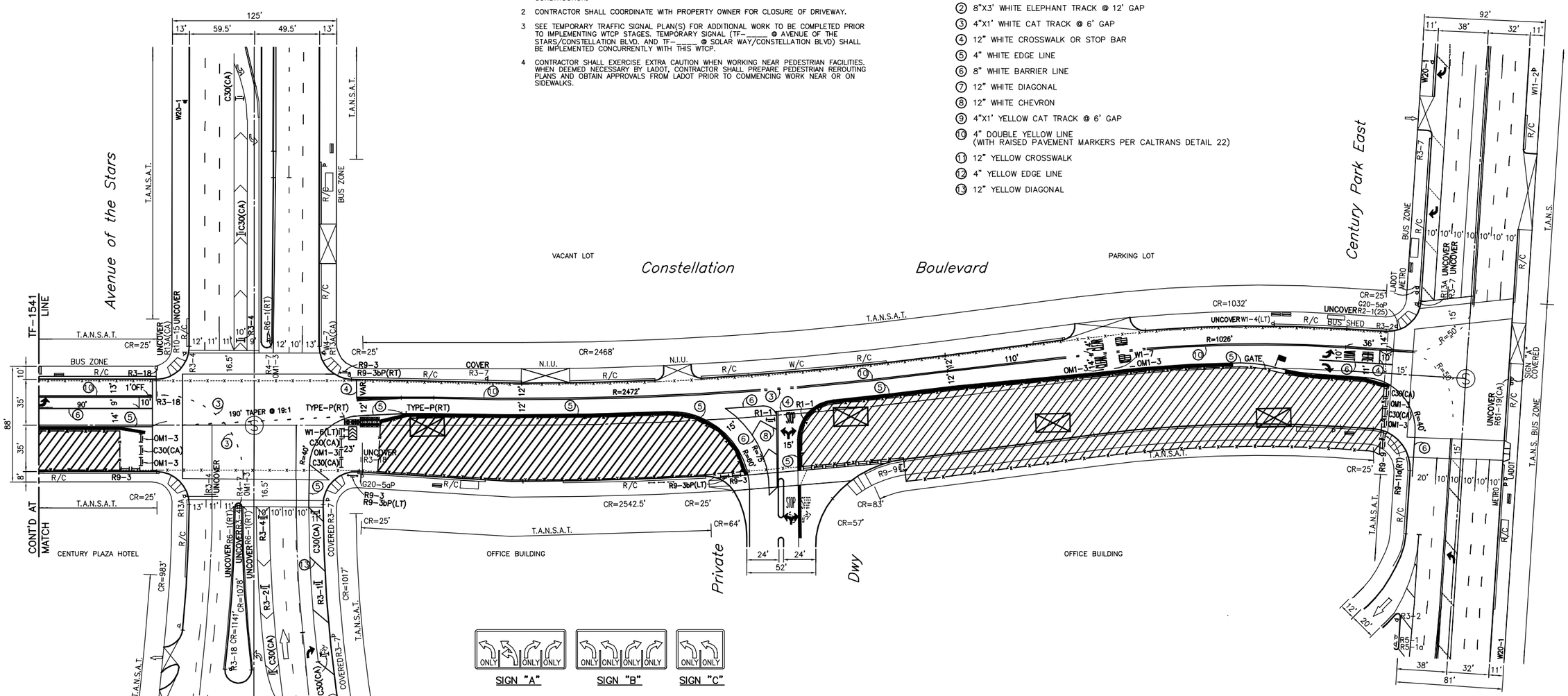
13. 12" YELLOW DIAGONAL




CENTURY CITY CONSTELLATION STATION STAGE 10

SCALE: 1"=40'

REVIEWED: _____ 20___

BSS Investigation and Enforcement

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| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES
MARKOUT BEGAN: _____
MARKOUT COMPLETED: _____
STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

| Thomas Guide | District |
|---|---|
| 632-E3 | W |

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN

CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

PROJECT NO. PCR_____
DRAWING NO. TF-1540
38/39

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Metro

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
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F 949-753-9014

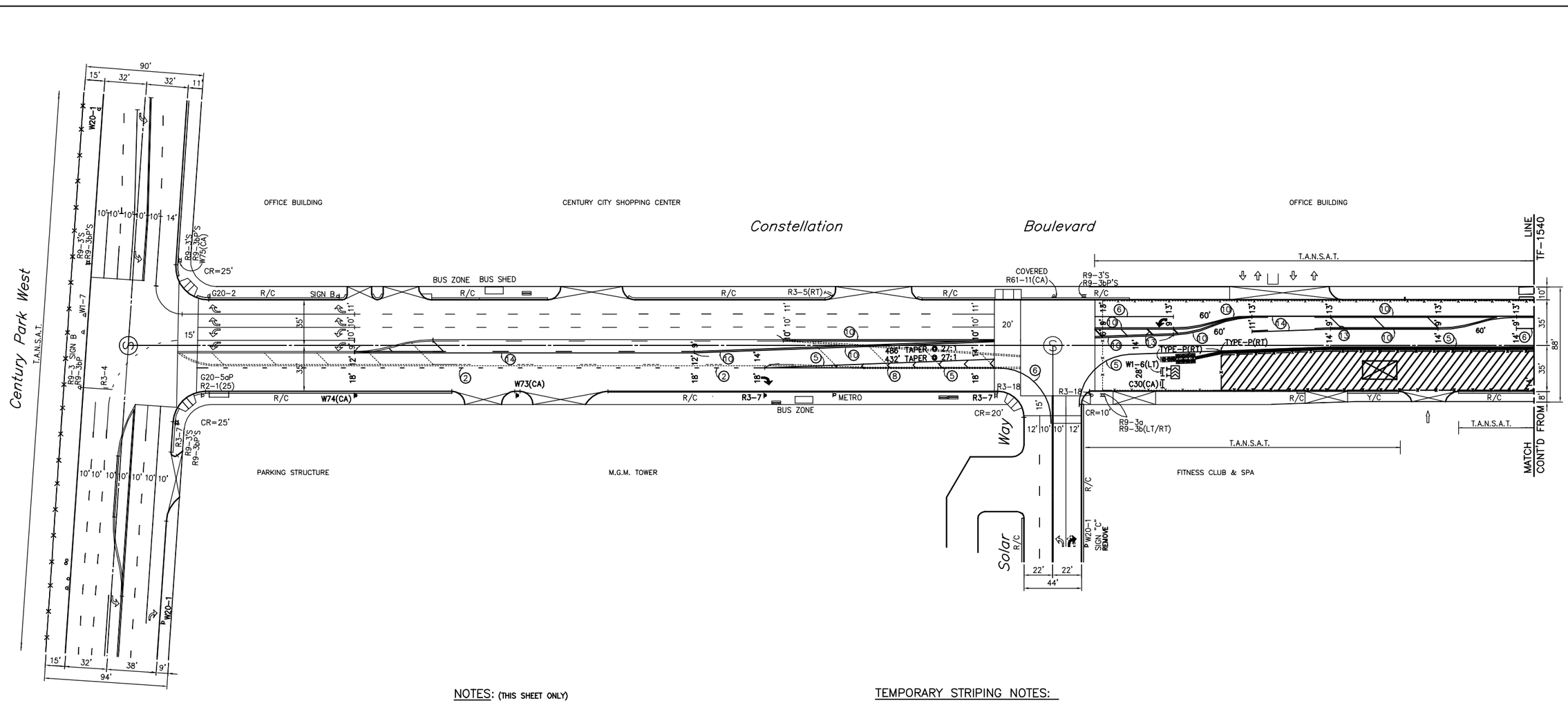
WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 10 – SHEET 1

CONTRACT NO
DRAWING NO TF-1540
REV
SCALE 1"=40'
SHEET NO

R1-1 STOP
R3-1
R3-2
R3-4
R3-7 RIGHT LANE MUST TURN RIGHT
R3-18
R9-3
R9-3bP(LT) USE CROSSWALK
R9-3bP(RT) USE CROSSWALK
R9-11(LT) SIDEWALK CLOSED AHEAD CROSS HERE
R9-11a(LT) SIDEWALK CLOSED CROSS HERE
R9-11a(RT) SIDEWALK CLOSED CROSS HERE
R9-9 SIDEWALK CLOSED
OM1-3
C30(CA) LANE CLOSED
TYPE P(LT)
TYPE P(RT)
W20-1 ROAD WORK AHEAD
W1-6(LT)
W1-7

1"=20' ORIGINAL MAP SCALE 1"=40'

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\cOXXXtf1540.dwg Sep 30, 2015 11:52am Santosc




1"=20'
ORIGINAL MAP SCALE
1"=40'

## NOTES: (THIS SHEET ONLY)

1 METRO RISK MANAGEMENT SHALL TAKE THE APPROPRIATE STEPS IN DEVELOPING NOISE MANAGEMENT TECHNIQUES WHEN INSTALLING THE SOLDIER PILES ON THIS STAGE OF CONSTRUCTION.

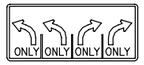
2 CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR CLOSURE OF DRIVEWAY.

3 SEE TEMPORARY TRAFFIC SIGNAL PLAN(S) FOR ADDITIONAL WORK TO BE COMPLETED PRIOR TO IMPLEMENTING WTCP STAGES. TEMPORARY SIGNAL (TF-_____ @ AVENUE OF THE STARS/CONSTELLATION BLVD. AND TF-_____ @ SOLAR WAY/CONSTELLATION BLVD) SHALL BE IMPLEMENTED CONCURRENTLY WITH THIS WTCP.

4 CONTRACTOR SHALL EXERCISE EXTRA CAUTION WHEN WORKING NEAR PEDESTRIAN FACILITIES. WHEN DEEMED NECESSARY BY LADOT, CONTRACTOR SHALL PREPARE PEDESTRIAN REROUTING PLANS AND OBTAIN APPROVALS FROM LADOT PRIOR TO COMMENCING WORK NEAR OR ON SIDEWALKS.




SIGN "A"




SIGN "B"

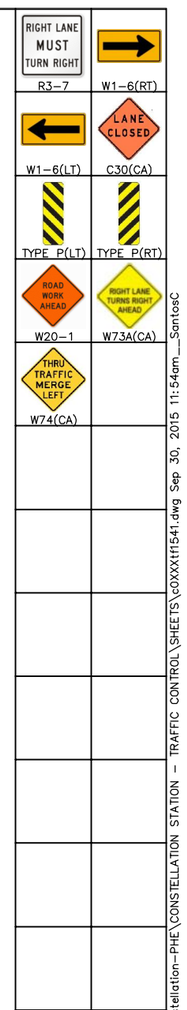



SIGN "C"

## TEMPORARY STRIPING NOTES:

1. 4"X7' WHITE LANE LINE @ 17' GAP (50' PAINT ON INTERSECTION APPROACH AND DEPARTURE)
2. 8"X3' WHITE ELEPHANT TRACK @ 12' GAP
3. 4"X1' WHITE CAT TRACK @ 6' GAP
4. 12" WHITE CROSSWALK OR STOP BAR
5. 4" WHITE EDGE LINE
6. 8" WHITE BARRIER LINE
7. 12" WHITE DIAGONAL
8. 12" WHITE CHEVRON
9. 4"X1' YELLOW CAT TRACK @ 6' GAP
10. 4" DOUBLE YELLOW LINE (WITH RAISED PAVEMENT MARKERS PER CALTRANS DETAIL 22)
11. 12" YELLOW CROSSWALK
12. 4" YELLOW EDGE LINE
13. 12" YELLOW DIAGONAL
14. 2 WAY LEFT TURN

SCALE: 1"=40'




CENTURY CITY CONSTELLATION STATION STAGE 10

REVIEWED _____ Transportation Engineer

ACCEPTED _____ Senior Transportation Engineer

INSTALLATION DATES

MARKOUT BEGAN: _____

MARKOUT COMPLETED: _____

STRIPING COMPLETED: _____

References:
FIELD CHECK
A-5150
A-2839
A-6173

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
SELETA J. REYNOLDS, GENERAL MANAGER

TRAFFIC CONTROL PLAN

CONSTELLATION BOULEVARD
CENTURY PARK E. TO CENTURY PARK W.

| Thomas Guide | District | PROJECT NO. | DRAWING NO. | |
|---|---|---|---|---|
| 632-E3 | W | PCR_____ | TF-1541 | 39/39 |

REVIEWED:_____ 20___
BSS Investigation and Enforcement

IF THE PLAN HAS NOT BEEN IMPLEMENTED WITHIN THREE (3) YEARS OF THE APPROVED DATE, IT MUST BE RESUBMITTED TO LADOT FOR REVIEW AND APPROVAL

**60% SUBMITTAL**

| REV | DATE | BY | APP | REG NO | EXPIRES | SEAL HOLDER | DESCRIPTION |
|---|---|---|---|---|---|---|---|

DESIGNED BY C. SANTOS
DRAWN BY C. SANTOS
CHECKED BY K. DERDERIAN
IN CHARGE K. DERDERIAN
DATE 10/02/2015

Metro
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

PARSONS BRINCKERHOFF

INTUEOR MAXIMIZING VALUE
7700 IRVINE CENTER DR.
SUITE 470
IRVINE, CA 92618
T 949-753-9010
F 949-753-9014

WESTSIDE PURPLE LINE EXTENSION - SECTION 2
STATION SHORING & EXCAVATION
WORKSITE TRAFFIC CONTROL PLAN
CENTURY CITY CONSTELLATION STATION
STAGE 10 – SHEET 2

CONTRACT NO

| DRAWING NO | REV |
|---|---|
| TF-1541 | |

SCALE 1"=40'

SHEET NO

CADD PROJECT FILE NAME: L:\LAWSBIM\WACBM\CADD\95_Working\TrafficTeam\Segment2-Constellation-PHE\CONSTELLATION STATION – TRAFFIC CONTROL\SHEETS\c0XXXtf1541.dwg Sep 30, 2015 11:54am Santosc

# APPENDIX B EXISTING PEAK HOUR COUNTS

# APPENDIX B EXISTING PEAK HOUR COUNTS

# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **4** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | THURSDAY FEBRUARY 10, 2011 | |
| PERIOD: | | 7:00 AM TO 10:00 AM | |
| INTERSECTION: | N/S | CENTURY PARK WEST | |
| | E/W | SANTA MONICA BOULEVARD | |

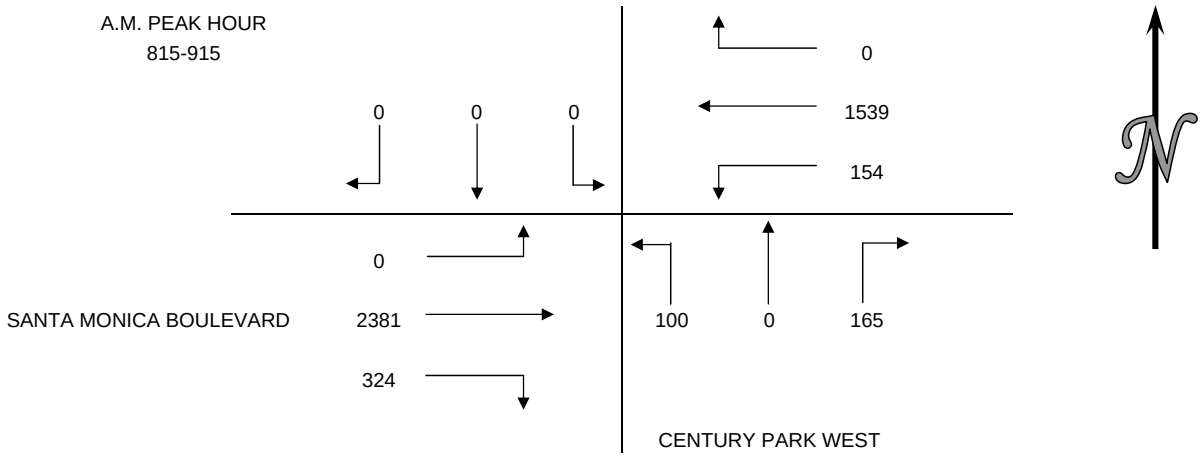
15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 0 | 0 | 0 | 0 | 275 | 16 | 12 | 0 | 9 | 27 | 354 | 0 | 693 |
| 715-730 | 0 | 0 | 0 | 0 | 345 | 9 | 18 | 0 | 12 | 38 | 391 | 0 | 813 |
| 730-745 | 0 | 0 | 0 | 0 | 299 | 27 | 22 | 0 | 28 | 57 | 503 | 0 | 936 |
| 745-800 | 0 | 0 | 0 | 0 | 440 | 15 | 19 | 0 | 14 | 58 | 517 | 0 | 1063 |
| 800-815 | 0 | 0 | 0 | 0 | 402 | 33 | 25 | 0 | 22 | 80 | 529 | 0 | 1091 |
| 815-830 | 0 | 0 | 0 | 0 | 422 | 31 | 30 | 0 | 23 | 80 | 565 | 0 | 1151 |
| 830-845 | 0 | 0 | 0 | 0 | 407 | 33 | 44 | 0 | 23 | 94 | 613 | 0 | 1214 |
| 845-900 | 0 | 0 | 0 | 0 | 377 | 47 | 52 | 0 | 18 | 79 | 625 | 0 | 1198 |
| 900-915 | 0 | 0 | 0 | 0 | 333 | 43 | 39 | 0 | 36 | 71 | 578 | 0 | 1100 |
| 915-930 | 0 | 0 | 0 | 0 | 370 | 72 | 38 | 0 | 25 | 65 | 564 | 0 | 1134 |
| 930-945 | 0 | 0 | 0 | 0 | 423 | 47 | 55 | 0 | 50 | 50 | 597 | 0 | 1222 |
| 945-1000 | 0 | 0 | 0 | 0 | 373 | 38 | 52 | 0 | 27 | 36 | 588 | 0 | 1114 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 0 | 0 | 0 | 0 | 1359 | 67 | 71 | 0 | 63 | 180 | 1765 | 0 | 3505 |
| 715-815 | 0 | 0 | 0 | 0 | 1486 | 84 | 84 | 0 | 76 | 233 | 1940 | 0 | 3903 |
| 730-830 | 0 | 0 | 0 | 0 | 1563 | 106 | 96 | 0 | 87 | 275 | 2114 | 0 | 4241 |
| 745-845 | 0 | 0 | 0 | 0 | 1671 | 112 | 118 | 0 | 82 | 312 | 2224 | 0 | 4519 |
| 800-900 | 0 | 0 | 0 | 0 | 1608 | 144 | 151 | 0 | 86 | 333 | 2332 | 0 | 4654 |
| 815-915 | 0 | 0 | 0 | 0 | 1539 | 154 | 165 | 0 | 100 | 324 | 2381 | 0 | 4663 |
| 830-930 | 0 | 0 | 0 | 0 | 1487 | 195 | 173 | 0 | 102 | 309 | 2380 | 0 | 4646 |
| 845-945 | 0 | 0 | 0 | 0 | 1503 | 209 | 184 | 0 | 129 | 265 | 2364 | 0 | 4654 |
| 900-1000 | 0 | 0 | 0 | 0 | 1499 | 200 | 184 | 0 | 138 | 222 | 2327 | 0 | 4570 |

A.M. PEAK HOUR
815-915



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

**5**

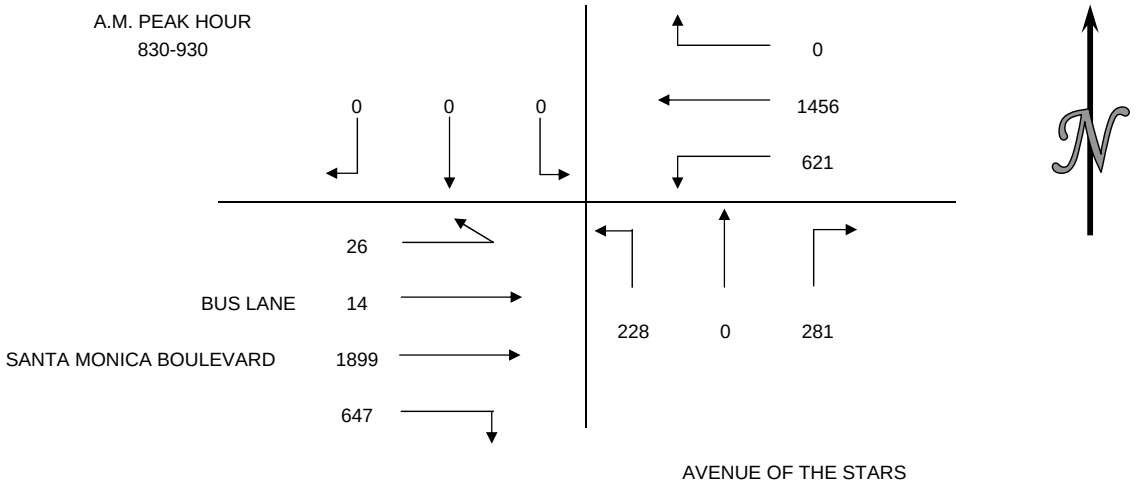
CLIENT: GIBSON TRANSPORTATION CONSULTANTS
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: THURSDAY FEBRUARY 10, 2011
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S AVENUE OF THE STARS
E/W SANTA MONICA BOULEVARD

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 11B EBTH | 12 EBUT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 0 | 0 | 0 | 0 | 240 | 52 | 29 | 0 | 24 | 103 | 259 | 2 | 1 | 710 |
| 715-730 | 0 | 0 | 0 | 0 | 314 | 79 | 29 | 0 | 43 | 123 | 297 | 4 | 0 | 889 |
| 730-745 | 0 | 0 | 0 | 0 | 335 | 109 | 34 | 0 | 54 | 138 | 337 | 3 | 0 | 1010 |
| 745-800 | 0 | 0 | 0 | 0 | 331 | 138 | 47 | 0 | 74 | 156 | 452 | 2 | 8 | 1208 |
| 800-815 | 0 | 0 | 0 | 0 | 408 | 137 | 46 | 0 | 47 | 160 | 445 | 2 | 2 | 1247 |
| 815-830 | 0 | 0 | 0 | 0 | 397 | 141 | 49 | 0 | 65 | 181 | 420 | 2 | 4 | 1259 |
| 830-845 | 0 | 0 | 0 | 0 | 415 | 184 | 67 | 0 | 70 | 127 | 452 | 4 | 5 | 1324 |
| 845-900 | 0 | 0 | 0 | 0 | 336 | 168 | 59 | 0 | 55 | 186 | 503 | 3 | 3 | 1313 |
| 900-915 | 0 | 0 | 0 | 0 | 366 | 157 | 68 | 0 | 44 | 151 | 441 | 2 | 9 | 1238 |
| 915-930 | 0 | 0 | 0 | 0 | 339 | 112 | 87 | 0 | 59 | 183 | 503 | 5 | 9 | 1297 |
| 930-945 | 0 | 0 | 0 | 0 | 401 | 159 | 59 | 0 | 75 | 153 | 430 | 4 | 10 | 1291 |
| 945-1000 | 0 | 0 | 0 | 0 | 338 | 170 | 83 | 0 | 58 | 148 | 450 | 6 | 14 | 1267 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 11B EBTH | 12 EBUT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 0 | 0 | 0 | 0 | 1220 | 378 | 139 | 0 | 195 | 520 | 1345 | 11 | 9 | 3817 |
| 715-815 | 0 | 0 | 0 | 0 | 1388 | 463 | 156 | 0 | 218 | 577 | 1531 | 11 | 10 | 4354 |
| 730-830 | 0 | 0 | 0 | 0 | 1471 | 525 | 176 | 0 | 240 | 635 | 1654 | 9 | 14 | 4724 |
| 745-845 | 0 | 0 | 0 | 0 | 1551 | 600 | 209 | 0 | 256 | 624 | 1769 | 10 | 19 | 5038 |
| 800-900 | 0 | 0 | 0 | 0 | 1556 | 630 | 221 | 0 | 237 | 654 | 1820 | 11 | 14 | 5143 |
| 815-915 | 0 | 0 | 0 | 0 | 1514 | 650 | 243 | 0 | 234 | 645 | 1816 | 11 | 21 | 5134 |
| 830-930 | 0 | 0 | 0 | 0 | 1456 | 621 | 281 | 0 | 228 | 647 | 1899 | 14 | 26 | 5172 |
| 845-945 | 0 | 0 | 0 | 0 | 1442 | 596 | 273 | 0 | 233 | 673 | 1877 | 14 | 31 | 5139 |
| 900-1000 | 0 | 0 | 0 | 0 | 1444 | 598 | 297 | 0 | 236 | 635 | 1824 | 17 | 42 | 5093 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

**6**

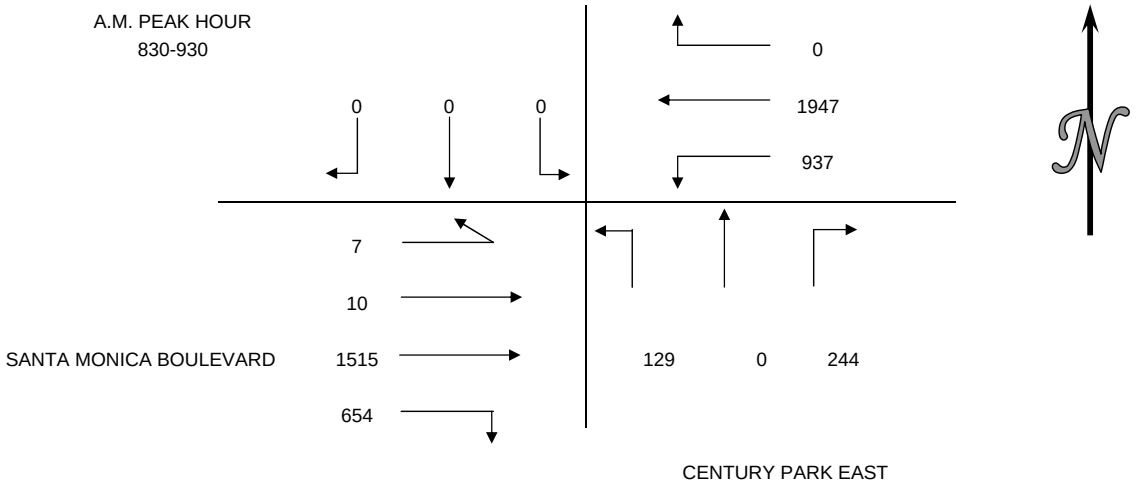
CLIENT: GIBSON TRANSPORTATION CONSULTANTS
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: THURSDAY FEBRUARY 10, 2011
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S CENTURY PARK EAST
E/W SANTA MONICA BOULEVARD

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 11B EBTH | 12U EBUT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 0 | 0 | 0 | 0 | 245 | 63 | 22 | 0 | 11 | 41 | 196 | 3 | 1 | 582 |
| 715-730 | 0 | 0 | 0 | 0 | 362 | 88 | 33 | 0 | 20 | 78 | 261 | 3 | 2 | 847 |
| 730-745 | 0 | 0 | 0 | 0 | 399 | 104 | 29 | 0 | 32 | 91 | 284 | 1 | 1 | 941 |
| 745-800 | 0 | 0 | 0 | 0 | 476 | 143 | 56 | 0 | 21 | 118 | 365 | 3 | 1 | 1183 |
| 800-815 | 0 | 0 | 0 | 0 | 480 | 180 | 64 | 0 | 39 | 149 | 410 | 2 | 1 | 1325 |
| 815-830 | 0 | 0 | 0 | 0 | 519 | 223 | 43 | 0 | 30 | 142 | 349 | 0 | 2 | 1308 |
| 830-845 | 0 | 0 | 0 | 0 | 511 | 213 | 59 | 0 | 40 | 174 | 391 | 3 | 4 | 1395 |
| 845-900 | 0 | 0 | 0 | 0 | 456 | 232 | 58 | 0 | 20 | 163 | 348 | 2 | 1 | 1280 |
| 900-915 | 0 | 0 | 0 | 0 | 499 | 262 | 52 | 0 | 32 | 127 | 366 | 2 | 1 | 1341 |
| 915-930 | 0 | 0 | 0 | 0 | 481 | 230 | 75 | 0 | 37 | 190 | 410 | 3 | 1 | 1427 |
| 930-945 | 0 | 0 | 0 | 0 | 413 | 223 | 28 | 0 | 27 | 82 | 346 | 0 | 0 | 1119 |
| 945-1000 | 0 | 0 | 0 | 0 | 498 | 156 | 51 | 0 | 17 | 126 | 410 | 1 | 1 | 1260 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 11B EBTH | 12U EBUT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 0 | 0 | 0 | 0 | 1482 | 398 | 140 | 0 | 84 | 328 | 1106 | 10 | 5 | 3553 |
| 715-815 | 0 | 0 | 0 | 0 | 1717 | 515 | 182 | 0 | 112 | 436 | 1320 | 9 | 5 | 4296 |
| 730-830 | 0 | 0 | 0 | 0 | 1874 | 650 | 192 | 0 | 122 | 500 | 1408 | 6 | 5 | 4757 |
| 745-845 | 0 | 0 | 0 | 0 | 1986 | 759 | 222 | 0 | 130 | 583 | 1515 | 8 | 8 | 5211 |
| 800-900 | 0 | 0 | 0 | 0 | 1966 | 848 | 224 | 0 | 129 | 628 | 1498 | 7 | 8 | 5308 |
| 815-915 | 0 | 0 | 0 | 0 | 1985 | 930 | 212 | 0 | 122 | 606 | 1454 | 7 | 8 | 5324 |
| 830-930 | 0 | 0 | 0 | 0 | 1947 | 937 | 244 | 0 | 129 | 654 | 1515 | 10 | 7 | 5443 |
| 845-945 | 0 | 0 | 0 | 0 | 1849 | 947 | 213 | 0 | 116 | 562 | 1470 | 7 | 3 | 5167 |
| 900-1000 | 0 | 0 | 0 | 0 | 1891 | 871 | 206 | 0 | 113 | 525 | 1532 | 6 | 3 | 5147 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **9** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 7:00 AM TO 10:00 AM | |
| INTERSECTION: | N/S | CENTURY PARK WEST | |
| | E/W | CONSTELLATION BOULEVARD | |

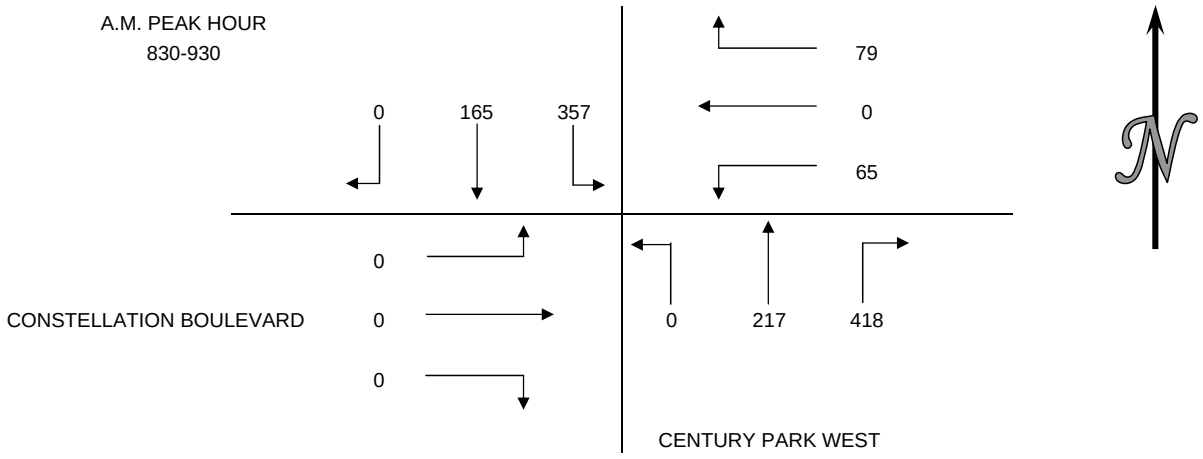
15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 0 | 11 | 35 | 8 | 0 | 12 | 29 | 10 | 0 | 0 | 0 | 0 | 105 |
| 715-730 | 0 | 8 | 34 | 15 | 0 | 5 | 47 | 26 | 0 | 0 | 0 | 0 | 135 |
| 730-745 | 0 | 25 | 47 | 6 | 0 | 6 | 29 | 16 | 0 | 0 | 0 | 0 | 129 |
| 745-800 | 0 | 32 | 57 | 20 | 0 | 5 | 45 | 35 | 0 | 0 | 0 | 0 | 194 |
| 800-815 | 0 | 26 | 66 | 29 | 0 | 11 | 86 | 59 | 0 | 0 | 0 | 0 | 277 |
| 815-830 | 0 | 35 | 84 | 18 | 0 | 11 | 81 | 32 | 0 | 0 | 0 | 0 | 261 |
| 830-845 | 0 | 28 | 83 | 16 | 0 | 14 | 103 | 52 | 0 | 0 | 0 | 0 | 296 |
| 845-900 | 0 | 57 | 105 | 11 | 0 | 5 | 121 | 49 | 0 | 0 | 0 | 0 | 348 |
| 900-915 | 0 | 35 | 94 | 31 | 0 | 20 | 112 | 60 | 0 | 0 | 0 | 0 | 352 |
| 915-930 | 0 | 45 | 75 | 21 | 0 | 26 | 82 | 56 | 0 | 0 | 0 | 0 | 305 |
| 930-945 | 0 | 28 | 52 | 23 | 0 | 23 | 92 | 47 | 0 | 0 | 0 | 0 | 265 |
| 945-1000 | 0 | 33 | 60 | 37 | 0 | 28 | 81 | 51 | 0 | 0 | 0 | 0 | 290 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 0 | 76 | 173 | 49 | 0 | 28 | 150 | 87 | 0 | 0 | 0 | 0 | 563 |
| 715-815 | 0 | 91 | 204 | 70 | 0 | 27 | 207 | 136 | 0 | 0 | 0 | 0 | 735 |
| 730-830 | 0 | 118 | 254 | 73 | 0 | 33 | 241 | 142 | 0 | 0 | 0 | 0 | 861 |
| 745-845 | 0 | 121 | 290 | 83 | 0 | 41 | 315 | 178 | 0 | 0 | 0 | 0 | 1028 |
| 800-900 | 0 | 146 | 338 | 74 | 0 | 41 | 391 | 192 | 0 | 0 | 0 | 0 | 1182 |
| 815-915 | 0 | 155 | 366 | 76 | 0 | 50 | 417 | 193 | 0 | 0 | 0 | 0 | 1257 |
| 830-930 | 0 | 165 | 357 | 79 | 0 | 65 | 418 | 217 | 0 | 0 | 0 | 0 | 1301 |
| 845-945 | 0 | 165 | 326 | 86 | 0 | 74 | 407 | 212 | 0 | 0 | 0 | 0 | 1270 |
| 900-1000 | 0 | 141 | 281 | 112 | 0 | 97 | 367 | 214 | 0 | 0 | 0 | 0 | 1212 |

A.M. PEAK HOUR
830-930



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **10** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 7:00 AM TO 10:00 AM | |
| INTERSECTION: | N/S | AVENUE OF THE STARS | |
| | E/W | CONSTELLATION BOULEVARD | |

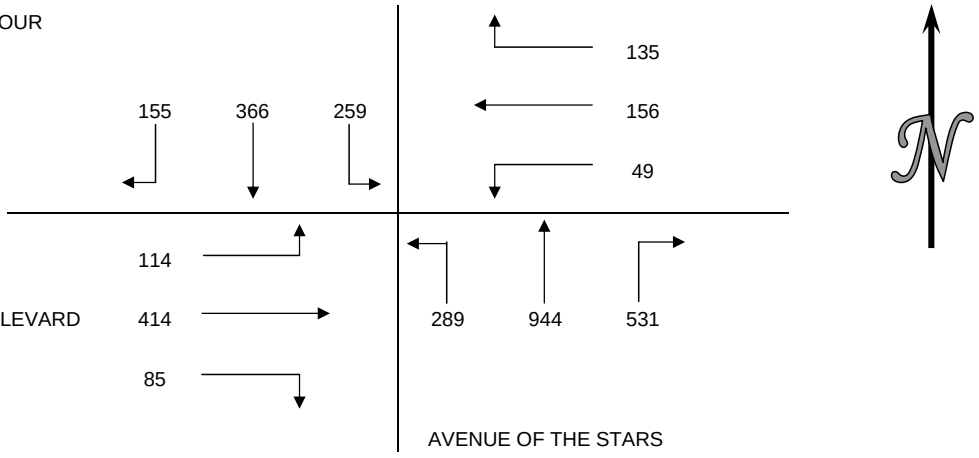
15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 22 | 42 | 35 | 12 | 10 | 4 | 70 | 88 | 28 | 13 | 20 | 5 | 349 |
| 715-730 | 23 | 55 | 53 | 10 | 13 | 1 | 58 | 104 | 30 | 10 | 27 | 5 | 389 |
| 730-745 | 21 | 84 | 51 | 15 | 16 | 5 | 65 | 153 | 31 | 9 | 41 | 13 | 504 |
| 745-800 | 43 | 93 | 67 | 21 | 23 | 6 | 74 | 172 | 56 | 11 | 58 | 18 | 642 |
| 800-815 | 30 | 89 | 55 | 24 | 22 | 6 | 110 | 196 | 60 | 13 | 63 | 29 | 697 |
| 815-830 | 48 | 93 | 83 | 25 | 21 | 6 | 123 | 235 | 61 | 18 | 95 | 35 | 843 |
| 830-845 | 49 | 76 | 61 | 31 | 30 | 4 | 144 | 256 | 71 | 12 | 89 | 17 | 840 |
| 845-900 | 42 | 92 | 71 | 34 | 33 | 4 | 152 | 241 | 64 | 16 | 112 | 35 | 896 |
| 900-915 | 33 | 95 | 59 | 38 | 52 | 23 | 122 | 231 | 83 | 27 | 118 | 35 | 916 |
| 915-930 | 31 | 103 | 68 | 32 | 41 | 18 | 113 | 216 | 71 | 30 | 95 | 27 | 845 |
| 930-945 | 53 | 141 | 73 | 34 | 29 | 11 | 99 | 211 | 66 | 7 | 75 | 28 | 827 |
| 945-1000 | 53 | 115 | 50 | 39 | 29 | 6 | 71 | 160 | 55 | 13 | 60 | 30 | 681 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 109 | 274 | 206 | 58 | 62 | 16 | 267 | 517 | 145 | 43 | 146 | 41 | 1884 |
| 715-815 | 117 | 321 | 226 | 70 | 74 | 18 | 307 | 625 | 177 | 43 | 189 | 65 | 2232 |
| 730-830 | 142 | 359 | 256 | 85 | 82 | 23 | 372 | 756 | 208 | 51 | 257 | 95 | 2686 |
| 745-845 | 170 | 351 | 266 | 101 | 96 | 22 | 451 | 859 | 248 | 54 | 305 | 99 | 3022 |
| 800-900 | 169 | 350 | 270 | 114 | 106 | 20 | 529 | 928 | 256 | 59 | 359 | 116 | 3276 |
| 815-915 | 172 | 356 | 274 | 128 | 136 | 37 | 541 | 963 | 279 | 73 | 414 | 122 | 3495 |
| 830-930 | 155 | 366 | 259 | 135 | 156 | 49 | 531 | 944 | 289 | 85 | 414 | 114 | 3497 |
| 845-945 | 159 | 431 | 271 | 138 | 155 | 56 | 486 | 899 | 284 | 80 | 400 | 125 | 3484 |
| 900-1000 | 170 | 454 | 250 | 143 | 151 | 58 | 405 | 818 | 275 | 77 | 348 | 120 | 3269 |

A.M. PEAK HOUR
830-930



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

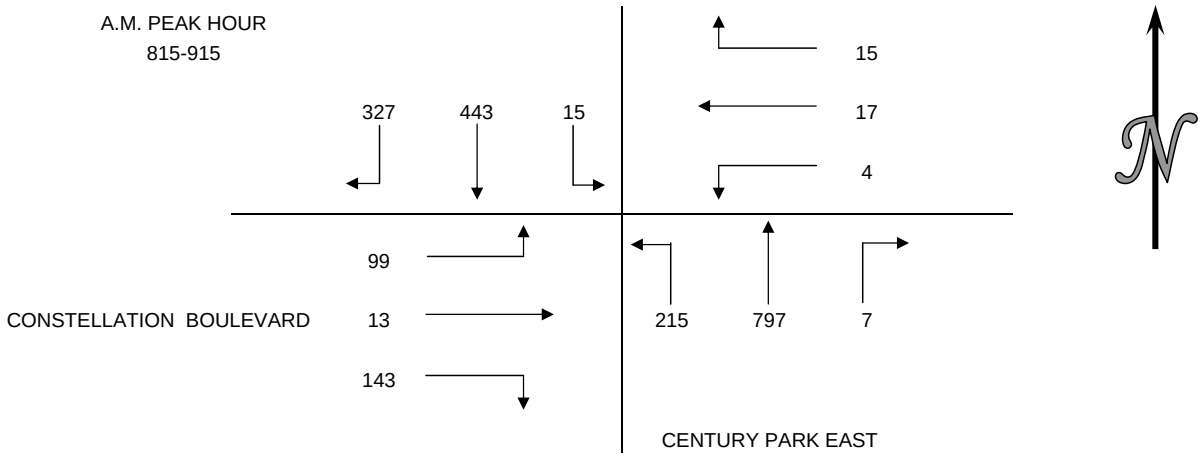
CLIENT: GIBSON TRANSPORTATION CONSULTANTS **11**
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: WEDNESDAY FEBRUARY 9, 2011
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S CENTURY PARK EAST
E/W CONSTELLATION BOULEVARD

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 30 | 44 | 3 | 0 | 4 | 0 | 4 | 70 | 24 | 17 | 1 | 12 | 209 |
| 715-730 | 47 | 60 | 2 | 3 | 2 | 6 | 2 | 104 | 20 | 14 | 1 | 10 | 271 |
| 730-745 | 38 | 77 | 3 | 9 | 3 | 0 | 4 | 113 | 29 | 17 | 0 | 4 | 297 |
| 745-800 | 45 | 81 | 2 | 3 | 14 | 3 | 1 | 147 | 40 | 19 | 3 | 17 | 375 |
| 800-815 | 58 | 90 | 2 | 4 | 5 | 2 | 1 | 178 | 36 | 34 | 1 | 28 | 439 |
| 815-830 | 80 | 109 | 4 | 4 | 7 | 1 | 1 | 212 | 45 | 34 | 1 | 22 | 520 |
| 830-845 | 59 | 109 | 4 | 5 | 5 | 2 | 1 | 222 | 43 | 22 | 0 | 23 | 495 |
| 845-900 | 96 | 116 | 7 | 2 | 3 | 1 | 5 | 188 | 71 | 51 | 10 | 30 | 580 |
| 900-915 | 92 | 109 | 0 | 4 | 2 | 0 | 0 | 175 | 56 | 36 | 2 | 24 | 500 |
| 915-930 | 58 | 106 | 2 | 3 | 3 | 1 | 1 | 164 | 43 | 49 | 3 | 38 | 471 |
| 930-945 | 60 | 108 | 1 | 2 | 3 | 0 | 2 | 158 | 34 | 20 | 0 | 34 | 422 |
| 945-1000 | 42 | 77 | 1 | 1 | 0 | 1 | 1 | 107 | 35 | 28 | 3 | 19 | 315 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 160 | 262 | 10 | 15 | 23 | 9 | 11 | 434 | 113 | 67 | 5 | 43 | 1152 |
| 715-815 | 188 | 308 | 9 | 19 | 24 | 11 | 8 | 542 | 125 | 84 | 5 | 59 | 1382 |
| 730-830 | 221 | 357 | 11 | 20 | 29 | 6 | 7 | 650 | 150 | 104 | 5 | 71 | 1631 |
| 745-845 | 242 | 389 | 12 | 16 | 31 | 8 | 4 | 759 | 164 | 109 | 5 | 90 | 1829 |
| 800-900 | 293 | 424 | 17 | 15 | 20 | 6 | 8 | 800 | 195 | 141 | 12 | 103 | 2034 |
| 815-915 | 327 | 443 | 15 | 15 | 17 | 4 | 7 | 797 | 215 | 143 | 13 | 99 | 2095 |
| 830-930 | 305 | 440 | 13 | 14 | 13 | 4 | 7 | 749 | 213 | 158 | 15 | 115 | 2046 |
| 845-945 | 306 | 439 | 10 | 11 | 11 | 2 | 8 | 685 | 204 | 156 | 15 | 126 | 1973 |
| 900-1000 | 252 | 400 | 4 | 10 | 8 | 2 | 4 | 604 | 168 | 133 | 8 | 115 | 1708 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | |
|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS |
| DATE: | | TUESDAY FEBRUARY 8, 2011 |
| PERIOD: | | 7:00 AM TO 10:00 AM |
| INTERSECTION: | N/S | CENTURY PARK WEST |
| | E/W | OLYMPIC BOULEVARD |

**14**

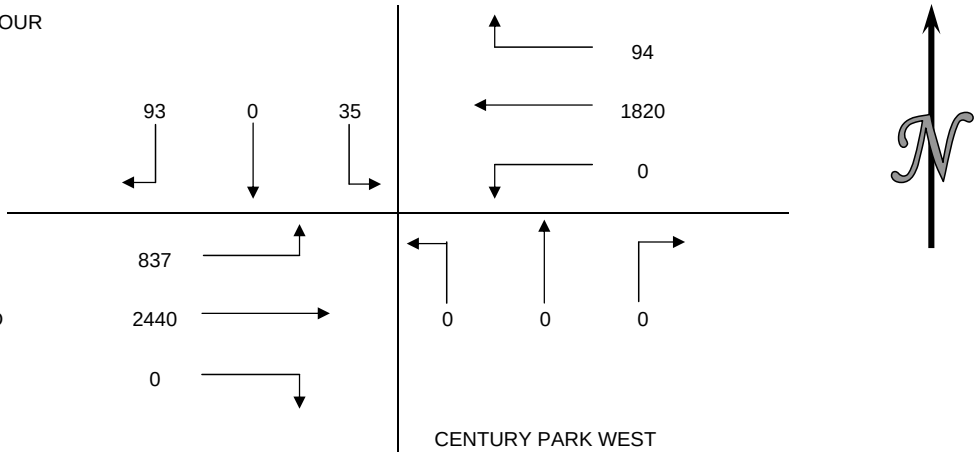
15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-715 | 13 | 0 | 11 | 6 | 329 | 0 | 0 | 0 | 0 | 0 | 128 | 35 | 522 |
| 715-730 | 8 | 0 | 0 | 18 | 365 | 0 | 0 | 0 | 0 | 0 | 229 | 51 | 671 |
| 730-745 | 19 | 0 | 1 | 13 | 494 | 0 | 0 | 0 | 0 | 0 | 335 | 82 | 944 |
| 745-800 | 29 | 0 | 13 | 17 | 492 | 0 | 0 | 0 | 0 | 0 | 432 | 90 | 1073 |
| 800-815 | 24 | 0 | 12 | 18 | 484 | 0 | 0 | 0 | 0 | 0 | 538 | 130 | 1206 |
| 815-830 | 21 | 0 | 8 | 15 | 482 | 0 | 0 | 0 | 0 | 0 | 578 | 221 | 1325 |
| 830-845 | 31 | 0 | 12 | 24 | 450 | 0 | 0 | 0 | 0 | 0 | 629 | 216 | 1362 |
| 845-900 | 27 | 0 | 9 | 25 | 456 | 0 | 0 | 0 | 0 | 0 | 626 | 193 | 1336 |
| 900-915 | 14 | 0 | 6 | 30 | 432 | 0 | 0 | 0 | 0 | 0 | 607 | 207 | 1296 |
| 915-930 | 31 | 0 | 14 | 28 | 424 | 0 | 0 | 0 | 0 | 0 | 576 | 159 | 1232 |
| 930-945 | 41 | 0 | 9 | 16 | 473 | 0 | 0 | 0 | 0 | 0 | 517 | 129 | 1185 |
| 945-1000 | 31 | 0 | 9 | 29 | 476 | 0 | 0 | 0 | 0 | 0 | 355 | 127 | 1027 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700-800 | 69 | 0 | 25 | 54 | 1680 | 0 | 0 | 0 | 0 | 0 | 1124 | 258 | 3210 |
| 715-815 | 80 | 0 | 26 | 66 | 1835 | 0 | 0 | 0 | 0 | 0 | 1534 | 353 | 3894 |
| 730-830 | 93 | 0 | 34 | 63 | 1952 | 0 | 0 | 0 | 0 | 0 | 1883 | 523 | 4548 |
| 745-845 | 105 | 0 | 45 | 74 | 1908 | 0 | 0 | 0 | 0 | 0 | 2177 | 657 | 4966 |
| 800-900 | 103 | 0 | 41 | 82 | 1872 | 0 | 0 | 0 | 0 | 0 | 2371 | 760 | 5229 |
| 815-915 | 93 | 0 | 35 | 94 | 1820 | 0 | 0 | 0 | 0 | 0 | 2440 | 837 | 5319 |
| 830-930 | 103 | 0 | 41 | 107 | 1762 | 0 | 0 | 0 | 0 | 0 | 2438 | 775 | 5226 |
| 845-945 | 113 | 0 | 38 | 99 | 1785 | 0 | 0 | 0 | 0 | 0 | 2326 | 688 | 5049 |
| 900-1000 | 117 | 0 | 38 | 103 | 1805 | 0 | 0 | 0 | 0 | 0 | 2055 | 622 | 4740 |

A.M. PEAK HOUR
815-915



# WILTEC

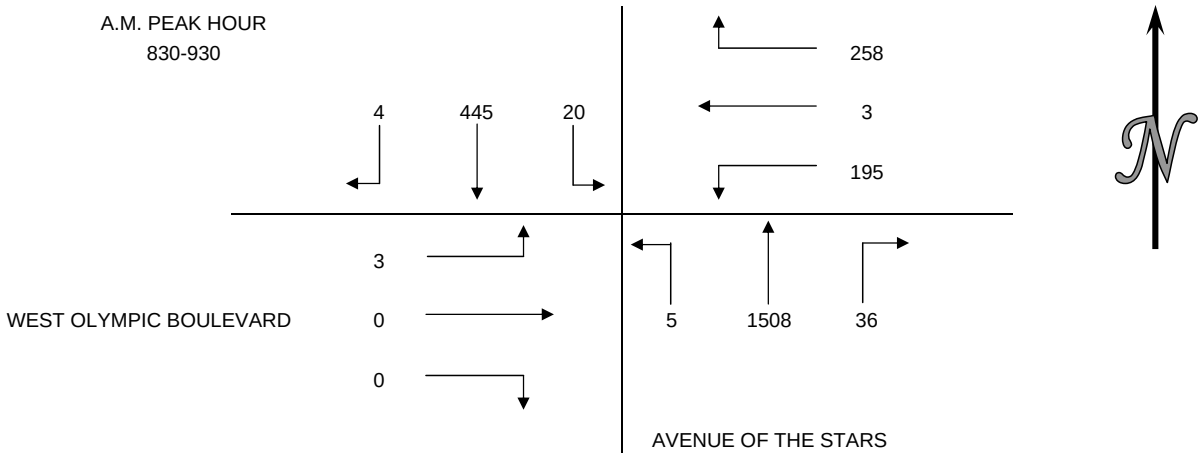
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

CLIENT: GIBSON TRANSPORTATION CONSULTANTS **15**
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: WEDNESDAY FEBRUARY 9, 2011
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S AVENUE OF THE STARS
E/W WEST OLYMPIC BOULEVARD

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| PERIOD | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 700-715 | 1 | 54 | 0 | 24 | 0 | 4 | 9 | 139 | 0 | 1 | 0 | 0 | 232 |
| 715-730 | 0 | 62 | 1 | 42 | 0 | 13 | 4 | 154 | 1 | 0 | 0 | 0 | 277 |
| 730-745 | 0 | 86 | 3 | 28 | 0 | 15 | 12 | 217 | 2 | 0 | 0 | 0 | 363 |
| 745-800 | 0 | 70 | 3 | 63 | 0 | 24 | 9 | 304 | 0 | 0 | 0 | 0 | 473 |
| 800-815 | 3 | 101 | 3 | 78 | 0 | 26 | 4 | 320 | 0 | 0 | 0 | 0 | 535 |
| 815-830 | 0 | 106 | 3 | 82 | 0 | 22 | 8 | 346 | 0 | 0 | 0 | 1 | 568 |
| 830-845 | 0 | 88 | 6 | 71 | 0 | 45 | 11 | 393 | 4 | 0 | 0 | 0 | 618 |
| 845-900 | 0 | 107 | 5 | 70 | 1 | 56 | 10 | 385 | 0 | 0 | 0 | 0 | 634 |
| 900-915 | 3 | 115 | 6 | 56 | 0 | 41 | 3 | 383 | 1 | 0 | 0 | 3 | 611 |
| 915-930 | 1 | 135 | 3 | 61 | 2 | 53 | 12 | 347 | 0 | 0 | 0 | 0 | 614 |
| 930-945 | 2 | 149 | 7 | 54 | 1 | 39 | 10 | 296 | 2 | 1 | 0 | 0 | 561 |
| 945-1000 | 0 | 115 | 10 | 40 | 2 | 43 | 9 | 228 | 0 | 0 | 0 | 0 | 447 |
| HOUR TOTALS | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| TIME | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 700-800 | 1 | 272 | 7 | 157 | 0 | 56 | 34 | 814 | 3 | 1 | 0 | 0 | 1345 |
| 715-815 | 3 | 319 | 10 | 211 | 0 | 78 | 29 | 995 | 3 | 0 | 0 | 0 | 1648 |
| 730-830 | 3 | 363 | 12 | 251 | 0 | 87 | 33 | 1187 | 2 | 0 | 0 | 1 | 1939 |
| 745-845 | 3 | 365 | 15 | 294 | 0 | 117 | 32 | 1363 | 4 | 0 | 0 | 1 | 2194 |
| 800-900 | 3 | 402 | 17 | 301 | 1 | 149 | 33 | 1444 | 4 | 0 | 0 | 1 | 2355 |
| 815-915 | 3 | 416 | 20 | 279 | 1 | 164 | 32 | 1507 | 5 | 0 | 0 | 4 | 2431 |
| 830-930 | 4 | 445 | 20 | 258 | 3 | 195 | 36 | 1508 | 5 | 0 | 0 | 3 | 2477 |
| 845-945 | 6 | 506 | 21 | 241 | 4 | 189 | 35 | 1411 | 3 | 1 | 0 | 3 | 2420 |
| 900-1000 | 6 | 514 | 26 | 211 | 5 | 176 | 34 | 1254 | 3 | 1 | 0 | 3 | 2233 |



# WILTEC

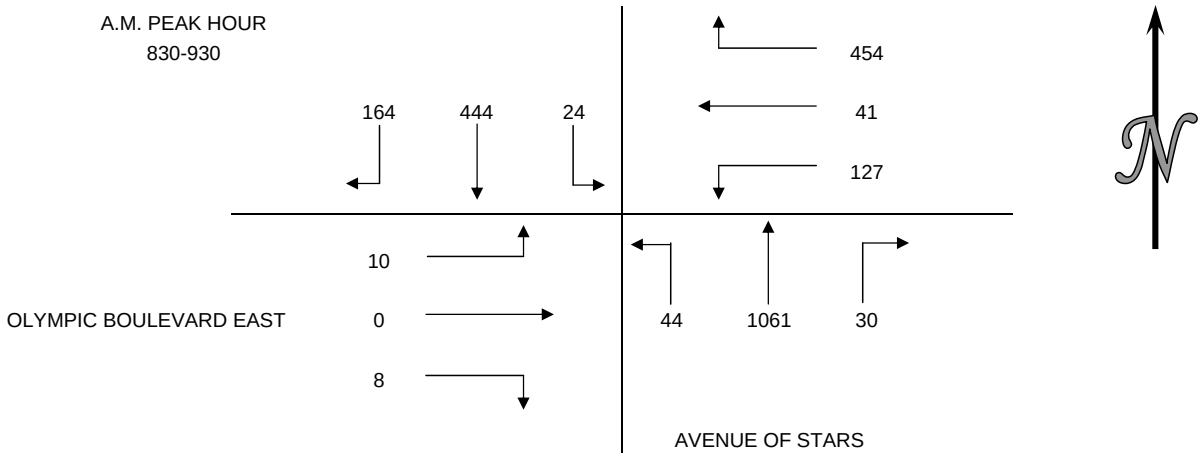
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

CLIENT: GIBSON TRANSPORTATION CONSULTANTS **16**
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: WEDNESDAY FEBRUARY 9, 2011
PERIOD: 7:00 AM TO 10:00 AM
INTERSECTION: N/S AVENUE OF STARS
E/W OLYMPIC BOULEVARD EAST

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-715 | 8 | 54 | 3 | 29 | 1 | 5 | 1 | 123 | 4 | 0 | 0 | 1 | 229 |
| 715-730 | 19 | 55 | 1 | 22 | 2 | 3 | 4 | 151 | 1 | 1 | 0 | 1 | 260 |
| 730-745 | 20 | 66 | 6 | 41 | 5 | 9 | 5 | 188 | 3 | 1 | 0 | 4 | 348 |
| 745-800 | 20 | 74 | 5 | 58 | 2 | 11 | 8 | 222 | 7 | 0 | 1 | 1 | 409 |
| 800-815 | 31 | 88 | 6 | 92 | 10 | 10 | 3 | 232 | 9 | 3 | 0 | 1 | 485 |
| 815-830 | 23 | 108 | 7 | 114 | 1 | 25 | 11 | 243 | 6 | 0 | 1 | 1 | 540 |
| 830-845 | 34 | 95 | 5 | 133 | 7 | 32 | 10 | 295 | 7 | 0 | 0 | 5 | 623 |
| 845-900 | 28 | 118 | 8 | 113 | 7 | 17 | 5 | 240 | 15 | 1 | 0 | 2 | 554 |
| 900-915 | 52 | 100 | 3 | 87 | 16 | 37 | 6 | 281 | 9 | 5 | 0 | 1 | 597 |
| 915-930 | 50 | 131 | 8 | 121 | 11 | 41 | 9 | 245 | 13 | 2 | 0 | 2 | 633 |
| 930-945 | 33 | 152 | 5 | 88 | 7 | 17 | 16 | 202 | 7 | 1 | 0 | 2 | 530 |
| 945-1000 | 25 | 120 | 9 | 64 | 8 | 25 | 6 | 183 | 4 | 3 | 0 | 5 | 452 |
| HOUR TOTALS | | | | | | | | | | | | | |
| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
| 700-800 | 67 | 249 | 15 | 150 | 10 | 28 | 18 | 684 | 15 | 2 | 1 | 7 | 1246 |
| 715-815 | 90 | 283 | 18 | 213 | 19 | 33 | 20 | 793 | 20 | 5 | 1 | 7 | 1502 |
| 730-830 | 94 | 336 | 24 | 305 | 18 | 55 | 27 | 885 | 25 | 4 | 2 | 7 | 1782 |
| 745-845 | 108 | 365 | 23 | 397 | 20 | 78 | 32 | 992 | 29 | 3 | 2 | 8 | 2057 |
| 800-900 | 116 | 409 | 26 | 452 | 25 | 84 | 29 | 1010 | 37 | 4 | 1 | 9 | 2202 |
| 815-915 | 137 | 421 | 23 | 447 | 31 | 111 | 32 | 1059 | 37 | 6 | 1 | 9 | 2314 |
| 830-930 | 164 | 444 | 24 | 454 | 41 | 127 | 30 | 1061 | 44 | 8 | 0 | 10 | 2407 |
| 845-945 | 163 | 501 | 24 | 409 | 41 | 112 | 36 | 968 | 44 | 9 | 0 | 7 | 2314 |
| 900-1000 | 160 | 503 | 25 | 360 | 42 | 120 | 37 | 911 | 33 | 11 | 0 | 10 | 2212 |



# WILTEC

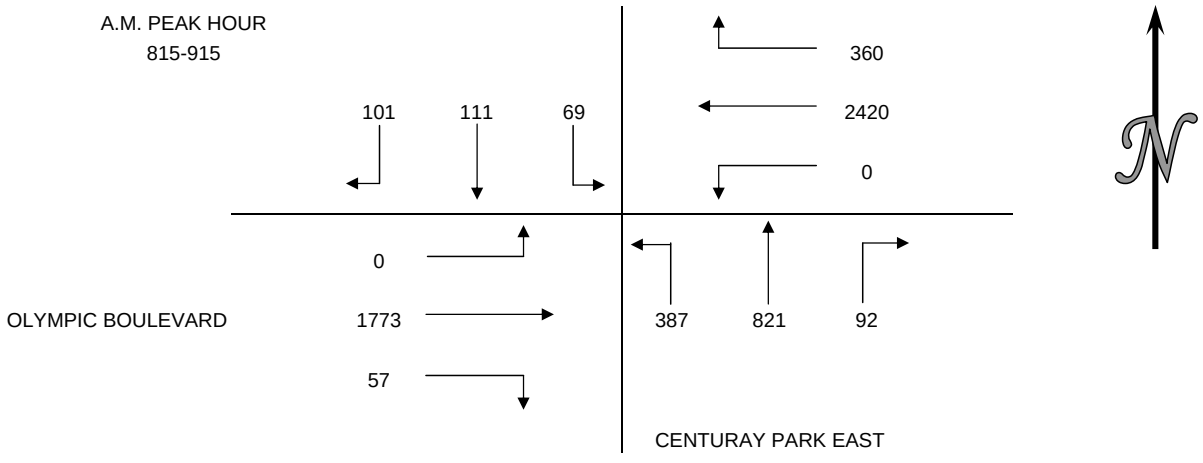
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **17** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 7:00 AM TO 10:00 AM | |
| INTERSECTION: | N/S | CENTURAY PARK EAST | |
| | E/W | OLYMPIC BOULEVARD | |

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| PERIOD | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 700-715 | 10 | 21 | 11 | 47 | 357 | 0 | 10 | 66 | 37 | 4 | 208 | 1 | 772 |
| 715-730 | 17 | 16 | 8 | 30 | 403 | 0 | 11 | 72 | 23 | 7 | 234 | 0 | 821 |
| 730-745 | 17 | 20 | 21 | 46 | 500 | 0 | 15 | 83 | 52 | 8 | 288 | 0 | 1050 |
| 745-800 | 17 | 20 | 14 | 55 | 576 | 0 | 19 | 148 | 65 | 30 | 350 | 0 | 1294 |
| 800-815 | 21 | 18 | 13 | 65 | 498 | 0 | 10 | 176 | 72 | 8 | 434 | 0 | 1315 |
| 815-830 | 26 | 29 | 11 | 92 | 587 | 0 | 18 | 204 | 88 | 15 | 488 | 0 | 1558 |
| 830-845 | 20 | 32 | 16 | 76 | 575 | 0 | 28 | 228 | 106 | 10 | 440 | 0 | 1531 |
| 845-900 | 24 | 18 | 20 | 85 | 622 | 0 | 28 | 219 | 98 | 15 | 438 | 0 | 1567 |
| 900-915 | 31 | 32 | 22 | 107 | 636 | 0 | 18 | 170 | 95 | 17 | 407 | 0 | 1535 |
| 915-930 | 24 | 13 | 30 | 74 | 575 | 0 | 24 | 112 | 67 | 17 | 381 | 0 | 1317 |
| 930-945 | 29 | 33 | 26 | 72 | 607 | 0 | 23 | 145 | 58 | 16 | 424 | 0 | 1433 |
| 945-1000 | 30 | 28 | 15 | 77 | 523 | 0 | 14 | 99 | 39 | 18 | 337 | 0 | 1180 |
| HOUR TOTALS | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| TIME | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 700-800 | 61 | 77 | 54 | 178 | 1836 | 0 | 55 | 369 | 177 | 49 | 1080 | 1 | 3937 |
| 715-815 | 72 | 74 | 56 | 196 | 1977 | 0 | 55 | 479 | 212 | 53 | 1306 | 0 | 4480 |
| 730-830 | 81 | 87 | 59 | 258 | 2161 | 0 | 62 | 611 | 277 | 61 | 1560 | 0 | 5217 |
| 745-845 | 84 | 99 | 54 | 288 | 2236 | 0 | 75 | 756 | 331 | 63 | 1712 | 0 | 5698 |
| 800-900 | 91 | 97 | 60 | 318 | 2282 | 0 | 84 | 827 | 364 | 48 | 1800 | 0 | 5971 |
| 815-915 | 101 | 111 | 69 | 360 | 2420 | 0 | 92 | 821 | 387 | 57 | 1773 | 0 | 6191 |
| 830-930 | 99 | 95 | 88 | 342 | 2408 | 0 | 98 | 729 | 366 | 59 | 1666 | 0 | 5950 |
| 845-945 | 108 | 96 | 98 | 338 | 2440 | 0 | 93 | 646 | 318 | 65 | 1650 | 0 | 5852 |
| 900-1000 | 114 | 106 | 93 | 330 | 2341 | 0 | 79 | 526 | 259 | 68 | 1549 | 0 | 5465 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

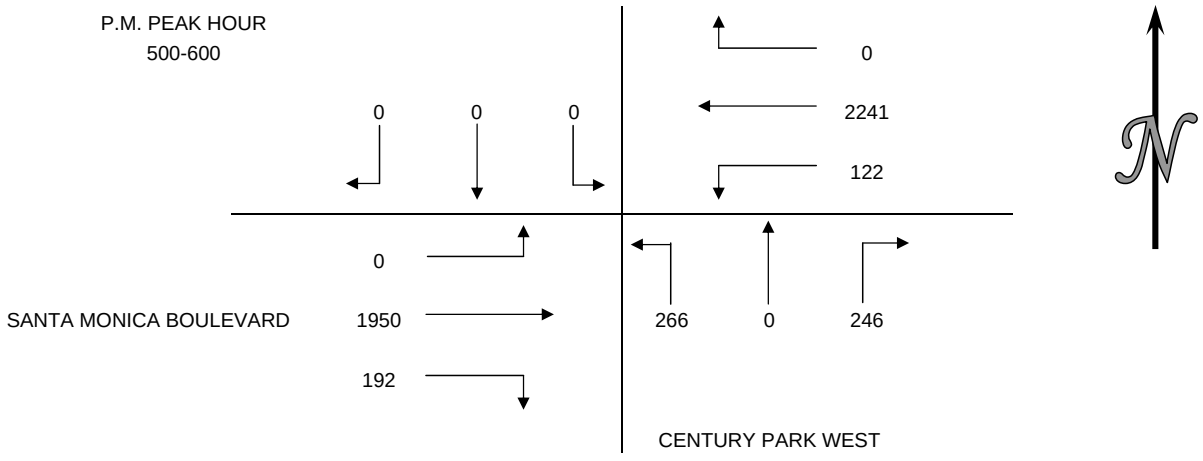
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **4** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | THURSDAY FEBRUARY 10, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | CENTURY PARK WEST | |
| | E/W | SANTA MONICA BOULEVARD | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 0 | 0 | 0 | 0 | 438 | 29 | 57 | 0 | 54 | 33 | 510 | 0 | 1121 |
| 315-330 | 0 | 0 | 0 | 0 | 584 | 31 | 49 | 0 | 58 | 29 | 468 | 0 | 1219 |
| 330-345 | 0 | 0 | 0 | 0 | 502 | 19 | 64 | 0 | 53 | 30 | 479 | 0 | 1147 |
| 345-400 | 0 | 0 | 0 | 0 | 525 | 24 | 53 | 0 | 78 | 35 | 463 | 0 | 1178 |
| 400-415 | 0 | 0 | 0 | 0 | 564 | 28 | 64 | 0 | 78 | 31 | 476 | 0 | 1241 |
| 415-430 | 0 | 0 | 0 | 0 | 520 | 32 | 50 | 0 | 53 | 37 | 407 | 0 | 1099 |
| 430-445 | 0 | 0 | 0 | 0 | 496 | 26 | 59 | 0 | 68 | 47 | 424 | 0 | 1120 |
| 445-500 | 0 | 0 | 0 | 0 | 474 | 24 | 48 | 0 | 78 | 65 | 425 | 0 | 1114 |
| 500-515 | 0 | 0 | 0 | 0 | 536 | 33 | 71 | 0 | 54 | 47 | 501 | 0 | 1242 |
| 515-530 | 0 | 0 | 0 | 0 | 565 | 23 | 55 | 0 | 73 | 49 | 467 | 0 | 1232 |
| 530-545 | 0 | 0 | 0 | 0 | 553 | 30 | 63 | 0 | 74 | 56 | 531 | 0 | 1307 |
| 545-600 | 0 | 0 | 0 | 0 | 587 | 36 | 57 | 0 | 65 | 40 | 451 | 0 | 1236 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 0 | 0 | 0 | 0 | 2049 | 103 | 223 | 0 | 243 | 127 | 1920 | 0 | 4665 |
| 315-415 | 0 | 0 | 0 | 0 | 2175 | 102 | 230 | 0 | 267 | 125 | 1886 | 0 | 4785 |
| 330-430 | 0 | 0 | 0 | 0 | 2111 | 103 | 231 | 0 | 262 | 133 | 1825 | 0 | 4665 |
| 345-445 | 0 | 0 | 0 | 0 | 2105 | 110 | 226 | 0 | 277 | 150 | 1770 | 0 | 4638 |
| 400-500 | 0 | 0 | 0 | 0 | 2054 | 110 | 221 | 0 | 277 | 180 | 1732 | 0 | 4574 |
| 415-515 | 0 | 0 | 0 | 0 | 2026 | 115 | 228 | 0 | 253 | 196 | 1757 | 0 | 4575 |
| 430-530 | 0 | 0 | 0 | 0 | 2071 | 106 | 233 | 0 | 273 | 208 | 1817 | 0 | 4708 |
| 445-545 | 0 | 0 | 0 | 0 | 2128 | 110 | 237 | 0 | 279 | 217 | 1924 | 0 | 4895 |
| 500-600 | 0 | 0 | 0 | 0 | 2241 | 122 | 246 | 0 | 266 | 192 | 1950 | 0 | 5017 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

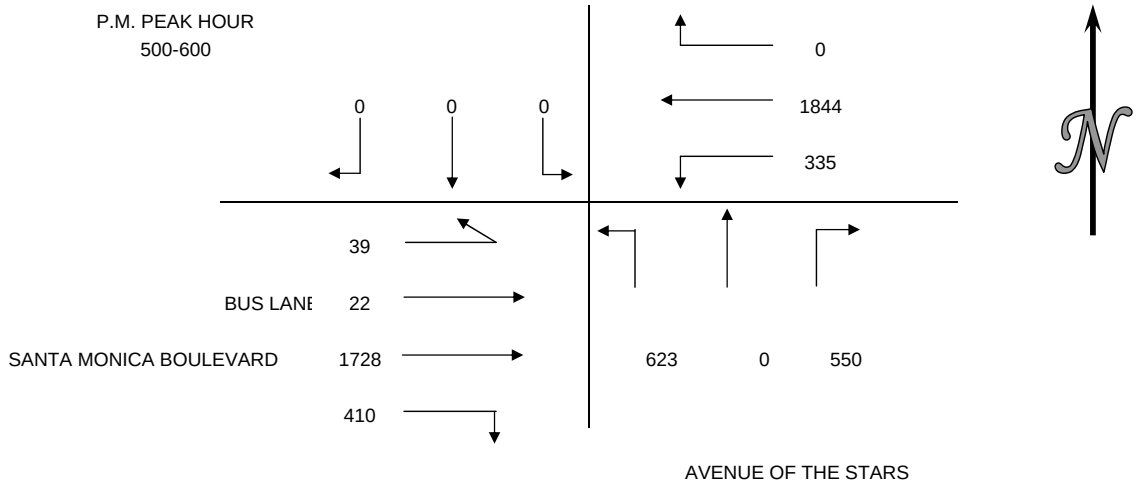
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

**5**

CLIENT: GIBSON TRANSPORTATION CONSULTANTS
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: THURSDAY FEBRUARY 10, 2011
PERIOD: 3:00 PM TO 6:00 PM
INTERSECTION: N/S AVENUE OF THE STARS
E/W SANTA MONICA BOULEVARD

| 15 MIN COUNTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11B | 12U | |
| PERIOD | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBTH | EBLT | TOTAL |
| 300-315 | 0 | 0 | 0 | 0 | 415 | 60 | 81 | 0 | 108 | 101 | 474 | 2 | 14 | 1255 |
| 315-330 | 0 | 0 | 0 | 0 | 493 | 102 | 62 | 0 | 106 | 92 | 413 | 4 | 14 | 1286 |
| 330-345 | 0 | 0 | 0 | 0 | 394 | 82 | 90 | 0 | 87 | 96 | 428 | 4 | 18 | 1199 |
| 345-400 | 0 | 0 | 0 | 0 | 478 | 101 | 114 | 0 | 116 | 93 | 372 | 3 | 9 | 1286 |
| 400-415 | 0 | 0 | 0 | 0 | 426 | 106 | 71 | 0 | 108 | 105 | 423 | 2 | 17 | 1258 |
| 415-430 | 0 | 0 | 0 | 0 | 442 | 82 | 95 | 0 | 123 | 78 | 368 | 5 | 11 | 1204 |
| 430-445 | 0 | 0 | 0 | 0 | 378 | 64 | 104 | 0 | 116 | 84 | 397 | 3 | 7 | 1153 |
| 445-500 | 0 | 0 | 0 | 0 | 402 | 68 | 91 | 0 | 123 | 87 | 409 | 1 | 4 | 1185 |
| 500-515 | 0 | 0 | 0 | 0 | 429 | 74 | 128 | 0 | 138 | 104 | 431 | 4 | 13 | 1321 |
| 515-530 | 0 | 0 | 0 | 0 | 465 | 95 | 120 | 0 | 161 | 109 | 409 | 3 | 9 | 1371 |
| 530-545 | 0 | 0 | 0 | 0 | 442 | 78 | 171 | 0 | 156 | 105 | 453 | 1 | 10 | 1416 |
| 545-600 | 0 | 0 | 0 | 0 | 508 | 88 | 131 | 0 | 168 | 92 | 435 | 1 | 7 | 1430 |
| HOUR TOTALS | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11B | 12U | |
| TIME | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBTH | EBLT | TOTAL |
| 300-400 | 0 | 0 | 0 | 0 | 1780 | 345 | 347 | 0 | 417 | 382 | 1687 | 13 | 55 | 5026 |
| 315-415 | 0 | 0 | 0 | 0 | 1791 | 391 | 337 | 0 | 417 | 386 | 1636 | 13 | 58 | 5029 |
| 330-430 | 0 | 0 | 0 | 0 | 1740 | 371 | 370 | 0 | 434 | 372 | 1591 | 14 | 55 | 4947 |
| 345-445 | 0 | 0 | 0 | 0 | 1724 | 353 | 384 | 0 | 463 | 360 | 1560 | 13 | 44 | 4901 |
| 400-500 | 0 | 0 | 0 | 0 | 1648 | 320 | 361 | 0 | 470 | 354 | 1597 | 11 | 39 | 4800 |
| 415-515 | 0 | 0 | 0 | 0 | 1651 | 288 | 418 | 0 | 500 | 353 | 1605 | 13 | 35 | 4863 |
| 430-530 | 0 | 0 | 0 | 0 | 1674 | 301 | 443 | 0 | 538 | 384 | 1646 | 11 | 33 | 5030 |
| 445-545 | 0 | 0 | 0 | 0 | 1738 | 315 | 510 | 0 | 578 | 405 | 1702 | 9 | 36 | 5293 |
| 500-600 | 0 | 0 | 0 | 0 | 1844 | 335 | 550 | 0 | 623 | 410 | 1728 | 9 | 39 | 5538 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

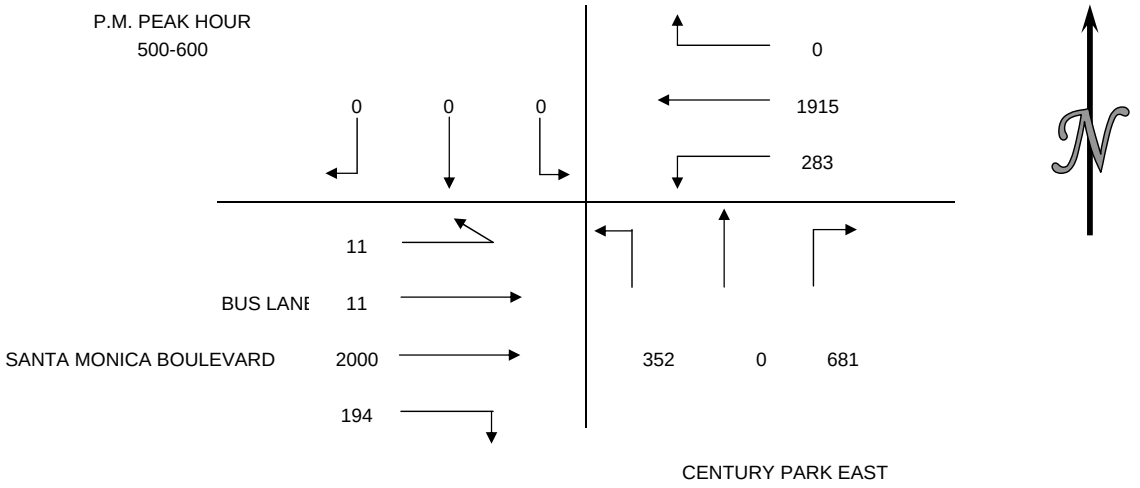
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

**6**

CLIENT: GIBSON TRANSPORTATION CONSULTANTS
PROJECT: CENTURY CITY TRAFFIC COUNTS
DATE: THURSDAY FEBRUARY 10, 2011
PERIOD: 3:00 PM TO 6:00 PM
INTERSECTION: N/S CENTURY PARK EAST
E/W SANTA MONICA BOULEVARD

| 15 MIN COUNTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11B | 12U | |
| PERIOD | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBTH | EBUT | TOTAL |
| 300-315 | 0 | 0 | 0 | 0 | 463 | 159 | 84 | 0 | 58 | 60 | 471 | 4 | 7 | 1306 |
| 315-330 | 0 | 0 | 0 | 0 | 467 | 189 | 79 | 0 | 69 | 61 | 432 | 4 | 4 | 1305 |
| 330-345 | 0 | 0 | 0 | 0 | 459 | 177 | 106 | 0 | 68 | 80 | 460 | 2 | 10 | 1362 |
| 345-400 | 0 | 0 | 0 | 0 | 411 | 127 | 105 | 0 | 56 | 74 | 414 | 3 | 5 | 1195 |
| 400-415 | 0 | 0 | 0 | 0 | 514 | 135 | 111 | 0 | 66 | 52 | 440 | 1 | 5 | 1324 |
| 415-430 | 0 | 0 | 0 | 0 | 406 | 99 | 133 | 0 | 50 | 63 | 419 | 4 | 6 | 1180 |
| 430-445 | 0 | 0 | 0 | 0 | 387 | 116 | 113 | 0 | 62 | 82 | 430 | 3 | 9 | 1202 |
| 445-500 | 0 | 0 | 0 | 0 | 408 | 94 | 133 | 0 | 80 | 69 | 485 | 1 | 6 | 1276 |
| 500-515 | 0 | 0 | 0 | 0 | 437 | 71 | 144 | 0 | 79 | 54 | 453 | 4 | 5 | 1247 |
| 515-530 | 0 | 0 | 0 | 0 | 427 | 57 | 190 | 0 | 81 | 54 | 531 | 2 | 2 | 1344 |
| 530-545 | 0 | 0 | 0 | 0 | 504 | 62 | 218 | 0 | 105 | 48 | 494 | 2 | 4 | 1437 |
| 545-600 | 0 | 0 | 0 | 0 | 547 | 93 | 129 | 0 | 87 | 38 | 522 | 3 | 0 | 1419 |
| HOUR TOTALS | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11B | 12U | |
| TIME | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBTH | EBUT | TOTAL |
| 300-400 | 0 | 0 | 0 | 0 | 1800 | 652 | 374 | 0 | 251 | 275 | 1777 | 13 | 26 | 5168 |
| 315-415 | 0 | 0 | 0 | 0 | 1851 | 628 | 401 | 0 | 259 | 267 | 1746 | 10 | 24 | 5186 |
| 330-430 | 0 | 0 | 0 | 0 | 1790 | 538 | 455 | 0 | 240 | 269 | 1733 | 10 | 26 | 5061 |
| 345-445 | 0 | 0 | 0 | 0 | 1718 | 477 | 462 | 0 | 234 | 271 | 1703 | 11 | 25 | 4901 |
| 400-500 | 0 | 0 | 0 | 0 | 1715 | 444 | 490 | 0 | 258 | 266 | 1774 | 9 | 26 | 4982 |
| 415-515 | 0 | 0 | 0 | 0 | 1638 | 380 | 523 | 0 | 271 | 268 | 1787 | 12 | 26 | 4905 |
| 430-530 | 0 | 0 | 0 | 0 | 1659 | 338 | 580 | 0 | 302 | 259 | 1899 | 10 | 22 | 5069 |
| 445-545 | 0 | 0 | 0 | 0 | 1776 | 284 | 685 | 0 | 345 | 225 | 1963 | 9 | 17 | 5304 |
| 500-600 | 0 | 0 | 0 | 0 | 1915 | 283 | 681 | 0 | 352 | 194 | 2000 | 11 | 11 | 5447 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

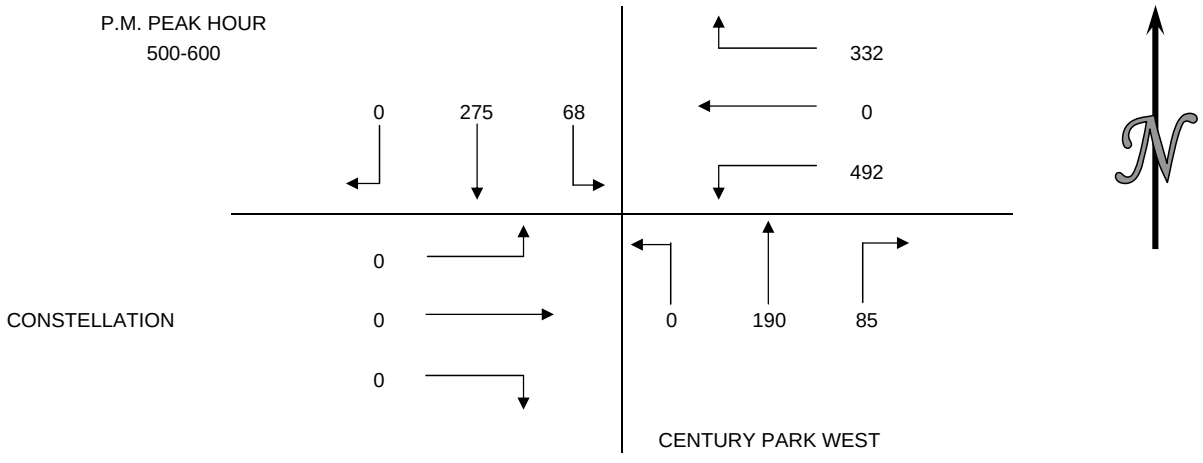
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **9** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | CENTURY PARK WEST | |
| | E/W | CONSTELLATION | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 0 | 47 | 19 | 55 | 0 | 73 | 34 | 50 | 0 | 0 | 0 | 0 | 278 |
| 315-330 | 0 | 40 | 18 | 67 | 0 | 81 | 28 | 34 | 0 | 0 | 0 | 0 | 268 |
| 330-345 | 0 | 33 | 23 | 52 | 0 | 64 | 20 | 35 | 0 | 0 | 0 | 0 | 227 |
| 345-400 | 0 | 49 | 21 | 82 | 0 | 75 | 38 | 38 | 0 | 0 | 0 | 0 | 303 |
| 400-415 | 0 | 58 | 17 | 81 | 0 | 94 | 31 | 36 | 0 | 0 | 0 | 0 | 317 |
| 415-430 | 0 | 56 | 18 | 51 | 0 | 80 | 25 | 41 | 0 | 0 | 0 | 0 | 271 |
| 430-445 | 0 | 59 | 24 | 77 | 0 | 110 | 17 | 44 | 0 | 0 | 0 | 0 | 331 |
| 445-500 | 0 | 60 | 10 | 58 | 0 | 88 | 25 | 24 | 0 | 0 | 0 | 0 | 265 |
| 500-515 | 0 | 68 | 16 | 88 | 0 | 124 | 25 | 40 | 0 | 0 | 0 | 0 | 361 |
| 515-530 | 0 | 76 | 23 | 82 | 0 | 117 | 22 | 46 | 0 | 0 | 0 | 0 | 366 |
| 530-545 | 0 | 59 | 12 | 92 | 0 | 146 | 18 | 57 | 0 | 0 | 0 | 0 | 384 |
| 545-600 | 0 | 72 | 17 | 70 | 0 | 105 | 20 | 47 | 0 | 0 | 0 | 0 | 331 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 0 | 169 | 81 | 256 | 0 | 293 | 120 | 157 | 0 | 0 | 0 | 0 | 1076 |
| 315-415 | 0 | 180 | 79 | 282 | 0 | 314 | 117 | 143 | 0 | 0 | 0 | 0 | 1115 |
| 330-430 | 0 | 196 | 79 | 266 | 0 | 313 | 114 | 150 | 0 | 0 | 0 | 0 | 1118 |
| 345-445 | 0 | 222 | 80 | 291 | 0 | 359 | 111 | 159 | 0 | 0 | 0 | 0 | 1222 |
| 400-500 | 0 | 233 | 69 | 267 | 0 | 372 | 98 | 145 | 0 | 0 | 0 | 0 | 1184 |
| 415-515 | 0 | 243 | 68 | 274 | 0 | 402 | 92 | 149 | 0 | 0 | 0 | 0 | 1228 |
| 430-530 | 0 | 263 | 73 | 305 | 0 | 439 | 89 | 154 | 0 | 0 | 0 | 0 | 1323 |
| 445-545 | 0 | 263 | 61 | 320 | 0 | 475 | 90 | 167 | 0 | 0 | 0 | 0 | 1376 |
| 500-600 | 0 | 275 | 68 | 332 | 0 | 492 | 85 | 190 | 0 | 0 | 0 | 0 | 1442 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

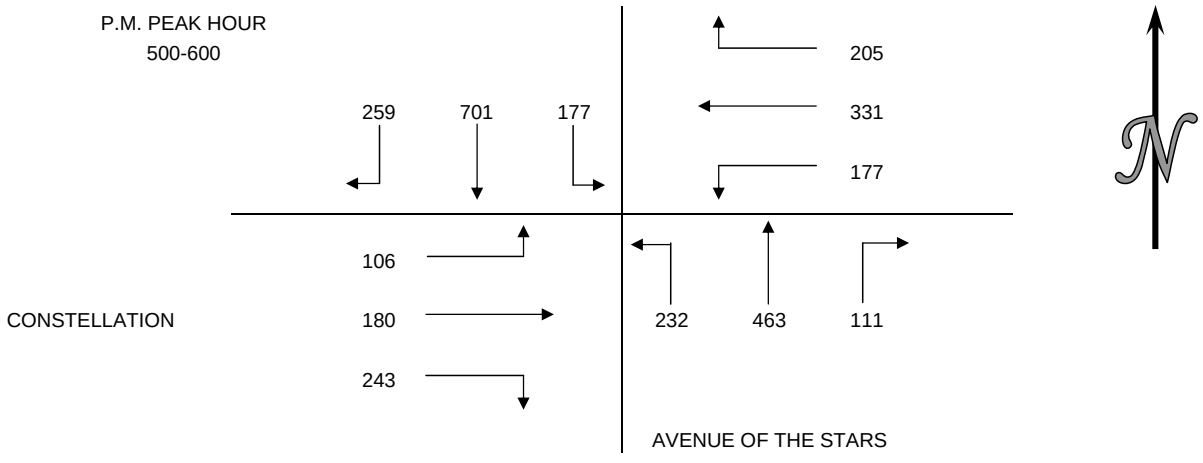
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **10** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | AVENUE OF THE STARS | |
| | E/W | CONSTELLATION | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 45 | 151 | 29 | 24 | 44 | 23 | 26 | 132 | 55 | 47 | 35 | 19 | 630 |
| 315-330 | 36 | 130 | 32 | 32 | 44 | 17 | 25 | 129 | 46 | 31 | 23 | 16 | 561 |
| 330-345 | 27 | 120 | 30 | 18 | 43 | 19 | 32 | 115 | 42 | 37 | 34 | 20 | 537 |
| 345-400 | 53 | 125 | 33 | 23 | 34 | 18 | 22 | 130 | 64 | 44 | 40 | 16 | 602 |
| 400-415 | 73 | 144 | 30 | 34 | 53 | 22 | 29 | 125 | 51 | 33 | 33 | 19 | 646 |
| 415-430 | 51 | 124 | 34 | 23 | 40 | 27 | 23 | 112 | 44 | 42 | 39 | 12 | 571 |
| 430-445 | 55 | 136 | 29 | 32 | 58 | 38 | 29 | 104 | 47 | 43 | 37 | 18 | 626 |
| 445-500 | 50 | 142 | 26 | 36 | 47 | 26 | 20 | 119 | 55 | 37 | 28 | 11 | 597 |
| 500-515 | 61 | 171 | 46 | 54 | 79 | 47 | 35 | 104 | 53 | 60 | 46 | 26 | 782 |
| 515-530 | 47 | 179 | 41 | 45 | 73 | 39 | 24 | 112 | 61 | 63 | 30 | 20 | 734 |
| 530-545 | 76 | 192 | 37 | 50 | 88 | 56 | 32 | 111 | 45 | 59 | 50 | 36 | 832 |
| 545-600 | 75 | 159 | 53 | 56 | 91 | 35 | 20 | 136 | 73 | 61 | 54 | 24 | 837 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 161 | 526 | 124 | 97 | 165 | 77 | 105 | 506 | 207 | 159 | 132 | 71 | 2330 |
| 315-415 | 189 | 519 | 125 | 107 | 174 | 76 | 108 | 499 | 203 | 145 | 130 | 71 | 2346 |
| 330-430 | 204 | 513 | 127 | 98 | 170 | 86 | 106 | 482 | 201 | 156 | 146 | 67 | 2356 |
| 345-445 | 232 | 529 | 126 | 112 | 185 | 105 | 103 | 471 | 206 | 162 | 149 | 65 | 2445 |
| 400-500 | 229 | 546 | 119 | 125 | 198 | 113 | 101 | 460 | 197 | 155 | 137 | 60 | 2440 |
| 415-515 | 217 | 573 | 135 | 145 | 224 | 138 | 107 | 439 | 199 | 182 | 150 | 67 | 2576 |
| 430-530 | 213 | 628 | 142 | 167 | 257 | 150 | 108 | 439 | 216 | 203 | 141 | 75 | 2739 |
| 445-545 | 234 | 684 | 150 | 185 | 287 | 168 | 111 | 446 | 214 | 219 | 154 | 93 | 2945 |
| 500-600 | 259 | 701 | 177 | 205 | 331 | 177 | 111 | 463 | 232 | 243 | 180 | 106 | 3185 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | |
|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 |
| PERIOD: | | 3:00 PM TO 6:00 PM |
| INTERSECTION: | N/S | CENTURY PARK EAST |
| | E/W | CONSTELLATION |

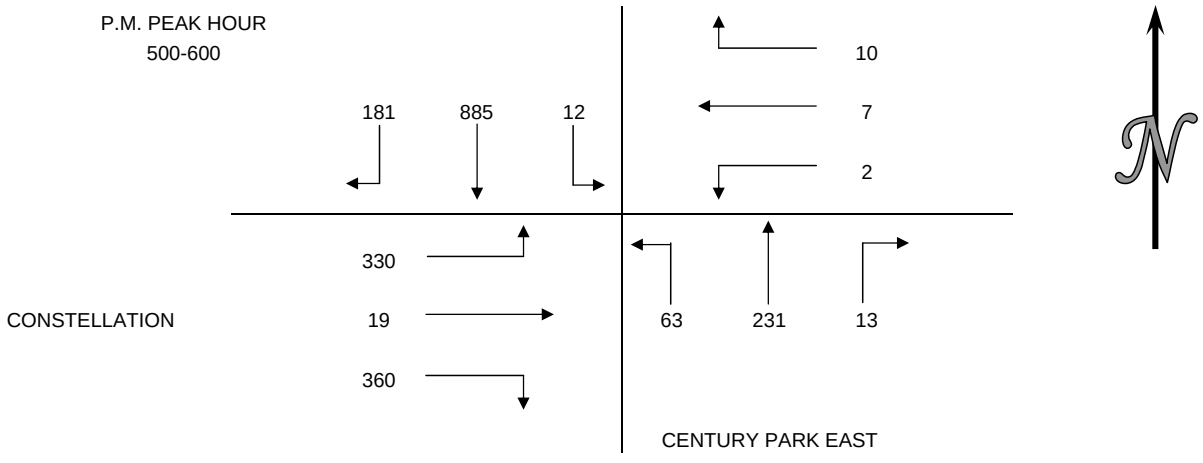
**11**

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 38 | 108 | 0 | 0 | 2 | 0 | 4 | 68 | 16 | 71 | 3 | 41 | 351 |
| 315-330 | 29 | 135 | 2 | 1 | 2 | 2 | 5 | 81 | 24 | 60 | 1 | 28 | 370 |
| 330-345 | 24 | 132 | 3 | 2 | 1 | 0 | 5 | 77 | 24 | 63 | 1 | 35 | 367 |
| 345-400 | 34 | 135 | 1 | 5 | 0 | 0 | 2 | 83 | 21 | 60 | 0 | 36 | 377 |
| 400-415 | 24 | 141 | 1 | 4 | 5 | 0 | 0 | 96 | 26 | 72 | 2 | 43 | 414 |
| 415-430 | 24 | 150 | 1 | 1 | 1 | 1 | 0 | 59 | 17 | 55 | 2 | 49 | 360 |
| 430-445 | 28 | 165 | 3 | 0 | 0 | 0 | 1 | 62 | 26 | 82 | 4 | 56 | 427 |
| 445-500 | 21 | 147 | 3 | 0 | 4 | 3 | 3 | 55 | 12 | 66 | 1 | 75 | 390 |
| 500-515 | 49 | 197 | 0 | 3 | 4 | 0 | 1 | 69 | 19 | 105 | 5 | 92 | 544 |
| 515-530 | 64 | 265 | 7 | 1 | 0 | 0 | 2 | 52 | 12 | 63 | 0 | 76 | 542 |
| 530-545 | 25 | 228 | 1 | 3 | 1 | 2 | 3 | 56 | 17 | 105 | 3 | 92 | 536 |
| 545-600 | 43 | 195 | 4 | 3 | 2 | 0 | 7 | 54 | 15 | 87 | 11 | 70 | 491 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 125 | 510 | 6 | 8 | 5 | 2 | 16 | 309 | 85 | 254 | 5 | 140 | 1465 |
| 315-415 | 111 | 543 | 7 | 12 | 8 | 2 | 12 | 337 | 95 | 255 | 4 | 142 | 1528 |
| 330-430 | 106 | 558 | 6 | 12 | 7 | 1 | 7 | 315 | 88 | 250 | 5 | 163 | 1518 |
| 345-445 | 110 | 591 | 6 | 10 | 6 | 1 | 3 | 300 | 90 | 269 | 8 | 184 | 1578 |
| 400-500 | 97 | 603 | 8 | 5 | 10 | 4 | 4 | 272 | 81 | 275 | 9 | 223 | 1591 |
| 415-515 | 122 | 659 | 7 | 4 | 9 | 4 | 5 | 245 | 74 | 308 | 12 | 272 | 1721 |
| 430-530 | 162 | 774 | 13 | 4 | 8 | 3 | 7 | 238 | 69 | 316 | 10 | 299 | 1903 |
| 445-545 | 159 | 837 | 11 | 7 | 9 | 5 | 9 | 232 | 60 | 339 | 9 | 335 | 2012 |
| 500-600 | 181 | 885 | 12 | 10 | 7 | 2 | 13 | 231 | 63 | 360 | 19 | 330 | 2113 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

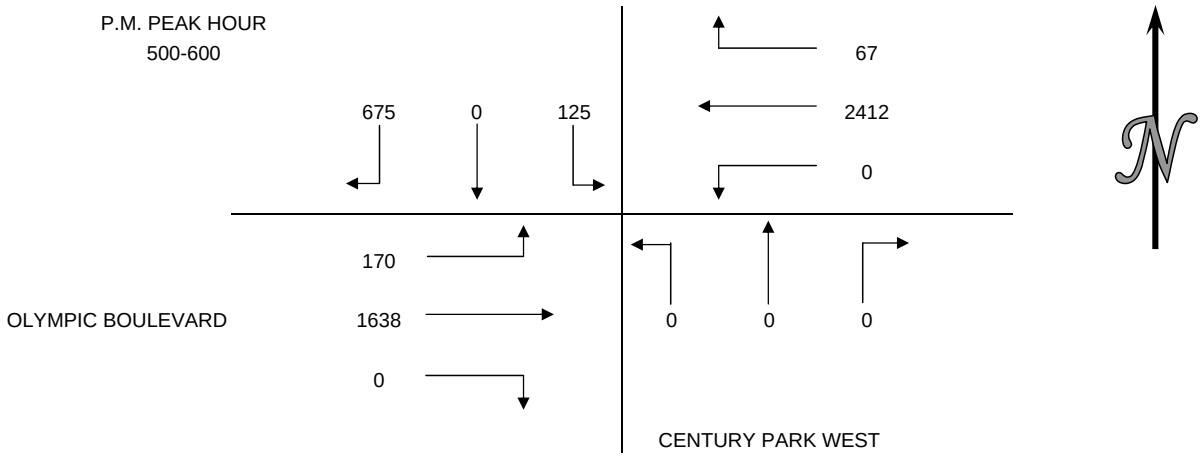
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **14** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | TUESDAY FEBRUARY 8, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | CENTURY PARK WEST | |
| | E/W | OLYMPIC BOULEVARD | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 115 | 0 | 30 | 14 | 455 | 0 | 0 | 0 | 0 | 0 | 381 | 65 | 1060 |
| 315-330 | 90 | 0 | 17 | 18 | 506 | 0 | 0 | 0 | 0 | 0 | 390 | 41 | 1062 |
| 330-345 | 82 | 0 | 32 | 15 | 512 | 0 | 0 | 0 | 0 | 0 | 450 | 65 | 1156 |
| 345-400 | 106 | 0 | 22 | 20 | 500 | 0 | 0 | 0 | 0 | 0 | 353 | 56 | 1057 |
| 400-415 | 133 | 0 | 28 | 21 | 534 | 0 | 0 | 0 | 0 | 0 | 420 | 38 | 1174 |
| 415-430 | 105 | 0 | 26 | 12 | 532 | 0 | 0 | 0 | 0 | 0 | 449 | 61 | 1185 |
| 430-445 | 145 | 0 | 25 | 14 | 568 | 0 | 0 | 0 | 0 | 0 | 428 | 41 | 1221 |
| 445-500 | 130 | 0 | 24 | 11 | 543 | 0 | 0 | 0 | 0 | 0 | 405 | 52 | 1165 |
| 500-515 | 199 | 0 | 28 | 12 | 607 | 0 | 0 | 0 | 0 | 0 | 422 | 30 | 1298 |
| 515-530 | 148 | 0 | 35 | 19 | 668 | 0 | 0 | 0 | 0 | 0 | 400 | 31 | 1301 |
| 530-545 | 157 | 0 | 27 | 15 | 543 | 0 | 0 | 0 | 0 | 0 | 434 | 64 | 1240 |
| 545-600 | 171 | 0 | 35 | 21 | 594 | 0 | 0 | 0 | 0 | 0 | 382 | 45 | 1248 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 393 | 0 | 101 | 67 | 1973 | 0 | 0 | 0 | 0 | 0 | 1574 | 227 | 4335 |
| 315-415 | 411 | 0 | 99 | 74 | 2052 | 0 | 0 | 0 | 0 | 0 | 1613 | 200 | 4449 |
| 330-430 | 426 | 0 | 108 | 68 | 2078 | 0 | 0 | 0 | 0 | 0 | 1672 | 220 | 4572 |
| 345-445 | 489 | 0 | 101 | 67 | 2134 | 0 | 0 | 0 | 0 | 0 | 1650 | 196 | 4637 |
| 400-500 | 513 | 0 | 103 | 58 | 2177 | 0 | 0 | 0 | 0 | 0 | 1702 | 192 | 4745 |
| 415-515 | 579 | 0 | 103 | 49 | 2250 | 0 | 0 | 0 | 0 | 0 | 1704 | 184 | 4869 |
| 430-530 | 622 | 0 | 112 | 56 | 2386 | 0 | 0 | 0 | 0 | 0 | 1655 | 154 | 4985 |
| 445-545 | 634 | 0 | 114 | 57 | 2361 | 0 | 0 | 0 | 0 | 0 | 1661 | 177 | 5004 |
| 500-600 | 675 | 0 | 125 | 67 | 2412 | 0 | 0 | 0 | 0 | 0 | 1638 | 170 | 5087 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969


INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

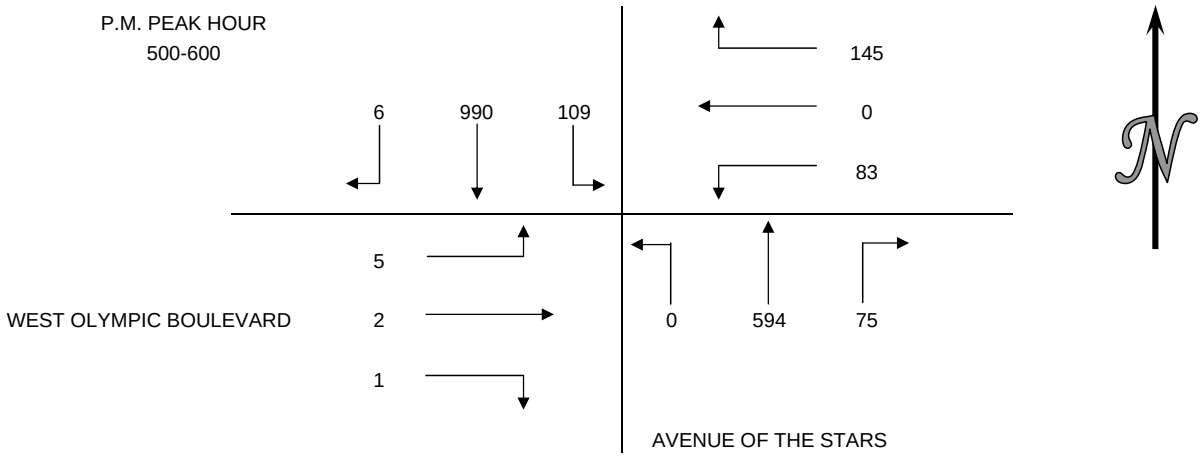
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **15** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | AVENUE OF THE STARS | |
| | E/W | WEST OLYMPIC BOULEVARD | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 2 | 200 | 26 | 51 | 0 | 24 | 21 | 149 | 0 | 2 | 1 | 1 | 477 |
| 315-330 | 0 | 154 | 13 | 39 | 0 | 17 | 11 | 145 | 0 | 1 | 0 | 2 | 382 |
| 330-345 | 1 | 139 | 19 | 28 | 0 | 23 | 17 | 132 | 2 | 2 | 0 | 1 | 364 |
| 345-400 | 0 | 175 | 23 | 40 | 0 | 27 | 9 | 148 | 0 | 0 | 0 | 1 | 423 |
| 400-415 | 2 | 190 | 26 | 44 | 0 | 38 | 14 | 174 | 1 | 3 | 0 | 0 | 492 |
| 415-430 | 0 | 166 | 15 | 32 | 0 | 18 | 10 | 143 | 0 | 3 | 0 | 0 | 387 |
| 430-445 | 0 | 181 | 35 | 39 | 3 | 25 | 18 | 152 | 1 | 0 | 0 | 2 | 456 |
| 445-500 | 1 | 208 | 20 | 40 | 1 | 29 | 15 | 122 | 0 | 2 | 0 | 1 | 439 |
| 500-515 | 1 | 238 | 19 | 45 | 0 | 29 | 16 | 157 | 0 | 0 | 0 | 3 | 508 |
| 515-530 | 0 | 257 | 31 | 40 | 0 | 22 | 18 | 139 | 0 | 1 | 1 | 1 | 510 |
| 530-545 | 1 | 255 | 35 | 24 | 0 | 15 | 16 | 147 | 0 | 0 | 1 | 1 | 495 |
| 545-600 | 4 | 240 | 24 | 36 | 0 | 17 | 25 | 151 | 0 | 0 | 0 | 0 | 497 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 3 | 668 | 81 | 158 | 0 | 91 | 58 | 574 | 2 | 5 | 1 | 5 | 1646 |
| 315-415 | 3 | 658 | 81 | 151 | 0 | 105 | 51 | 599 | 3 | 6 | 0 | 4 | 1661 |
| 330-430 | 3 | 670 | 83 | 144 | 0 | 106 | 50 | 597 | 3 | 8 | 0 | 2 | 1666 |
| 345-445 | 2 | 712 | 99 | 155 | 3 | 108 | 51 | 617 | 2 | 6 | 0 | 3 | 1758 |
| 400-500 | 3 | 745 | 96 | 155 | 4 | 110 | 57 | 591 | 2 | 8 | 0 | 3 | 1774 |
| 415-515 | 2 | 793 | 89 | 156 | 4 | 101 | 59 | 574 | 1 | 5 | 0 | 6 | 1790 |
| 430-530 | 2 | 884 | 105 | 164 | 4 | 105 | 67 | 570 | 1 | 3 | 1 | 7 | 1913 |
| 445-545 | 3 | 958 | 105 | 149 | 1 | 95 | 65 | 565 | 0 | 3 | 2 | 6 | 1952 |
| 500-600 | 6 | 990 | 109 | 145 | 0 | 83 | 75 | 594 | 0 | 1 | 2 | 5 | 2010 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

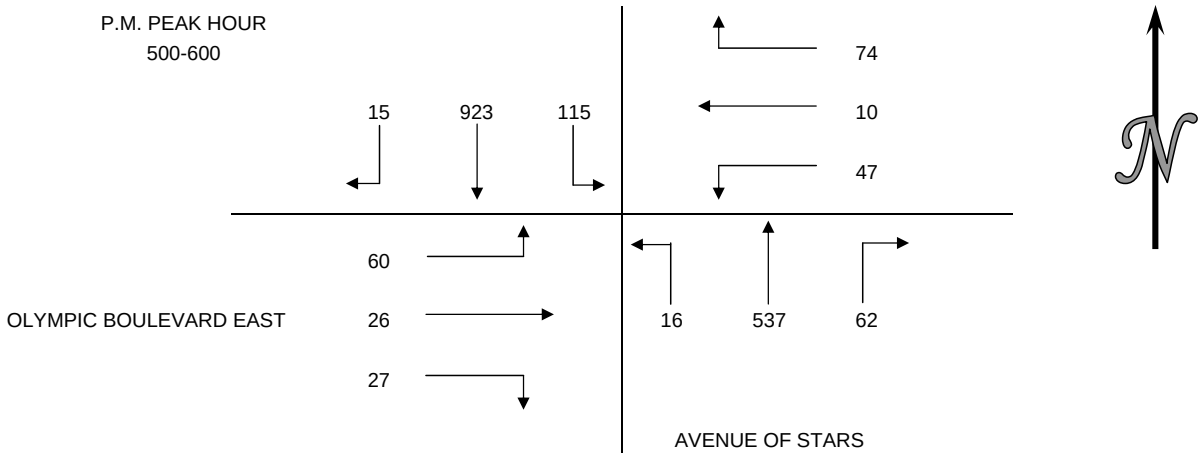
| | | | |
|---|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS | **16** |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS | |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 | |
| PERIOD: | | 3:00 PM TO 6:00 PM | |
| INTERSECTION: | N/S | AVENUE OF STARS | |
| | E/W | OLYMPIC BOULEVARD EAST | |

15 MIN COUNTS

| PERIOD | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-315 | 10 | 184 | 23 | 21 | 0 | 10 | 16 | 127 | 3 | 1 | 2 | 10 | 407 |
| 315-330 | 7 | 141 | 12 | 12 | 1 | 4 | 10 | 139 | 3 | 8 | 1 | 3 | 341 |
| 330-345 | 3 | 147 | 22 | 21 | 3 | 8 | 10 | 130 | 5 | 6 | 1 | 4 | 360 |
| 345-400 | 7 | 173 | 15 | 19 | 1 | 13 | 8 | 127 | 3 | 4 | 2 | 2 | 374 |
| 400-415 | 5 | 188 | 33 | 20 | 1 | 4 | 17 | 154 | 2 | 8 | 5 | 8 | 445 |
| 415-430 | 5 | 190 | 21 | 19 | 1 | 10 | 11 | 121 | 3 | 6 | 3 | 4 | 394 |
| 430-445 | 2 | 188 | 18 | 21 | 1 | 11 | 10 | 134 | 6 | 4 | 4 | 11 | 410 |
| 445-500 | 4 | 200 | 20 | 18 | 1 | 9 | 8 | 114 | 2 | 4 | 8 | 6 | 394 |
| 500-515 | 10 | 242 | 34 | 18 | 5 | 8 | 18 | 126 | 5 | 9 | 8 | 16 | 499 |
| 515-530 | 2 | 221 | 28 | 16 | 2 | 10 | 17 | 123 | 1 | 5 | 9 | 13 | 447 |
| 530-545 | 1 | 257 | 29 | 15 | 2 | 16 | 10 | 137 | 7 | 7 | 6 | 16 | 503 |
| 545-600 | 2 | 203 | 24 | 25 | 1 | 13 | 17 | 151 | 3 | 6 | 3 | 15 | 463 |

HOUR TOTALS

| TIME | 1 SBRT | 2 SBTH | 3 SBLT | 4 WBRT | 5 WBTH | 6 WBLT | 7 NBRT | 8 NBTH | 9 NBLT | 10 EBRT | 11 EBTH | 12 EBLT | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300-400 | 27 | 645 | 72 | 73 | 5 | 35 | 44 | 523 | 14 | 19 | 6 | 19 | 1482 |
| 315-415 | 22 | 649 | 82 | 72 | 6 | 29 | 45 | 550 | 13 | 26 | 9 | 17 | 1520 |
| 330-430 | 20 | 698 | 91 | 79 | 6 | 35 | 46 | 532 | 13 | 24 | 11 | 18 | 1573 |
| 345-445 | 19 | 739 | 87 | 79 | 4 | 38 | 46 | 536 | 14 | 22 | 14 | 25 | 1623 |
| 400-500 | 16 | 766 | 92 | 78 | 4 | 34 | 46 | 523 | 13 | 22 | 20 | 29 | 1643 |
| 415-515 | 21 | 820 | 93 | 76 | 8 | 38 | 47 | 495 | 16 | 23 | 23 | 37 | 1697 |
| 430-530 | 18 | 851 | 100 | 73 | 9 | 38 | 53 | 497 | 14 | 22 | 29 | 46 | 1750 |
| 445-545 | 17 | 920 | 111 | 67 | 10 | 43 | 53 | 500 | 15 | 25 | 31 | 51 | 1843 |
| 500-600 | 15 | 923 | 115 | 74 | 10 | 47 | 62 | 537 | 16 | 27 | 26 | 60 | 1912 |



# WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

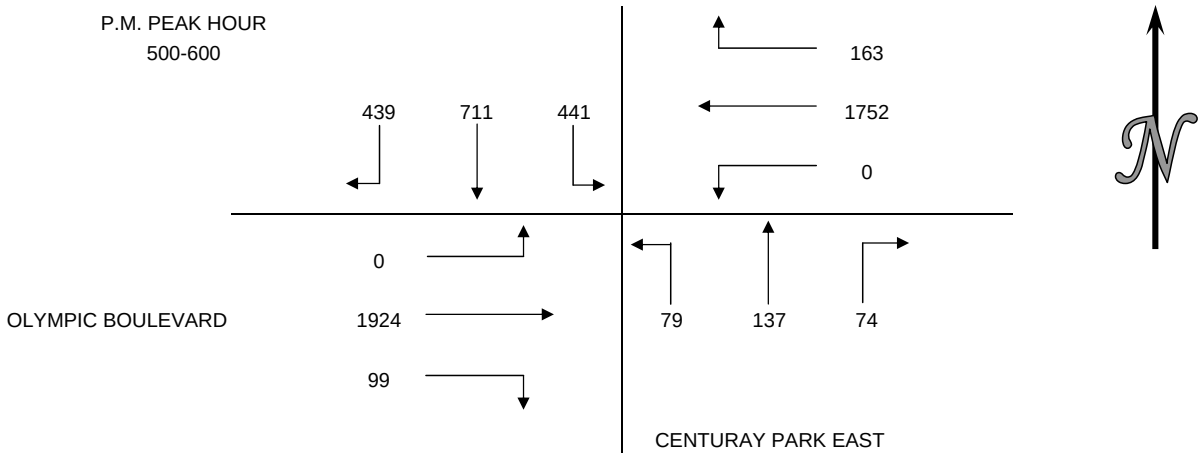
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

**INTERSECTION**

| | | |
|---|---|---|
| CLIENT: | | GIBSON TRANSPORTATION CONSULTANTS |
| PROJECT: | | CENTURY CITY TRAFFIC COUNTS |
| DATE: | | WEDNESDAY FEBRUARY 9, 2011 |
| PERIOD: | | 3:00 PM TO 6:00 PM |
| INTERSECTION: | N/S | CENTURAY PARK EAST |
| | E/W | OLYMPIC BOULEVARD |

**17**

| 15 MIN COUNTS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| PERIOD | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 300-315 | 55 | 62 | 68 | 47 | 364 | 0 | 26 | 41 | 17 | 23 | 361 | 0 | 1064 |
| 315-330 | 51 | 68 | 58 | 33 | 331 | 0 | 18 | 58 | 15 | 27 | 381 | 0 | 1040 |
| 330-345 | 68 | 82 | 84 | 45 | 379 | 0 | 25 | 63 | 18 | 20 | 419 | 0 | 1203 |
| 345-400 | 59 | 66 | 70 | 47 | 366 | 0 | 17 | 62 | 16 | 26 | 443 | 0 | 1172 |
| 400-415 | 86 | 87 | 82 | 40 | 372 | 1 | 21 | 57 | 20 | 34 | 486 | 0 | 1286 |
| 415-430 | 86 | 96 | 98 | 37 | 399 | 0 | 27 | 43 | 10 | 18 | 430 | 0 | 1244 |
| 430-445 | 101 | 87 | 98 | 45 | 452 | 0 | 17 | 36 | 17 | 21 | 512 | 0 | 1386 |
| 445-500 | 95 | 104 | 87 | 43 | 432 | 0 | 10 | 27 | 7 | 23 | 439 | 0 | 1267 |
| 500-515 | 122 | 174 | 104 | 55 | 416 | 0 | 23 | 33 | 12 | 25 | 445 | 0 | 1409 |
| 515-530 | 100 | 156 | 112 | 40 | 474 | 0 | 19 | 32 | 22 | 26 | 524 | 0 | 1505 |
| 530-545 | 104 | 192 | 135 | 22 | 405 | 0 | 17 | 28 | 24 | 24 | 487 | 0 | 1438 |
| 545-600 | 113 | 189 | 90 | 46 | 457 | 0 | 15 | 44 | 21 | 24 | 468 | 0 | 1467 |
| HOUR TOTALS | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| TIME | SBRT | SBTH | SBLT | WBRT | WBTH | WBLT | NBRT | NBTH | NBLT | EBRT | EBTH | EBLT | TOTAL |
| 300-400 | 233 | 278 | 280 | 172 | 1440 | 0 | 86 | 224 | 66 | 96 | 1604 | 0 | 4479 |
| 315-415 | 264 | 303 | 294 | 165 | 1448 | 1 | 81 | 240 | 69 | 107 | 1729 | 0 | 4701 |
| 330-430 | 299 | 331 | 334 | 169 | 1516 | 1 | 90 | 225 | 64 | 98 | 1778 | 0 | 4905 |
| 345-445 | 332 | 336 | 348 | 169 | 1589 | 1 | 82 | 198 | 63 | 99 | 1871 | 0 | 5088 |
| 400-500 | 368 | 374 | 365 | 165 | 1655 | 1 | 75 | 163 | 54 | 96 | 1867 | 0 | 5183 |
| 415-515 | 404 | 461 | 387 | 180 | 1699 | 0 | 77 | 139 | 46 | 87 | 1826 | 0 | 5306 |
| 430-530 | 418 | 521 | 401 | 183 | 1774 | 0 | 69 | 128 | 58 | 95 | 1920 | 0 | 5567 |
| 445-545 | 421 | 626 | 438 | 160 | 1727 | 0 | 69 | 120 | 65 | 98 | 1895 | 0 | 5619 |
| 500-600 | 439 | 711 | 441 | 163 | 1752 | 0 | 74 | 137 | 79 | 99 | 1924 | 0 | 5819 |



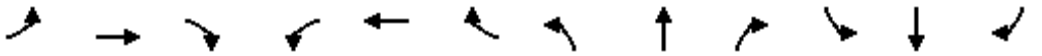
# APPENDIX C EXISTING LEVEL OF SERVICE CONDITIONS

# APPENDIX C EXISTING LEVEL OF SERVICE CONDITIONS



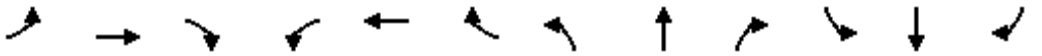
| Movement | EBU | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 8 | 1556 | 668 | 956 | 1987 | 132 | 249 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 0.97 | 0.86 | 0.97 | 0.88 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1118 | 4047 | 971 | 2168 | 4047 | 2168 | 1760 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1118 | 4047 | 971 | 2168 | 4047 | 2168 | 1760 |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 8 | 1604 | 689 | 986 | 2048 | 136 | 257 |
| RTOR Reduction (vph) | 0 | 0 | 62 | 0 | 0 | 0 | 192 |
| Lane Group Flow (vph) | 8 | 1604 | 627 | 986 | 2048 | 136 | 65 |
| Confl. Peds. (#/hr) | | | 33 | 33 | | | 38 |
| Confl. Bikes (#/hr) | | | 14 | | | | 1 |
| Turn Type | Prot | NA | pm+ov | Prot | NA | Prot | Over |
| Protected Phases | 1 | 6 | 4 | 3 | 2 3 | 4 | 3 |
| Permitted Phases | | | 6 | | | | |
| Actuated Green, G (s) | 1.0 | 31.0 | 59.1 | 29.0 | 66.0 | 28.1 | 29.0 |
| Effective Green, g (s) | 2.0 | 33.0 | 64.9 | 28.0 | 68.0 | 31.0 | 28.0 |
| Actuated g/C Ratio | 0.02 | 0.30 | 0.59 | 0.25 | 0.62 | 0.28 | 0.25 |
| Clearance Time (s) | 5.0 | 6.0 | 6.9 | 3.0 | | 6.9 | 3.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 20 | 1214 | 572 | 551 | 2501 | 610 | 448 |
| v/s Ratio Prot | c0.01 | c0.40 | c0.31 | c0.45 | 0.51 | 0.06 | 0.04 |
| v/s Ratio Perm | | | 0.34 | | | | |
| v/c Ratio | 0.40 | 1.32 | 1.10 | 1.79 | 0.82 | 0.22 | 0.15 |
| Uniform Delay, d1 | 53.4 | 38.5 | 22.5 | 41.0 | 16.2 | 30.3 | 31.7 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 12.6 | 150.4 | 66.6 | 362.5 | 2.2 | 0.2 | 0.2 |
| Delay (s) | 66.0 | 188.9 | 89.2 | 403.5 | 18.4 | 30.5 | 31.9 |
| Level of Service | E | F | F | F | B | C | C |
| Approach Delay (s) | | 158.6 | | | 143.6 | 31.4 | |
| Approach LOS | | F | | | F | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 141.9 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.37 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 118.3% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 101 | 14 | 146 | 0 | 18 | 21 | 220 | 814 | 8 | 16 | 452 | 334 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 0.95 | 0.88 | | 1.00 | | 1.00 | 0.91 | | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | | 0.93 | | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | 1.00 | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1504 | 1524 | 2493 | | 1544 | | 1583 | 4543 | | 1583 | 3167 | 1417 |
| Flt Permitted | 0.95 | 0.96 | 1.00 | | 1.00 | | 0.39 | 1.00 | | 0.23 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1504 | 1524 | 2493 | | 1544 | | 653 | 4543 | | 376 | 3167 | 1417 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 115 | 16 | 166 | 0 | 20 | 24 | 250 | 925 | 9 | 18 | 514 | 380 |
| RTOR Reduction (vph) | 0 | 0 | 136 | 0 | 21 | 0 | 0 | 1 | 0 | 0 | 0 | 289 |
| Lane Group Flow (vph) | 57 | 74 | 30 | 0 | 23 | 0 | 250 | 933 | 0 | 18 | 514 | 91 |
| Turn Type | Split | NA | custom | | NA | | pm+pt | NA | | Perm | NA | Over |
| Protected Phases | 4 | 4 | 7 1 | | 3 | | 1 | 6 | | | 2 | 4 |
| Permitted Phases | | | | | | | 6 | | | 2 | | |
| Actuated Green, G (s) | 21.0 | 21.0 | 15.1 | | 9.7 | | 40.5 | 35.5 | | 35.5 | 35.5 | 21.0 |
| Effective Green, g (s) | 21.6 | 21.6 | 16.3 | | 10.7 | | 40.5 | 36.7 | | 36.7 | 36.7 | 21.6 |
| Actuated g/C Ratio | 0.24 | 0.24 | 0.18 | | 0.12 | | 0.45 | 0.41 | | 0.41 | 0.41 | 0.24 |
| Clearance Time (s) | 4.6 | 4.6 | | | 5.0 | | 4.0 | 5.2 | | 5.2 | 5.2 | 4.6 |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.4 | | 3.2 | 3.2 | 3.0 |
| Lane Grp Cap (vph) | 360 | 365 | 451 | | 183 | | 345 | 1852 | | 153 | 1291 | 340 |
| v/s Ratio Prot | 0.04 | 0.05 | 0.01 | | c0.01 | | c0.04 | 0.21 | | | 0.16 | c0.06 |
| v/s Ratio Perm | | | | | | | c0.29 | | | 0.05 | | |
| v/c Ratio | 0.16 | 0.20 | 0.07 | | 0.12 | | 0.72 | 0.50 | | 0.12 | 0.40 | 0.27 |
| Uniform Delay, d1 | 27.0 | 27.3 | 30.5 | | 35.5 | | 19.3 | 19.9 | | 16.6 | 18.8 | 27.8 |
| Progression Factor | 0.76 | 0.77 | 1.49 | | 1.00 | | 1.78 | 1.56 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.7 | 0.9 | 0.0 | | 0.3 | | 4.6 | 0.6 | | 1.6 | 0.9 | 1.9 |
| Delay (s) | 21.3 | 21.9 | 45.5 | | 35.8 | | 39.1 | 31.6 | | 18.1 | 19.8 | 29.7 |
| Level of Service | C | C | D | | D | | D | C | | B | B | C |
| Approach Delay (s) | | 35.0 | | | 35.8 | | | 33.2 | | | 23.9 | |
| Approach LOS | | C | | | D | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 30.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.50 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 16.6 |
| Intersection Capacity Utilization | 50.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



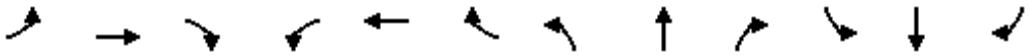
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1809 | 59 | 0 | 2469 | 368 | 395 | 838 | 94 | 71 | 114 | 104 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 1.00 | | 0.86 | | 0.97 | 0.91 | | 0.97 | 0.95 | 0.88 |
| Frt | | 1.00 | 0.85 | | 0.98 | | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 4550 | 1417 | | 5622 | | 3072 | 4481 | | 3072 | 3167 | 2493 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 4550 | 1417 | | 5622 | | 3072 | 4481 | | 3072 | 3167 | 2493 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 0 | 1846 | 60 | 0 | 2519 | 376 | 403 | 855 | 96 | 72 | 116 | 106 |
| RTOR Reduction (vph) | 0 | 0 | 25 | 0 | 27 | 0 | 0 | 15 | 0 | 0 | 0 | 58 |
| Lane Group Flow (vph) | 0 | 1846 | 35 | 0 | 2868 | 0 | 403 | 936 | 0 | 72 | 116 | 48 |
| Turn Type | | NA | pm+ov | | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | | 6 | 3 | | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 6 | | | | | | | | | 4 |
| Actuated Green, G (s) | | 40.1 | 52.1 | | 40.1 | | 12.0 | 28.7 | | 6.4 | 23.1 | 23.1 |
| Effective Green, g (s) | | 41.6 | 52.1 | | 41.6 | | 12.0 | 30.0 | | 6.4 | 24.4 | 24.4 |
| Actuated g/C Ratio | | 0.46 | 0.58 | | 0.46 | | 0.13 | 0.33 | | 0.07 | 0.27 | 0.27 |
| Clearance Time (s) | | 5.5 | 4.0 | | 5.5 | | 4.0 | 5.3 | | 4.0 | 5.3 | 5.3 |
| Vehicle Extension (s) | | 4.9 | 3.0 | | 5.2 | | 3.0 | 5.1 | | 3.0 | 5.1 | 5.1 |
| Lane Grp Cap (vph) | | 2103 | 820 | | 2598 | | 409 | 1493 | | 218 | 858 | 675 |
| v/s Ratio Prot | | 0.41 | 0.01 | | c0.51 | | c0.13 | c0.21 | | 0.02 | 0.04 | |
| v/s Ratio Perm | | | 0.02 | | | | | | | | | 0.02 |
| v/c Ratio | | 0.88 | 0.04 | | 1.10 | | 0.99 | 0.63 | | 0.33 | 0.14 | 0.07 |
| Uniform Delay, d1 | | 21.9 | 8.2 | | 24.2 | | 38.9 | 25.3 | | 39.8 | 24.8 | 24.4 |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.54 | 0.45 | 0.16 |
| Incremental Delay, d2 | | 5.6 | 0.0 | | 53.2 | | 40.3 | 2.0 | | 0.9 | 0.1 | 0.1 |
| Delay (s) | | 27.5 | 8.2 | | 77.4 | | 79.2 | 27.3 | | 62.2 | 11.4 | 3.9 |
| Level of Service | | C | A | | E | | E | C | | E | B | A |
| Approach Delay (s) | | 26.9 | | | 77.4 | | | 42.7 | | | 21.2 | |
| Approach LOS | | C | | | E | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 52.6 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.96 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 81.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



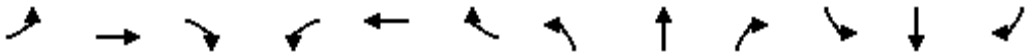
| Movement | EBU | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 27 | 1952 | 661 | 634 | 1486 | 233 | 287 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 6.0 | 3.3 | 4.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 0.97 | 0.91 | 0.94 | 0.88 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1118 | 4047 | 949 | 2168 | 3212 | 3152 | 1760 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1118 | 4047 | 949 | 2168 | 3212 | 3152 | 1760 |
| Peak-hour factor, PHF | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Adj. Flow (vph) | 27 | 1972 | 668 | 640 | 1501 | 235 | 290 |
| RTOR Reduction (vph) | 0 | 0 | 93 | 0 | 0 | 0 | 225 |
| Lane Group Flow (vph) | 27 | 1972 | 575 | 640 | 1501 | 235 | 65 |
| Confl. Peds. (#/hr) | | | 55 | 55 | | 1 | 111 |
| Confl. Bikes (#/hr) | | | 15 | | | | 7 |
| Turn Type | Prot | NA | pm+ov | Prot | NA | Prot | Over |
| Protected Phases | 1 | 6 | 4 | 3 | 3 2 | 4 | 3 |
| Permitted Phases | | | 6 | | | | |
| Actuated Green, G (s) | 4.2 | 37.1 | 64.2 | 27.0 | 70.8 | 27.1 | 27.0 |
| Effective Green, g (s) | 5.2 | 39.8 | 70.0 | 27.0 | 69.5 | 30.0 | 27.0 |
| Actuated g/C Ratio | 0.04 | 0.33 | 0.58 | 0.22 | 0.58 | 0.25 | 0.22 |
| Clearance Time (s) | 5.0 | 6.7 | 6.9 | 6.0 | | 6.9 | 6.0 |
| Vehicle Extension (s) | 3.0 | 5.0 | 5.0 | 3.0 | | 5.0 | 3.0 |
| Lane Grp Cap (vph) | 48 | 1342 | 553 | 487 | 1860 | 788 | 396 |
| v/s Ratio Prot | c0.02 | c0.49 | c0.26 | c0.30 | 0.47 | 0.07 | 0.04 |
| v/s Ratio Perm | | | 0.35 | | | | |
| v/c Ratio | 0.56 | 1.47 | 1.04 | 1.31 | 0.81 | 0.30 | 0.16 |
| Uniform Delay, d1 | 56.3 | 40.1 | 25.0 | 46.5 | 20.0 | 36.5 | 37.4 |
| Progression Factor | 0.50 | 1.33 | 2.56 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.4 | 211.6 | 23.5 | 155.4 | 2.7 | 0.4 | 0.2 |
| Delay (s) | 29.5 | 264.8 | 87.5 | 201.9 | 22.6 | 36.9 | 37.6 |
| Level of Service | C | F | F | F | C | D | D |
| Approach Delay (s) | | 218.0 | | | 76.2 | 37.3 | |
| Approach LOS | | F | | | E | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 143.3 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.25 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 107.2% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



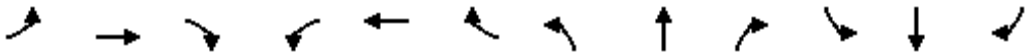
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 117 | 423 | 87 | 50 | 160 | 138 | 295 | 964 | 542 | 265 | 374 | 159 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.5 | 4.0 | 2.0 | 4.5 | 4.5 | 4.0 | 4.5 | 3.0 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.92 | 1.00 | 1.00 | 0.94 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1552 | 3167 | 1362 | 1565 | 3167 | 1307 | 3072 | 4550 | 1330 | 3072 | 4217 | |
| Flt Permitted | 0.44 | 1.00 | 1.00 | 0.48 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 719 | 3167 | 1362 | 791 | 3167 | 1307 | 3072 | 4550 | 1330 | 3072 | 4217 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 131 | 475 | 98 | 56 | 180 | 155 | 331 | 1083 | 609 | 298 | 420 | 179 |
| RTOR Reduction (vph) | 0 | 0 | 60 | 0 | 0 | 102 | 0 | 0 | 80 | 0 | 86 | 0 |
| Lane Group Flow (vph) | 131 | 475 | 38 | 56 | 180 | 53 | 331 | 1083 | 529 | 298 | 513 | 0 |
| Confl. Peds. (#/hr) | 69 | | 51 | 51 | | 69 | 66 | | 76 | 76 | | 66 |
| Confl. Bikes (#/hr) | | | 2 | | | | | | 2 | | | 5 |
| Turn Type | pm+pt | NA | pm+ov | pm+pt | NA | Perm | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 1 | 6 | 3 | 5 | 2 | | 3 | 8 | 5 | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | 8 | | | |
| Actuated Green, G (s) | 21.9 | 21.9 | 34.5 | 31.7 | 29.2 | 29.2 | 12.6 | 21.0 | 37.3 | 12.3 | 20.7 | |
| Effective Green, g (s) | 21.4 | 23.4 | 34.5 | 33.2 | 30.7 | 30.7 | 12.6 | 21.5 | 38.3 | 12.3 | 21.2 | |
| Actuated g/C Ratio | 0.24 | 0.26 | 0.38 | 0.37 | 0.34 | 0.34 | 0.14 | 0.24 | 0.43 | 0.14 | 0.24 | |
| Clearance Time (s) | 3.5 | 6.0 | 4.0 | 3.5 | 6.0 | 6.0 | 4.0 | 5.0 | 3.5 | 4.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.3 | 3.0 | 3.0 | 4.3 | 4.3 | 3.0 | 5.0 | 3.0 | 3.0 | 4.3 | |
| Lane Grp Cap (vph) | 249 | 823 | 522 | 444 | 1080 | 445 | 430 | 1086 | 610 | 419 | 993 | |
| v/s Ratio Prot | 0.05 | c0.15 | 0.01 | 0.02 | 0.06 | | 0.11 | c0.24 | c0.16 | c0.10 | 0.12 | |
| v/s Ratio Perm | 0.08 | | 0.02 | 0.02 | | 0.04 | | | 0.24 | | | |
| v/c Ratio | 0.53 | 0.58 | 0.07 | 0.13 | 0.17 | 0.12 | 0.77 | 1.00 | 0.87 | 0.71 | 0.52 | |
| Uniform Delay, d1 | 28.7 | 29.0 | 17.6 | 19.3 | 20.7 | 20.4 | 37.3 | 34.2 | 23.5 | 37.2 | 29.9 | |
| Progression Factor | 0.82 | 0.84 | 4.50 | 1.14 | 1.09 | 2.21 | 0.72 | 0.74 | 0.38 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.9 | 1.2 | 0.1 | 0.1 | 0.1 | 0.1 | 6.7 | 24.0 | 10.4 | 5.6 | 1.9 | |
| Delay (s) | 25.5 | 25.6 | 79.3 | 22.1 | 22.6 | 45.1 | 33.5 | 49.3 | 19.3 | 42.8 | 31.9 | |
| Level of Service | C | C | E | C | C | D | C | D | B | D | C | |
| Approach Delay (s) | | 33.1 | | | 31.5 | | | 37.7 | | | 35.5 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 35.8 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.81 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 17.0 |
| Intersection Capacity Utilization | 83.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 4 | 0 | 0 | 199 | 4 | 264 | 6 | 1539 | 37 | 21 | 454 | 5 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | | 4.4 | | | 4.4 | 4.4 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | |
| Frt | | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.95 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1583 | | | 1589 | 1417 | 1583 | 4550 | 1417 | 1583 | 4542 | |
| Flt Permitted | | 0.48 | | | 0.73 | 1.00 | 0.45 | 1.00 | 1.00 | 0.10 | 1.00 | |
| Satd. Flow (perm) | | 803 | | | 1213 | 1417 | 752 | 4550 | 1417 | 162 | 4542 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 4 | 0 | 0 | 224 | 4 | 297 | 7 | 1729 | 42 | 24 | 510 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 15 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 0 | 4 | 0 | 0 | 228 | 279 | 7 | 1729 | 27 | 24 | 515 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 6 | | | 2 | |
| Permitted Phases | 4 | | | 8 | | 8 | 6 | | 6 | 2 | | |
| Actuated Green, G (s) | | 22.8 | | | 22.8 | 22.8 | 56.8 | 56.8 | 56.8 | 56.8 | 56.8 | |
| Effective Green, g (s) | | 23.8 | | | 23.8 | 23.8 | 57.8 | 57.8 | 57.8 | 57.8 | 57.8 | |
| Actuated g/C Ratio | | 0.26 | | | 0.26 | 0.26 | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | |
| Clearance Time (s) | | 5.4 | | | 5.4 | 5.4 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 212 | | | 320 | 374 | 482 | 2922 | 910 | 104 | 2916 | |
| v/s Ratio Prot | | | | | | | | c0.38 | | | 0.11 | |
| v/s Ratio Perm | | 0.00 | | | 0.19 | c0.20 | 0.01 | | 0.02 | 0.15 | | |
| v/c Ratio | | 0.02 | | | 0.71 | 0.75 | 0.01 | 0.59 | 0.03 | 0.23 | 0.18 | |
| Uniform Delay, d1 | | 24.5 | | | 30.0 | 30.3 | 5.8 | 9.3 | 5.9 | 6.8 | 6.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 0.78 | 1.31 | 1.03 | 1.86 | 1.76 | |
| Incremental Delay, d2 | | 0.0 | | | 7.3 | 7.9 | 0.0 | 0.6 | 0.0 | 4.7 | 0.1 | |
| Delay (s) | | 24.5 | | | 37.3 | 38.3 | 4.6 | 12.8 | 6.1 | 17.2 | 11.6 | |
| Level of Service | | C | | | D | D | A | B | A | B | B | |
| Approach Delay (s) | | 24.5 | | | 37.8 | | | 12.6 | | | 11.8 | |
| Approach LOS | | C | | | D | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 17.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 8.4 |
| Intersection Capacity Utilization | 70.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 11 | 0 | 9 | 130 | 42 | 464 | 45 | 1083 | 31 | 25 | 453 | 168 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.1 | 4.1 | | | 4.0 | 4.0 | 4.0 | 4.1 | | 4.0 | 4.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | 0.95 | 1.00 | 0.91 | | 1.00 | 0.91 | |
| Frt | 1.00 | 0.85 | | | 0.95 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | | 0.98 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1583 | 1417 | | | 1462 | 1346 | 1583 | 4531 | | 1583 | 4365 | |
| Flt Permitted | 0.32 | 1.00 | | | 0.84 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 533 | 1417 | | | 1261 | 1346 | 1583 | 4531 | | 1583 | 4365 | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 12 | 0 | 10 | 148 | 48 | 527 | 51 | 1231 | 35 | 28 | 515 | 191 |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 23 | 281 | 0 | 3 | 0 | 0 | 60 | 0 |
| Lane Group Flow (vph) | 12 | 1 | 0 | 0 | 284 | 135 | 51 | 1263 | 0 | 28 | 646 | 0 |
| Turn Type | Perm | NA | | Perm | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | | 3 | | | 4 | 5 | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 3 | | | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 11.0 | 11.0 | | | 15.5 | 25.6 | 6.3 | 33.5 | | 10.1 | 37.3 | |
| Effective Green, g (s) | 12.5 | 12.5 | | | 17.0 | 25.6 | 6.3 | 34.2 | | 10.1 | 38.0 | |
| Actuated g/C Ratio | 0.14 | 0.14 | | | 0.19 | 0.28 | 0.07 | 0.38 | | 0.11 | 0.42 | |
| Clearance Time (s) | 5.6 | 5.6 | | | 5.5 | 4.0 | 4.0 | 4.8 | | 4.0 | 4.8 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 74 | 196 | | | 238 | 382 | 110 | 1721 | | 177 | 1843 | |
| v/s Ratio Prot | | 0.00 | | | | 0.04 | c0.03 | c0.28 | | 0.02 | c0.15 | |
| v/s Ratio Perm | c0.02 | | | | c0.23 | 0.06 | | | | | | |
| v/c Ratio | 0.16 | 0.01 | | | 1.19 | 0.35 | 0.46 | 0.73 | | 0.16 | 0.35 | |
| Uniform Delay, d1 | 34.1 | 33.4 | | | 36.5 | 25.6 | 40.2 | 24.0 | | 36.1 | 17.6 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 0.86 | 1.55 | |
| Incremental Delay, d2 | 1.0 | 0.0 | | | 121.1 | 0.6 | 3.1 | 2.8 | | 0.4 | 0.5 | |
| Delay (s) | 35.2 | 33.4 | | | 157.6 | 26.2 | 43.3 | 26.8 | | 31.6 | 27.8 | |
| Level of Service | D | C | | | F | C | D | C | | C | C | |
| Approach Delay (s) | | 34.4 | | | 82.0 | | | 27.4 | | | 28.0 | |
| Approach LOS | | C | | | F | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 41.7 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 16.2 |
| Intersection Capacity Utilization | 70.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



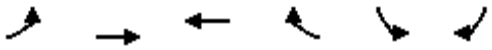
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 2429 | 331 | 158 | 1571 | 103 | 169 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.91 | 1.00 | 0.97 | 0.91 | 0.97 | 0.91 |
| Frpb, ped/bikes | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.94 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3212 | 905 | 2168 | 3212 | 2078 | 910 |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3212 | 905 | 2168 | 3212 | 2078 | 910 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 2479 | 338 | 161 | 1603 | 105 | 172 |
| RTOR Reduction (vph) | 0 | 101 | 0 | 0 | 66 | 82 |
| Lane Group Flow (vph) | 2479 | 237 | 161 | 1603 | 116 | 13 |
| Confl. Peds. (#/hr) | | 59 | 59 | | 11 | |
| Confl. Bikes (#/hr) | | 14 | | | | |
| Turn Type | NA | pm+ov | Prot | NA | Prot | Perm |
| Protected Phases | 6 | 4 | 3 5 | 2 | 4 | |
| Permitted Phases | | 6 | | | | 4 |
| Actuated Green, G (s) | 61.8 | 76.9 | 24.0 | 61.8 | 15.1 | 15.1 |
| Effective Green, g (s) | 63.0 | 80.7 | 24.0 | 63.0 | 17.0 | 17.0 |
| Actuated g/C Ratio | 0.52 | 0.67 | 0.20 | 0.52 | 0.14 | 0.14 |
| Clearance Time (s) | 5.2 | 5.9 | | 5.2 | 5.9 | 5.9 |
| Vehicle Extension (s) | 3.7 | 3.8 | | 3.5 | 3.8 | 3.8 |
| Lane Grp Cap (vph) | 1686 | 608 | 433 | 1686 | 294 | 128 |
| v/s Ratio Prot | c0.77 | 0.06 | c0.07 | 0.50 | c0.06 | |
| v/s Ratio Perm | | 0.21 | | | | 0.01 |
| v/c Ratio | 1.47 | 0.39 | 0.37 | 0.95 | 0.39 | 0.11 |
| Uniform Delay, d1 | 28.5 | 8.7 | 41.5 | 27.0 | 46.8 | 44.9 |
| Progression Factor | 1.00 | 1.00 | 1.53 | 0.66 | 1.00 | 1.00 |
| Incremental Delay, d2 | 214.9 | 1.9 | 0.1 | 10.2 | 3.9 | 1.6 |
| Delay (s) | 243.4 | 10.6 | 63.5 | 28.1 | 50.7 | 46.5 |
| Level of Service | F | B | E | C | D | D |
| Approach Delay (s) | 215.5 | | | 31.3 | 49.3 | |
| Approach LOS | F | | | C | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 139.1 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.04 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 98.9% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 67 | 81 | 222 | 427 | 365 | 169 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.5 | 3.5 | 3.5 | 4.5 | 5.0 | 3.5 |
| Lane Util. Factor | 0.97 | 0.88 | 0.95 | 1.00 | 1.00 | 0.91 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3072 | 2493 | 3167 | 1417 | 1583 | 4550 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.55 | 1.00 |
| Satd. Flow (perm) | 3072 | 2493 | 3167 | 1417 | 917 | 4550 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 74 | 90 | 247 | 474 | 406 | 188 |
| RTOR Reduction (vph) | 0 | 71 | 0 | 64 | 0 | 0 |
| Lane Group Flow (vph) | 74 | 19 | 247 | 410 | 406 | 188 |
| Turn Type | Prot | pm+ov | NA | pm+ov | pm+pt | NA |
| Protected Phases | 4 | 1 | 2 | 4 | 1 | 6 |
| Permitted Phases | | 4 | | 2 | 6 | |
| Actuated Green, G (s) | 8.0 | 17.7 | 58.3 | 66.3 | 72.0 | 72.0 |
| Effective Green, g (s) | 8.5 | 18.7 | 59.8 | 67.3 | 71.0 | 73.5 |
| Actuated g/C Ratio | 0.09 | 0.21 | 0.66 | 0.75 | 0.79 | 0.82 |
| Clearance Time (s) | 5.0 | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 5.8 | 3.0 | 3.0 | 4.4 |
| Lane Grp Cap (vph) | 290 | 517 | 2104 | 1130 | 787 | 3715 |
| v/s Ratio Prot | 0.02 | 0.00 | 0.08 | c0.03 | c0.05 | 0.04 |
| v/s Ratio Perm | | 0.00 | | 0.25 | c0.36 | |
| v/c Ratio | 0.26 | 0.04 | 0.12 | 0.36 | 0.52 | 0.05 |
| Uniform Delay, d1 | 37.8 | 28.5 | 5.5 | 3.9 | 2.9 | 1.6 |
| Progression Factor | 1.14 | 0.63 | 0.14 | 3.63 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 |
| Delay (s) | 43.5 | 17.8 | 0.8 | 14.3 | 3.5 | 1.6 |
| Level of Service | D | B | A | B | A | A |
| Approach Delay (s) | 29.4 | | 9.6 | | | 2.9 |
| Approach LOS | C | | A | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 9.1 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 59.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



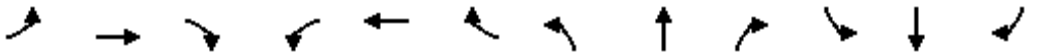
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 854 | 2490 | 1857 | 96 | 36 | 95 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.1 | 3.3 |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 1.00 | 0.97 | 0.88 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3072 | 4550 | 4550 | 1417 | 3072 | 2493 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3072 | 4550 | 4550 | 1417 | 3072 | 2493 |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 880 | 2567 | 1914 | 99 | 37 | 98 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 62 | 0 | 0 |
| Lane Group Flow (vph) | 880 | 2567 | 1914 | 37 | 37 | 98 |
| Turn Type | Prot | NA | NA | Perm | Prot | pm+ov |
| Protected Phases | 5 | 2 | 6 | | 4 | 5 |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 21.0 | 54.4 | 29.4 | 29.4 | 25.0 | 46.0 |
| Effective Green, g (s) | 21.0 | 55.6 | 30.6 | 30.6 | 25.7 | 47.4 |
| Actuated g/C Ratio | 0.23 | 0.62 | 0.34 | 0.34 | 0.29 | 0.53 |
| Clearance Time (s) | 4.0 | 5.8 | 5.8 | 5.8 | 4.8 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 716 | 2810 | 1547 | 481 | 877 | 1312 |
| v/s Ratio Prot | c0.29 | 0.56 | c0.42 | | 0.01 | c0.02 |
| v/s Ratio Perm | | | | 0.03 | | 0.02 |
| v/c Ratio | 1.23 | 0.91 | 1.24 | 0.08 | 0.04 | 0.07 |
| Uniform Delay, d1 | 34.5 | 15.1 | 29.7 | 20.1 | 23.2 | 10.5 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.26 | 1.14 |
| Incremental Delay, d2 | 115.1 | 5.9 | 112.5 | 0.3 | 0.0 | 0.0 |
| Delay (s) | 149.6 | 21.0 | 142.2 | 20.4 | 29.4 | 12.0 |
| Level of Service | F | C | F | C | C | B |
| Approach Delay (s) | | 53.8 | 136.2 | | 16.8 | |
| Approach LOS | | D | F | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 82.6 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 0.86 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 13.4 |
| Intersection Capacity Utilization | 82.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



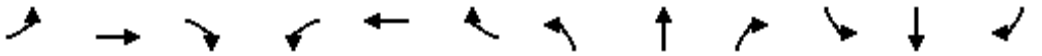
| Movement | EBU | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 12 | 2052 | 198 | 289 | 1954 | 360 | 695 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 0.97 | 0.86 | 0.97 | 0.88 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1118 | 4047 | 967 | 2168 | 4047 | 2168 | 1760 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1118 | 4047 | 967 | 2168 | 4047 | 2168 | 1760 |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 12 | 2115 | 204 | 298 | 2014 | 371 | 716 |
| RTOR Reduction (vph) | 0 | 0 | 84 | 0 | 0 | 0 | 534 |
| Lane Group Flow (vph) | 12 | 2115 | 120 | 298 | 2014 | 371 | 182 |
| Confl. Peds. (#/hr) | | | 33 | 33 | | | 38 |
| Confl. Bikes (#/hr) | | | 14 | | | | 1 |
| Turn Type | Prot | NA | pm+ov | Prot | NA | Prot | Over |
| Protected Phases | 1 | 6 | 4 | 3 | 2 3 | 4 | 3 |
| Permitted Phases | | | 6 | | | | |
| Actuated Green, G (s) | 1.0 | 35.5 | 59.1 | 29.0 | 70.5 | 23.6 | 29.0 |
| Effective Green, g (s) | 2.0 | 37.5 | 64.9 | 28.0 | 72.5 | 26.5 | 28.0 |
| Actuated g/C Ratio | 0.02 | 0.34 | 0.59 | 0.25 | 0.66 | 0.24 | 0.25 |
| Clearance Time (s) | 5.0 | 6.0 | 6.9 | 3.0 | | 6.9 | 3.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 20 | 1379 | 570 | 551 | 2667 | 522 | 448 |
| v/s Ratio Prot | c0.01 | c0.52 | 0.05 | 0.14 | c0.50 | c0.17 | 0.10 |
| v/s Ratio Perm | | | 0.07 | | | | |
| v/c Ratio | 0.60 | 1.53 | 0.21 | 0.54 | 0.76 | 0.71 | 0.41 |
| Uniform Delay, d1 | 53.6 | 36.2 | 10.6 | 35.4 | 12.7 | 38.2 | 34.1 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 40.2 | 243.9 | 0.2 | 1.1 | 1.3 | 4.5 | 0.6 |
| Delay (s) | 93.8 | 280.1 | 10.7 | 36.5 | 14.0 | 42.8 | 34.7 |
| Level of Service | F | F | B | D | B | D | C |
| Approach Delay (s) | | 255.6 | | | 16.9 | 37.5 | |
| Approach LOS | | F | | | B | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 117.9 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.08 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 95.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 337 | 20 | 368 | 3 | 8 | 11 | 65 | 236 | 14 | 13 | 903 | 185 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 0.95 | 0.88 | | 1.00 | | 1.00 | 0.91 | | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | | 0.93 | | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 0.96 | 1.00 | | 0.99 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 1504 | 1516 | 2493 | | 1545 | | 1583 | 4512 | | 1583 | 3167 | 1417 |
| Flt Permitted | 0.95 | 0.96 | 1.00 | | 0.39 | | 0.13 | 1.00 | | 0.57 | 1.00 | 1.00 |
| Satd. Flow (perm) | 1504 | 1516 | 2493 | | 609 | | 218 | 4512 | | 951 | 3167 | 1417 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 383 | 23 | 418 | 3 | 9 | 12 | 74 | 268 | 16 | 15 | 1026 | 210 |
| RTOR Reduction (vph) | 0 | 0 | 342 | 0 | 11 | 0 | 0 | 6 | 0 | 0 | 0 | 160 |
| Lane Group Flow (vph) | 191 | 215 | 76 | 0 | 13 | 0 | 74 | 278 | 0 | 15 | 1026 | 50 |
| Turn Type | Split | NA | custom | Perm | NA | | pm+pt | NA | | Perm | NA | Over |
| Protected Phases | 4 | 4 | 7 1 | | 3 | | 1 | 6 | | | 2 | 4 |
| Permitted Phases | | | | 3 | | | 6 | | | 2 | | |
| Actuated Green, G (s) | 21.0 | 21.0 | 15.1 | | 9.7 | | 40.5 | 35.5 | | 35.5 | 35.5 | 21.0 |
| Effective Green, g (s) | 21.6 | 21.6 | 16.3 | | 10.7 | | 40.5 | 36.7 | | 36.7 | 36.7 | 21.6 |
| Actuated g/C Ratio | 0.24 | 0.24 | 0.18 | | 0.12 | | 0.45 | 0.41 | | 0.41 | 0.41 | 0.24 |
| Clearance Time (s) | 4.6 | 4.6 | | | 5.0 | | 4.0 | 5.2 | | 5.2 | 5.2 | 4.6 |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.4 | | 3.2 | 3.2 | 3.0 |
| Lane Grp Cap (vph) | 360 | 363 | 451 | | 72 | | 173 | 1839 | | 387 | 1291 | 340 |
| v/s Ratio Prot | 0.13 | c0.14 | 0.03 | | | | c0.02 | 0.06 | | | c0.32 | 0.04 |
| v/s Ratio Perm | | | | | c0.02 | | 0.17 | | | 0.02 | | |
| v/c Ratio | 0.53 | 0.59 | 0.17 | | 0.19 | | 0.43 | 0.15 | | 0.04 | 0.79 | 0.15 |
| Uniform Delay, d1 | 29.8 | 30.3 | 31.1 | | 35.7 | | 16.6 | 16.8 | | 16.0 | 23.3 | 27.0 |
| Progression Factor | 0.73 | 0.73 | 3.35 | | 1.00 | | 1.12 | 0.81 | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 5.5 | 6.9 | 0.2 | | 1.3 | | 1.5 | 0.2 | | 0.2 | 5.1 | 0.9 |
| Delay (s) | 27.3 | 29.1 | 104.6 | | 37.0 | | 20.1 | 13.7 | | 16.2 | 28.5 | 27.9 |
| Level of Service | C | C | F | | D | | C | B | | B | C | C |
| Approach Delay (s) | | 67.0 | | | 37.0 | | | 15.0 | | | 28.2 | |
| Approach LOS | | E | | | D | | | B | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 39.4 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.63 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 16.6 |
| Intersection Capacity Utilization | 59.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



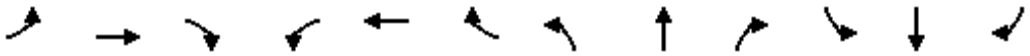
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1963 | 101 | 0 | 1788 | 167 | 81 | 140 | 76 | 450 | 726 | 448 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 1.00 | | 0.86 | | 0.97 | 0.91 | | 0.97 | 0.95 | 0.88 |
| Frt | | 1.00 | 0.85 | | 0.99 | | 1.00 | 0.95 | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 4550 | 1417 | | 5660 | | 3072 | 4309 | | 3072 | 3167 | 2493 |
| Flt Permitted | | 1.00 | 1.00 | | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 4550 | 1417 | | 5660 | | 3072 | 4309 | | 3072 | 3167 | 2493 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 0 | 2003 | 103 | 0 | 1824 | 170 | 83 | 143 | 78 | 459 | 741 | 457 |
| RTOR Reduction (vph) | 0 | 0 | 27 | 0 | 16 | 0 | 0 | 1 | 0 | 0 | 0 | 85 |
| Lane Group Flow (vph) | 0 | 2003 | 76 | 0 | 1978 | 0 | 83 | 220 | 0 | 459 | 741 | 372 |
| Turn Type | | NA | pm+ov | | NA | | Prot | NA | | Prot | NA | Perm |
| Protected Phases | | 6 | 3 | | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | 6 | | | | | | | | | 4 |
| Actuated Green, G (s) | | 37.5 | 45.1 | | 37.5 | | 7.6 | 28.7 | | 9.0 | 30.1 | 30.1 |
| Effective Green, g (s) | | 39.0 | 45.1 | | 39.0 | | 7.6 | 30.0 | | 9.0 | 31.4 | 31.4 |
| Actuated g/C Ratio | | 0.43 | 0.50 | | 0.43 | | 0.08 | 0.33 | | 0.10 | 0.35 | 0.35 |
| Clearance Time (s) | | 5.5 | 4.0 | | 5.5 | | 4.0 | 5.3 | | 4.0 | 5.3 | 5.3 |
| Vehicle Extension (s) | | 4.9 | 3.0 | | 5.2 | | 3.0 | 5.1 | | 3.0 | 5.1 | 5.1 |
| Lane Grp Cap (vph) | | 1971 | 710 | | 2452 | | 259 | 1436 | | 307 | 1104 | 869 |
| v/s Ratio Prot | | c0.44 | 0.01 | | 0.35 | | 0.03 | 0.05 | | c0.15 | c0.23 | |
| v/s Ratio Perm | | | 0.04 | | | | | | | | | 0.15 |
| v/c Ratio | | 1.02 | 0.11 | | 0.81 | | 0.32 | 0.15 | | 1.50 | 0.67 | 0.43 |
| Uniform Delay, d1 | | 25.5 | 11.8 | | 22.2 | | 38.8 | 21.1 | | 40.5 | 24.9 | 22.4 |
| Progression Factor | | 1.00 | 1.00 | | 1.00 | | 1.00 | 1.00 | | 1.19 | 1.06 | 1.19 |
| Incremental Delay, d2 | | 24.4 | 0.1 | | 3.0 | | 0.7 | 0.2 | | 236.4 | 1.8 | 0.6 |
| Delay (s) | | 49.9 | 11.9 | | 25.2 | | 39.5 | 21.3 | | 284.5 | 28.2 | 27.2 |
| Level of Service | | D | B | | C | | D | C | | F | C | C |
| Approach Delay (s) | | 48.1 | | | 25.2 | | | 26.3 | | | 98.9 | |
| Approach LOS | | D | | | C | | | C | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 53.3 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 0.95 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 79.0% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



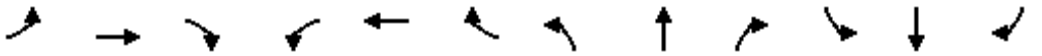
| Movement | EBU | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Volume (vph) | 40 | 1786 | 419 | 342 | 1882 | 636 | 562 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 6.0 | 3.3 | 4.0 | 6.0 |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 0.97 | 0.91 | 0.94 | 0.88 |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1118 | 4047 | 950 | 2168 | 3212 | 3152 | 1760 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1118 | 4047 | 950 | 2168 | 3212 | 3152 | 1760 |
| Peak-hour factor, PHF | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Adj. Flow (vph) | 40 | 1804 | 423 | 345 | 1901 | 642 | 568 |
| RTOR Reduction (vph) | 0 | 0 | 137 | 0 | 0 | 0 | 440 |
| Lane Group Flow (vph) | 40 | 1804 | 286 | 345 | 1901 | 642 | 128 |
| Confl. Peds. (#/hr) | | | 55 | 55 | | 1 | 111 |
| Confl. Bikes (#/hr) | | | 15 | | | | 7 |
| Turn Type | Prot | NA | pm+ov | Prot | NA | Prot | Over |
| Protected Phases | 1 | 6 | 4 | 3 | 3 2 | 4 | 3 |
| Permitted Phases | | | 6 | | | | |
| Actuated Green, G (s) | 5.6 | 35.7 | 62.8 | 27.0 | 69.4 | 27.1 | 27.0 |
| Effective Green, g (s) | 6.6 | 38.4 | 68.6 | 27.0 | 68.1 | 30.0 | 27.0 |
| Actuated g/C Ratio | 0.05 | 0.32 | 0.57 | 0.22 | 0.57 | 0.25 | 0.22 |
| Clearance Time (s) | 5.0 | 6.7 | 6.9 | 6.0 | | 6.9 | 6.0 |
| Vehicle Extension (s) | 3.0 | 5.0 | 5.0 | 3.0 | | 5.0 | 3.0 |
| Lane Grp Cap (vph) | 61 | 1295 | 543 | 487 | 1822 | 788 | 396 |
| v/s Ratio Prot | c0.04 | c0.45 | 0.13 | 0.16 | c0.59 | c0.20 | 0.07 |
| v/s Ratio Perm | | | 0.17 | | | | |
| v/c Ratio | 0.66 | 1.39 | 0.53 | 0.71 | 1.04 | 0.81 | 0.32 |
| Uniform Delay, d1 | 55.6 | 40.8 | 15.7 | 42.9 | 26.0 | 42.4 | 38.9 |
| Progression Factor | 0.88 | 1.46 | 6.77 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.3 | 177.3 | 0.2 | 4.7 | 33.4 | 7.3 | 0.5 |
| Delay (s) | 51.0 | 237.1 | 106.7 | 47.6 | 59.3 | 49.7 | 39.3 |
| Level of Service | D | F | F | D | E | D | D |
| Approach Delay (s) | | 209.5 | | | 57.5 | 44.8 | |
| Approach LOS | | F | | | E | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 115.0 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.11 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 94.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



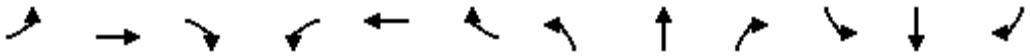
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 109 | 184 | 248 | 181 | 338 | 210 | 237 | 473 | 114 | 181 | 716 | 265 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.5 | 4.0 | 2.0 | 4.5 | 4.5 | 4.0 | 4.5 | 3.0 | 4.0 | 4.5 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 0.92 | 1.00 | 1.00 | 0.93 | 1.00 | 0.97 | |
| Flpb, ped/bikes | 0.99 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1560 | 3167 | 1359 | 1548 | 3167 | 1307 | 3072 | 4550 | 1312 | 3072 | 4250 | |
| Flt Permitted | 0.46 | 1.00 | 1.00 | 0.62 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 755 | 3167 | 1359 | 1014 | 3167 | 1307 | 3072 | 4550 | 1312 | 3072 | 4250 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 122 | 207 | 279 | 203 | 380 | 236 | 266 | 531 | 128 | 203 | 804 | 298 |
| RTOR Reduction (vph) | 0 | 0 | 111 | 0 | 0 | 178 | 0 | 0 | 73 | 0 | 65 | 0 |
| Lane Group Flow (vph) | 122 | 207 | 168 | 203 | 380 | 58 | 266 | 531 | 55 | 203 | 1037 | 0 |
| Confl. Peds. (#/hr) | 69 | | 51 | 51 | | 69 | 66 | | 76 | 76 | | 66 |
| Confl. Bikes (#/hr) | | | 2 | | | | | | 2 | | | 5 |
| Turn Type | pm+pt | NA | pm+ov | pm+pt | NA | Perm | Prot | NA | pm+ov | Prot | NA | |
| Protected Phases | 1 | 6 | 3 | 5 | 2 | | 3 | 8 | 5 | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | 8 | | | |
| Actuated Green, G (s) | 17.7 | 17.7 | 26.7 | 23.1 | 20.6 | 20.6 | 9.0 | 26.0 | 37.9 | 15.9 | 32.9 | |
| Effective Green, g (s) | 17.2 | 19.2 | 26.7 | 24.6 | 22.1 | 22.1 | 9.0 | 26.5 | 38.9 | 15.9 | 33.4 | |
| Actuated g/C Ratio | 0.19 | 0.21 | 0.30 | 0.27 | 0.25 | 0.25 | 0.10 | 0.29 | 0.43 | 0.18 | 0.37 | |
| Clearance Time (s) | 3.5 | 6.0 | 4.0 | 3.5 | 6.0 | 6.0 | 4.0 | 5.0 | 3.5 | 4.0 | 5.0 | |
| Vehicle Extension (s) | 3.0 | 4.3 | 3.0 | 3.0 | 4.3 | 4.3 | 3.0 | 5.0 | 3.0 | 3.0 | 4.3 | |
| Lane Grp Cap (vph) | 220 | 675 | 403 | 356 | 777 | 320 | 307 | 1339 | 610 | 542 | 1577 | |
| v/s Ratio Prot | c0.05 | 0.07 | 0.04 | c0.08 | 0.12 | | c0.09 | 0.12 | 0.01 | 0.07 | c0.24 | |
| v/s Ratio Perm | 0.05 | | 0.08 | c0.07 | | 0.04 | | | 0.03 | | | |
| v/c Ratio | 0.55 | 0.31 | 0.42 | 0.57 | 0.49 | 0.18 | 0.87 | 0.40 | 0.09 | 0.37 | 0.66 | |
| Uniform Delay, d1 | 32.1 | 29.8 | 25.4 | 28.3 | 29.1 | 26.8 | 39.9 | 25.4 | 15.1 | 32.7 | 23.5 | |
| Progression Factor | 1.05 | 1.06 | 0.96 | 1.05 | 1.05 | 1.51 | 0.84 | 1.08 | 2.59 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.0 | 0.4 | 0.7 | 2.2 | 0.8 | 0.4 | 21.5 | 0.9 | 0.1 | 0.4 | 2.2 | |
| Delay (s) | 36.7 | 32.0 | 25.0 | 31.8 | 31.4 | 40.8 | 55.1 | 28.4 | 39.2 | 33.1 | 25.7 | |
| Level of Service | D | C | C | C | C | D | E | C | D | C | C | |
| Approach Delay (s) | | 29.7 | | | 34.2 | | | 37.6 | | | 26.9 | |
| Approach LOS | | C | | | C | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 31.7 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.66 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 17.0 |
| Intersection Capacity Utilization | 76.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 6 | 3 | 2 | 85 | 0 | 148 | 0 | 606 | 77 | 112 | 1010 | 7 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | | 4.4 | | | 4.4 | 4.4 | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | | 0.91 | 1.00 | 1.00 | 0.91 | |
| Frt | | 0.98 | | | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.97 | | | 0.95 | 1.00 | | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1583 | | | 1583 | 1417 | | 4550 | 1417 | 1583 | 4545 | |
| Flt Permitted | | 0.87 | | | 0.75 | 1.00 | | 1.00 | 1.00 | 0.38 | 1.00 | |
| Satd. Flow (perm) | | 1414 | | | 1250 | 1417 | | 4550 | 1417 | 636 | 4545 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 7 | 3 | 2 | 96 | 0 | 166 | 0 | 681 | 87 | 126 | 1135 | 8 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 0 | 136 | 0 | 0 | 24 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 96 | 30 | 0 | 681 | 63 | 126 | 1142 | 0 |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 6 | | | 2 | |
| Permitted Phases | 4 | | | 8 | | 8 | 6 | | 6 | 2 | | |
| Actuated Green, G (s) | | 15.4 | | | 15.4 | 15.4 | | 64.2 | 64.2 | 64.2 | 64.2 | |
| Effective Green, g (s) | | 16.4 | | | 16.4 | 16.4 | | 65.2 | 65.2 | 65.2 | 65.2 | |
| Actuated g/C Ratio | | 0.18 | | | 0.18 | 0.18 | | 0.72 | 0.72 | 0.72 | 0.72 | |
| Clearance Time (s) | | 5.4 | | | 5.4 | 5.4 | | 5.0 | 5.0 | 5.0 | 5.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 257 | | | 227 | 258 | | 3296 | 1026 | 460 | 3292 | |
| v/s Ratio Prot | | | | | | | | 0.15 | | | c0.25 | |
| v/s Ratio Perm | | 0.01 | | | c0.08 | 0.02 | | | 0.04 | 0.20 | | |
| v/c Ratio | | 0.04 | | | 0.42 | 0.12 | | 0.21 | 0.06 | 0.27 | 0.35 | |
| Uniform Delay, d1 | | 30.3 | | | 32.6 | 30.8 | | 4.0 | 3.6 | 4.3 | 4.6 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | | 1.09 | 1.62 | 0.87 | 0.97 | |
| Incremental Delay, d2 | | 0.1 | | | 1.3 | 0.2 | | 0.1 | 0.1 | 1.2 | 0.2 | |
| Delay (s) | | 30.4 | | | 33.9 | 31.0 | | 4.5 | 5.9 | 4.9 | 4.6 | |
| Level of Service | | C | | | C | C | | A | A | A | A | |
| Approach Delay (s) | | 30.4 | | | 32.0 | | | 4.7 | | | 4.7 | |
| Approach LOS | | C | | | C | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 7.9 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.36 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 8.4 |
| Intersection Capacity Utilization | 49.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 62 | 27 | 28 | 48 | 11 | 76 | 17 | 548 | 64 | 118 | 942 | 16 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.1 | 4.1 | | | 4.0 | 4.0 | 4.0 | 4.1 | | 4.0 | 4.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 0.95 | 0.95 | 1.00 | 0.91 | | 1.00 | 0.91 | |
| Frt | 1.00 | 0.92 | | | 0.97 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | | 0.97 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1583 | 1540 | | | 1485 | 1346 | 1583 | 4478 | | 1583 | 4539 | |
| Flt Permitted | 0.24 | 1.00 | | | 0.77 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 394 | 1540 | | | 1178 | 1346 | 1583 | 4478 | | 1583 | 4539 | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 70 | 31 | 32 | 55 | 12 | 86 | 19 | 623 | 73 | 134 | 1070 | 18 |
| RTOR Reduction (vph) | 0 | 26 | 0 | 0 | 11 | 49 | 0 | 14 | 0 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 70 | 37 | 0 | 0 | 74 | 19 | 19 | 682 | 0 | 134 | 1087 | 0 |
| Turn Type | Perm | NA | | Perm | NA | pm+ov | Prot | NA | | Prot | NA | |
| Protected Phases | | 3 | | | 4 | 5 | 1 | 6 | | 5 | 2 | |
| Permitted Phases | 3 | | | 4 | | 4 | | | | | | |
| Actuated Green, G (s) | 15.4 | 15.4 | | | 11.8 | 25.1 | 4.0 | 29.6 | | 13.3 | 38.9 | |
| Effective Green, g (s) | 16.9 | 16.9 | | | 13.3 | 25.1 | 4.0 | 30.3 | | 13.3 | 39.6 | |
| Actuated g/C Ratio | 0.19 | 0.19 | | | 0.15 | 0.28 | 0.04 | 0.34 | | 0.15 | 0.44 | |
| Clearance Time (s) | 5.6 | 5.6 | | | 5.5 | 4.0 | 4.0 | 4.8 | | 4.0 | 4.8 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 73 | 289 | | | 174 | 375 | 70 | 1507 | | 233 | 1997 | |
| v/s Ratio Prot | | 0.02 | | | | 0.01 | 0.01 | 0.15 | | c0.08 | c0.24 | |
| v/s Ratio Perm | c0.18 | | | | c0.06 | 0.01 | | | | | | |
| v/c Ratio | 0.96 | 0.13 | | | 0.42 | 0.05 | 0.27 | 0.45 | | 0.58 | 0.54 | |
| Uniform Delay, d1 | 36.2 | 30.4 | | | 34.9 | 23.7 | 41.6 | 23.4 | | 35.7 | 18.6 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | | 0.88 | 1.42 | |
| Incremental Delay, d2 | 90.1 | 0.2 | | | 1.7 | 0.1 | 2.1 | 1.0 | | 3.3 | 1.0 | |
| Delay (s) | 126.3 | 30.6 | | | 36.5 | 23.8 | 43.7 | 24.3 | | 34.7 | 27.4 | |
| Level of Service | F | C | | | D | C | D | C | | C | C | |
| Approach Delay (s) | | 81.0 | | | 30.9 | | | 24.9 | | | 28.2 | |
| Approach LOS | | F | | | C | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 30.5 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 16.2 |
| Intersection Capacity Utilization | 51.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 1990 | 196 | 125 | 2287 | 272 | 251 |
| Ideal Flow (vphpl) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.91 | 1.00 | 0.97 | 0.91 | 0.97 | 0.91 |
| Frpb, ped/bikes | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 0.96 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 |
| Satd. Flow (prot) | 3212 | 905 | 2168 | 3212 | 2108 | 910 |
| Flt Permitted | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 |
| Satd. Flow (perm) | 3212 | 905 | 2168 | 3212 | 2108 | 910 |
| Peak-hour factor, PHF | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Adj. Flow (vph) | 2031 | 200 | 128 | 2334 | 278 | 256 |
| RTOR Reduction (vph) | 0 | 64 | 0 | 0 | 39 | 121 |
| Lane Group Flow (vph) | 2031 | 136 | 128 | 2334 | 354 | 20 |
| Confl. Peds. (#/hr) | | 59 | 59 | | 11 | |
| Confl. Bikes (#/hr) | | 14 | | | | |
| Turn Type | NA | pm+ov | Prot | NA | Prot | Perm |
| Protected Phases | 6 | 4 | 3 5 | 2 | 4 | |
| Permitted Phases | | 6 | | | | 4 |
| Actuated Green, G (s) | 62.9 | 78.0 | 22.9 | 62.9 | 15.1 | 15.1 |
| Effective Green, g (s) | 64.1 | 81.8 | 22.9 | 64.1 | 17.0 | 17.0 |
| Actuated g/C Ratio | 0.53 | 0.68 | 0.19 | 0.53 | 0.14 | 0.14 |
| Clearance Time (s) | 5.2 | 5.9 | | 5.2 | 5.9 | 5.9 |
| Vehicle Extension (s) | 3.7 | 3.8 | | 3.5 | 3.8 | 3.8 |
| Lane Grp Cap (vph) | 1715 | 616 | 413 | 1715 | 298 | 128 |
| v/s Ratio Prot | 0.63 | 0.03 | c0.06 | c0.73 | c0.17 | |
| v/s Ratio Perm | | 0.12 | | | | 0.02 |
| v/c Ratio | 1.18 | 0.22 | 0.31 | 1.36 | 1.19 | 0.16 |
| Uniform Delay, d1 | 28.0 | 7.2 | 41.8 | 28.0 | 51.5 | 45.2 |
| Progression Factor | 1.00 | 1.00 | 0.83 | 0.97 | 1.00 | 1.00 |
| Incremental Delay, d2 | 89.2 | 0.8 | 0.1 | 163.9 | 112.5 | 2.6 |
| Delay (s) | 117.1 | 8.0 | 34.9 | 191.0 | 164.0 | 47.8 |
| Level of Service | F | A | C | F | F | D |
| Approach Delay (s) | 107.4 | | | 182.9 | 133.3 | |
| Approach LOS | F | | | F | F | |

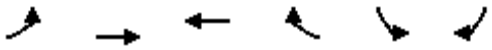
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 145.6 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.10 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 93.1% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 502 | 339 | 194 | 87 | 70 | 281 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.5 | 3.5 | 3.5 | 4.5 | 5.0 | 3.5 |
| Lane Util. Factor | 0.97 | 0.88 | 0.95 | 1.00 | 1.00 | 0.91 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3072 | 2493 | 3167 | 1417 | 1583 | 4550 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.56 | 1.00 |
| Satd. Flow (perm) | 3072 | 2493 | 3167 | 1417 | 928 | 4550 |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 558 | 377 | 216 | 97 | 78 | 312 |
| RTOR Reduction (vph) | 0 | 255 | 0 | 19 | 0 | 0 |
| Lane Group Flow (vph) | 558 | 122 | 216 | 78 | 78 | 312 |
| Turn Type | Prot | pm+ov | NA | pm+ov | pm+pt | NA |
| Protected Phases | 4 | 1 | 2 | 4 | 1 | 6 |
| Permitted Phases | | 4 | | 2 | 6 | |
| Actuated Green, G (s) | 23.2 | 28.2 | 47.8 | 71.0 | 56.8 | 56.8 |
| Effective Green, g (s) | 23.7 | 29.2 | 49.3 | 72.0 | 55.8 | 58.3 |
| Actuated g/C Ratio | 0.26 | 0.32 | 0.55 | 0.80 | 0.62 | 0.65 |
| Clearance Time (s) | 5.0 | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 5.8 | 3.0 | 3.0 | 4.4 |
| Lane Grp Cap (vph) | 808 | 808 | 1734 | 1204 | 604 | 2947 |
| v/s Ratio Prot | c0.18 | c0.01 | 0.07 | 0.02 | 0.01 | 0.07 |
| v/s Ratio Perm | | 0.04 | | 0.04 | c0.07 | |
| v/c Ratio | 0.69 | 0.15 | 0.12 | 0.06 | 0.13 | 0.11 |
| Uniform Delay, d1 | 29.8 | 21.6 | 9.9 | 1.9 | 7.0 | 6.0 |
| Progression Factor | 1.41 | 3.53 | 0.61 | 0.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Delay (s) | 44.2 | 76.4 | 6.2 | 0.0 | 7.1 | 6.1 |
| Level of Service | D | E | A | A | A | A |
| Approach Delay (s) | 57.2 | | 4.3 | | | 6.3 |
| Approach LOS | E | | A | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 35.0 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.31 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 13.0 |
| Intersection Capacity Utilization | 39.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 174 | 1672 | 2461 | 69 | 128 | 689 |
| Ideal Flow (vphpl) | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Total Lost time (s) | 4.0 | 4.6 | 4.6 | 4.6 | 4.1 | 3.3 |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 1.00 | 0.97 | 0.88 |
| Frt | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3072 | 4550 | 4550 | 1417 | 3072 | 2493 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3072 | 4550 | 4550 | 1417 | 3072 | 2493 |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 179 | 1724 | 2537 | 71 | 132 | 710 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 31 | 0 | 0 |
| Lane Group Flow (vph) | 179 | 1724 | 2537 | 40 | 132 | 710 |
| Turn Type | Prot | NA | NA | Perm | Prot | pm+ov |
| Protected Phases | 5 | 2 | 6 | | 4 | 5 |
| Permitted Phases | | | | 6 | | 4 |
| Actuated Green, G (s) | 12.1 | 54.4 | 38.3 | 38.3 | 25.0 | 37.1 |
| Effective Green, g (s) | 12.1 | 55.6 | 39.5 | 39.5 | 25.7 | 38.5 |
| Actuated g/C Ratio | 0.13 | 0.62 | 0.44 | 0.44 | 0.29 | 0.43 |
| Clearance Time (s) | 4.0 | 5.8 | 5.8 | 5.8 | 4.8 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 413 | 2810 | 1996 | 621 | 877 | 1066 |
| v/s Ratio Prot | 0.06 | 0.38 | c0.56 | | 0.04 | c0.09 |
| v/s Ratio Perm | | | | 0.03 | | 0.19 |
| v/c Ratio | 0.43 | 0.61 | 1.27 | 0.06 | 0.15 | 0.67 |
| Uniform Delay, d1 | 35.8 | 10.6 | 25.2 | 14.6 | 24.0 | 20.6 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.69 | 0.51 |
| Incremental Delay, d2 | 0.7 | 1.0 | 126.1 | 0.2 | 0.1 | 1.6 |
| Delay (s) | 36.5 | 11.6 | 151.3 | 14.8 | 40.6 | 12.2 |
| Level of Service | D | B | F | B | D | B |
| Approach Delay (s) | | 13.9 | 147.6 | | 16.6 | |
| Approach LOS | | B | F | | B | |

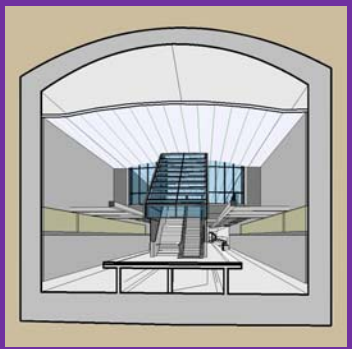
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 79.5 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 13.4 |
| Intersection Capacity Utilization | 87.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

# WESTSIDE PURPLE LINE EXTENSION PROJECT, SECTION 2

## ADVANCED PRELIMINARY ENGINEERING

Contract No. PS-4350-2000


# Century City Constellation Station
# Air Quality Impacts Memorandum

*Prepared for:*

Metro

*Prepared by:*

PARSONS BRINCKERHOFF

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| Review Copy | | |
|---|---|---|
| | Date | Initials |
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October 8, 2015

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# 1.0 INTRODUCTION

This memorandum supplements the *Westside Subway Extension Air Quality Technical Report (*August 2010) and the *Westside Subway Extension Air Quality Memorandum* (December 2011) and supports the *Westside Subway Extension Final EIS/EIR* (March 2012). This memorandum updates the analysis in Section 3.4 of the *Air Quality Memorandum* to incorporate further refinements to the construction approach and schedule for the Century City Constellation Station.

As a result of this refined analysis, SCAQMD thresholds will be exceeded for $PM_{10}$ during the construction of the Project, prior to mitigation. With the proposed mitigation implemented, however, both $PM_{10}$ and $PM_{2.5}$ will be reduced, and SCAQMD thresholds would not be exceeded for any pollutant. These determinations are consistent with the findings in the *Westside Subway Extension Draft EIS/EIR* (September 2010).

Only the LPA (Alternative 2) is included in this memorandum. The LPA is being constructed as three consecutive phases under the Metro Long Range Transportation Plan (LRTP) Scenario.

Information on regulatory framework, analysis methodology and existing conditions/affected environment can be found in the *Westside Subway Extension Project Air Quality Technical Report*.

# 2.0 REFINEMENTS TO CONSTRUCTION APPROACH AND SCHEDULE

The reason for the re-evaluation of Section 2 of the Westside Subway Extension is a result of a change in the development timeline for the parcel originally identified in the August 2012 Record of Decision (ROD) as the primary construction staging and laydown area along with station entrance for the Century City Constellation Station.

Due to a proposed commercial development at the corner of Avenue of the Stars and Constellation Boulevard (Area 1), the site can no longer be utilized for construction staging and laydown. However, the station entrance proposed at this location will remain and be incorporated into the new development. The following provides a summary of the areas of change from the approved construction staging scenario for the Century City Constellation Station (see Figure 2-1 for locations of referenced areas):

**1. Change in construction staging scenario locations**

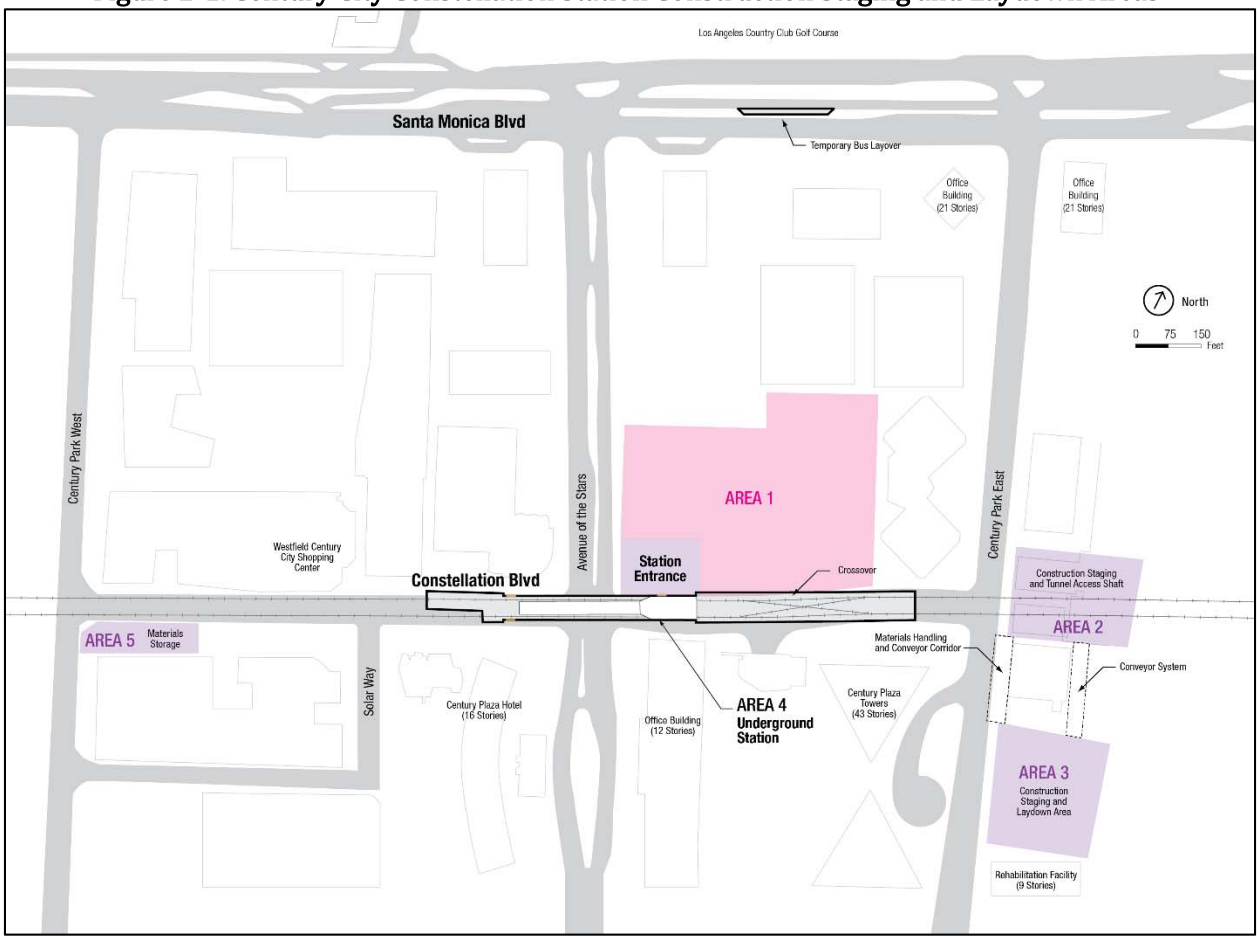
Scenario A, as identified in the EIS/EIR, with the Century City Constellation Station entrance and approximately 5.5 acre construction staging and laydown area (staging area) at the northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1) was selected as part of the preferred alternative. Due to a proposed commercial development at this site, the selected construction staging area can no longer be used for the project. Instead, the staging areas identified in EIS/EIR as part of Scenario B will be used. The Scenario B sites (Area 2 and Area 3) include two locations along Century Park East and require full acquisition of 1940 Century Park East, 1950 Century Park East, and 2040 Century Park East.

A portion (less than 0.25 acres) of Area 1 will be required for construction of the station entrance which is to remain in the original location at the northeast corner of Constellation Boulevard and Avenue of the Stars (Area 1) and will be incorporated into future development to be constructed at this location. Metro will coordinate with the developer regarding the station entrance, although if development of the site has not yet begun when construction of the Constellation Station begins, the station entrance would be designed as described in the EIR. If the site is not developed at the start of the Constellation Station construction, it is possible that more than 0.25 acres of Area 1 will be used for construction activities.

In addition, due to the loss of full use of Area 1, the tunnel boring machine (TBM) will be lowered into the station excavation along Constellation Boulevard. This will require the full closure of approximately 200 feet of the eastern end of Constellation Boulevard between Century Park East and the first driveway on the north side of the street. Constellation Boulevard is a minor 4-lane east/west collector street median traversing a distance of approximately 0.4 miles between Century Park West and Century Park East that is classified in the Transportation Element of the City of Los Angeles General Plan as a Divided Secondary Highway. Within the study area, Constellation Boulevard has two travel lanes in each direction with painted two-way left-turn lanes and primarily provides a means of access to the properties located along its length. The closure of this short section of the noncontiguous Constellation Boulevard will be in place for approximately six months and will not block any building or driveway entrances.

Therefore, a hybrid of construction staging scenarios will be implemented with the station entrance location from Scenario A and staging areas from Scenario B.

**Figure 2-1. Century City Constellation Station Construction Staging and Laydown Areas**




## 2. Installation of a new tunnel access shaft and conveyor in Area 2

Since the majority of Area 1 will no longer be available for construction staging and removal of excavated materials, a temporary vertical access shaft, up to 80 feet in diameter will be constructed in Area 2 to provide access to the tunnel heading for workers and materials and to remove excavated material from the tunnel. The placement of a vertical access shaft in Area 2 was not included as part of a construction staging scenario presented in the EIS/EIR. The vertical access shaft will include three phases: construction of the shaft; operations conducted through the shaft including mucking, concrete work, and rail welding; and backfill of the shaft. Construction staging activities in Area 2 will occur for approximately seven years.

Because Areas 2 and 3 are not adjacent to each other, excavated material will likely be moved between the tunnel access shaft in Area 2 and staging area in Area 3 via an enclosed conveyor system. The conveyer will be in operation for approximately three years and located along a new temporary easement to be acquired by Metro. Should a slurry TBM be used, the conveyance system will carry the slurry feed and discharge pipes from the tunnel access shaft to a slurry separation plant in Area 3. There are three proposed location options for the conveyor system, with the final location to be determined after negotiations with the property owner:

I. The first option aligns the conveyor system from the vertical access shaft in Area 2 and travels approximately 400 feet along the east side of the AT&T building parking structure at 2010 Century Park East to Area 3. The conveyor would span the top of the parking structure. In addition to the conveyor, temporary pipe racks carrying utility lines, water, grout, foam, compressed air, etc. would also be installed over the top of the parking structure.

II. The second option is also located along the east side of the AT&T building at 2010 Century Park East. With this option the parking structure would be demolished and the conveyor system would be placed at ground level for approximately 400 feet from the tunnel shaft to Area 3. The parking structure is structurally unsound and only partially used now. Should AT&T agree to remove the parking structure, the enclosed conveyor system would be placed at ground level between Areas 2 and 3. Removal of the parking structure would also allow for additional area behind the AT&T building to be used for construction staging and laydown activities and for movement of materials and equipment between Areas 2 and 3. In addition, the area immediately adjacent to the east side of the building will be available for use as parking for employees of the AT&T facility.

III. The third option would place the conveyor system along the west side of the AT&T building in a materials handling corridor. This option would only be used if an easement along the east side of the AT&T building is not feasible. The corridor would extend from staging Area 2 to Area 3, a distance of approximately 400 feet, with a width encompassing one northbound traffic lane and sidewalk in the public right-of-way along the eastern side of Century Park East, and the space between the AT&T building and the eastern edge of the sidewalk. The corridor would be separated from traffic on Century Park East by K-Rail dividers plus fencing with fabric sight screening. Materials handling equipment would travel on the closed street lane. The enclosed conveyor would be elevated such that traffic entering the AT&T facility could pass beneath the conveyor structure. Access to the AT&T building and their facilities will be maintained through the period of use, which is approximately five years. The materials handling corridor along Century Park East would require the temporary relocation of one bus stop serving the Metro 28 line and LADOT Commuter Express line 534.

### 3. Operation of inpatient long-term rehabilitation facility adjacent to construction staging Area 3

Immediately south of staging Area 3, a former physician-run hospital at 2080 Century Park East that has been closed since 2008 is being remodeled to become a new inpatient rehabilitation facility with a tentative opening date of March 2016. The nine story rehabilitation facility was not in operation at the time of the EIR, therefore the analysis of the adjacent construction staging area did not assess potential noise, air quality, dust, light, and visual impacts to an inpatient medical facility. The 138 bed facility will provide inpatient rehabilitation services. Adjacent to the building, construction staging Area 3 will primarily be used for the temporary storage of excavated material which will then be hauled away for off-site disposal. Area 3 will also be used for storage of materials and equipment required for tunnel and station construction, and for the design/build contractor's office, maintenance shops, and parking. There is no change to the truck haul routes to be used for construction of the Century City Constellation Station identified in the EIS/EIR. Construction related activities will be in operation at this site for approximately seven years.

### 4. Use of existing Metro bus layover area for construction material storage

In addition to the Century Park East sites identified in the EIR, a material storage area will be placed at the existing 0.3 acre Metro bus layover site on the southeast corner of Century Park West and Constellation Boulevard (Area 5). The property owner also uses the site for a fuel cell installation to generate electricity. Access to the fuel cell installation will be maintained during the entire time the site is used by Metro. There will be no ground disturbing activity at the site other than for the installation and removal of soundwalls, and for removal and restoration of curbs and landscaping. Following construction of the station, the site will be returned to its current use as a Metro bus layover facility. The site will be used approximately seven years for storage of construction ma

### 5. Temporary bus layover on Santa Monica Boulevard

Due to the use of the existing Metro bus layover site (Area 5), a new temporary bus layover approximately 250 feet long and 12 feet wide providing parking for up to five buses, will be constructed in the median of Santa Monica Boulevard between Avenue of the Stars and Century Park East. Also included will be restroom facilities for Metro bus operators. The layover zone will be located in the landscaped median between the eastbound lanes of Santa Monica Boulevard and a dedicated bus lane, and will be in use for approximately seven years.

### 6. Westfield Mall Station Entrance

A potential second station entrance is under consideration at the Westfield Century City Mall. A knockout panel will be included in the northwest corner of the station box which will allow the Westfield Mall to connect directly to the Constellation Station if desired. In addition, Metro is currently in discussions with the property owners regarding the placement of the station appendages (exhaust and vent shafts) within the Westfield Mall property.

### 7. Elimination of train cross-over at Wilshire/Rodeo Station.

After an operational analysis was performed to verify that the train cross-over east of the Wilshire/Rodeo Station could be eliminated while still maintaining operational requirements for the Westside Subway Extension Project, Section 2, the Metro Board, at its September 2014 Board meeting approved the elimination of the cross-over. This action will result in significant shortening of the underground station, thus reducing construction costs and impacts to traffic and disruption to the surrounding streets and businesses.

# 3.0 CONSTRUCTION ASSESSMENTS

## 3.1 Existing with Project

An assessment of the air quality construction impacts was conducted. The assessment utilized CARB's EMFAC2011 mobile source emission factors, and the SCAQMD OFFROAD emission factors. SCAQMD OFFROAD was used to develop emission factors from off-road construction equipment. Using these various data sources, daily construction emission levels were developed. These values were compared to the air quality construction significance thresholds shown in Table 3-1 to determine if the project would meet or exceed these values. As the construction schedule is still preliminary at this time, construction emissions were estimated for each major activity.

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**Table 3-1: SCAQMD Air Quality Significance Thresholds**

| Mass Daily Thresholds[1] | | |
|---|---|---|
| Pollutant | Construction[2] | Operation[3] |
| Nitrogen Oxides (NOx) | 100 lbs/day | 55 lbs/day |
| Volatile Organic Compounds (VOC) | 75 lbs/day | 55 lbs/day |
| Respirable Particulate Matter (PM10) | 150 lbs/day | 150 lbs/day |
| Fine Particulate Matter (PM2.5) | 55 lbs/day | 55 lbs/day |
| Sulfur Oxides (SOx) | 150 lbs/day | 150 lbs/day |
| Carbon Monoxide (CO) | 550 lbs/day | 550 lbs/day |
| Lead (Pb) | 3 lbs/day | 3 lbs/day |
| **Toxic Air Contaminants (TACs), Odor and GHG Thresholds** | | |
| TACs (including carcinogens and non-carcinogens) | Maximum Incremental Cancer Risk ≥ 10 in 1 million<br>Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Hazard Index ≥ 1.0 (project increment) | |
| Odor | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| GHG | 10,000 MT/yr CO2eq for industrial facilities | |
| **Ambient Air Quality for Criteria Pollutants[4]** | | |
| NO2<br><br><br>1-hour average<br>annual average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>0.18 ppm (state)<br>0.03 ppm (state) and 0.0534 ppm (federal) | |
| PM10<br>24-hour average<br>annual average | 10.4 µg/m3 (construction)[5] & 2.5 µg/m3 (operation)<br>1.0 µg/m3 | |
| PM2.5<br>24-hour average | 10.4 µg/m3 (construction)[5] & 2.5 µg/m3 (operation) | |
| SO2<br>1-hour average<br>24-hour average | 0.25 ppm (state) & 0.075 ppm (federal-99th percentile)<br>0.04 ppm (state) | |
| Sulfate<br>24-hour average | 25 µg/m3 (state) | |
| CO<br><br><br>1-hour average<br>8-hour average | SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| Lead<br>30-day average<br>Rolling 3-month average | 1.5 µg/m3 (state)<br>0.15 µg/m3 (federal) | |

SCAQMD, March 2015, http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2
[1]*Source: SCAQMD CEQA Handbook (SCAQMD, 1993).*
[2]Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[3]For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[4]Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[5]Ambient air quality threshold based on SCAQMD Rule 403.
*KEY:* lbs/day = pounds per day; ppm = parts per million; µg/m3 = microgram per cubic meter; ≥ = greater than or equal to; MT/yr CO2eq = metric tons per year of CO2 equivalents

As shown in Table 3-2, for the Century City Constellation Station, SCAQMD thresholds would be exceeded for $PM_{10}$.

**Table 3-2: Estimated Highest Daily Construction Impacts for Century City Constellation Station Construction (lbs/day) – Prior to Mitigation**

| Activity | VOC | CO | NOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|
| Construction Equipment | 10 | 50 | 65 | 3 | 3 |
| Dust Generated from Dirt Handling (Excavation, Backfilling, etc.) | | | | 158 | 33 |
| Mobile Sources (Deliveries, worker trips, hauling of material, etc.) | 2 | 16 | 33 | 2 | 1 |
| **Highest Daily Total*** | 11 | 67 | 98 | 163 | 37 |
| **SCAQMD Thresholds** | **75** | **550** | **100** | **150** | **55** |

Note: Because the maximum daily emissions from construction equipment, dust generation, and mobile sources do not occur on the same day, the highest daily totals (which are presented) are less than the sum of the individual source maximums.

## 3.2 Mitigation Measures

To reduce air quality impacts related to construction activities, the following mitigation measures are recommended to be implemented. All of these mitigations were included in the Final EIS/EIR, published in March 2012 and are included in the Mitigation Monitoring and Reporting Plan.

### CON-6—Meet Mine Safety (MSHA) Standards

Tunnel locomotives (hauling spoils and other equipment to the tunnel heading) will be approved by Metro to meet MSHA standards.

### CON-7—Meet SCAQMD Standards

Metro and its contractors will set and maintain work equipment and standards to meet SCAQMD standards, including NOx.

### CON-8—Monitoring and Recording of Air Quality at Worksites

Monitoring and recording of air quality at the worksites will be conducted. In areas of gassy soil conditions, air quality will be continuously monitored and recorded. Construction will be altered as required to maintain a safe working atmosphere. The working environment will be kept in compliance with federal, state, and local regulations, including SCAQMD and Cal/OSHA standards.

### CON-9—No Idling of Heavy Equipment

Metro specifications will require that contractors not unnecessarily idle heavy equipment.

### CON-10—Maintenance of Construction Equipment

Metro will require its contractors to maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies. Metro will also require periodic,

unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications.

CON-11—Prohibit Tampering of Equipment

Metro will prohibit its contractors from tampering with engines and require continuing adherence to manufacturer's recommendations.

CON-12—Use of Best Available Emissions Control Technologies

Metro will encourage its contractors to lease new, clean equipment meeting the most stringent of applicable federal or state standards (e.g., Tier 3 or greater engine standards) or best available emissions control technologies on all equipment.

CON-13—Placement of Construction Equipment

Construction equipment and staging zones will be located away from sensitive receptors and fresh air intakes to buildings and air conditioners.

CON-14—Measures to Reduce the Predicted PM10 Levels

Mitigation measures such as watering, the use of soil stabilizers, etc. will be applied to reduce the predicted $PM_{10}$ levels to below the SCAQMD daily construction threshold levels. A watering schedule will be established to prevent soil stockpiles from drying out.

CON-15—Reduce Street Debris

At truck exit areas, wheel washing equipment will be installed to prevent soil from being tracked onto city streets, and followed by street sweeping as required to clean streets.

CON-16—Dust Control During Transport

Trucks will be covered to control dust during transport of spoils.

CON-17—Fugitive Dust Control

To control fugitive dust, wind fencing and phase grading operations, where appropriate, will be implemented along with the use of water trucks for stabilization of surfaces under windy conditions.

CON-18—Street Watering

Surrounding streets at construction sites will be watered by trucks as needed to eliminate air-borne dust. In keeping with Metro's prior policy on the Eastside Gold Line, the contractor will water streets in the station area impacted by dust not less than once a day and more often if needed.

CON-19—Spillage Prevention for Non-Earthmoving Equipment

Provisions will be made to prevent spillage when hauling materials and operating non-earthmoving equipment. Additionally, speed will be limited to 15 mph for these activities at construction sites.

CON-20—Spillage Prevention for Earthmoving Equipment

Provisions will be made to prevent spillage when hauling materials and operating earth-moving equipment. Additionally, speed will be limited to 10 mph for these activities at construction sites.

CON-21—Additional Controls to Reduce Emissions

EPA-registered particulate traps and other appropriate controls will be used where suitable to reduce emissions of particulate matter and other pollutants at the construction site.

## 3.3 Impacts Remaining After Mitigation

With the implementation of the mitigation measures listed above in Section 3.2, $PM_{10}$ and $PM_{2.5}$ will be reduced, and SCAQMD thresholds would not be exceeded for any pollutant.

**Table 3-3. Estimated Highest Daily Construction Impacts for Century City Constellation Station Construction (lbs/day) – After Mitigation**

| Activity | VOC | CO | NOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|
| Construction Equipment | 10 | 50 | 65 | 3 | 3 |
| Dust Generated from Dirt Handling (Excavation, Backfilling, etc.) | | | | 26 | 5 |
| Mobile Sources (Deliveries, worker trips, hauling of material, etc.) | 2 | 16 | 33 | 2 | 1 |
| **Highest Daily Total*** | 11 | 67 | 98 | 31 | 9 |
| **SCAQMD Thresholds** | **75** | **550** | **100** | **150** | **55** |

Note: Because the maximum daily emissions from construction equipment, dust generation, and mobile sources do not occur on the same day, the highest daily totals (which are presented) are less than the sum of the individual source maximums.

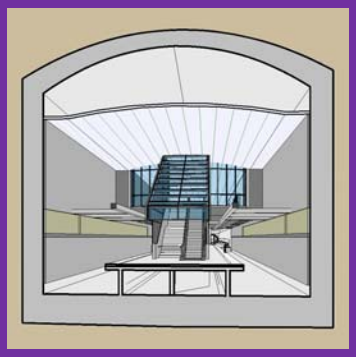
DRAFT

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

# WESTSIDE PURPLE LINE EXTENSION PROJECT, SECTION 2

## ADVANCED PRELIMINARY ENGINEERING

**Contract No. PS-4350-2000**


# Section 2 Construction Noise/ Vibration Mitigation and Monitoring Plan (Draft)

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October 8, 2015

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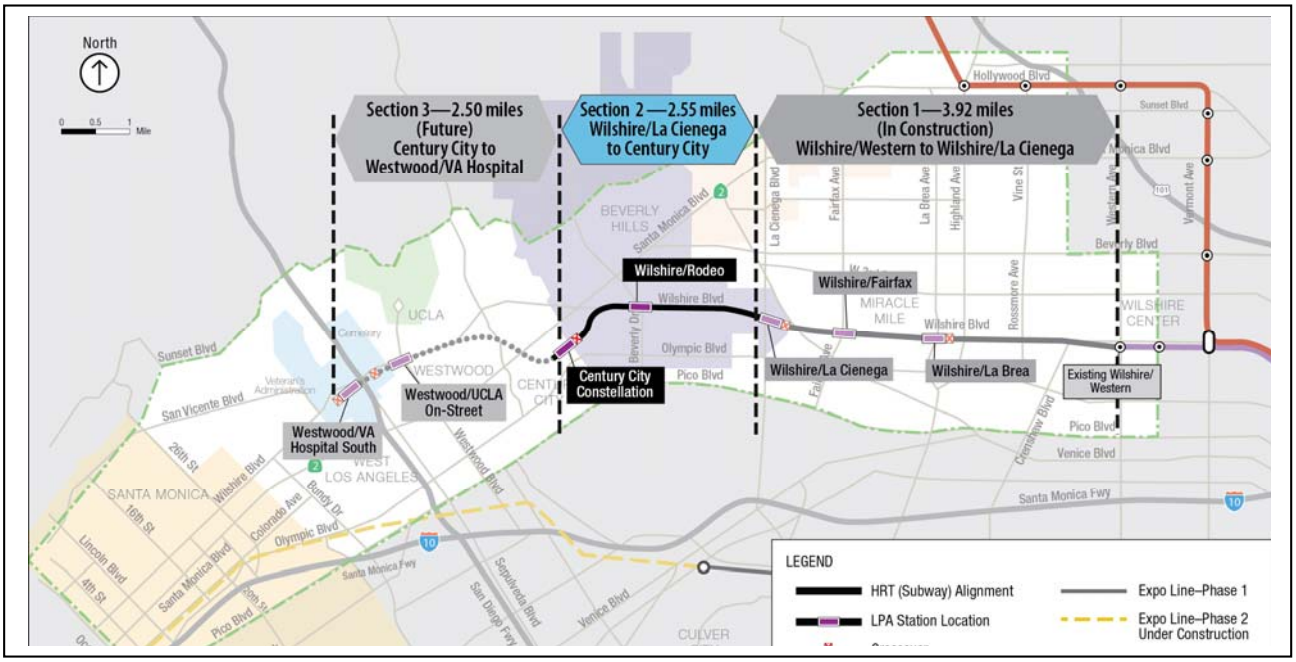
# 1.0 INTRODUCTION

The Westside Subway Extension Project is located in western Los Angeles County, and will extend the heavy rail Metro Purple Line subway line westward from the existing Wilshire/Western station to the Veterans Administration (VA) Hospital in Westwood. The subway lies within the Cities of Los Angeles and Beverly Hills, and a part of unincorporated Los Angeles County in the vicinity of the Federal Building and the Veterans Administration Hospital area.

The project consists of approximately nine miles of twin bore tunnels, seven underground stations, and modifications to the existing Division 20 rail vehicle storage and maintenance facility. The project will be constructed in three sections which are shown in Figure 1-1 and with further contracts for modifications to the Division 20 Maintenance Yard.

Figure 1-1: Project Sections




A design / build contract for Section 1 was awarded on November 5, 2014 and Notice to Proceed issued on January 12, 2015. Section 2 received Entry into Engineering from the FTA on December 31, 2014. Advanced Preliminary Engineering for Section 2 is now underway with the goal of issuing a Request for Proposals in late 2015.

The Westside Subway Extension Section 2 Project (the Project) involves construction activities which generate high noise and vibration levels. This Construction Noise and Vibration Plan (the Plan) discloses the predicted noise and vibration effects of construction activities related to the Project based on possible construction methods, though the actual means and methods employed during construction will be determined by the construction contractors and may differ from those described in this document.

This Plan outlines the potential noise and vibration effects of constructing Section 2, a 2.55 mile section with two stations at Wilshire/ Rodeo and Century City on Constellation Blvd. It describes possible construction methods, though the actual means and methods employed during construction will be determined by the construction contractors and may differ from those outlined in this document.

The Plan was prepared to meet the criteria, standards, and mitigation commitments in the Westside Subway Extension Final Environmental Impact Statement/ Environmental Impact Report (EIS/EIR), March 2012. The Plan identifies receivers where noise or vibration impact may occur as a result of construction activities, provides additional information on the noise and vibration limits for the planned means and methods of construction, and recommends mitigation measures and monitoring locations where necessary.

# 2.0 CONSTRUCTION ACTIVITIES

The Project's plans call for lay down and staging areas to support the station construction and tunneling activities. Site plans and more detailed descriptions of the activities to be conducted at each laydown site can be found in the Westside Purple Line Extension - Section 2 Construction Approach (June 2015). A brief description of each construction area and the noise and vibration generating construction activities modeled in this Plan follow below. The location of the construction areas discussed below are shown in Figure 2-3 and Figure 2-4.

## 2.1 Wilshire/Rodeo

A station box will be constructed below Wilshire Boulevard between S. Crescent Drive and S. Beverly Drive as shown on Figure 2-3. The lay down and staging areas supporting the construction of the Wilshire/Rodeo Station are:

Wilshire/Rodeo Station Box: Construction of the Wilshire/Rodeo Station box includes installation of piling and lagging, excavation below street level and installation of main deck beams and street decking. The installation of the main deck beams and street decking occurs over the 56 hour weekend closure (16 weekend closures). The remaining excavation is done under the street decking system. Spoils are hoisted to the surface by crane and temporarily stockpiled in the adjacent laydown and staging areas. The spoils are then loaded onto trucks for transportation to a disposal site. Once excavation is complete, station concreting occurs which includes concreting of station appendages and entrance structure. Concreting is followed backfilling and compaction of the station, appendages and entrance structure. Concurrent with the backfilling and compaction operation is installation of station mechanical and electrical in the various ancillary spaces/rooms and the entrance structure. Station finishes follows including those in the station entrance. Concurrent with the installation of the station finishes, site restoration occurs including AC pavement, concrete sidewalks, curbs, gutters, street lighting, signal systems, landscaping, signing, pavement striping and installation of street furniture.

Wilshire South Staging Area (Site 9447 Wilshire Blvd): This site is utilized for materials staging to support construction of Rodeo Station. The site includes an open shaft which allows access to the main station box, storage containers, air scrubbers and a water treatment plant. This staging area is shown on Figure 2-1 labeled as Parcel 4. This staging site will be used during station excavation to stockpile, load and haul-out excavated materials.

Wilshire North Staging Area (Site 9384 thru 9440 Wilshire Blvd): This site is utilized for muck handling for excavation down to 12' below street level. Once the main deck beams and street decking are in place, this site will revert over to support construction of Rodeo Station. The site includes an open shaft which allows access to the main station box, temporary power and a water treatment plant. This staging site will be used during station excavation to stockpile, loading and haul-out of excavated materials. This staging area is shown on Figure 2-1 labeled as Parcels 1, 2, and 3.

Figure 2-1: Lay down and Staging Areas at Wilshire/Rodeo Station




## 2.2 Century City/Constellation

A station box will be constructed below Constellation Boulevard between Century Park East and Solar Way (Figure 2-4). The lay down and staging areas supporting the construction of the Century City Station are:

Median of Constellation Boulevard: Main construction staging to support all construction operations necessary to construct Century City/Constellation station with the exception of installing main deck beams and street decking which occurs continuously over the 56 hour weekend closures (21 weekend closures). As there are no spoils storage areas available, all spoils are immediately loaded onto trucks and taken to disposal sites. This site is to be utilized for both day and night work shifts. This area is shown on Figure 2-2 labeled as Site 4.

Construction Site 1940 Century Park East (CPE): Primary use is to support tunneling operations for day and night shifts. This site also is to receive materials such as pre-cast concrete segments which constitute the tunnel lining. This site will also support the mining of cross-passages and concreting of tunnels and cross-passages, mechanical, electrical and finishes for day shifts. This area is shown on Figure 2-2 labeled as Site 2. Tunnel ventilation and air scrubbing equipment will be located on this site, together with a temporary substation providing power for tunneling equipment

Construction Site 1950 CPE: Access shaft to support tunneling operations for day and night shifts during tunneling. The access shaft facilitates removal of tunnel muck as well as for deliveries of precast segments to rail mounted cars below which will be taken to the TBM's rear trailing gear for installation as the tunnel liner. Other miscellaneous material appurtenances will also be delivered in this manner. This site also supports concreting of tunnels (invert & walkway) and cross-passages, mechanical, electrical and finishes for day shifts. This area is shown on Figure 2-2 labeled as Site 2. During construction of the access shaft, the site will also be used by excavating and hoisting equipment required for shaft construction. At the completion of tunnel construction, the shaft will be used to

support rail welding. Stock rail will be delivered to the site by trucks. The rail will be lowered down to track level through the shaft and placed in stockpiles. A portable rail welding plant will be set up at the bottom of the shaft to weld stock rail into continuous welded rail (CWR) strings approximately 500 ft long. The CWR strings will also be stockpiled within the tunnels

Construction Site 2040 CPE: Main construction staging site to support tunneling operations for day and night shifts during tunneling. This site also supports the drying and storage of tunnel muck until such time as it is loaded onto trucks and taken to disposal sites. This site houses the compressor plant, ventilation plant, grout plant, foam plant, conveyor system, machine shop and electrical shop. Upon completion of tunneling, this site reverts to daytime use to support concreting of tunnels and cross-passages, mechanical, electrical and finishes. This area is shown on Figure 2-2 labeled as Site 3.

Construction Site at Constellation Boulevard and Century Park West (Parcel W3901): Primary use of this site for miscellaneous tool storage as well as limited materials storage to support Century City/Constellation Station construction operations. This site is to be for both day and night work shifts. This area is shown on Figure 2-2 labeled as Site 5.

Once tunnels have been completed, the tunneling operation will demobilize, thereby leaving construction sites 1940 CPE, 1950 CPE, and 2040 CPE to support construction of the Century City/Constellation Station and Systems installation (Trackwork, Traction Power, Automatic Train Control and Communications).

Figure 2-2: Lay down and Staging Areas at Century City/Constellation Station

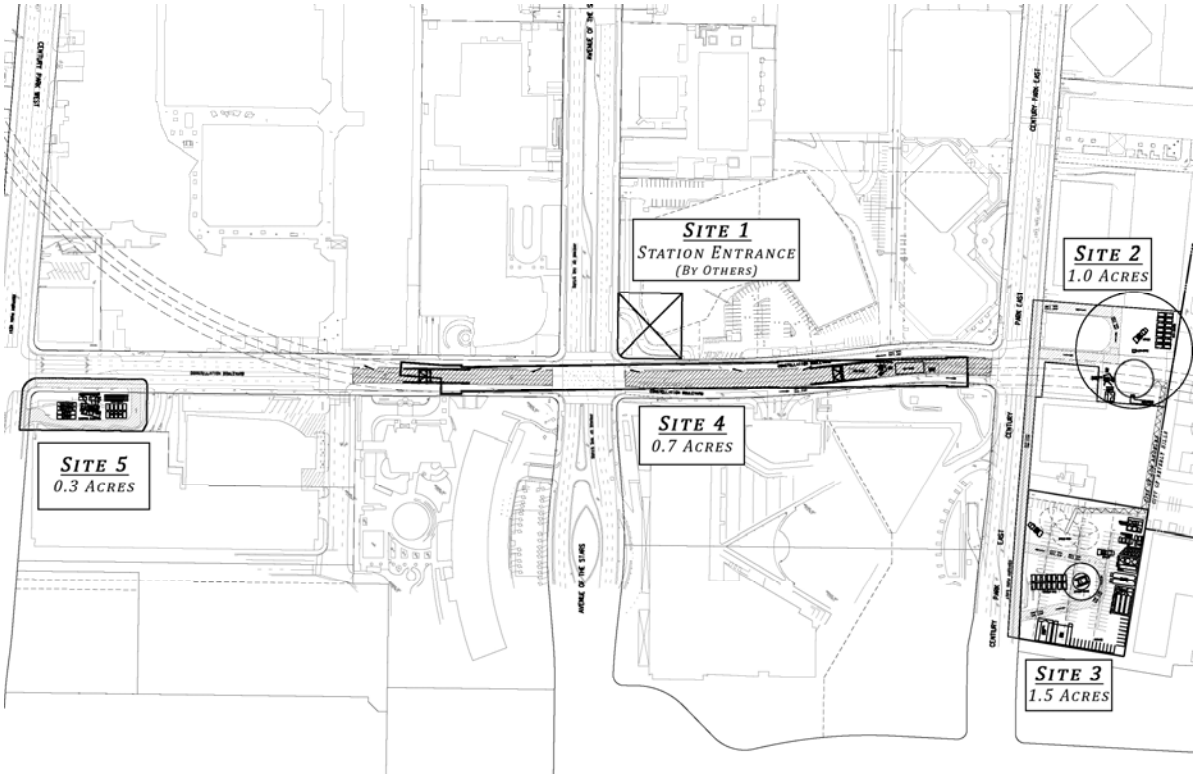


Figure 2-3: Wilshire/Rodeo Station Construction Sites and Noise Receivers

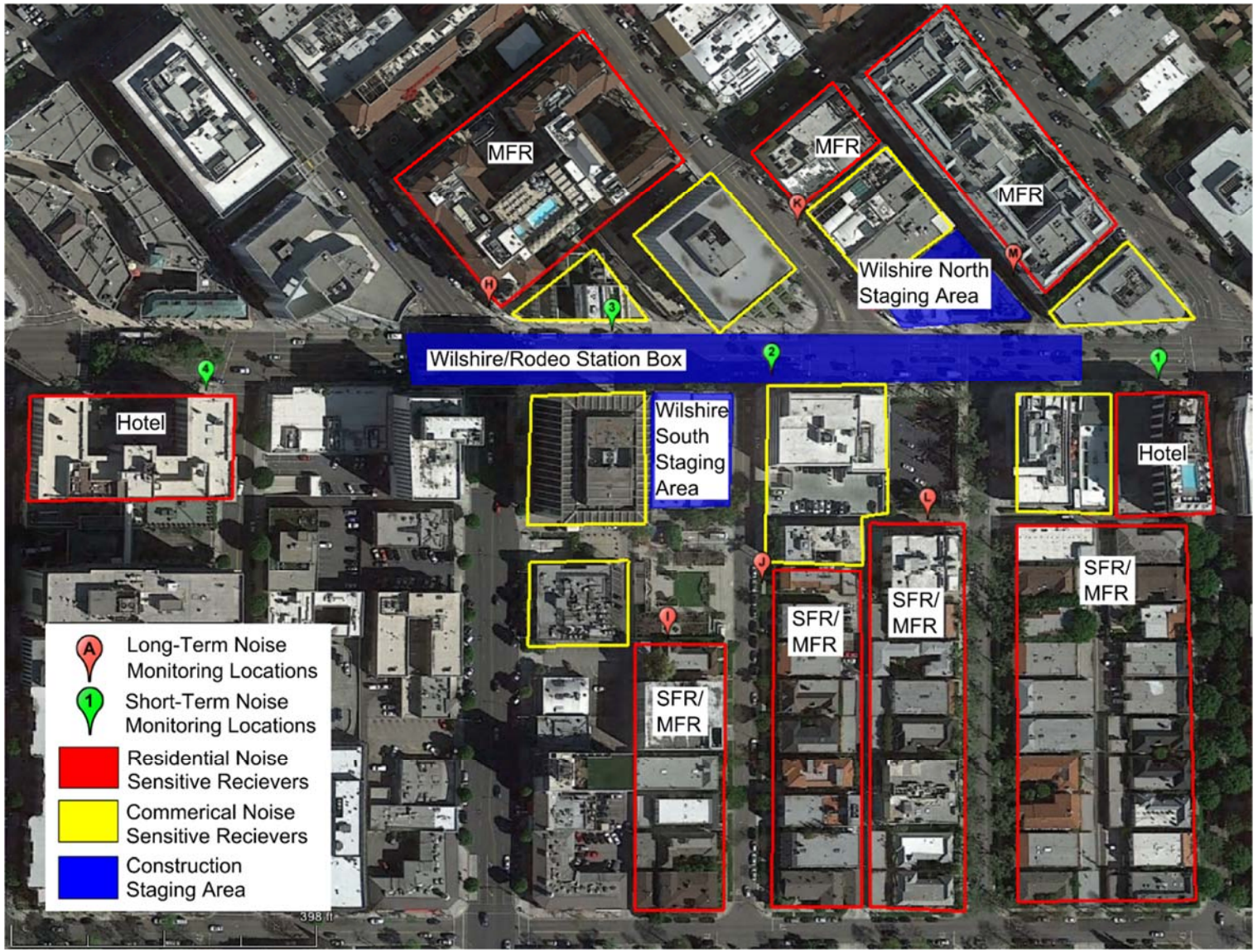
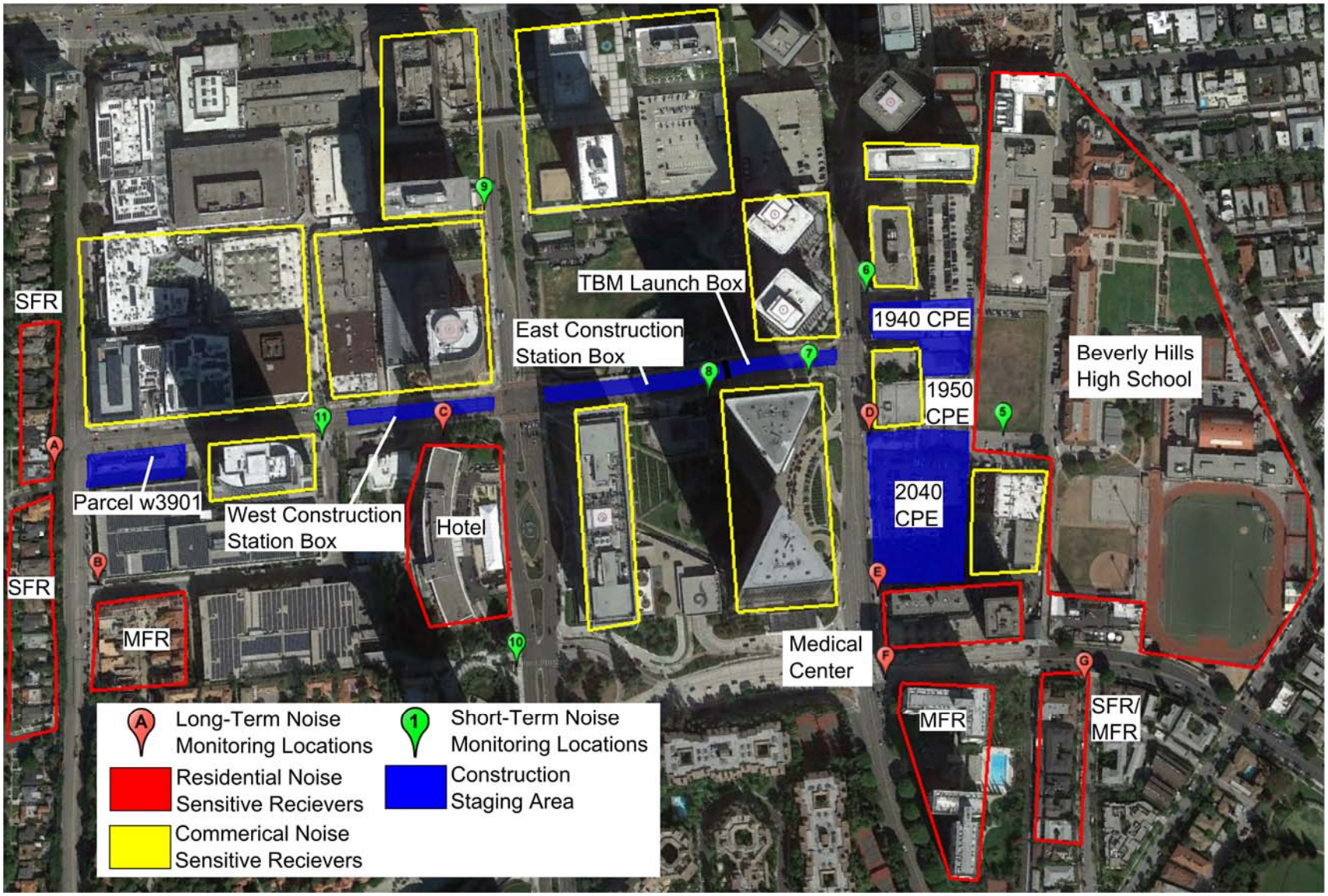


Figure 2-4: Century City/Constellation Station Construction Sites and Noise Receivers



# 3.0 PRE-CONSTRUCTION NOISE MEASUREMENTS

Existing noise conditions were documented at sensitive receivers closest to the construction areas to determine the baseline ambient noise levels before construction activities. The location of the noise sensitive receivers are shown on Figure 2-3 and Figure 2-4. These existing noise measurements are used as the basis for:

- A noise variance from the City of Los Angeles for construction during the nighttime hours 9:00 P.M. to 7:00 A.M.
- A noise variance from the City of Beverly Hills for construction during the evening hours of 6:00 P.M. to 9:00 P.M. and nighttime hours of 9:00 P.M. to 8:00 A.M.
- Establish City of Beverly Hills daytime construction noise limits during the hours of 8:00 A.M. to 6:00 P.M.

Existing daytime noise, from 7:00 A.M. to 9:00 P.M., at receivers in the City of Los Angeles was not measured because the City has a construction noise limit of 75 dBA for these hours.

The results of the noise measurements are presented in Table 3-1 and Table 3-2. The table presents the average of the measured daytime, evening, and nighttime noise levels (Leq) for receivers in the jurisdiction of the City of Beverly Hills and the nighttime Leq, for receivers within the jurisdiction of the City of Los Angeles. Detailed measurement results are presented in Appendix B.

Table 3-1: Pre-Construction Noise Measurement Results Wilshire/Rode Station

| Site No. | Measurement Location | Daytime Leq[b] | Evening Leq[b] | Nighttime Leq[b] |
|---|---|---|---|---|
| H | 210 N. Beverly Drive (MFR) | 72 dBA | 70 dBA | 69 dBA |
| I | 133-153 S. Reeves Drive (SFR/MFR) | 59 dBA | 56 dBA | 54 dBA |
| J | Sitaj Hotel, 120 S. Reeves Drive | 58 dBA | 56 dBA | 52 dBA |
| K | 192 N. Canon Drive (Offices) | 68 dBA | 65 dBA | 65 dBA |
| L | 121-157 S. Canon Drive (SFR/MFR) | 61 dBA | 61 dBA | 57 dBA |
| M | AKA Beverly Hills Hotel, 155 N. Crescent Drive | 62 dBA | 60 dBA | 62 dBA |
| 1 | Beverly Sixty Hotel, 9360 Wilshire Boulevard[a] | 76 dBA | 74 dBA | 72 dBA |
| 2 | The Rolex Building, 9420 Wilshire Boulevard (Offices) [a] | 74 dBA | 72 dBA | 70 dBA |
| 3 | Sterling Plaza/Bank of California, 9441 Wilshire Boulevard (Offices) [a] | 74 dBA | 72 dBA | 71 dBA |
| 4 | Beverly Wilshire Hotel, 9500 Wilshire Boulevard[a] | 73 dBA | 72 dBA | 70 dBA |

Notes:
[a] 1-hour measurements were taken at Sites 1 through 4. The daytime Leq, evening Leq, and nighttime Leq were estimated by comparing the 1-hour measurement to the same hour of the nearest 24-hour measurement location.
[b] Daytime is from 8:00 A.M. to 6:00 P.M., evening is from 6:00 P.M. to 9:00 P.M. and nighttime is from 9:00 P.M. to 8:00 A.M.,
MFR – Multi-Family Residences
SFR – Single-Family Residences

Table 3-2: Pre-Construction Noise Measurement Results Century City/Constellation Station

| Site No. | Measurement Location | Nighttime Leq[b] | | |
|---|---|---|---|---|
| A | 1918-1952 Fox Hills Drive (MFR) | 58 dBA | | |
| B | 2050 Century Park West (MFR) | 59 dBA | | |
| C | Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars | 56 dBA | | |
| D | 2010 Century Park East (Offices) | 63 dBA | | |
| E | Century City Hospital & Medical Center, 2080 Century Park East | 63 dBA | | |
| F | 2160 Century Park East (MFR) | 65 dBA | | |
| 6 | 1888 Century Park East (Offices)[a] | 63 dBA | | |
| 7 | Century Plaza Towers, 2049 Century Park East (Offices)[a] | 59 dBA | | |
| 8 | Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard[a] | 56 dBA | | |
| 9 | Bain & Company Building, 1901 Avenue of the Stars[a] | 61 dBA | | |
| 10 | The Century, 10 West Century Drive (Offices)[a] | 57 dBA | | |
| 11 | Constellation Place, 10250 Constellation Boulevard (Offices)[a] | 64 dBA | | |
| Sites G and 5 are in the City of Beverly Hills and subject to the Beverly Hills' Noise Code | | | | |
| | | Daytime | Evening | Nighttime |
| G | 401 Shirley Place, Beverly Hills (SFR) | 68 dBA | 68 dBA | 63 dBA |
| 5 | Beverly Hills High School[a] | 56 dBA | 53 dBA | 51 dBA |

Notes:
[a] 1-hour measurements were taken at Sites 5 through 11. At these locations the daytime Leq, evening Leq, and nighttime Leq were estimated by comparing the 1-hour measurement to the same hour of the nearest 24-hour measurement location.
[b] Nighttime is from 9:00 P.M. to 7:00 A.M as defined by the City of Los Angles Municipal Code.
MFR – Multi-Family Residences
SFR – Single-Family Residences

# 4.0 CONSTRUCTION NOISE LIMITS

The Project is subject to the local noise limits set forth in the City of Los Angeles Municipal Code (LAMC) and the City of Beverly Hills Municipal Code (BHMC). The Wilshire/Rodeo construction areas are located in the City of Beverly Hills and are subject to the BHMC. The Century City/Constellation construction areas are in the City of Los Angeles and are subject to the LAMC. The exception are those noise sensitive receivers within the City of Beverly Hills limits are affected by the activities at Century City/Constellation construction sites on Century Park East. These receivers, single-family residences on Shirley Place (Site G) and Beverly Hills High School (Site 5) are subject to the BHMC.

## 4.1 City of Los Angeles Noise Limits

Section 112.05 of the LAMC sets a maximum noise level for powered equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. However, compliance with this standard is not required where “technically infeasible”. Technically infeasible means that the established noise limits cannot be met with at the project site despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques employed during the operation of equipment.

Section 111.02 of the LAMC provides procedures and criteria for the measurement and impact assessment of noise sources. Specifically, the procedures provide for a penalty of 5 dBA for steady high-pitched noise or repeated impulsive noises. Conversely, the procedures provide a credit of 5 dBA for noise occurring less than 15 minutes in a period of 60 consecutive minutes during the day because short-term noise events are typically less annoying than continuous noise sources.

The LAMC also restricts the hours of construction activities. Section 41.40 prohibits construction between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M and 8:00 A.M on Saturday, and at any time on Sunday. Construction during nighttime hours or on Sunday requires a noise variance. If a noise variance is obtained, construction can be conducted during nighttime hours with a noise limit of 5 decibels above the measured ambient.

Pre-construction noise measurements were conducted at the sensitive receivers adjacent to the construction areas to determine the pre-construction ambient noise levels and nighttime construction noise limits. The noise measurement results are presented in Section 0. More detailed information on the ambient measurement results are shown in Appendix B.

## 4.2 City of Beverly Hills Noise Limits

Section 5-1-202 of the BHMC limits the noise level of any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient noise level by more than five decibels.

Section 5-1-205 of the BHMC restricts the hours of construction activity during the hours of 6:00 P.M. and 8:00 A.M. of any day or at any time on a Sunday or public holiday. The Project may be granted an afterhours construction permit authorizing work during restricted hours if the city building official determines that the public interest will be served by such a permit.

The BHMC does not mention the nighttime noise limit that is applied if a nighttime noise permit is obtained. In this Plan, we assume that the nighttime noise limit will be five decibels above the ambient

noise level. This is consistent with the limit applied during the nighttime hours in the City of Los Angeles and with the limit applied during the daytime in the city of Beverly Hills.

## 4.3 Summary of Noise Limits

A summary of the noise limits is presented in Table 4-1. The table presents the different noise limits for City of Los Angeles and the City of Beverly Hills. Additionally, there are different limits for different times of day. For the noise impact analysis in this Plan, the limits are applied at the facade of the nearest sensitive receivers. Residential land uses (where people sleep) or institutional land uses such as theatres, churches, or schools are considered to be sensitive receivers. Commercial and industrial land uses are not considered sensitive and are not assessed for impact in this Plan.

Table 4-1: Summary of Construction Noise Limits

| Construction Activity | Noise Limit[1], dBA |
|---|---|
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), general activities | 75 dBA |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), steady high-pitch noise or repeated impulsive noises | 70 dBA |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), less than 15 minute duration in a period of 60 consecutive minutes | 80 dBA |
| City of Los Angeles Nighttime (9:00 P.M.-7:00 A.M.), all activities | Nighttime Ambient + 5dB |
| City of Beverly Hills Daytime (8:00 A.M.-6:00 P.M.), all activities | Daytime Ambient +5 dB |
| City of Beverly Hills Evening (6:00 P.M.-9:00 P.M.), all activities | Evening Ambient + 5dB |
| City of Beverly Hills Nighttime (9:00 P.M.-8:00 A.M.), all activities | Nighttime Ambient + 5 dB |

Notes:
[1]Noise limit applies to the facade of the closest noise sensitive property.

# 5.0 CONSTRUCTION VIBRATION LIMITS

The primary concern regarding construction vibration relates to risk of damage. Vibration is generally assessed in terms of peak particle velocity (PPV) for risk of building damage. PPV is the appropriate metric for evaluating the potential of building damage and is often used when monitoring blasting and construction vibration because it relates to the stresses that are experienced by the buildings.

Vibration damage risk thresholds from the Westside Subway Extension Final EIS/EIR are presented in Table 5-1. The table presents PPV thresholds for different building categories. The 'Structural Building Damage' category is the level above which there is a risk that structural damage may occur. The 'Architectural Building Damage' category is the level above which there is a risk that superficial building damage, such as small cracks, may occur. The third category, 'Damage Risk to Historic Buildings and Cultural Resource Structures' is meant to apply to historic buildings that are particularly susceptible to damage. In this Plan, we use the 'Architectural Building Damage' threshold of 0.5 PPV for all non-historic structures. Where the PPV exceeds 0.5, monitoring or other appropriate mitigation measures such as using alternative construction approaches, are considered.

Table 5-1: Construction Vibration Damage Risk Thresholds

| Building Category | Peak Particle Velocity (in/sec) |
|---|---|
| Structural Building Damage | 2.0 |
| Architectural Building Damage | 0.5 |
| Damage Risk to Historic Buildings and Cultural Resource Structures | 0.12 to 0.2 |
| Source: Westside Subway Extension Final EIS/EIR, LAMTA, March 2012. | |

A survey of the cultural resources and historic properties within the project area were completed as part of the EIS/EIR.

Table 5-2 lists the properties identified in the survey which are eligible for the National Register of Historic Places (NRHP) and the California Register of Historic Places (CHRP) and are within 500 feet of any of the construction laydown areas or other major construction activities. Based the existing condition of the properties identified as historic these building will be assessed with the upper limit of the damage risk threshold of 0.2 PPV in/sec in this Plan. This is a conservative threshold to prevent any architectural damage to the buildings.

Table 5-2: Properties Listed and Eligible as NRHP

| Property | Status |
|---|---|
| Sterling Plaza/Bank of California, 9441 Wilshire Boulevard | Potentially Eligible NRHP, CRHP |
| Ace Gallery, 9430 Wilshire Boulevard | Potentially Eligible NRHP, CRHP |
| Union Bank Building, 9460 Wilshire Boulevard | Potentially Eligible NRHP, CRHP |
| Beverly Hills High School | Potentially Eligible NRHP, CRHP |
| Century Plaza Hotel, 2025 Avenue of the Stars | Potentially Eligible NRHP, CRHP |
| Source: Historic Properties Supplemental Survey Technical Report, LAMTA, March 2012. | |

## 5.1 Groundborne Noise

During tunnel excavation the operation of the tunnel train will result in groundborne noise levels that could affect receivers above the tunnel such as residences, hotels, theaters, churches, and schools. Metro has adopted a groundborne noise criteria for tunneling that is based on adding 5 dB to the FTA groundborne noise criteria. Table 5-3 lists the criteria which are also included in Metros' Contract Specification Section 01565, Construction Noise and Vibration Control, which will be included as part of the contract documents for this Project.

Table 5-3: Allowable Maximum Interior Groundborne Noise from Underground Construction Activities (Lmax)

| Land Use Activity | Groundborne Noise Level Limits – $L_{max}$ (dBA) |
|---|---|
| Single-Family Dwellings | 40 |
| Multi-Family Dwellings | 45 |
| Hotel/Motel | 45 |
| Offices | 50 |
| Commercial Buildings | 55 |
| Concert Halls, Recording and TV Studios | 30 |
| Auditoriums and Music Rooms | 35 |
| Churches and Theaters | 40 |
| Hospital Sleeping Rooms | 45 |
| Schools and Libraries | 50 |
| Note: Maximum ground borne noise is as measured in the inside of the affected noise sensitive structure. | |

# 6.0 CONSTRUCTION NOISE PREDICTIONS

## 6.1 Noise Prediction Methodology

The projected daytime and nighttime construction noise levels were modeled using CadnaA version 4.0, a three dimensional graphics oriented noise modeling program that uses the International Standards Organization (ISO)9613, a general purpose standard for outdoor noise propagation. CadnaA incorporates the following elements:

- An emission model to determine the noise generated by the equipment at a reference distance.
- A propagation model that calculates how the noise level varies with distance.
- A prediction model that sums the noise of each source at sensitive locations.

The noise modeling includes the effects of ground cover, the shielding of building structures, and the reduction provided by a noise barrier wall (if one is specified in the construction plans). The construction noise levels were estimated at each of the receivers within close proximity to the construction sites. The source noise levels used in the model for different pieces of construction equipment are based on the actual measured noise level data presented in Table 6-1. This data is from the Federal Highway Administration (FHWA) Roadway Construction Noise Model.

## 6.2 Noise Prediction Results and Impact Assessment

Noise prediction models were developed for each construction site based on the project plan drawings and the current means and methods planned for the construction phases. Each of the construction sites where nighttime activities will occur are assumed to have a noise barrier wall of different heights erected around the perimeter of each site and construction at that site would use low noise emission equipment as specified by Metro's Specification Section 01 56 19, Construction Noise and Vibration Control (Appendix C). The following sections present predictions of noise levels at sensitive receivers in the vicinity of the laydown areas and other areas where construction activity is scheduled to take place. The hourly noise levels from the proposed construction activities (Leq) and the applicable noise limits at the nearest receivers are presented in Table 6-2 and Table 6-3.

### 6.2.1 Wilshire/Rodeo Station

Activities at the Wilshire/Rodeo site consist of construction of the station box and support of underground mining activities. There are three construction areas, all of which, will support construction activities during nighttime hours from 6:00 P.M. to 8:00 A.M. During these nighttime hours the following equipment is expected to be used at each of these areas:

- Wilshire/Rodeo Station Box Area: boom crane, rough terrain crane, fork lift truck, and a pickup truck.
- Wilshire South Staging Area: rough terrain crane, excavator, dump trucks, fork lift truck, and pickup truck.
- Wilshire North Staging Area: hydraulic crane, excavator, dump trucks, fork lift truck, and pickup truck.

Moveable noise barriers, as shown in Figure 9-3, shall be used to mitigate noise at surface work sites within the perimeter of the Wilshire/Rodeo Station Box Area. A 20 foot high noise barrier walls shall be constructed at the perimeters of the Wilshire South Staging Area and the Wilshire North Staging Area. The noise barrier walls will be constructed in accordance with Metro's Specification Section 01 56 19, Construction Noise and Vibration Control (Appendix C). Equipment used during nighttime hours at these construction areas shall comply with the low noise equipment emission limits also specified in Section 01 56 19. Wilshire/Rodeo noise receivers are presented below. The predicted construction noise at the nearby noise sensitive receivers to these construction areas during the daytime, evening, and nighttime hours compared with the BHMC noise levels limits of the existing ambient noise plus 5 dB are presented in Table 6-2. The predicted construction noise levels at all the receiver sites analyzed do not exceed the daytime, evening, or nighttime BHMC noise limits.

Table 6-1: Construction Equipment Noise Emission Levels

| Equipment Description | Lmax Noise Limit at 50 ft, dB Slow | Is Equipment an Impact Device? |
|---|---|---|
| Auger Drill Rig | 85 dBA | No |
| Backhoe | 80 dBA | No |
| Boring Jack Power Unit | 80 dBA | No |
| Chain Saw | 85 dBA | No |
| Clam Shovel | 93 dBA | Yes |
| Compactor (ground) | 80 dBA | No |
| Compressor (air) | 80 dBA | No |
| Concrete Mixer Truck | 85 dBA | No |
| Concrete Pump Truck | 82 dBA | No |
| Concrete Saw | 90 dBA | No |
| Crane (mobile or stationary) | 85 dBA | No |
| Dozer | 85 dBA | No |
| Dump Truck | 84 dBA | No |
| Excavator | 85 dBA | No |
| Flat Bed Truck | 84 dBA | No |
| Front End Loader | 80 dBA | No |
| Generator (25 KVA or less) | 70 dBA | No |
| Generator (more than 25 KVA) | 82 dBA | No |
| Gradall | 85 dBA | No |
| Horizontal Boring Hydraulic Jack | 80 dBA | No |
| Impact Pile Driver (diesel or drop) | 95 dBA | Yes |
| Jackhammer | 85 dBA | Yes |
| Mounted Impact Hammer (hoe ram) | 90 dBA | Yes |
| Paver | 85 dBA | No |
| Pickup Truck | 55 dBA | No |
| Pneumatic Tools | 85 dBA | No |
| Pumps | 77 dBA | No |
| Rock Drill | 85 dBA | No |
| Scraper | 85 dBA | No |
| Slurry Plant | 78 dBA | No |
| Slurry Trenching Machine | 82 dBA | No |
| Soil Mix Drill Rig | 80 dBA | No |
| Tractor | 84 dBA | No |
| Vacuum Excavator (Vac-Truck) | 85 dBA | No |
| Vacuum Street Sweeper | 80 dBA | No |
| Vibratory Concrete Mixer | 80 dBA | No |
| Vibratory Pile Driver | 95 dBA | No |
| Welder | 73 dBA | No |
| Source: Federal Highway Administration (FHWA) Roadway Construction Noise Model, 2006 | | |

Table 6-2: Wilshire/Rodeo Nighttime Construction Noise – Leq (dBA)

| Receiver[1] | Location | Daytime Construction Noise | Daytime Noise Limit[2] | Evening Construction Noise | Evening Noise Limit | Nighttime Construction Noise | Nighttime Noise Limit |
|---|---|---|---|---|---|---|---|
| H | 210 N. Beverly Drive (MFR) | 69 | 77 | 54 | 75 | 54 | 74 |
| I | 133-153 S. Reeves Drive (SFR/MFR) | 59 | 64 | 55 | 61 | 55 | 59 |
| J | Sirtaj Hotel 120 S. Reeves Drive | 60 | 63 | 57 | 61 | 57 | 57 |
| K | 192 N. Canon Drive (Offices) | 64 | 73 | 54 | 70 | 54 | 70 |
| L | 121-157 S. Canon Drive (SFR/MFR) | 63 | 66 | 52 | 66 | 52 | 62 |
| M | AKA Beverly Hills Hotel, 155 N. Crescent Drive | 62 | 67 | 59 | 65 | 59 | 67 |
| 1 | Beverly Sixty Hotel, 9360 Wilshire Boulevard | 65 | 81 | 54 | 79 | 54 | 77 |
| 2 | The Rolex Building, 9420 Wilshire Boulevard (Offices) | 70 | 79 | 62 | 77 | 62 | 75 |
| 3 | Sterling Plaza/Bank of California, 9441 Wilshire Boulevard (Offices) | 72 | 79 | 62 | 77 | 62 | 76 |
| 4 | Beverly Wilshire Hotel, 9500 Wilshire Boulevard | 63 | 78 | 52 | 77 | 52 | 75 |

Notes:
[1]The location of the modeled receiver is shown on Figure 2-3.

### 6.2.2 Century City/Constellation Station

Activities at the Century City/Constellation site consist of launching of the TBM, construction of the station box, removal of the tunnel spoils, and support of station and tunnel underground mining activities. There are five construction areas, all of which, will support construction activities during nighttime hours from 9:00 P.M. to 7:00 A.M for most of the noise receivers that are within the jurisdiction of the City of Los Angeles and 6:00 P.M. to 8:00 A.M. for those two receivers, Site G, SFR on Shirley Place and Site 5, Beverly Hills High School that are within the jurisdiction of the City of Beverly Hills. During these nighttime hours the following equipment is expected to be used at each of these areas:

- 2040 CPE Construction Area: front end loader, boom crane, haul trucks, ventilation plant, compressor plant, foam plant, conveyor system, mechanical shop, and electrical shop.
- 1940-1950 CPE Construction Area: excavator, roller compactor, dozer, tower crane, rough terrain crane, hydraulic crane, haul trucks, fork lift truck, conveyor system, concrete pump, dewatering station, pickup truck, tunnel ventilation fans and scrubbers.
- TBM Launch Site: dozer, excavator, front end loader, boom crane, rough terrain crane, concrete pump, fork lift truck, and pickup truck.
- Century City/Constellation Station Box: grader, roller compacter, dozer, excavator, front end loader, boom crane, rough terrain crane, concrete pump, haul trucks, fork lift truck, pickup truck, and ventilation fans.

- Construction Site at Constellation Boulevard and CPW (Parcel W3901): forklift and pickup truck.

A noise barrier wall shall be constructed at the perimeter of the following construction areas:

- 2040 CPE Construction Area - 20 foot high
- 1940-1950 CPE Construction Area - 20 foot high
- Construction Site at Constellation Boulevard and CPW (Parcel W3901) – 20 foot high

At the Century City/Constellation Station Box and the TBM Launch Site areas a moveable noise barrier, as shown in Figure 9-3, shall be used at the perimeter of the construction sites.

The noise barrier wall and moveable noise barrier shall be constructed in accordance with Metro's Specification Section 01 56 19, Construction Noise and Vibration Control (Appendix C). Equipment used during nighttime hours at these construction areas shall comply with the low noise equipment emission limits also specified in Section 01 56 19.

Table 6-3 presents the predicted construction noise during the daytime, evening, and nighttime hours for Receivers G and 5 which are in the City of Beverly Hills, compared with the BHMC noise levels limits of the existing ambient noise plus 5 dB. The remaining receiver sites which are within the City of Los Angeles are presented showing the predicted daytime construction noise is compared to the LAMC noise limit of 75 dBA and the nighttime construction noise to the existing ambient noise plus 5 dB.

As shown in Table 6-3, the daytime construction noise level at Site 5, Beverly Hills High School, would exceed the noise limit by 2 dB. At all the other sites analyzed the daytime noise limits are not exceeded. At Site C, Hyatt Regency Century Plaza Hotel, the nighttime noise limit is exceeded by 2 dB and At Site 5 the nighttime noise limit would be exceeded by 1 dB. At all the other sites analyzed the evening and nighttime noise limits are not exceeded.

At both the Century City Station Box and the 1940-1950 CPE Construction Area moveable noise barriers and/or sound control curtains located closer to the construction activities could be used to further reduce the construction noise at Sites C and 5 to below the noise limit.

The Contractor will be responsible for providing additional noise control measures and/or limiting the equipment and construction activities to be used at the Century City/Constellation Station Box Area to meet the LAMC nighttime noise limit at Site C and at the 1940-1950 CPE Construction Area to meet the BHMC daytime and nighttime noise limits at Site 5.

Table 6-3: Century City/Constellation Nighttime Construction Noise – Leq (dBA)

| Receiver[1] | Location | Daytime Construction Noise | Daytime Noise Limit[2] | Evening Construction Noise | Evening Noise Limit[3] | Nighttime Construction Noise | Nighttime Noise Limit[4] |
|---|---|---|---|---|---|---|---|
| The following receivers are within the jurisdiction of the City of Beverly Hills | | | | | | | |
| G | 401 Shirley Place (SFR) | 45 | 73 | 40 | 73 | 40 | 68 |
| 5 | Beverly Hills High School | 63 | 61 | 57 | 58 | 57 | 56 |
| The following receivers are within the jurisdiction of the City of Los Angles | | | | | | | |
| A | 1918-1952 Fox Hills Drive (MFR) | 54 | 75 | | | 50 | 63 |
| B | 2050 Century Park West (MFR) | 42 | 75 | | | 38 | 64 |
| C | Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars | 67 | 75 | | | 63 | 61 |
| D | 2010 Century Park East (Offices) | 62 | 75 | | | 58 | 68 |
| E[5] | Century City Hospital & Medical Center, 2080 Century Park East | 67 | 75 | | | 54 | 68 |
| F | 2160 Century Park East (MFR) | 52 | 75 | | | 41 | 70 |
| 6 | 1888 Century Park East (Offices) | 63 | 75 | | | 50 | 68 |
| 7 | Century Plaza Towers, 2049 Century Park East (Offices) | 69 | 75 | | | 54 | 64 |
| 8 | Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard | 66 | 75 | | | 54 | 61 |
| 9 | Bain & Company Building, 1901 Avenue of the Stars | 52 | 75 | | | 54 | 66 |
| 10 | The Century, 10 West Century Drive (Offices) | 57 | 75 | | | 54 | 62 |
| 11 | Constellation Place, 10250 Constellation Boulevard (Offices) | 58 | 75 | | | 54 | 69 |

Notes:
[1]The location of the modeled receiver is shown on Figure 2-4.
[2] Daytime is defined as 8:00 A.M. to 6:00 P.M. by the City of Beverly Hills and 7:00 A.M. to 9:00 P.M. by the City of Los Angeles.
[3] Evening is defined as 6:00 P.M. to 9:00 P.M. by the City of Beverly Hills. The City of Los Angeles municipal code does not include evening hour.
[4] Nighttime is defined as 9:00 P.M. to 8:00 A.M. by the City of Beverly Hills and 9:00 P.M to 7:00 A.M. by the City of Los Angeles.
[5] Construction noise at Site E was modeled at street level. A more detailed assessment of the construction noise at the upper floors of the Century City Hospital is presented in Section 6.2.3.

### 6.2.3 Century City Hospital and Medical Center

The Century City Hospital is adjoining 2040 CPE Construction Area. The 20 foot high noise barrier wall at the perimeter of this site will shield the construction noise activities at the street level of the hospital building resulting in an average nighttime noise level of 66 dBA which is 2 dB less than the noise limit of 68 dBA (see Table 6-3). Since the patient rooms of the hospital overlooking the construction site are on the upper floors of the building a more detailed noise assessment was prepared for this receiver.

The primary use of 2040 CPE construction site is for the main construction staging to support tunneling operations for day and night shifts during tunneling. This site also supports the drying and storage of tunnel muck until such time as it is loaded onto trucks and taken to disposal sites. It is expected that

removal of muck from this site by truck will occur during nighttime hours. This site houses the compressor plant, ventilation plant, grout plant, foam plant, conveyor system, machine shop and electrical shop. A long boom crane and a front end loader will also operate during both day and night shifts. Upon completion of tunneling, this site reverts to daytime use to support concreting of tunnels and cross-passages, mechanical, electrical and finishes.

The assessment is based on the expected construction activities at the 2040 Century Park East (CPE) construction site between the hours of 9 P.M. and 7 A.M. (Figure 1). Patient rooms at the hospital facing the construction site are on the 3rd through the 8th floors of the building. The assessment includes the predicted construction noise at these floors and also adjusts the ambient noise levels measured at ground level at these different building heights.

**Existing Ambient Noise Levels**

Ambient noise measurements were conducted at the Century City Hospital at 2080 Century Park East, 180 feet from Olympic Boulevard (Site E) setback 4 feet from the street curb (Figure 6-1). The measured noise levels were then adjusted to account for the additional setback distance of the hospital building. The adjusted 24 one-hour Leq ambient noise levels at the face of the hospital building is graphically shown in Figure 6-2.

The measurements were conducted from 7 P.M. to 10 A.M. This time period was chosen to characterize the nighttime noise levels at the hospital. Section 41.40 of the Los Angeles Municipal Code requires a variance for nighttime construction from 9 P.M. to 7 A.M. The variance is based on not exceeding a noise limit of the ambient level plus 5 dB. Ambient noise measurements were not conducted during daytime hours because the City of Los Angeles has a maximum construction noise level limit of 75 dBA for daytime construction regardless of the ambient level.

Figure 6-1: Noise Measurement Sites

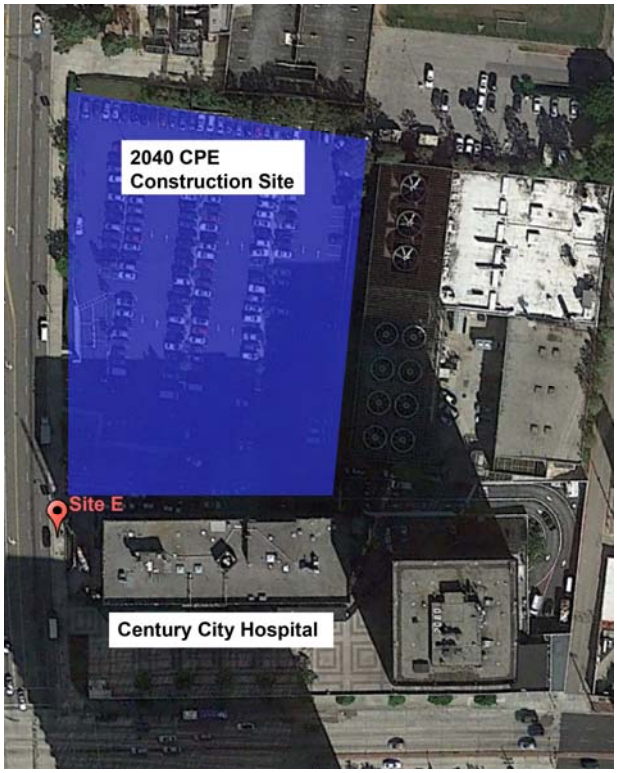
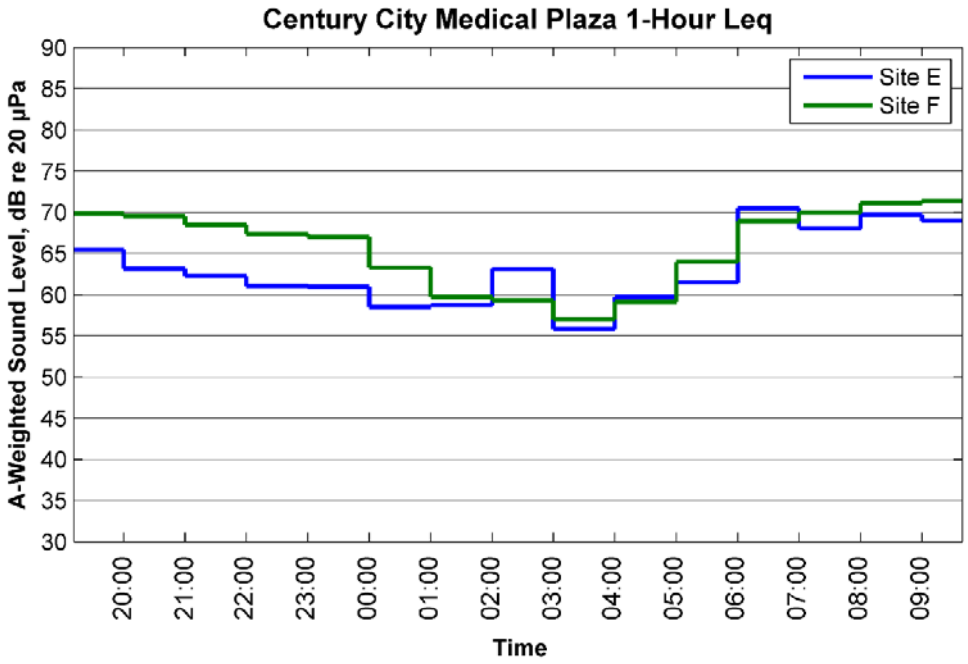



Figure 6-2: Century City Hospital Measured Noise Levels



As a worst case scenario the ambient noise of Leq=56 dBA measured from 3 A.M. and 4 A.M. was used as the nighttime noise impact threshold for the hospital building. The ambient was measured at ground level and adjusted for additional height of the 3rd through the 8th floor patient levels. The adjusted ambient along with the nighttime noise impact threshold are presented in Table 6-4 along with the predicted noise levels from nighttime construction activities. The predicted nighttime construction noise is based on a 20 foot noise barrier wall around the perimeter of the site and the use of low noise emission equipment.

Table 6-4. Nighttime Construction Noise Impact Thresholds at the Century City Hospital

| Hospital Building Floor | Ambient Noise Level, Leq (dBA) | Los Angles Nighttime Construction Noise Limit, Leq (dBA) | Nighttime Construction Noise, Leq (dBA) | Exceeds the Nighttime Noise Limit (Y/N) |
|---|---|---|---|---|
| Ground Level | 56 | 61 | 66 | Y |
| Patient Floor 3 | 52 | 57 | 69 | Y |
| Patient Floor 4 | 51 | 56 | 69 | Y |
| Patient Floor 5 | 51 | 56 | 69 | Y |
| Patient Floor 6 | 51 | 56 | 69 | Y |
| Patient Floor 7 | 51 | 56 | 69 | Y |
| Patient Floor 8 | 51 | 56 | 68 | Y |

The predicted construction noise at the patient floors exceed the nighttime noise limits of existing ambient plus 5 dB. Additional noise control measures recommended for the 2040 CPE Construction Area to meet the nighttime noise limits are presented in Section 9.0 of this report.

# 7.0 CONSTRUCTION VIBRATION PREDICTIONS

## 7.1 Prediction Methodology

For this study, the FTA analytical/empirical construction vibration prediction model was used to estimate vibration levels propagate from construction equipment to vibration sensitive locations. The vibration model is based on a combination of previous works including measured equipment vibration emission data from the FTA and the Central Artery/Tunnel project in Boston, and ground transmissibility relationships found in Charles Dowding's reference textbook Construction Vibrations1. The fundamental equation used in the model is based on propagation relationships of vibration through average soil conditions and distance, as follows:

$$PPV_{receiver} = PPV_{ref} * \left( 100 / Dist_{receiver} \right)^{n},$$

where:

PPVreceiver = predicted PPV at the receiver,

PPVref = reference PPV of equipment at 100 feet,

Distreceiver = distance from the receiver to the equipment in feet, and

n = 1.5 (the vibration attenuation rate through the soil).

The suggested value for n in the FTA Manual is 1.5. The value for n can lie between 1.0 and 2.0 and a value of 1.5 is commonly used in general models. The value of 1.1 is considered appropriate for this model because the project area has stiff soils which generally have a higher value of n.

Equipment vibration emission levels used for the predictions are shown in Table 7-1. The levels were gathered from measurements performed and published from several projects including the FTA Manual, Central Artery/Tunnel Project in Boston, and Dowding's textbook. The equipment with a reference PPV of N/A implies the equipment does not generate vibration levels significantly above normal ambient levels. Therefore, equipment such as generators and compressors that may require noise modeling and assessment are not assessed for vibration impact. The vibration generating equipment that is likely to be used during the Project are shown as highlighted in Table 7-1.

[1] Dowding, Charles, Construction Vibrations, Prentice Hall, Upper Saddle River, NJ, 1996.

Table 7-1: Equipment Vibration Emission Levels

| Equipment Description | Vibration Type (Steady or Transient) | Ref PPV at 100 ft |
|---|---|---|
| Auger Drill Rig | Steady | 0.011125 |
| Backhoe | Steady | 0.011 |
| Compactor | Steady | 0.03 |
| Concrete Mixer | Steady | 0.01 |
| Concrete Pump | Steady | 0.01 |
| Crane | Steady | 0.001 |
| Large Dozer | Steady | 0.07 |
| Small Dozer | Steady | 0.04 |
| Dump Truck | Steady | 0.01 |
| Excavator | Steady | 0.011 |
| Flat Bed Truck | Steady | 0.01 |
| Front End Loader | Steady | 0.011 |
| Gradall | Steady | 0.011 |
| Grader | Steady | 0.011 |
| Horizontal Boring Hydraulic Jack | Steady | 0.003 |
| Hydra Break Ram | Transient | 0.05 |
| Impact Pile Driver | Transient | 0.2 |
| Insitu Soil Sampling Rig | Steady | 0.011125 |
| Jackhammer | Steady | 0.030 |
| Paver | Steady | 0.01 |
| Pickup Truck | Steady | 0.01 |
| Scraper | Steady | 0.000375 |
| Slurry Trenching Machine | Steady | 0.002125 |
| Soil Mix Drill Rig | Steady | 0.011125 |
| Tractor | Steady | 0.01 |
| Tunnel Boring Machine (rock) | Steady | 0.0058 |
| Tunnel Boring Machine (soil) | Steady | 0.003 |
| Vibratory Pile Driver | Steady | 0.15 |
| Vibratory Roller (large) | Steady | 0.059 |
| Vibratory Roller (small) | Steady | 0.022 |
| Blasting | Transient | 0.75 |
| Clam Shovel | Transient | 0.02525 |
| Rock Drill | Steady | 0.011125 |
| 3-ton truck at 35 mph | Steady | 0.0002 |

## 7.2 Prediction Results and Impact Assessment

Table 7-2 presents the distance beyond which the damage risk criteria would not be exceeded for the major vibration-generating pieces of equipment likely to be used for the Project. Most of the equipment can be operated without risk of damage at distances of 35 feet or greater from historic building or at distances of 20 feet or greater from non-historic buildings.

Table 7-2: Distance to Construction Vibration Impact Thresholds

| Equipment | PPV Ref Level at 100 ft (in/sec) | Distance to Impact Threshold of 0.5 in/sec PPV[(a)] | Distance to Impact Threshold of 0.2 in/sec PPV[(a)] |
|---|---|---|---|
| Compactor | 0.030 in/sec | 10 ft | 20 ft |
| Cranes | 0.001 in/sec | 2 ft | 3 ft |
| Dozer | 0.040 in/sec | 15 ft | 25 ft |
| Dump Truck | 0.01 in/sec | 3 ft | 8 ft |
| Front End Loader | 0.011 in/sec | 4ft | 8 ft |
| Jackhammer | 0.035 in/sec | 12 ft | 22 ft |

Notes:
[(a)]The impact threshold for non-historic buildings is 0.5in/sec PPV and the impact threshold for historic buildings is 0.2 in/sec PPV.

### 7.2.1 Wilshire/Rodeo Station

The Sterling Plaza/Bank of California building and Union Bank Building (see Table 5-2) are within 25 feet of the Wilshire/Rodeo Station Box Construction Area. At this distance there is the potential risk of exceeding the damage risk criteria of 0.20 inches/second during jackhammering, compacting, and operation of a dozer.

### 7.2.2 Century City/Constellation Station

The closest building of the Century Plaza Hotel to the station box construction is more than 40 feet from the edge of the construction. The Beverly Hills High School is over 200 feet from 2040 CPE and 1940-1950 CPE Construction Areas. At these distances it is not expected that the equipment assumed to be used for construction will exceed the damage risk criteria of 0.20 inches/second.

## 7.3 Tunnel Trains

Previous measurements conducted of tunnel trains operating during the construction of the Metro Red Line Segment 2 tunnel shows a predominance of high frequency energy, up to 125 Hz. This contrasts with the groundborne vibration from rail trains in subways where vibration levels usually peak below 60 Hz. The high frequency energy of the tunnel trains means the community intrusion is more likely to be caused by groundborne noise rather than perceptible vibration.

Tunnel trains are expected to operate for the duration of the tunnel construction typically 24 to 36 months until the final trackwork is installed. The vibration from the tunnel train operations is transmitted directly into the tunnel invert through the rails. Providing a resilient support under the track in the form of rubber rail pad will reduce the high frequency vibration and in most cases either eliminate or minimize the perception of the groundborne noise in the buildings above the tunnel.

## 7.4 Sensitive Receivers

There are several vibration sensitive receivers that may be affected during the tunnel excavation including:

- Montage Hotel and Condominiums

- Beverly Wilshire Hotel
- Apartment Buildings
- Hotels
- Medical Offices
- Beverly Hills High School Offices and Classrooms

As discussed above the effects of the TBM would be limited to a few days when its operations would be perceptible at these receivers. In terms of a tunnel train operating in the tunnel, mitigation measures to control train vibrations would need to be included for the entire length of the running tunnel from the Wilshire/Rodeo Station to the Century City/Constellation Station due to the close proximity of these receivers above the tunnel.

# 8.0 GROUNDBORNE VIBRATION DURING TUNNELING

The primary sources of vibration during tunneling are generated by the tunnel boring machine (TBM) and the tunnel train used to carry muck, pre-cast concrete tunnel segments and materials. The TBM will be used to excavate the running tunnel between the Wilshire/Rodeo and Century City/Constellation station boxes. The TBMs will be pressurized closed face tunnel boring machines. The tunnel trains run 24 hours a day in the underground tunnels if used to take out the muck disposed of by the tunnel boring machines. These trains have open gondolier cars which are pulled by a diesel locomotive and run at speed of about 5 to 10 mph. Tunnel trains follow the TBMs as they move ahead boring the tunnel. A conveyor connected to the center of the cutter head of the TBM delivers the muck to these trains. The trains carry the muck outside from the TBM area, where the cars are lifted to the surface through a shaft by gantry cranes and the muck is deposited in muck piles before loading on to dump trucks and then carried away from the construction site. These same tunnel trains are used to transport material and the precast tunnel lining segments. The tunnel trains run on temporary rails that are usually directly fixed to the invert of the tunnel. These trains are also used to carry tunnel segments and materials.

## 8.1 Tunnel Boring Machines

The main source of vibration during tunneling is when the TBM pushes the shield forward against the earth using a hydraulic ram. The vibration generated by this action would be perceptible above the tunnel at distances of 100 feet from the tunnel centerline and would approach human annoyance levels at closer distances. Most of the energy from the TBM operation is at low frequencies (30 Hz and lower). This would mean that if the TBM vibration is perceived in buildings above the tunnel, it will be perceived as feelable vibration rather than ground-borne noise.

Vibration levels from TBMs are always below damage risk levels, either structural damage or minor cosmetic damage such as hairline fractions in plaster or drywall. This is an important point since whenever ground-borne vibration is perceptible, most people's first response is "This must be damaging my house."

There is the potential for community intrusion during the passing of the TBM. The advance rate of the TBM is expected to be approximately 40 feet per day. The presence of the TBM beneath any one residential structure where it would be perceptible as either feelable vibration or ground-borne noise would be approximately three to four days. The intrusion would not be continuous but would occur only at times when the shield is pushed against the earth using the hydraulic ram approximately four to six times a day. There are no measures that can be used to mitigate the effects of the TBM other than keeping residents informed when the tunneling will occur in their area and that some vibration may be perceptible, but not damaging.

# 9.0 MITIGATION

A perimeter noise barrier wall has been incorporated into the design of the construction sites at Wilshire/Rodeo and Century City/Constellation Stations where nighttime construction will occur. The noise barrier wall shall be constructed in accordance with Metro's Specification Section 01 56 19, Construction Noise and Vibration Control (Appendix C). The noise and vibration predictions presented in this report identified impacts at the construction sites that require additional mitigation measures.

This section identifies mitigation measures to be used in addition to the noise barrier wall and low noise emission equipment to meet the nighttime noise limits. Also included are measures that should be considered if compliance with the noise limits are not met and general control measures that shall be implemented by the Contractor at all sites.

## 9.1 Wilshire/Rodeo Station

The potential for noise impact at sensitive receivers during both daytime and nighttime construction was determined not to exceed the BHMC and LAMC noise level limits using noise barrier walls and low noise emission equipment. It is not expected that any other noise mitigation measures are needed. The exception is the Century City Hospital (Site E) where additional mitigation measures are needed to reduce nighttime construction noise to the upper floor patient rooms on the 3$^{rd}$ through 8$^{th}$ floors.

## 9.2 Century City/Constellation Station

To meet the noise level limits required by the City of Los Angeles for nighttime construction at the Century City Hospital patient floors, levels 3 through 8, the following noise control measures will be required in addition to the 20-foot high noise barrier wall constructed around the perimeter of the 2040 CPE construction site (Figure 9-1) and the use of low noise emission equipment.

- The compressor plant, ventilation plant, grout plant, foam plant, machine shop and electrical shop are to be fully enclosed.
- The conveyor system is to be enclosed.
- The boom crane and front end loader used during the night shift are to be retrofitted with a hospital grade muffler and additional damping and insulation added to the engine compartments.
- A supplemental 16-foot noise barrier wall shall be built, as shown in Figure 9-1, to further shield the noise from the front end loader and crane operations.

With the implementation of these noise control measures the nighttime construction noise at the patient floors of the Century City Hospital building are predicted not to exceed the Los Angeles nighttime construction noise limits as shown in Table 6-4. The nighttime construction noise contours at the face of the hospital building are shown graphically in Figure 9-2.

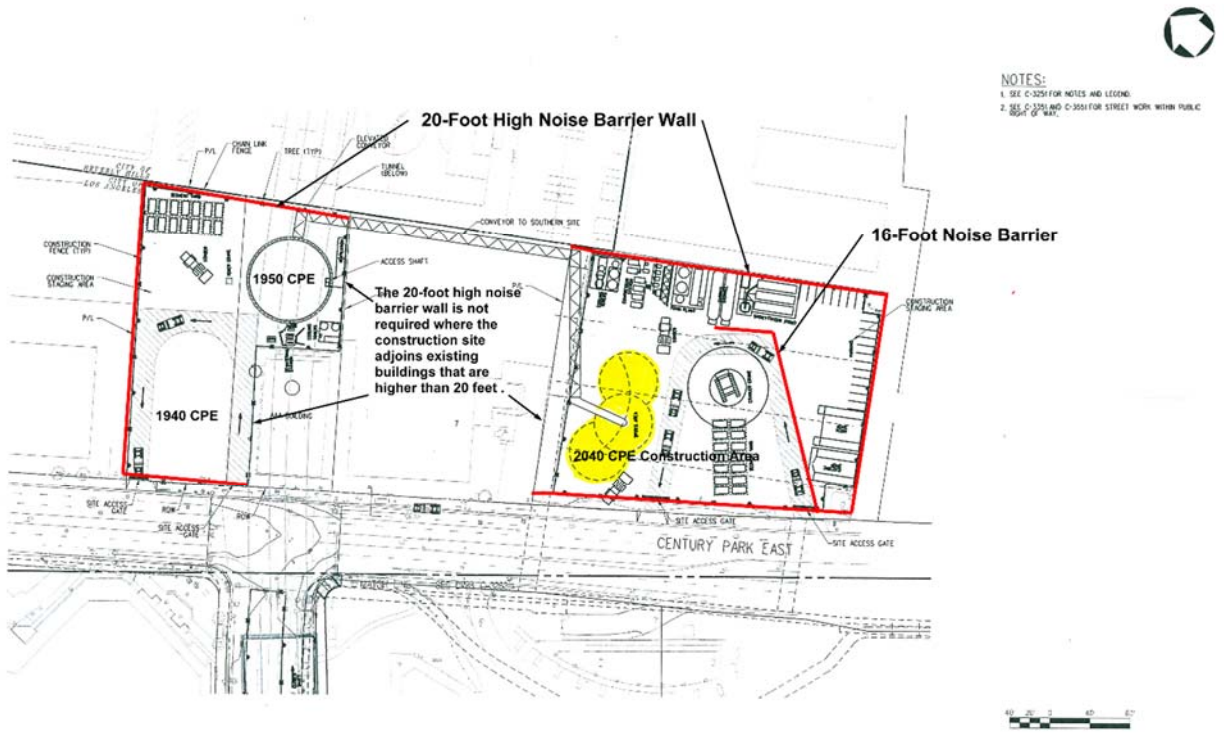



Figure 9-1: 2040 CPE and 1940-1950 CPE Construction Site Noise Barrier Walls

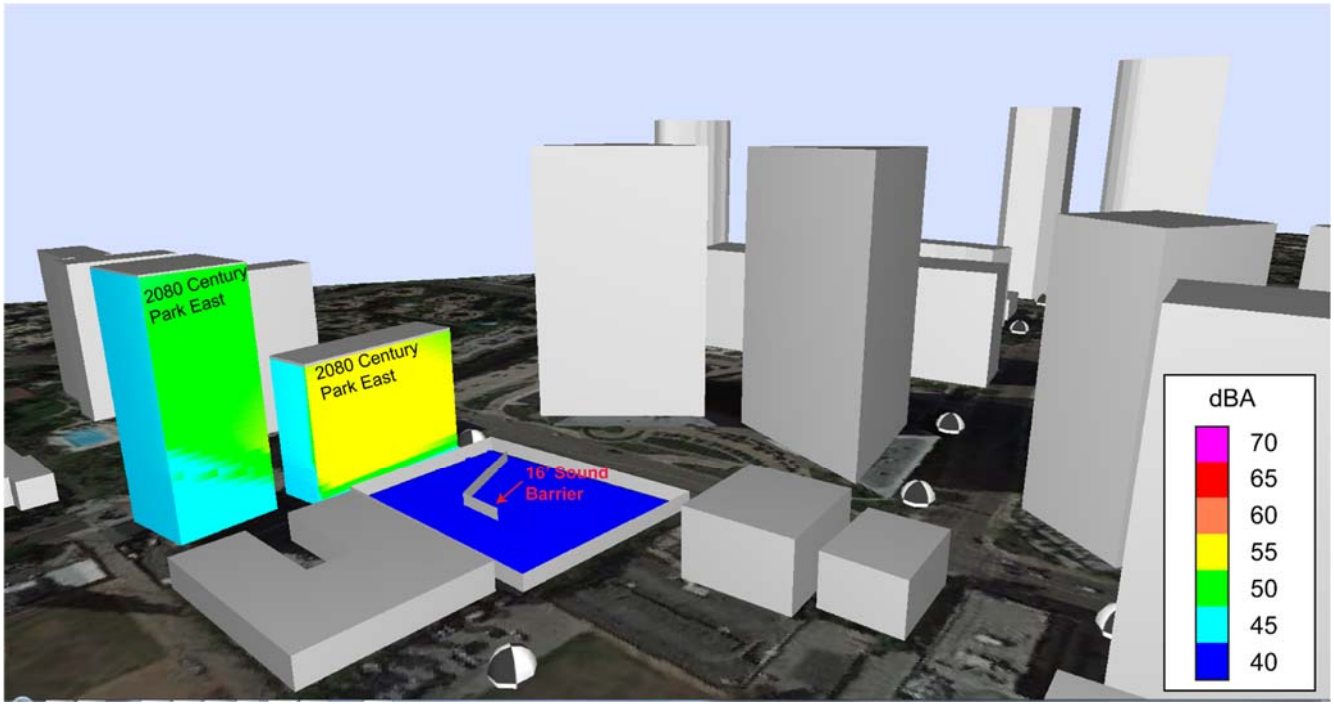



Figure 9-2: Nighttime Noise Level Contours at Century City Hospital

## 9.3 Backup Alarms

All equipment operating during nighttime hours at all construction sites shall use low impact backup alarms. The low impact back-up alarms shall comply with CCR Title 8, Section 1592, Warning Methods. For equipment that must comply with CCR Title 8, Section 1592(a), equip these vehicles with compliant white sound, broadband and multi-frequency type back-up alarm devices. For equipment subject to the requirements of CCR Title 8, Section 1592(b) the Contractor may choose to equip with automatic back-up audible alarms. Such alarms shall only be of a compliant white sound, broadband or multi-frequency back-up alarm type device.

The compliant white sound, broadband and multi-frequency type back-up alarm device shall be a self-adjusting, "smart" reversing, alarm that continually adjusts to 5 dB above ambient. Acceptable manufacturers are Brigade, ECCO or approved equal. The compliant white sound, broadband and multi-frequency type back-up alarm device shall be rated as medium duty or heavy duty, as the field conditions and/or usage would dictate.

## 9.4 Running Tunnel from Wilshire/Rodeo and Century City/Constellation Stations

To reduce the vibration generated by a tunnel train the Contractor shall be required to use a durable resilient system to support and the tunnel train tracks. Such as system would include a resilient mat under the tracks and a resilient grommet or bushing under the heads of any track fasteners. The hardness of the resilient mat should be in the 40 to 50 durometer range and be about 1 to 2" thick, depending on how heavily loaded the cars would be. The Contractor would need to select the mat thickness so that the rail doesn't bottom out during a train passby.

If the Metro ground-borne noise limits presented in Table 5-3 are exceeded, the contractor shall be required to take action to reduce vibrations to acceptable levels. Such action could include reducing the train speed, additional rail and tie isolation, and maintain the tunnel train track and train wheels in good order to reduce potential vibration impacts, including keeping gaps between track sections to a minimum and more frequent maintenance to avoid wheel flats.

## 9.5 Additional Mitigation Measures

The following are additional noise control measures that can be used to at the construction site to shield noise generating equipment.

- Moveable noise barriers that can be located within the construction site in close proximity to the equipment and activities that are exceeded the impact thresholds. The moveable noise barriers shall be constructed in accordance with Metro's Specification Section 01 56 19, Construction Noise and Vibration Control, Article 2.03, Moveable Noise Barriers (Appendix C). The height of the moveable noise barrier shall be a minimum of 14 feet. A representative design of a moveable noise barrier used for other construction projects is shown in Figure 9-3.

- Noise control curtains that can be tented over the area where the noisy equipment is operating. The noise curtain shall be constructed in accordance with Metro's Specification Section 01 56 19, Construction Noise and Vibration Control, Article 2.04, Noise Control Curtains (Appendix C).

- Replace the standard engine exhaust muffler with a hospital grade engine silencer for stationary cranes, front end loaders, dozers, and any other diesel powered equipment operating during nighttime hours.

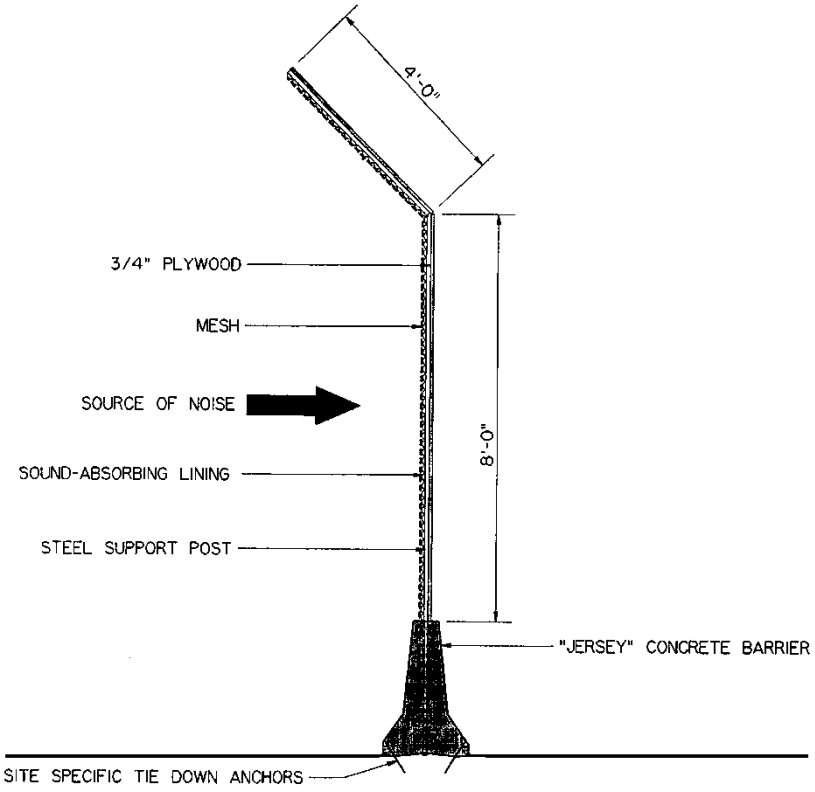



Figure 9-3: Representative Moveable Noise Barrier Design

## 9.6 General Noise and Vibration Control Measures

The following general noise and vibration control measures shall be implemented by the Contractor at all construction sites:

- Readily visible signs indicating “Noise Control Zone” would be prepared.
- Noise-control devices that meet original specifications and performance would be used.
- Fixed noise-producing equipment would be used to comply with regulations in the course of project activity.
- Mobile or fixed noise-producing equipment that are equipped to mitigate noise to the extent practical would be used.
- Electrically-powered equipment would be used to the extent practical.
- Temporary noise barriers and sound-control curtains would be erected where project activity is unavoidably close to noise-sensitive receivers.

- Designated haul routes would be used based on the least overall noise impact Route heavily-loaded trucks away from residential streets, if possible. Identification of haul routes would consider streets with the fewest noise sensitive receivers if no alternatives are available.
- Non-noise sensitive, designated parking areas for project-related vehicles would be used.
- Earth-moving equipment, fixed noise-generating equipment, stockpiles, staging areas, and other noise-producing operations would be located as far as practicable from noise-sensitive receivers.
- The use of air horn type devices, including but not limited to vehicle mounted or hand held, shall not be used to communicate signals from one area of the project site to another. Compliance with the requirements of the Tunnel Safety Orders for signaling systems shall be obtained through the use of other auditory or visual systems other than the use of air horn type devices.
- Use of horns, whistles, alarms, and bells would be limited.
- All noise-producing project equipment and vehicles would be required to use internal combustion engines equipped with mufflers and air-inlet silencers, where appropriate, and kept in good operating condition that meet or exceed original factory specifications. Mobile or fixed “package” equipment (e.g., arc- welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Any project-related public address or music system would not be audible at any adjacent receiver.
- Demolition, earth moving, and ground impacting operations would be phased so as not to occur in the same time period.
- Impact pile driving would be avoided. Drilled piles drivers would be used where the geological conditions permit their use.
- Demolition methods would be selected to minimize noise and vibration impact where possible.
- Use of vibratory rollers and packers would be avoided near vibration sensitive areas.
- An elastomer isolator would be installed between the floor of the tunnel and the rails and ties on which the tunnel train carrying excavated materials operates. If the Metro ground-borne noise limits or ground-borne vibration limits are exceeded, the Contractor shall be required to take action to reduce vibrations to acceptable levels. Such action could include reducing the tunnel train speed, additional rail and tie isolation, and more frequent rail and wheel maintenance.
- Enclosures for fixed equipment such as TBM slurry processing plants would be required in order to reduce noise.

Metro Baseline Specifications Section 01565, Construction Noise and Vibration Control requires that the contractor shall, among other provisions

- Hire or retain the services of an Acoustical Engineer to be responsible for preparing and overseeing the implementation of the Noise Control and Monitoring Plans.
- Prepare a Noise Control Plan that includes an inventory of construction equipment used during daytime and nighttime hours, estimate of projected construction noise levels, and locations and types of noise abatement measures that may be required to meet the specified noise limits.

- In the case of nighttime construction, the contractor shall comply with the provisions of the nighttime noise variance issued by the local jurisdictions.
- Conduct periodic noise measurement in accordance with an approved Noise Monitoring Plan, specifying monitoring locations, equipment, procedures, and schedule of measurements and reporting methods to be used.
- During nighttime hours, use equipment at the surface of the construction site that, operating under full load, is certified to meet specified lower noise level limits than standard equipment.
- For nighttime construction activities, erect Metro designed noise barrier walls at each construction site prior to the start of any construction activities.

# 10.0 MONITORING

The Contractor is required to submit a Noise and Vibration Monitoring Plan prepared, stamped, and administered by the Contractor's Acoustical Engineer. Noise and vibration monitoring shall be performed at locations in the vicinity of all of the construction sites.

## 10.1 Noise Monitoring

There are two types of noise monitoring that shall be performed, depending on the location and the expected level of impact. The first type is continuous noise monitoring, which is to be performed in areas where nighttime work is anticipated from 6:00 P.M. to 8:00 A.M. in the City of Beverly Hills and from 9:00 P.M. to 7:00 AM. In the City of Los Angeles. The second type is short-term noise monitoring, which consists of weekly short-duration (1 hour or more) measurements to verify that noise levels during construction do not exceed the predicted noise levels or relevant impact criteria.

Continuous noise monitoring will require the installation of permanent monitoring stations that include microphones, sound level meters, power sources, and associated ancillary equipment. Each continuous noise monitoring station should also include data transmission capabilities to make remote access possible. Monitors should be installed in locations that provide a direct line of sight to construction activities and are representative of residential (or otherwise noise-sensitive) receivers.

In all measurement sites the continuous noise monitor shall be located at side of the building closest to the construction activities no closer than 3 feet from the building façade. If this is not possible and another site is selected the measured data shall be adjusted to the building setback distance from the construction activities.

Weekly short-term noise measurements may be performed using a sound level meter and associated ancillary equipment. Short-term measurements should be conducted at a height of approximately 5 feet above ground level.

Contractor must initiate short-term noise monitoring when performing a new activity or as requested by Metro.

### 10.1.1 Wilshire/Rodeo

Continuous noise levels shall be monitored at the following locations:

- 210 N. Beverly Drive (Site H)
- Sirtaj Hotel, 120 S. Reeves Drive (Site J)
- AKA Beverly Hills Hotel, 155 N. Crescent Drive (Site M)
- Beverly Sixty Hotel (Site 1)

Short-term noise measurements shall be conducted on a weekly basis during daytime and nighttime hours at the following locations:

- 133-153 S. Reeves Drive (Site I)

- 192 N. Canon Drive (Site K)
- 121-157 S. Canon Drive (Site L)
- The Rolex Building, 9420 Wilshire Boulevard (Site 2)
- Sterling Plaza/Bank of California, 9441 Wilshire Boulevard (Site 3)

If the measured levels exceed the noise limits specified in Table 4-1, reduce the noise levels by appropriate abatement measures, or terminate the construction activity responsible for the noise limit exceedance.

### 10.1.2 Century City/Constellation

Continuous noise levels shall be monitored at the following locations:

- Hyatt Regency Century Plaza Hotel (Site C)
- Century City Hospital (Site E)

Short-term noise measurements will be conducted on a weekly basis during daytime and nighttime hours at the following locations:

- Beverly Hills High School (Site 5)
- 401 Shirley Place (Site G)
- 1918-1952 Fox Hills Drive (Site A)
- 2050 Century Park West (Site B)
- 2010 Century Park East (Site D)
- 2160 Century Park East (Site F)
- 1888 Century Park East (Site 6)
- Century Plaza Towers, 2049 Century Park East (Site 7)
- Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard (Site 8)
- Bain & Company Building, 1901 Avenue of the Stars (Site 9)
- The Century, 10 West Century Drive (Site 10)
- Constellation Place, 10250 Constellation Boulevard (Site 11)

If the measured levels exceed the noise limits specified in Table 4-1, reduce the noise levels by appropriate abatement measures, or terminate the construction activity responsible for the noise limit exceedance.

## 10.2 Vibration Monitoring

Vibration monitoring for this project shall consist of continuous measurements of vibration at the closest building façade to the construction activities of the following historic buildings using a permanent vibration monitor:

- Sterling Plaza/Bank of California, 9441 Wilshire Boulevard
- Union Bank Building, 9460 Wilshire Boulevard

Short term vibration measurements shall also be conducted at buildings closest to the construction activities during periods of construction when equipment that generate a substantial amount of ground-borne vibration (such as jack hammer or compactor) are in use. All vibration monitors used for either permanent monitoring or short term measurements should be equipped with an “alarm” feature to provide notification that vibration impact criteria have been approached or exceeded.

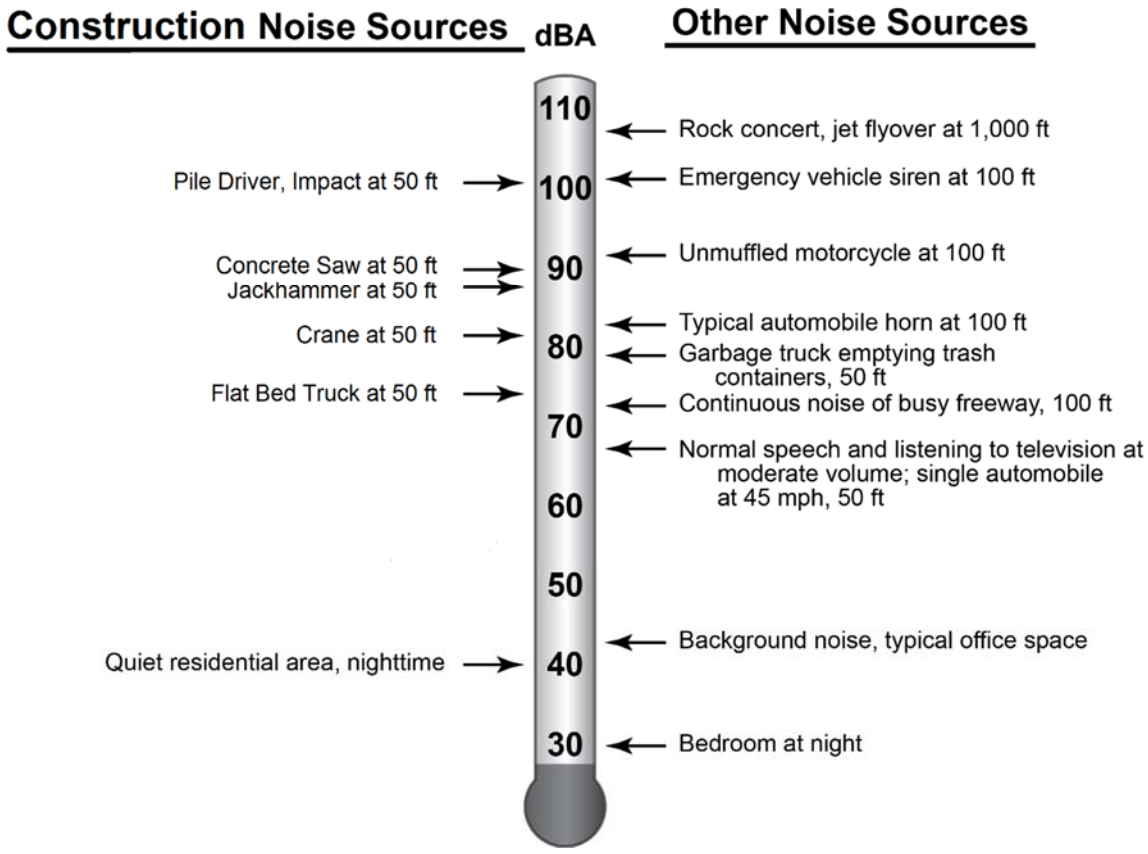
# APPENDIX A FUNDAMENTALS OF NOISE AND VIBRATION

# APPENDIX A FUNDAMENTALS OF NOISE AND VIBRATION

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound. Sound can vary in intensity by over one million times within the range of human hearing. Therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity and compress the scale to a more manageable range.

Sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale has been developed. A-weighted decibels are abbreviated as "dBA." On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA. As a point of reference, Figure A-1 includes examples of A-weighted sound levels from common indoor and outdoor sounds.

Figure A-1: Typical Outdoor and Indoor Noise Levels




Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dBA. The smallest recognizable change in sound level is approximately 1 dBA. A 3-dBA increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. A 10-dBA increase is judged by most people as an approximate doubling of the perceived loudness.

Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source and the receiver and having intervening obstacles, such as walls, buildings, or terrain features that block the direct path between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include the proximity of the sound source to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

Brief definitions of the measures of environmental noise used in this report are:

- **Equivalent Sound Level (Leq)**: Environmental sound fluctuates constantly. The equivalent sound level (Leq), sometimes referred to as the energy-average sound level, is the most common means of characterizing community noise. Leq represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound.
- **Day-Night Sound Level (Ldn)**: Ldn is basically a 24-hour Leq with an adjustment to reflect the greater sensitivity of most people to nighttime noise. The adjustment is a 10-dB penalty for all sound that occurs between the hours of 10 P.M. and 7 A.M. The effect of the penalty is that, when calculating Ldn, any event that occurs during the nighttime is equivalent to 10 of the same event during the daytime. Ldn is the most common measure of total community noise over a 24-hour period.
- **Maximum Sound Level (Lmax)**: The maximum sound level over a period of time or for a specific event can also be a useful parameter for characterizing specific noise sources. Standard sound level meters have two settings, fast and slow, which represent different time constants. Lmax using the fast setting will typically be 1 to 3 dB greater than Lmax using the slow setting.
- **Percent Exceedance Level (Lxx)**: This is the sound level that is exceeded for xx percent of the measurement period. For example, L99 is the sound level exceeded 99 percent of the measurement period. For a one hour period, the sound level is less than L99 for 36 seconds of the hour and the sound level is greater than L1 for 36 seconds of the hour. L1 represents typical maximum sound levels, L33 is approximately equal to Leq when free-flowing traffic is the dominant noise source, L50 is the median sound level, and L99 is close to the minimum sound level.
- **Sound Exposure Level (SEL)**: SEL is a measure of the total sound energy of an event. In essence, all sound from the event is compressed into a one-second period. This means that SEL increases as the event duration increases and as the event sound level increases. SEL is useful for estimating the Ldn that would be caused by individual events such as train passbys.

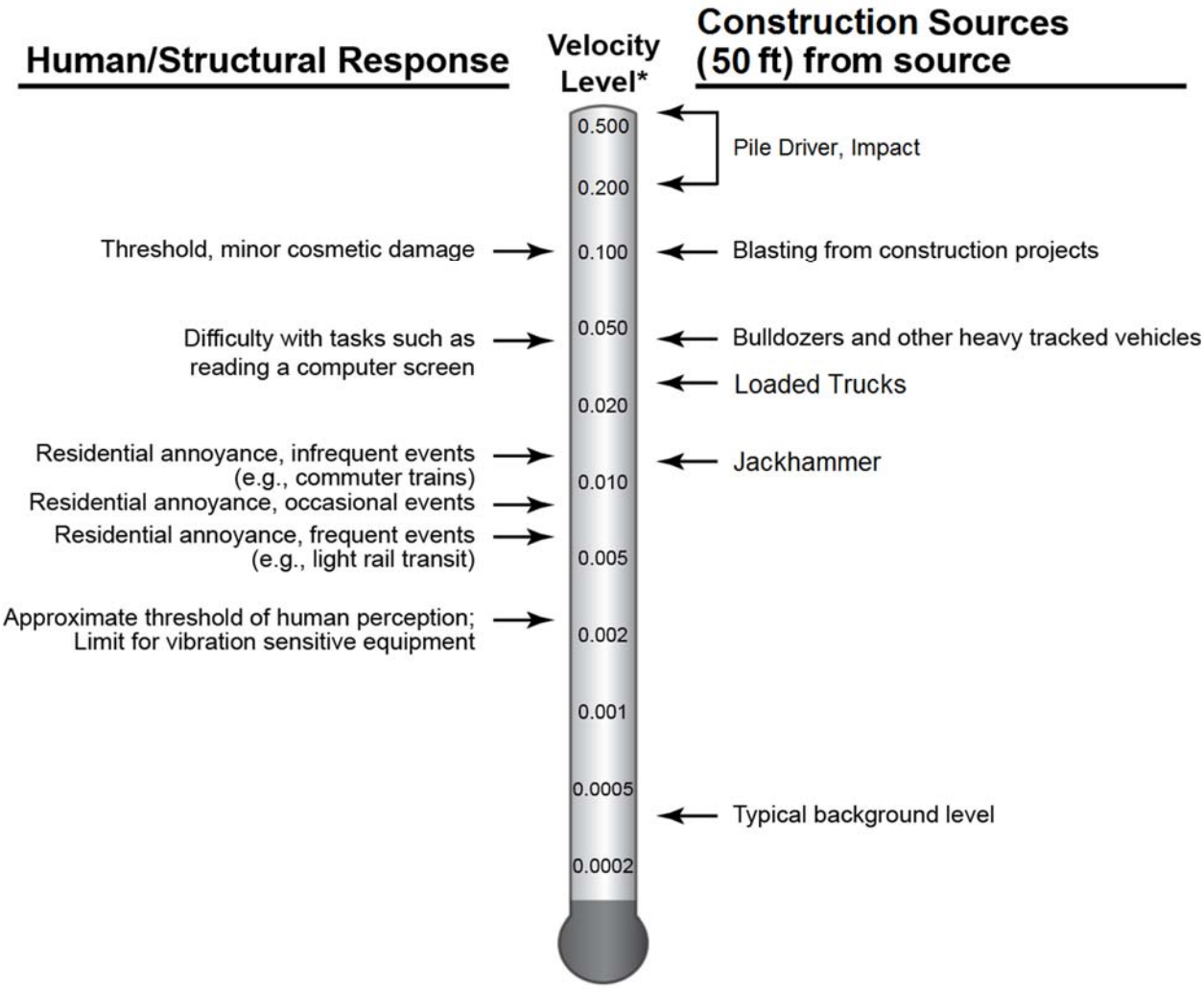
Vibration is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration of the motion. One potential effect from the proposed project is an increase in vibration that is transmitted from the tracks through the ground into adjacent houses. When evaluating human response, groundborne vibration is usually expressed in terms of decibels using the RMS vibration velocity. RMS is defined as the average of the squared amplitude of the vibration signal. To avoid confusion with sound decibels, the abbreviation VdB is used for vibration decibels. All vibration decibels in this report use a decibel reference of 1 μin/sec. Vibration can also be expressed as the peak particle velocity (PPV), which is generally used to evaluate whether vibration has potential to cause damage to fragile building structures. Peak particle velocity is normally expressed in inches per second.

The potential adverse effects of rail transit groundborne vibration are as follows:

- **Perceptible Building Vibration**: This is when building occupants feel the vibration of the floor or other building surfaces. Experience has shown that the threshold of human perception is around 65 VdB and that vibration that exceeds 75 to 80 VdB may be intrusive and annoying to building occupants.
- **Rattle**: The building vibration can cause rattling of items on shelves and hanging on walls, and various different rattle and buzzing noises from windows and doors.
- **Reradiated Noise**: The vibration of room surfaces radiates sound waves that may be audible to humans. This is referred to as groundborne noise. When audible groundborne noise occurs, it sounds like a low-frequency rumble. For surface rail systems the groundborne noise is usually masked by the normal airborne noise radiated from the transit vehicle and the rails.
- **Damage to Building Structures**: Vibration from rail systems is usually one to two orders of magnitude below the most restrictive thresholds for preventing building damage. However, fragile and extremely fragile structures may be susceptible to damage if the tracks are in sufficient proximity to the structure.

Figure A-2 shows typical RMS vibration velocity levels from rail and nonrail sources as well as the human and structure response to such levels.

Figure A-2: Typical RMS Vibration Velocity Levels




Often it is necessary to determine the contribution at different frequencies when evaluating vibration or noise signals. The 1/3-octave band spectrum is the most common procedure used to evaluate frequency components of acoustic signals. The term “octave” has been borrowed from music where it refers to a span of eight notes. The ratio of the highest frequency to the lowest frequency in an octave is 2:1. For a 1/3-octave band spectrum, each octave is divided into three bands where the ratio of the lowest frequency to the highest frequency in each 1/3-octave band is 21/3:1 (1.26:1). An octave consists of three 1/3 octaves.

The 1/3-octave band spectrum of a signal is obtained by passing the signal through a bank of filters. Each filter excludes all components except those that are between the upper and lower range of one 1/3-octave band. The FTA Guidance Manual is a good reference for additional information on transit noise and vibration and the technical terms used in this section.

Construction equipment can produce high levels of vibration, and many pieces of equipment will incite vibration levels greater than expected from train operations. Vibration from construction equipment is generally expressed as a peak particle velocity (PPV) in units of inches per second. The PPV is an instantaneous linear peak value and is more appropriate for assessing vibration when damage is a concern.

# APPENDIX B NOISE MEASUREMENT RESULTS

# APPENDIX B NOISE MEASUREMENT RESULTS

Noise measurements were conducted at sensitive receivers near the construction laydown areas to document the pre-construction ambient noise levels. This section includes brief descriptions of the measurement sites and tables of the hourly sound levels.

## B.1 WILSHIRE/RODEO STATION

Six long-term (24-hour) measurements and four short-term (1-hour) measurement were conducted near the Wilshire/Rodeo laydown, staging, and construction areas to document the pre-construction ambient noise levels. The hourly results of the measurements are presented in Table B-1 and Table B-2. Brief descriptions of the measurement sites follow below:

- Site H - 210 North Beverly Drive: A long-term noise measurement was conducted from 10:19 A.M. on August 10th 2015 to 10:19 A.M. on August 11th 2015. The building is an apartment complex with ground floor retail. The microphone was located on the sidewalk in front of Beverly Drive, about 10 feet from the building façade, 20 feet from Wilshire Boulevard, the main source of traffic noise at this site. The microphone was 5 feet above street level.

- Site I - 133-153 South Reeves Drive: A long-term noise measurement was conducted from 9:04 A.M. on August 11th 2015 to 9:42 A.M. on August 12th 2015. The building is an apartment complex at the south end of Reeves Park. The microphone was located within this park, about 10 feet from the southern end of the park, 20 feet from the western end, and 100 feet from Reeves Drive. The main noise source at this site was traffic on Reeves Drive. The microphone was 5 feet above street level.

- Site J - 120 South Reeves Drive: A long-term noise measurement was conducted from 9:32 A.M. on August 11th 2015 to 10:32 A.M. on August 12th 2015. The microphone was located on the sidewalk in front of the Sirtaj Hotel. It was 13 feet from the building façade. It was 4 feet from Reeves Drive, the main source of traffic noise at this site. The microphone was 5 feet above street level.

- Site K - 192 North Canon Drive: A long-term noise measurement was conducted from 10:37 A.M. on August 10th 2015 to 11:02 A.M. on August 11th 2015. The building is an apartment/office complex with ground floor retail. The microphone was located on the sidewalk in front of Canon Drive, 6 feet from the building façade 220 feet from Wilshire Boulevard, and 4 feet from Canon Drive. The main source of traffic noise at this site was from Canon Drive. The microphone was 5 feet above street level.

- Site L - 121-157 South Canon Drive: A long-term noise measurement was conducted from 9:04 A.M. on August 11th 2015 to 9:42 A.M. on August 12th 2015. The building is an apartment complex on Canon Drive directly south of a small parking lot. The microphone was located in an alley between the apartment complex and the parking lot at the southern end of the alley, 190 feet from Wilshire Boulevard and 90 feet from Canon Drive. The main source of traffic noise at this site was from Canon Drive. The microphone was 5 feet above street level and 5 feet from the building wall.

- Site M – 155 North Crescent Drive: A long-term noise measurement was conducted from 8:35 A.M. on August 10th 2015 to 9:14 A.M. on August 11th 2015. The building is the AKA Beverly Hills Hotel located on Crescent Drive with one end of the building on Crescent Drive and the other on an alley between and Crescent Drive and Canon Drive. The microphone was located in this alley 3 feet from the building façade, 265 feet from Wilshire Boulevard. The main noise source at this site was trucks coming through the alley. The microphone was 5 feet above street level.

- Site 1 – Beverly Sixty Hotel, 9360 Wilshire Boulevard: A long-term noise measurement was conducted from 8:57 A.M. on August 11th 2015 to 9:57 A.M. on August 11th 2015. The microphone was located on the sidewalk in front of the hotel on Wilshire Boulevard, the main traffic noise source at this site. The microphone was 3 feet from the building façade, 12 feet from Wilshire Boulevard, and 5 feet above street level.

- Site 2 – The Rolex Building, 9420 Wilshire Boulevard: A long-term noise measurement was conducted from 7:34 A.M. on August 11th 2015 to 8:37 A.M. on August 11th 2015. The microphone was located on the sidewalk in front of the building on Wilshire Boulevard, the main traffic noise source at this site. The microphone was 12 feet from the building façade, 3 feet from Wilshire Boulevard, and 5 feet above street level.

- Site 3 – Sterling Plaza/Bank of California, 9441 Wilshire Boulevard: A long-term noise measurement was conducted from 7:35 on August 11th 2015 to 8:39 on August 11th 2015. The microphone was located on the sidewalk in front of the building on Wilshire Boulevard, the main traffic noise source at this site. The microphone was 8 feet from the building façade, 5 feet from Wilshire Boulevard, and 5 feet above street level.

- Site 4 – Beverly Wilshire Hotel, 9500 Wilshire Boulevard: A long-term noise measurement was conducted from 7:25 A.M. on August 11th 2015 to 8:25 A.M. on August 11th 2015. The microphone was located on the sidewalk in front of the hotel building on South El Camino Drive 7 feet from the building façade, 18 feet from Wilshire Boulevard and 5 feet above street level. Traffic on Wilshire Boulevard was the main source of noise at this site.

Table B-1: Long-Term Noise Measurement Results at Wilshire/Rodeo

| Hour Start | Site H | Site I | Site J | Site K | Site L | Site M |
|---|---|---|---|---|---|---|
| 11:00 | 70.4 | 57.9 | 58.3 | 68.5 | 61.4 | 61.8 |
| 12:00 | 73.7 | 58.6 | 55.5 | 66.0 | 60.8 | 65.9 |
| 13:00 | 71.3 | 57.9 | 57.2 | 68.2 | 60.0 | 72.3 |
| 14:00 | 71.4 | 59.2 | 58.1 | 71.2 | 59.8 | 59.5 |
| 15:00 | 70.8 | 58.2 | 58.5 | 67.6 | 60.8 | 62.4 |
| 16:00 | 70.1 | 59.0 | 57.1 | 66.2 | 59.1 | 59.7 |
| 17:00 | 74.4 | 59.3 | 58.5 | 67.0 | 64.4 | 59.4 |
| 18:00 | 71.1 | 57.4 | 56.9 | 67.1 | 59.3 | 59.8 |
| 19:00 | 70.2 | 55.7 | 55.5 | 64.8 | 62.5 | 60.9 |
| 20:00 | 70.0 | 54.4 | 55.0 | 63.7 | 59.8 | 59.0 |
| 21:00 | 68.8 | 53.6 | 54.2 | 68.9 | 60.4 | 60.9 |
| 22:00 | 69.2 | 53.7 | 53.2 | 65.3 | 55.6 | 64.3 |
| 23:00 | 67.8 | 54.9 | 52.6 | 65.3 | 56.5 | 57.5 |
| 00:00 | 67.6 | 51.5 | 53.6 | 65.4 | 56.6 | 59.1 |
| 01:00 | 67.1 | 51.5 | 49.1 | 59.0 | 53.7 | 56.0 |
| 02:00 | 65.7 | 50.4 | 48.6 | 64.3 | 51.8 | 54.4 |
| 03:00 | 64.0 | 50.9 | 47.4 | 58.7 | 52.7 | 54.5 |
| 04:00 | 63.2 | 52.4 | 49.8 | 55.1 | 54.8 | 60.2 |
| 05:00 | 67.1 | 53.5 | 50.6 | 62.6 | 54.6 | 64.7 |
| 06:00 | 70.9 | 57.8 | 53.1 | 65.5 | 56.9 | 66.2 |
| 07:00 | 73.3 | 57.5 | 56.0 | 66.5 | 60.6 | 64.5 |
| 08:00 | 71.8 | 61.6 | 56.3 | 69.2 | 61.0 | 63.2 |
| 09:00 | 71.2 | 59.6 | 57.4 | 71.6 | 58.8 | 63.2 |
| 10:00 | 70.9 | 58.0 | 57.8 | 66.3 | 62.4 | 63.9 |
| Daytime (8 am-6.pm) | 72 | 59 | 60 | 64 | 63 | 62 |
| Evening (6pm-9pm) | 70 | 56 | 56 | 65 | 61 | 60 |
| Nighttime (9pm-8am) | 69 | 54 | 52 | 65 | 57 | 62 |

Table B-2: Short-Term Noise Measurement Results at Wilshire/Rodeo

| Hour Start | Site 1 | Site 2 | Site 3 | Site 4 |
|---|---|---|---|---|
| 11:00 | 74.1 | 72.2 | 72.3 | 71.5 |
| 12:00 | 77.5 | 75.5 | 75.6 | 74.8 |
| 13:00 | 75.1 | 73.1 | 73.2 | 72.4 |
| 14:00 | 75.1 | 73.2 | 73.2 | 72.4 |
| 15:00 | 74.5 | 72.6 | 72.7 | 71.8 |
| 16:00 | 73.9 | 71.9 | 72.0 | 71.2 |
| 17:00 | 78.2 | 76.2 | 76.3 | 75.5 |
| 18:00 | 74.8 | 72.9 | 73.0 | 72.2 |
| 19:00 | 73.9 | 71.9 | 72.0 | 71.2 |
| 20:00 | 73.7 | 71.8 | 71.9 | 71.1 |
| 21:00 | 72.5 | 70.6 | 70.7 | 69.9 |
| 22:00 | 72.9 | 71.0 | 71.1 | 70.2 |
| 23:00 | 71.5 | 69.6 | 69.7 | 68.9 |
| 00:00 | 71.3 | 69.3 | 69.4 | 68.6 |
| 01:00 | 70.8 | 68.9 | 69.0 | 68.2 |
| 02:00 | 69.4 | 67.5 | 67.6 | 66.8 |
| 03:00 | 67.7 | 65.8 | 65.9 | 65.0 |
| 04:00 | 66.9 | 64.9 | 65.0 | 64.2 |
| 05:00 | 70.8 | 68.8 | 68.9 | 68.1 |
| 06:00 | 74.6 | 72.6 | 72.7 | 71.9 |
| 07:00 | 77.1 | 75.1 | 75.2 | 74.4 |
| 08:00 | 75.5 | 73.6 | 73.7 | 72.9 |
| 09:00 | 74.9 | 73.0 | 73.0 | 72.2 |
| 10:00 | 74.6 | 72.6 | 72.7 | 71.9 |
| Daytime (8 am-6.pm) | 76 | 74 | 74 | 73 |
| Evening (6pm-9pm) | 74 | 72 | 72 | 72 |
| Nighttime (9pm-8am) | 72 | 70 | 71 | 70 |

## B.2 CENTURY CITY/CONSTELLATION STATION

Six long-term nighttime measurements, from 9:00 P.M. to 7:00 A.M. (minimum 10 hour), one long-term 24-hour noise measurement, and seven short-term (1-hour) measurement were conducted near the Century City/Constellation laydown, staging, and construction areas to document the pre-construction ambient noise levels. The hourly results of the measurements are presented in Table B-3 and Table B-4. Brief descriptions of the measurement sites follow below:

- Site A – 1918 0 1952 Fox Hills Drive: A nighttime noise measurement was conducted from 7:55 P.M. on August 17th 2015 to 8:00 A.M. on August 18th 2015. The buildings are a row of single family house across from the trees on the western side of Century Park West. The microphone was located within this tree area, 10 feet from the curb of Century Park West, the main traffic noise source at this site. The microphone was 5 feet above street level.

- Site B – 2050 Century Park West: A nighttime noise measurement was conducted from 7:21 P.M. on August 13th 2015 to 8:02 A.M. on August 14th 2015. The site is an under-construction apartment complex on the SE corner of Solar Way and Century Park West. The microphone was located 3 feet from the north side of Solar Way, 30 feet from the east curb of Century Park West, and 5 feet above street level. Traffic on Century Park West was the main source of noise at this site.

- Site C – Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars: A nighttime noise measurement was conducted from 7:35 P.M. on August 13th 2015 to 8:11 A.M. on August 14th 2015. The microphone was located in the slightly hilly landscaped area between the hotel and Constellation Boulevard, 25 feet from Constellation Boulevard, and 70 feet from the hotel. The microphone was 8 feet above street level. Traffic on Constellation Boulevard was the main source of noise at this site.

- Site D – 2019 Century Park East: A nighttime noise measurement was conducted from 7:45 P.M. on August 12th 2015 to 8:11 A.M. on August 13th 2015. The microphone was located on the sidewalk in front office building at this location, 12 feet from Century Park East, 32 feet from the south side of the building, and 5 feet above street level. Daytime data was also taken from 9:30 A.M. on August 13th 2015 to 8:03 P.M. on August 13th 2015. The second location was 2 feet from Century Park East, 22 feet from the west side of the building, and 5 feet above street level. Traffic on Century Park East was the main source of noise at this site.

- Site E – Century Park Hospital and Medical Center, 2080 Century Park East: A nighttime noise measurement was conducted from 7:11 P.M. on August 13th 2015 to 9:39 A.M. on August 14th 2015. The microphone was located on the sidewalk of Century Park East, 4 feet from the curb and 40 feet from the building façade. The microphone was 5 feet above street level. Traffic on Century Park East was the main source of noise at this site.

- Site F – 2160 Century Park East: A nighttime noise measurement was conducted from 7:11 P.M. on August 13th 2015 to 9:39 A.M. on August 14th 2015. The site is a high rise apartment complex. The microphone was located on the sidewalk of Olympic Boulevard in front of the building, 4 feet from the curb and 20 feet from the façade. The microphone was 5 feet above street level. Traffic on Olympic Boulevard was the main noise source at this site.

- Site G – 401 Shirley Place, Beverly Hills: A long-term noise measurement was conducted from 10:28 A.M. on August 11th 2015 to 8:54 A.M. on August 12th 2015. The site is a row of single family houses on Shirley Place. The microphone was located on the sidewalk of Shirley place, 3 feet from the curb, 15 feet from the façade, and 40 feet from Olympic Boulevard, the main source of traffic noise at this site. The microphone was 5 feet above street level.

- Site 5 – Beverly Hills High School: A short-term noise measurement was conducted on August 12th 2015 from 8:36 P.M. to 8:57 P.M. at one location, and 8:59 P.M. to 9:30 P.M. at another location. At the first location the microphone was located in the back of the high school parking lot, closest to Century Park East. The main noise source at this location was the HVAC of the building located on Heath Ave behind the high school parking lot. The other measurement location at the corner of the high school soccer field and Heath Avenue. Both microphones were 5 feet above street level.

- Site 6 – 1888 Century Park East: A short-term noise measurement was conducted from 9:01 P.M. on August 12th 2015 to 10:01 P.M. on August 12th 2015. The microphone was located on the sidewalk of Century Park East in front of the office building. The microphone 5 feet from the curb, 14 feet from the building façade, and 5 feet above street level. The traffic on Century Park East was the main source of noise at this site.

- Site 7 – Century Park Towers, 2049 Century Park East: A short-term noise measurement was conducted from 10:03 P.M. on August 12th 2015 to 11:03 P.M. on August 12th 2015. The microphone was located on the sidewalk of Constellation Boulevard, 5 feet from the curb, 100 feet from the building façade, and 5 feet above street level. Traffic on Constellation Boulevard was the main source of noise at this site.

- Site 8 - Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard: A short-term noise measurement was conducted from 9:29 P.M. on August 12th 2015 to 10:45 P.M. on August 12th 2015. The microphone was located on the sidewalk of Constellation Boulevard in front of the art studio, 22 feet from the curb, 23 feet from the building façade, and 5 feet above street level. Traffic on Constellation Boulevard was the main source of noise at this site.

- Site 9 - Bain & Company Building, 1901 Avenue of the Stars: A short-term noise measurement was conducted from 9:29 P.M. on August 13th 2015 to 10:45 P.M. on August 13th 2015. The microphone was located on the sidewalk of Avenue of the Stars in front of the office building. It was 8 feet from the curb, 32 feet from the building façade, and 7.5 feet above street level. Traffic on Avenue of the Stars was the main source of noise at this site.

- Site 10 - The Century, 10 West Century Drive: A short-term noise measurement was conducted from 9:43 P.M. on August 13th 2015 to 10:44 P.M. on August 13th 2015. The microphone was located on the sidewalk of Avenue of the Stars in front of the apartment complex, 13 feet from the curb, 200 feet from the building façade, and 5 feet above street level. Traffic on Avenue of the Stars was the main source of noise at this site.

- Site 11 - Constellation Place, 10250 Constellation Boulevard: A short-term noise measurement was conducted from 9:43 P.M. on August 13th 2015 to 10:44 P.M. on August 13th 2015. The microphone was located in front of the office building on the sidewalk of Constellation Boulevard, 10 feet from the curb, 40 feet from the building façade, and 5 feet above street level. Traffic on Constellation Boulevard was the main source of noise at this site.

Table B-3: Long-Term Noise Measurement Results at Century City/Constellation

| Hour Start | Site A | Site B | Site C | Site D | Site E | Site F | Site G |
|---|---|---|---|---|---|---|---|
| 11:00 | | | | | | | 67.6 |
| 12:00 | | | | | | | 67.3 |
| 13:00 | | | | | | | 67.5 |
| 14:00 | | | | | | | 67.9 |
| 15:00 | | | | | | | 67.6 |
| 16:00 | | | | | | | 68.4 |
| 17:00 | | | | | | | 68.9 |
| 18:00 | | | | | | | 67.0 |
| 19:00 | | | | | | | 66.8 |
| 20:00 | | | | | | | 68.7 |
| 21:00 | 61.9 | 63.2 | 57.6 | 62.2 | 62.3 | 68.5 | 67.7 |
| 22:00 | 60.9 | 59.2 | 57.6 | 61.8 | 61.0 | 67.4 | 66.9 |
| 23:00 | 58.2 | 58.5 | 56.0 | 60.8 | 60.9 | 67.0 | 65.1 |
| 00:00 | 54.1 | 54.6 | 57.1 | 61.0 | 58.5 | 63.3 | 64.1 |
| 01:00 | 51.3 | 58.5 | 51.9 | 58.5 | 58.7 | 59.7 | 61.4 |
| 02:00 | 49.5 | 53.8 | 54.1 | 58.9 | 63.1 | 59.3 | 58.2 |
| 03:00 | 55.5 | 53.7 | 49.4 | 58.3 | 55.8 | 57.0 | 58.2 |
| 04:00 | 51.9 | 56.6 | 54.9 | 59.6 | 59.7 | 59.1 | 56.6 |
| 05:00 | 58.2 | 61.5 | 55.8 | 61.1 | 61.5 | 64.0 | 59.2 |
| 06:00 | 60.6 | 60.6 | 59.8 | 69.0 | 70.5 | 68.9 | 62.4 |
| 07:00 | | | | | | | 66.1 |
| 08:00 | | | | | | | 68.3 |
| 09:00 | | | | | | | 68.3 |
| 10:00 | | | | | | | 65.6 |
| Daytime (8 am-6.pm) | | | | | | | 69 |
| Evening (6pm-9pm) | | | | | | | 68 |
| Nighttime (9pm-8am for Site G and 9pm-7am for Sites A through F) | 58 | 59 | 56 | 63 | 63 | 65 | 63 |

Table B-4: Short-Term Noise Measurement Results at Century City/Constellation

| Hour Start | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 | Site 11 |
|---|---|---|---|---|---|---|---|
| 11:00 | 54.8 | | | | | | |
| 12:00 | 56.1 | | | | | | |
| 13:00 | 55.6 | | | | | | |
| 14:00 | 54.9 | | | | | | |
| 15:00 | 55.1 | | | | | | |
| 16:00 | 54.6 | | | | | | |
| 17:00 | 54.8 | | | | | | |
| 18:00 | 53.7 | | | | | | |
| 19:00 | 53.4 | | | | | | |
| 20:00 | 51.5 | | | | | | |
| 21:00 | 50.2 | 62.2 | 59.7 | 57.2 | 62.4 | 58.5 | 65.2 |
| 22:00 | 49.7 | 61.8 | 58.3 | 57.2 | 62.4 | 58.5 | 65.2 |
| 23:00 | 48.7 | 60.8 | 57.9 | 55.6 | 60.8 | 56.9 | 63.6 |
| 00:00 | 48.9 | 61.0 | 56.9 | 56.7 | 61.9 | 58.0 | 64.7 |
| 01:00 | 46.4 | 58.5 | 57.1 | 51.5 | 56.7 | 52.8 | 59.5 |
| 02:00 | 46.8 | 58.9 | 54.6 | 53.7 | 58.9 | 55.0 | 61.6 |
| 03:00 | 46.3 | 58.3 | 55.0 | 49.1 | 54.3 | 50.4 | 57.0 |
| 04:00 | 47.6 | 59.6 | 54.4 | 54.5 | 59.7 | 55.8 | 62.5 |
| 05:00 | 49.1 | 61.1 | 55.7 | 55.4 | 60.6 | 56.8 | 63.4 |
| 06:00 | 56.9 | 69.0 | 57.3 | 59.4 | 64.6 | 60.7 | 67.3 |
| 07:00 | 54.4 | | | | | | |
| 08:00 | 56.3 | | | | | | |
| 09:00 | 57.4 | | | | | | |
| 10:00 | 55.7 | | | | | | |
| Daytime (8 am-6.pm) | 56 | | | | | | |
| Evening (6pm-9pm) | 53 | | | | | | |
| Nighttime (9pm-8am for Site 5 and 9pm-7am for Sites 6 through 11) | 51 | 63 | 59 | 56 | 61 | 57 | 64 |

# APPENDIX C SPECIFICATION SECTION 01 56 19 CONSTRUCTION NOISE AND VIBRATION CONTROL

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**SECTION 01 56 19**

**CONSTRUCTION NOISE AND VIBRATION CONTROL**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

A. Eliminating or minimizing noise and vibration generated by construction activities, and complying with applicable noise regulations, specification requirements, and noise and vibration limits specified within this Section.

B. Metro has prepared a Final Environmental Impact Statement/Final Environmental Impact Report for the Westside Subway Extension, with supporting technical reports on noise and vibration, which describe impacts the Project will have on the environment and indicates measures Metro has agreed to implement. See 01 35 44 Environmental Mitigation and Monitoring.

C. Metro is pursuing an initial variance from The City of Los Angeles Board of Police Commissioners for nighttime and weekend construction for this Contract. Once the variance is obtained, the variance will be good for a 6 month period. Variance shall be renewable by contractor every six months on the condition that the Contractor is in good standing and no community complaints are registered. This variance would allow the Contractor to schedule Work at night and weekends subject to the provisions of the variance to Section 41.40 of the Los Angeles Municipal Code, and the provisions herein. The variance could be withdrawn if the construction noise levels exceed the ambient noise level on the premise of any occupied property by more than five decibels from 9:00 PM to 7:00 AM Monday through Friday, from 9:00 PM Friday to 8:00 AM Saturday, from 6:00PM Saturday to 8:00 AM Sunday and all day Sunday as well as from 6:00 PM Sunday to 7:00 AM Monday.

D. Metro is pursuing an initial variance from the City of Beverly Hills for night-time and weekend construction. Contractor will be responsible for renewing variance if initial variance is issued.

E. Use equipment with effective noise-suppression devices and employ other noise control measures such as enclosures and barriers necessary to protect the public. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

F. Submit a Noise Control Plan and a Noise Monitoring Plan, as specified in this Section. Both plans shall be prepared by an Acoustical Engineer meeting the qualifications specified in this Section. Do not operate noise generating construction equipment at the construction site prior to acceptance of the Noise Control and Monitoring Plans. Update Noise Control Plan every three months.

G. Compliance with the requirements of this Section may require the use of equipment with special exhaust silencers or noise attenuating enclosures, and construction of temporary enclosures or noise barriers around activities.

H. Use haul routes and staging areas, as approved by Metro and the City of Los Angeles or City of Beverly Hills to minimize noise at residential and other sensitive receptor sites. Do not operate trucks used for removal of excavated material and delivery of construction materials on local residential streets or on streets that pass by schools during school hours, unless specifically accepted by Metro.

I. Metro will monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures.

J. Staff members shall be trained by and work with the Acoustical Engineer specified in this Section to conduct measurements and manage noise and vibration control.

K. Contractor will coordinate with Metro on communicating with the noise sensitive locations listed in Table 5 and others that may arise during the life of the project regarding noise and vibration monitoring, schedule of construction activities where activities may affect these locations, and implementing mitigation measures to reduce noise and vibration

**1.02 RELATED SECTIONS**

| | | |
|---|---|---|
| A. | Section 01 31 30 | Interface with Other Jurisdictions |
| B. | Section 01 33 00 | Submittal Procedures |
| C. | Section 01 35 23 | Worksite Safety Requirements |
| D. | Section 01 35 53 | Worksite Security Requirements |
| E. | Section 01 43 10 | Project Quality Program Requirements - Design/Build |
| F. | Section 01 51 23 | Temporary Construction Ventilation |
| G. | Section 01 56 26 | Construction Fencing (Wood) |
| H. | Section 01 56 28 | Construction Fencing (Chain Link) |

**1.03 REFERENCES**

A. California Code of Regulations (CCR), Title 24

B. California Health and Safety Code (CHSC)

C. City of Los Angeles Building Code, Chapter XI, Los Angeles Noise Ordinance

D. City of Beverly Hills Municipal Code.

E. American National Standards Institute (ANSI):

1. ANSI S1.4 - Specification for Sound Level Meters

2. ANSI S1.10 – Methods for the calibration of microphones

3. ANSI S2.4 - Method for Specifying the Characteristics of Auxiliary Analog Equipment for Shock and Vibration Measurements

F. ASTM International (ASTM):

1. ASTM C423 - Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

2. ASTM E90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

3. ASTM E413 - Classification for Rating Sound Insulation

G. International Electrotechnical Commission (IEC):

1. IEC 61672 - Electroacoustics Sound Level Meters

2. IEC 179 - Precision Sound Level Meters

H. Occupational Safety and Health Act (OSHA) regulations (CCR Title 8)

I. Society of Automotive Engineers (SAE):

1. SAE J88 - Sound Measurement Off-Road Work Machines - Exterior

2. SAE J366 - Exterior Sound Level for Heavy Trucks and Buses

3. SAE J994 - Alarm- Backup- Electric Laboratory Performance Testing

J. International Organization for Standardization (ISO):

1. ISO 9533 - Earth-moving machinery. Machine-mounted audible travel alarms and forward horns – Test methods and performance criteria.

K. U.S. Department of Transportation, Federal Highway Administration (FHWA):

1. Special Report Highway Construction Notes: Measurement, Prediction, and Mitigation. (March, 1977)

L. U.S. Department of Transportation, Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006

M. U.S. Environmental Protection Agency (EPA):

1. EPA Report NTID 300.1 – Notice from Construction Equipment and Operations, Building Equipment, and Home Appliances. (1972)

**1.04 QUALITY ASSURANCE**

A. Comply with requirements of Section 01 43 10, Project Quality Program Requirements – Design/Build.

B. Qualifications for the Acoustical Engineer:

1. The minimum requirements for the Acoustical Engineer: Bachelor of Science Degree or higher degree, from a qualified program in engineering, physics, or architecture offered by an accredited university or college, and ten years' experience in noise and vibration control engineering and noise and vibration analysis, or current enrollment as a full Member or Board-certified Member in the Institute of Noise Control Engineering.

2. Acoustical Engineer must demonstrate substantial and responsible experience in preparing and implementing construction noise control and monitoring plans on construction projects conducted in an urban setting calculating construction noise abatement measures.

3. Acoustical Engineer must demonstrate substantial and responsible experience in preparing and implementing construction noise control and monitoring plans on construction projects conduced in an urban setting, calculating construction noise abatement measures.

**1.05 SUBMITTALS**

A. Refer to Section 01 33 00, Submittal Procedures.

B. Qualifications and work experience of the Acoustical Engineer as specified in paragraph 1.04.B of this Section. This submittal is required prior to the submittal of the Noise Control and Noise Monitoring Plans.

C. Proposed locations for pre-construction ambient noise measurements at all work sites.

D. Pre-construction ambient noise level measurement report.

E. Contractor's Noise Control Plan as specified in this Section.

F. Contractor's Noise Monitoring Plan and the weekly Noise Measurement Reports as specified in this Section.

G. Noise measurement equipment makes and models, and calibration conformance certificates as specified in this Section.

H. Equipment noise certification reports as specified in this Section.

I. Shop and Working Drawings, computations, material data and other criteria, for noise abatement measures, identified in the Noise Control Plan and for moveable noise barriers, noise barrier walls and noise control curtains as specified in this Section. Have drawings and computations stamped by a License Professional Engineer registered in the State of California.

J. Contractors Weekly Vibration Measurement Reports as specified in this Section.

K. Contractor's Vibration Control Plans and Vibration Monitoring Plan as specified in this Section.

L. Material Safety Data Sheets (MSDS): Manufacturer's Material Safety Data Sheets for each type of material used in Work.

**1.06 DEFINITIONS**

A. Construction Site: For purpose of noise and vibration control requirements, the Contract limits of construction. This includes Right-of-Way lines, property lines, construction Easement Boundary or property lines and Contractor staging areas outside the defined boundary lines, used expressly for construction.

B. Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response settings of instrument complying with Type 2 requirements of latest revision of ANSI S1.4 and IEC 61672.

C. Pre-construction ambient noise levels: Existing noise levels measured 3 feet from the building face of the noise sensitive receivers so named herein.

D. A-Weighted Noise Levels: Decibels (referenced to 20 micro-Pascal) as measured with A-weighting network of standard sound level meter, abbreviated dBA.

E. C-Weighted Noise Level: Decibels (referenced to 20 micro-Pascal) as measured using the C-weighting network on a sound level meter complying with the criteria for a Type 1 (Precision) or Type 2 (General Purpose Sound Level Meter), as defined in the current revision of ANSI S1.4. Use the FAST setting on the sound level meter to measure the C-weighted sound level.

F. Vibration Measurements: The use of a vibration transducer, amplifier, peak detector, and frequency band filters complying with ANSI S2.4.

G. Vibration: Velocity in microinches per second. Vibration levels are expressed as velocity levels in Decibels referenced to one microinch per second, abbreviated VdB.

H. Daytime: As defined by the City of Los Angeles - 7:00 AM to 9:00 PM Monday through Friday local time, and Saturdays, 8:00 AM to 6:00 PM. As defined by the City of Beverly Hills - 8:00 AM to 6:00 PM Monday through Friday.

I. Nighttime: Periods other than daytime.

J. Noise Sensitive Locations: Residential areas, institutions, hospitals, parks, and other locations so named herein.

K. $L_{max}$: The maximum measured sound level.

L. One-hour Leq A weighted Equivalent Sound Level (Leq): The continuous sound level that represents the same sound energy as the varying sound levels over one hour.

M. Sound Transmission Class (STC): A single number rating calculated in accordance with ASTM E413, using values of sound transmission loss. It provides an estimate of the performance of a partition in certain common sound insulation problems.

N. Stationary/Continuous Noise: Daytime noise from stationary sources, and parked mobile sources that produce repetitive or long-term noise lasting more than two hours.

O. Mobile/Intermittent Noise: Daytime noise from non-stationary mobile equipment operated by a driver, or from source of intermittent, non-recurring on long-term basis, non-scheduled, non-repetitive, short-term noises (not lasting more than two hours).

**1.07 RESPONSIBILITIES OF CONTRACTOR**

A. Perform Work within the permissible noise levels, work schedule limitations, and procedures provided for in this Section and applicable Federal, state, county and municipal codes, regulations, and standards.

B. Other than those provided herein, be responsible for obtaining, at Contractor's own expense, permits, variances, equipment certifications, and other documents required by this Section and by applicable Federal, state, county and municipal codes, regulations and standards.

C. With regard to noise monitoring, include the following:

1. Furnish instrumentation for noise monitoring that complies with the standards specified in this Section and that is capable of measuring the sound levels defined in this Section.

2. Collect and report noise monitoring data, report whether the noise monitoring data indicates compliance under specialized in this Section, and submit a Noise Measurement Report to Metro on a weekly basis. Noise monitoring that is not conducted at the façade of the noise sensitive receiver should be adjusted accordingly.

3. Provide access to Metro to review measured data and coordinate the Contractor's schedule for noise monitoring.

4. Implement noise abatement measures as required by this Section, based on the Contractor's noise monitoring data and nuisance conditions reported by Metro.

D. With regard to vibration monitoring, include the following:

1. Furnish instrumentation for vibration monitoring that complies with the standards specified in Paragraph 1.02.A of this Section and that is capable of measuring the vibration levels defined in Paragraph 3.05.A of this Section

2. Collect and report vibration monitoring data, report whether the vibration monitoring data indicates compliance as specified in this Section, and submit a Vibration Measurement Report to Metro on a weekly basis.

3. Provide access to Metro to review measured data and coordinate with the Contractor's schedule for vibration monitoring schedules.

4. Implement vibration abatement measures as required by this Section, based on the Contractor's vibration monitoring data and nuisance conditions reported by Metro.

E. The adjacent noise and vibration sensitive locations include, but are not limited to, the following:

1. Properties listed in Table 5 of this Section

**PART 2 - PRODUCTS**

**2.01 NOISE CONTROL MATERIALS**

A. Noise control materials may be new or used. Used materials shall be sound and free of damage and defects and shall be of a quality and condition to perform their designed function.

**2.02 NOISE BARRIER WALLS**

A. Install noise barrier walls around all construction staging areas.

B. Use material that will last for the duration of construction of this Contract. Construct using AC Plywood or acceptable equal.

C. Line the construction site side of noise barrier walls with glass fiber or mineral wool type noise-absorbing material at least two inches thick. Protect this material using wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area and provision for water drainage, or provide a wall assembly with a STC-25 or greater, based on certified sound transmission loss data taken according to ASTM E90 and a Noise Reduction Coefficient (NRC) rating of NRC-0.70 or greater, based on certified sound absorption coefficient data taken according to ASTM C423.

D. Construct gates and doors in the wall either hinged or rolling of the same or equally effective material as the noise barrier wall. Construct gates and doors in the wall to ensure that the edges overlap the wall to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

E. Attach lagging to support posts designed so that the wall will withstand 80 mph wind loads plus a 30 percent gust factor.

F. Provide flush mating surfaces of wall sides when walls are joined together or at corners. Close gaps between wall sections and between bottom edge of walls and grade with material that will completely close the gaps and be dense enough to attenuate noise.

G. Be responsible for the design, detailing and adequacy of the framework and supports, posts, attachment methods and other appurtenances required for the proper erection of the noise control barriers.

H. Prepare the design details for the noise control wall footing, steel posts, supports and framework, signed and sealed by a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro.

I. Design and install foundations or piers for walls that do not require excessive noise to remove.

J. Height of Noise Barriers: As required to meet noise control plan requirements, but not less than 20 ft. at Construction Laydown Yards.

K. Temporary Art and Displays: Refer to Sections 01 58 13 A, Temporary Signs and Banners, 01 56 26, Construction Fencing (Wood) and Section 01 56 28, Construction Fencing (Chain Link), for temporary artwork and displays.

L. Post readily visible signs indicating "Noise Control Zone" on or near construction equipment operating close to noise sensitive sites

**2.03 MOVEABLE NOISE BARRIERS**

A. Construct moveable barriers of AC Plywood sheeting, or other acceptable material. Line barriers on construction site side with glass fiber or mineral wool type sound absorbing material at least two inches thick to produce a noise barrier assembly with an STC25 rating or greater. Protect sound absorbing material by wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area, with provision for water drainage.

B. Provide materials and details of construction sufficiently weather resistant to last through the duration of construction of this Contract.

C. Construction Details:

1. Attach barrier panels to support frames constructed in sections to provide a moveable barrier utilizing the standard temporary precast concrete median barrier or other supports.

2. When barrier units are joined together, overlap the mating surfaces of the barrier sides or make flush with each other. Close gaps between barrier units, and between the bottom edge of the barrier panels and the ground, with material that will completely close the gaps and be dense enough to attenuate noise.

3. Height of barriers: As required to meet noise control plan requirements.

**2.04 NOISE CONTROL CURTAINS**

A. Noise Control Curtains: Durable, flexible composite material featuring a noise barrier layer bonded to a sound-absorptive material on one side.

1. STC rating of STC-25 or greater based on certified sound transmission loss data taken according to ASTM E90.

2. NRC rating of NRC 0.70 or greater based on certified sound absorption coefficient data taken according to ASTM C423.

B. Noise Barrier Layer: A rugged, impervious material with a surface weight of at least one pound per square foot.

C. Sound Absorptive Material: Include a protective facing, and securely attached to one side of the noise barrier layer over its entire surface.

1. Mildew resistant, vermin proof and non-hygroscopic.

D. The noise control curtain materials: Abuse resistant, exhibiting superior hanging and tear strength during construction. The curtain barrier material shall have a minimum

breaking strength of 120 lb/in. and a minimum tear strength of 30 lb/in. Based on the same test procedures, the curtain absorptive material facing shall have a minimum breaking strength of 100 lb/in. and a minimum tear strength of seven lb/in.

1. Corrosion resistant to most acids, mild alkalis, road salts, oils and grease.

2. Fire retardant, and approved by the City of Los Angeles Fire Department prior to procurement.

E. Construct gates and doors of a material with a STC 25 or greater rating.

F. Construction Details:

1. Install the noise control curtains in vertical segments extending the full curtain height, and have seams and joints with a minimum overlap of two inches and be sealed using hook fasteners or double grommets. Use construction details according to the manufacturer's recommendations.

2. Secure the curtain at ground level and/or at intermediate points by framework and supports.

3. Be responsible for the design, detailing and adequacy of framework, supports, ties, attachment methods and other appurtenances required for the proper installation of the curtain.

4. Height of Curtains: As required to meet noise control plan requirements.

5. Prepare and seal the design and details necessary for the noise control curtain framework and supports using a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro for review prior to procurement.

## 2.05 VIBRATION CONTROL FOR TUNNEL TRAIN

A. If ground-borne noise limits or ground-borne vibration limits are exceeded, the contractor will be required to take action to reduce noise and/or vibrations to acceptable levels. Such action could include:

1. A durable resilient system to support and the tunnel train tracks. Such as system would include:

a. Resilient mat under the tracks

b. A resilient grommet or bushing under the heads of any track fasteners.

2. The hardness of the resilient mat should be in the 40 to 50 durometer range and be about 1 to 2” thick, depending on how heavily loaded the cars would be.

3. The Contractor would need to select the mat thickness so that the rail doesn’t bottom out during a train passby.

4. Reduce the speed of the tunnel trains.

5. Maintain the tunnel train track and train wheels in good order to reduce potential vibration impacts, including keeping gaps between track sections to a minimum and more frequent maintenance to avoid wheel flats.

**PART 3 - EXECUTION**

**3.01 ACOUSTICAL ENGINEER**

A. Engage an Acoustical Engineer meeting requirements of Para 1.04B of this Section to be responsible for preparing and overseeing the implementation of the Noise Control Plan and mitigation measures.

**3.02 NOISE LEVEL LIMITS**

A. A summary of Allowable Construction Site Noise Levels in the cities of Los Angeles and Beverly Hills is provided on Table 2. Contractor to review and update to current City Codes and Ordinances.

B. Metro has taken measurements of the ambient noise levels at noise sensitive receivers near the construction areas. The measured ambient noise levels are presented in Table 1. These measured ambient levels are for information only and not to be used as the basis for developing allowable noise levels. Contractor shall review and update the noise sensitive locations listed in Table 5, adding and deleting locations to reflect changes since the date of the RFP.

C. Neither the LAPD nor the City of Beverly Hills have taken measurements of the ambient noise levels at construction locations. Contractor will take pre-construction 24-hour noise level measurements at each of the noise sensitive locations listed in Table 5. Where nighttime work is planned for any project sites, take pre-construction measurements at Table 5 locations during nighttime hours and provide to Metro. The selection of the measurement sites shall be subject to Metro approval. Measure levels, continuously over a 14 day period, 30 days prior to the beginning of construction, under the supervision of the Acoustical Engineer. Report data to Metro as 1-hour Leq (A-weighted) levels or other selected measurement period as directed by Metro. The Contractor's Acoustical Engineer will establish the day and night noise level limits based on the measured data for Metro's review and approval.

D. After completion of Contractor's pre-construction ambient noise measurements, Table 1 will be updated to indicate for each receiver site, the daytime, evening, and nighttime noise limits for construction. If either the LAPD or the City of Beverly Hills has granted the nighttime noise variance, it will include nighttime limits for selected sites, thus complementing these Ldn criteria, as shown in the Appendix. If LAPD or City of Beverly Hills noise limits differ from the Metro project noise criteria, apply the strictest.

E. The ground borne noise levels within building structures due to underground construction activities - Limited to the Lmax noise levels listed in Table 3.

F. At the surface of the construction site during nighttime hours use only equipment that, operating under full load, meets the noise limits specified in Table 4 when measured according to the test procedures used for equipment noise certification as specified in this Section.

G. Contractor is prohibited from operating equipment at night that does not meet nighttime noise emission limits in Table 4 below. If the Contractor's existing equipment on-site does not meet nighttime noise emission limits for surface construction activities specified in Table 4 or falls out of compliance, remove the non-compliant equipment promptly from nighttime service by immediately parking and turning off equipment when it is safe to do so.

H. Trucks operating off-site between the hours of 12:00 midnight and 5:00 AM must have lower emission limits (80 dBA at 50 feet) than normally required by the California Vehicle Code. All trucks used for these nighttime hours must be certified in accordance with these specifications. Take necessary steps to comply with this limit, which may include fitting this equipment with high grade engine exhaust silencers and engine casing sound insulation.

**3.03 NOISE CONTROL MEASURES**

A. Noise Barrier Walls

1. At the Wilshire/Rodeo Station laydown and staging work areas a 20-foot high noise barrier wall shall be erected around the perimeter of each of the work areas as shown in the Contract drawings in accordance with Article 2.02 of this Section.

2. At the Century City/Constellation Station laydown and staging work areas a 20-foot high noise barrier wall shall be erected around the perimeter of each of the work areas as shown in the Contract drawings in accordance with Article 2.02 of this Section.

B. Moveable Noise Barriers

1. For construction occurring at the Wilshire/Rodeo Station Box, Century City/Constellation Station Box and Century City/Constellation TBM Launch Area, moveable noise barriers with a nominal height of 14 feet shall be used at the perimeter of these sites in accordance with Article 2.03 of this Section.

C. These supplemental noise mitigation measures shall be provided at the 2040 CPE Work Area.

1. Compressor plant, ventilation plant, grout plant, foam plant, machine shop and electrical shop shall be fully enclosed.

2. Conveyor system shall be enclosed.

3. All diesel powered equipment, such as a boom crane or front end loader used during the night shift shall be retrofitted with a hospital grade muffler and additional damping and insulation added to the engine compartments.

4. A supplemental 16-foot high noise barrier wall will be built on site, as shown in the Contract drawings in accordance with Article 2.02 of this Section to further shield the noise from spoils handling operations.

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**3.04 NOISE CONTROL PLAN**

A. Requirements:

1. The Acoustical Engineer is responsible for preparing and overseeing the implementation of the Noise Control Plan.

2. Submit the Noise Control Plan to Metro or its designee a minimum of 90 days prior to the start of work.

3. Noise Control Plan: Include the following for daytime and nighttime construction activities that may occur at the surface of the construction site:

   a. Site Drawing: Prepare a scaled drawing of the construction site indicating the following:

      1) Contract name and number

      2) Contractor's name

      3) Date

      4) Scale

      5) Direction of North

      6) Noise sensitive locations near the construction site

      7) Construction equipment locations used during daytime and nighttime hours, designated by the code letter used in Column (a) in Part A of the Noise Control Plan Form, Figure 4.

      8) Locations of the noise levels calculated for residential, commercial, and industrial areas as specified in this Section.

      9) Locations and types of noise abatement measures that may be required to meet codes and regulations as indicated by the calculations as specified in this Section.

   b. Equipment Inventory: Prepare an inventory of equipment used during daytime and nighttime hours by providing the following information in the indicated columns of Noise Control Plan Form, Figure 4.

      1) Column (a): Code letter in sketch to indicate position of equipment on site and to identify Certificates of Noise Compliance

      2) Column (b): Appropriate equipment category from Table 4

      3) Column (c): Equipment manufacturer and model, if known at the time of the Plan's preparation

      4) Column (d): Unique identifier (ID), such as registration number, if known at the time of the Plans preparation.

5) Column (e): Equipment horsepower

6) Column (f): Noise emission limit from Table 4.

7) Column (g): Estimated noise level at 50 feet; if greater than the value in Column (f), source noise control device (e.g. mufflers) must be used to comply with limit.

8) Column (h): Estimated date of first use on site

9) Column (i): Estimated date of last use on site.

c. Noise Calculations: Prepare calculations of daytime and nighttime $L_{max}$ and one-hour $L_{eq}$ noise levels expected at the nearest residential, commercial and industrial property line based on the equipment noise levels given in Part A of the Noise Control Plan Form. Determine the nearest property lines from the currently identified noise sensitive locations indicated in Table 5. Calculate preliminary one-hour $L_{eq}$ construction noise projections for those sensitive locations and insert with locations into Table 6. Make the calculations for locations where noise emitted by applicable equipment will cause the greatest noise level for each type of land use, for daytime and nighttime periods if necessary. Provide the results on Part B of the Noise Control Plan Form with calculations included below the results, and with the locations for the calculations indicated on the site sketch. The noise calculation procedure shall be as follows:

1) Calculate $L_{max}$ according to the method outlined below:

$L_{max}(\text{equipment}) = EL - 20 \log_{10} (D/50)$

where:

EL = Estimated equipment noise level at 50 feet, in dBA.

D = Distance from the equipment to property-line location, in feet.

Then, combine the individual contributions of each piece of equipment to obtain the overall maximum construction noise level at each location as follows:

$L_{max}(\text{overall}) = 10 \log_{10} (\text{SUM } 10 [L_{max}(\text{equipment})/10] )$

2) Calculate one-hour $L_{eq}$ according to the methodology recommended by the US Department of Transportation, Federal Highway Administration Special Report Highway Construction Noise: Measurement, Prediction and Mitigation, as follows:

First, calculate the construction one-hour $L_{eq}$ at each property-line location for each item of equipment using the following equation:

One-hour $L_{eq}(\text{equipment}) = EL - 20 \log_{10}(D/50) + 10 \log_{10}(UF/100)$

where:

EL = Estimated equipment noise level at 50 feet, in dBA.

D = Distance from the equipment to the property-line location, in feet.

UF = "Usage factor," expressed as the percent of time that the equipment is operated at full power while on site. This factor shall be estimated by the Contractor or the qualified acoustical engineer. Guidelines for the selection of usage factors are provided by the US Environmental Protection Agency (EPA) Report NTID 300.1, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.

Then, combine the individual contributions of each piece of equipment to obtain the overall construction one-hour $L_{eq}$ at each location as follows:

One-hour $L_{eq}$(overall) =10 $\log_{10}$ (SUM 10[one-hour Leq (equipment)/10])

3) Compare the calculated $L_{max}$ and one-hour $L_{eq}$ values with the Contract limits specified in this Section.

d. Description of Required Noise Abatement Measures as specified in Paragraph 3.2.B of this Section.

4. Noise Control Plan for Construction Activities Near Schools – If any primary or secondary schools are identified within the noise impact area of construction, the Contractor shall prepare noise control plans to maintain acceptable interior noise levels within the school classrooms and occupied spaced. Metro will develop these criteria in coordination with the Los Angeles Unified School District (LAUSD), the Beverly Hills Unified School District (BHUSD), and individual school administrators. The Contractor shall monitor the construction noise levels to ensure compliance.

5. Update the Noise Control Plan at three month intervals (based on Metro's initial acceptance date) and re-submit the Plan within 10 days of the start of each quarterly period. Update and re-submit the Noise Control Plan upon any major change in work schedule, construction methods, or equipment operations not included in the most recent Plan.

B. Noise Abatement Measures: If the results of the noise calculations prepared in accordance with this Section indicate that noise level limits listed in this Section will be exceeded, identify proposed noise abatement measures, their anticipated effects (dBA reductions), and a schedule for their implementation. Re-calculate the noise levels at the nearest sensitive receptor location property lines which include the anticipated noise reduction effects and submit the results on Part B of the Noise Control Plan Form. Include, as backup documentation to Part B of the Noise Control Plan, drawings, sketches, and suitable calculations which demonstrate anticipated

noise reduction benefits and that proposed structures or facilities comply with applicable building code requirements.

C. Noise Reduction Methods: To the extent required to meet the noise limits specified by this Section, include noise reduction measures listed below, or others of the Contractor's devising to minimize construction noise emission levels. Noise reduction measures include, but are not limited to the following:

1. Scheduling truck loading, unloading, and hauling operations so as to minimize noise impact near noise sensitive locations and surrounding communities.

2. Locating stationary equipment so as to minimize noise impact on the community.

3. Do not leave equipment pieces idling when not in use.

4. Limiting the use of enunciators or public address systems, except for emergency notifications. Any public address or music system must not be audible at any adjacent sensitive receiver

5. Maintaining equipment such that parts of vehicles and loads are secure against rattling and banging.

6. Limit the time that steel decking or plates for street decking or covering excavated areas are in use.

7. Grading of surfaced irregularities on construction sites to prevent the generation of impact noise and ground vibrations by passing vehicles.

8. Schedule Work to avoid simultaneous activities that both generate high noise levels.

**3.05 NOISE MONITORING PLAN**

A. Requirements:

1. Noise Monitoring Plan shall be prepared and administered by the Contractor's Acoustical Engineer.

2. 60 days prior to commencing work, submit the Noise Monitoring Plan to Metro, specifying the nighttime and daytime construction activities, monitoring locations, equipment, procedures, schedule of measurements and reporting methods to be used.

3. Furnish noise monitoring data to Metro or its designee on a weekly basis. Include measurements taken during the previous week.

4. In the event that the measured noise levels exceed allowable limits, halt operation of the activity causing the exceedance and immediately notify Metro within one hour of the exceedance. Work on that activity shall be suspended until such time as an alternative construction method can be used and additional Noise Abatement Measures can be implemented as specified in the Noise Control Plan before this same activity can be resumed.

5. If the measured nighttime levels exceed the noise limits specified in this Section, reduce the noise levels by appropriate abatement measures in order to comply with the nighttime Noise Variance requirements or terminate the nighttime construction activity responsible for the noise limits exceedance until the daytime hours when higher noise levels are permitted.

B. Measurement Locations:

1. Measure noise levels at the noise-sensitive locations identified in Table 5 of this Section. These locations may change during the Contract and shall be updated as required by Metro.

2. Prepare and submit a scaled plan indicating monitoring locations, including measurements to be taken at construction site boundaries and at nearby residential, commercial and industrial property lines.

C. Noise Monitoring - (Continuous Noise Monitoring Stations (CMS)

1. Maintain continuous noise monitoring stations (CMS) with internet access at minimum of four selected locations within the community affected by the nighttime construction activities, and with an additional continuous noise monitoring station at the station construction sites at Wilshire/Rodeo and Century City Constellation.

2. CMS stations shall be programmed with an initial trigger that provides an alert when the construction noise levels are within 3 dB of the noise limit and a second trigger when the noise levels are at or above the noise limit.

3. CMS stations shall continuously measure the equivalent sound level (one-hour Leq) and the maximum sound level (Lmax) on the A-Scale (dBA) and report the measured levels on a real time basis and/or one-hour time period or other selected measurement period as directed by Metro. CMS shall make audio recordings of all exceedances.

4. Provide noise monitor telemetry links and software and computer capable of continuously measuring noise and transmitting the measured data from each of the CMS by a web based application to a computer located at the contractor's office.

5. Contractor shall review and analyze CMS data each day. The Acoustical Engineer or his designee shall each day listen to the audio of the exceedence events and identify the cause is from contractors work and not other sources such as emergency vehicle siren, helicopter etc. Submit noise data to Metro or its designee on a weekly basis using the Noise Measurements Report Form provided in Figure 2.

6. Monitoring locations for CMS will be selected by LAPD, City of Beverly Hills and Metro to ensure that the Nighttime Noise Variance requirements are met. As work progresses at each of the construction areas it may be necessary to periodically relocate the continuous noise monitors to the area most sensitive to on-going construction noise activities.

D. Noise Monitoring – Hand Held Monitors

1. Provide Metro with one Type 1 (precision sound level meter that meets the requirements outlined in this Section.

2. Measurement Equipment:

a. Perform noise measurements with an instrument that is in compliance with the criteria for a Type 1 (Precision) or Type 2 (General Purpose) Sound Level Meter as defined in the current revision of ANSI S1.4.

b. Provide sound level meters capable of measuring the $L_{max}$ and one-hour $L_{eq}$ on both the A-Weighted and C-Weighted scales required by regulatory criteria and Noise Level Limits.

c. Calibrate sound level meters, microphones, and calibrators for certified laboratory conformance at least once a year. Submit a current certificate of conformance to Metro prior to using the sound level meter and submit updated certificates following subsequent calibrations on a yearly basis for the duration of this Contract or upon the completion of repairs to the instrument.

E. Measurement Procedure – Hand Held Monitors

1. Field calibrate the sound level meter using an acoustic calibrator, according to the manufacturer's specifications, prior to each measurement.

2. Except as otherwise indicated, perform measurements using the A weighting network and the SLOW response of the sound level meter.

3. Measure impulsive or impact noises using the C-Weighting network and the FAST response of the sound level meter.

4. Fit the measurement microphone with an appropriate windscreen at the location of the sensitive receptor at least four to six feet away from the nearest reflective surface.

5. Take noise measurements at 3 feet from the building face of noise sensitive locations within 150 feet of the construction site at least once each week and after a change in construction activity or construction location. Measurement Periods: Minimum of 15 minutes.

6. Construction noise measurements shall coincide with daytime and nighttime periods of maximum noise generating construction activity, and be taken during the construction phase or activity that has the greatest potential to create annoyance or to exceed applicable noise regulations and restrictions.

7. If, in the estimation of the person performing the measurements, outside noise sources contribute significantly to the measured noise level, repeat the measurements (with the same outside source contributions when construction is inactive to determine the background noise level

8. Submit noise data to Metro or its designee on a weekly basis using the Noise Measurements Report Form provided in Figure 2. Note the type of measurement (e.g. baseline, on-going construction) on the form.

9. Clearly identify monitoring locations and sketch on the back of the Noise Measurements Report Form, Figure 2, along with the locations of and distances from any noise sensitive location.

10. Identify construction equipment operating during the monitoring period and the locations sketched on the back of the Noise Measurements Report Form, along with the locations and distances to any noise sensitive location.

**3.06 EQUIPMENT NOISE CERTIFICATION**

A. Requirements for Construction Equipment:

1. Ensure that Contractor and Subcontractor equipment, of the categories listed in Table 4 to be used (during nighttime hours at the surface of the construction site) for a total duration greater than five days, shall be tested for compliance with the stated noise emission limits by the Acoustical Engineer during the first day of use on the construction site or at an alternative site acceptable to Metro.

2. Retest equipment as described above at six month intervals while in use on-site, and certify new equipment before being placed into service at the site.

3. For each piece of equipment tested, submit a noise report to Metro or its designee by completing the Application for Certificate of Equipment Noise Compliance provided in Figure 3. Ensure that the equipment identification number used for the Certificates is consistent with the identification number used in the Noise Control Plan.

4. Do not use equipment of the categories listed in Table 4, as described above on-site without valid certificates of noise compliance submitted as required.

B. Test Procedures for Construction Equipment:

1. Operate engine powered equipment by the Contractor or Contractor's representative at maximum governed rpm under full load conditions during the tests under the supervision of the Acoustical Engineer.

2. Test portable and mounted impact hammers, such as hoe rams and jackhammers to be used for concrete breaking, by the Acoustical Engineer during the first day of actual operation at the construction site under maximum load conditions as rated by the equipment manufacturer.

3. Noise certification measurements: As specified in Paragraph 3.03 F. of this Section. Use an acoustic calibrator of the type recommended by the sound level meter manufacturer prior to measurements.

4. If possible, make measurements at two locations:

a. Two feet outside the right side of the equipment casing, at a distance of 50 feet and height of five feet above ground level, and;

b. Two feet outside the left side of the equipment casing, at a distance of 50 feet and a height of five feet above ground level, with the equipment operating as indicated in items 3.04.B.1, or 2 above for a minimum period of one minute. Reduce measurements made at less than 50 feet, because of space limitations at the test site, by the values given in Table 7 to estimate the 50-foot sound level.

C. Compliance:

1. Submit a noise report to Metro for each item of equipment used on the surface of the construction site during nighttime hours of the categories listed in Table 4. Submit the report on the form shown in Figure 3 with certification by the Acoustical Engineer that equipment noise emissions do not exceed those prescribed in Table 4.

2. If the noise levels obtained during the tests exceed those specified in Table 4, remove such equipment from nighttime use until such equipment is modified and retested, or substitute other equipment to meet the noise level requirements.

3. Upon compliance Metro will mark the noise report indicating Metro's concurrence, including the certification date and equipment identification number, for verification by Metro. Keep the noise reports readily available on file in the construction field office for inspection by Metro upon request.

4. The Certificate of Noise Compliance will remain valid for a period of six months only. Delays caused by the certification refusal or by time lost in improving the rejected equipment or finding alternate acceptable equipment will not be a basis for monetary or time delay claims, or for avoidance of liquidated damages or withholding of payment.

5. Equipment shall be subject to spot noise level testing by Metro's discretion to determine that the equipment in use meets the requirements specified in Table 4. If such tests are requested by Metro, locate and operate the equipment as directed by Metro at the designated site so as to facilitate the measurements.

a. Provide Metro with a copy of the results of the measurements. If such tests demonstrate that any equipment does not comply with this part, Metro will revoke the certificate of Noise Compliance and the Contractor will take the equipment out of use according to requirements of this Section until compliance is achieved. A new Certificate of Noise Compliance will be issued upon proof of compliance.

## 3.07 VIBRATION LEVEL LIMITS

A. Measures applied to limit noise levels may in some cases limit vibration levels also. Measures specified above for noise levels are applicable.

B. All Areas: Conduct Construction activities so that vibration levels at a distance of 50 feet from construction limits or at nearest affected building (whichever is closer) do not exceed root-mean-square (rms) unweighted vibration velocity levels in vertical direction over a frequency range of 1 to 100 Hz as listed in Table 8. Limit ground-

borne noise inside buildings due to construction vibration to below the limits in Table 3.

C. Historic and Cultural Resources Structures – The Contractor will be responsible for the protection of vibration sensitive historic buildings or cultural resource structures that are within 200 feet of any construction activity. These structures have been identified in the Final EIS/EIR. Vibration from construction activities shall not exceed the Category IV levels as indicated in Table 9 for any length of time. The Contractor shall perform periodic vibration monitoring at the closest structure to any construction activities using approved seismographs. If at any time the construction activity results in vibration levels that exceed those specified herein, that activity shall be halted immediately and work on that activity shall be suspended until such time as an alternative construction method can be used that will result in lower vibration levels.

D. The groundborne vibration levels at building structures due to any construction activities shall be no greater than the peak particle vibration levels shown in Table 9. The Contractor shall perform periodic vibration monitoring at the closest occupied building structure to any construction activities using approved seismographs. If at any time the construction activity results in vibration levels that exceed those specified herein, that activity shall be halted immediately and work on that activity shall be suspended until such time as an alternative construction method can be used that will result in lower vibration levels.

E. Vibration levels at buildings affected by construction operations refer to vertical direction vibration on ground surface or building floor.

F. Conduct daily measurements of vibration during peak vibration generating construction activities.

**3.08 VIBRATION CONTROL AND MONITORING PLAN**

A. Requirements

1. Same as noted above for the Noise Control Plan (3.02.A) and Noise Monitoring Plan (3.03.A), applied to vibration, where applicable.

2. Vibration Calculations – In the absence of relevant vibration measurement data that can be applied to this Project, prepare calculations of maximum groundborne noise and vibration at representative buildings along the Project. Preliminary source vibration levels are indicated in Table 10. These source levels are preliminary in nature and it is up to the Contractor to verify and update information during construction (and, where possible, before construction). Provide the results on a form similar to Part B of the Noise Control Plan Form, with the calculations included below the results, and with the locations for the calculations indicated on the site sketch. The vibration calculation procedure shall be as follows:

a. Damage Assessment – Calculate the vibration according to the method outlined below:

$$PPV_{equipment} = PPV_{ref} \times (25/D)^{1.5}$$

where:

$PPV_{equipment}$ is the peak particle velocity in units of inches/second of the equipment adjusted for distance

$PPV_{ref}$ is the reference vibration level in units of inches /second at 25 feet (see Table 10)

D is the distance from the equipment to the receiver, in feet.

b. Annoyance Assessment – Calculate the vibration according to the method outlined below:

$Lv(D) = Lv(25\ ft) - 30\ log_{10}\ (D/25) + correction$

where:

Lv(D) is the rms vibration velocity in logarithmic units of VdB re $10^{-6}$ in/sec of the equipment, adjusted for distance.

Lv(25 ft) is the reference vibration level in logarithmic units of VdB re 10-6 in/sec at 25 ft (see Table 10).

D is the distance from the equipment to the receiver, in feet.

Correction is as noted in Table 11.

B. Vibration Abatement Measures – if the results of the vibration calculations or representative field data indicate that the vibration level limits listed in this Section will be exceeded, identify proposed vibration abatement measures, their anticipated vibration effects, and schedule for their implementation. Provide calculations demonstrating the effectiveness of the proposed abatement measures, and, if applicable, provide applicable drawings and sketches to indicate where such abatement measures will be placed.

C. Vibration Reduction Methods – See paragraph 3.02.C for methods which can reduce noise and vibration.

D. Vibration Measurement Locations

1. Measure vibration and groundborne noise at sensitive locations in the vicinity of the construction sites. These locations may change during the Contract and shall be updated as required by Metro.

2. Prepare and submit a scaled plan indicating monitoring locations.

E. Vibration Monitor

1. Maintain a vibration monitoring station with internet connection at the closest building to the vibration generating construction activities. See Section 3.05 for other requirements. Measure vibration and groundborne noise at a minimum of these locations where there are buildings that are eligible for listing on the National Register of Historic Properties:

a. Pending

F. Measurement Equipment

1. Use an Instantel Blastmate III, Minimate Plus, Minimate Series IV pro or approved equal to monitor vibration. See 3.03.E for groundborne noise equipment requirements.

2. Calibrate vibration equipment at a certified laboratory at least once a year. Provide calibration documentation to Metro prior to placing equipment in service.

G. Measurement Procedure – See 3.03.F for general guidelines applicable to spot check for vibration and groundborne noise.

**3.09 CONSTRUCTION SITE NOISE CONTROL**

A. Perimeter Noise Barrier Wall:

1. Furnish and install perimeter noise barrier walls along streets as indicated. The noise barrier walls shall provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor's responsibility to meet these limits by other methods such as installing additional fixed barrier walls or movable barriers, raising the height of the noise barrier walls, and providing additional noise control measures specified in this Section. Perimeter fencing shall be a minimum height of 20 ft.

2. Construct gates and/or doors in the wall either hinged or rolling of the same or equally effective material as the noise barrier wall. Construct gates and doors in the wall to ensure that the edges overlap the wall to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

3. Install noise barrier walls, gates, and doors in the wall before commencing any work.

B. Noise Barrier Walls for Pile Installation and Grouting Stage Areas:

1. Provide Noise Control walls on perimeter of pile installation closure and grouting staging areas.

2. Provide noise absorptive material behind gawk screens on K-Rail which are adjacent to live traffic, and on construction chain link fencing, which is adjacent to the sidewalk.

**3.10 CONSTRUCTION SITE VIBRATION CONTROL**

A. Provide an elastomer isolator installed between the floor of the tunnel and the rails and ties on which the excavated materials train operates. The elastomer isolator shall be provided for the full extent of the running tunnel between the end of the Wilshire/La Cienega Station and the Constellation Century City Station.

B. Submit the excavated materials train rail vibration elastomer isolator design for Metro acceptance before installation of the track.

C. If the Metro ground-borne noise or ground-borne vibration limits (Table 3) are exceeded the Contractor will be required to take additional action to reduce vibration to acceptable levels.

**3.11 CONSTRUCTION METHODS – EQUIPMENT**

A. Minimize the use of impact devices, such as jackhammers, pavement breakers, and hoe rams. Where possible, use concrete crushers or pavement saws rather than hoe rams for tasks such as concrete deck removal and retaining wall demolition.

B. Pneumatic impact tools and equipment used at the construction site shall have intake and exhaust mufflers recommended by the manufacturers thereof, to meet relevant noise ordinance limitations and Metro project criteria shown in this Section.

C. Equip noise producing equipment i.e. jackhammers and pavement breakers with acoustically attenuating shields or shrouds recommended by the manufacturers thereof, to meet relevant noise ordinance limitations.

D. Line or cover hoppers, conveyor transfer points, storage bins, and chutes with sound-deadening material.

E. All noise producing equipment, including vehicles that use internal combustion engines will be required to be equipped with mufflers and air-inlet silencers, where appropriate, and kept in good operating condition that meets or exceeds original factory specifications. Mobile or fixed "package" equipment (e.g., arc welders, air compressors, ventilation fans) will be equipped with shrouds and similar noise control features, to meet noise ordinance limitations.

F. Blasting and Impact Pile Driving is specifically prohibited from use. Use of vibrating and impact hammers shall also be limited due to close proximity of adjacent buildings

G. As required to meet the noise limits specified in this Section, use alternative procedures of construction, and select proper combination of techniques that generate least overall noise and vibration. Such alternative procedures include the following:

1. Use electric welders powered from utility main lines instead of riveting or electric generators/welders.

2. Mix concrete off-site instead of on-site.

3. Employ prefabricated structures instead of assembling on-site.

4. Solar powered arrow boards

5. VMS message signs

H. Use only construction equipment, both fixed and mobile, that is equipped to operate within noise limits. At night, use only equipment when, when operating at the surface of the construction site under full load, is certified to meet the specified lower noise

level limits set in the noise control plan and specified in the noise variance application.

I. Use construction equipment manufactured or modified to dampen noise and vibration emissions, such as:

1. Use electric electrically powered equipment to the extent possible instead of diesel powered equipment.

2. Use hydraulic tools instead of pneumatic impact tools.

3. Use electric instead of air or gasoline driven saws.

4. Whisper Jet diesel powered generators.

J. Readily visible signs indicating "Noise Control Zone" shall be used.

K. Noise control devices that meet original specifications and performance shall be used.

L. Mobile or fixed noise-producing equipment shall be equipped to mitigate noise to the extent practical would be used.

M. Earth-moving equipment, fixed noise-generating equipment, stockpiles, staging areas, and other noise-producing operations would be located as far as practicable from noise-sensitive receivers.

N. The use of air horn type devices, including but not limited to vehicle mounted or hand held, shall not be used to communicate signals from one area of the project site to another. Compliance with the requirements of the Tunnel Safety Orders for signaling systems shall be obtained through the use of other auditory or visual systems other than the use of air horn type devices.

O. Use of horns, whistles, alarms, and bells would be limited.

P. Any project-related public address or music system would not be audible at any adjacent receiver.

Q. Enclosures for fixed equipment such as TBM slurry processing plants would be required in order to reduce noise.

R. Used approved design of silencers for all ventilation fans.

**3.12 CONSTRUCTION METHODS – OPERATIONS**

A. Operate equipment so as to minimize banging, clattering, buzzing, and other annoying types of noises, especially near residential areas during the nighttime hours.

B. To the extent feasible, configure the construction site in a manner that keeps noisier equipment and activities as far as possible from noise sensitive locations and nearby buildings.

C. In no case shall the above restrictions limit the Contractor's responsibility for compliance with applicable Federal, state and local safety ordinances and regulations and other Sections of these construction specifications.

D. Maximize physical separation, as far as practicable, between noise generators and noise receptors. Separation includes following measures:

1. Provide enclosures for stationary items of equipment and barriers around particularly noisy areas on site.

2. Locate stationary equipment to minimize noise and vibration impact on community, subject to acceptance of Metro.

E. Demolition methods to be selected to minimize noise and vibration impact where possible.

F. Use of vibratory rollers and packers tobe avoided near vibration sensitive areas.

G. Temporary noise barriers and sound-control curtains to be erected where project activity is unavoidably close to noise-sensitive receivers.

H. Minimize noise-intrusive impacts during most noise sensitive hours. Limit activities such as concrete saw cutting to daytime and early evenings.

1. Plan noisier operations during times of highest ambient noise levels.

2. Keep noise levels relatively uniform; avoid excessive and impulse noises.

3. Turn off idling equipment.

4. Phase in start-up and shut-down of site equipment.

I. Select truck routes for muck disposal so that noise from heavy-duty trucks will have minimal impact on sensitive land uses (e.g., residential).

1. Conduct truck loading, unloading and hauling operations so noise and vibration are kept to a minimum.

2. Where possible, route heavily loaded trucks away from residential streets. Where no alternatives are available, haul route selection will take into consideration streets with the fewest noise-sensitive receivers..

3. Submit haul routes and staging areas to the City of Los Angeles, Bureau of Engineering and LADOT, or the City of Beverly Hills 30 days before required date.

J. Minimize vibrations from operations and equipment where necessary.

1. Maintain smooth surfaces for construction equipment and vehicles to travel on (e.g., truck routes, tunnel train rail) to minimize vibration.

2. Conduct TBM operations and maintain equipment to minimize unnecessary vibration.

K. Use non-noise sensitive, designated parking areas for project related traffic.

**3.13 CONSTRUCTION METHODS – MOVEABLE NOISE BARRIERS**

A. At a minimum, provide movable noise barriers for work in public right-of-way during night time hours in accordance with requirements of this Section for Moveable Noise Barriers.

B. Provide readily removable noise barriers so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance, and Removal:

1. Install the barriers such that the sound-absorptive surfaces face the noise source.

2. Maintain the moveable noise barriers and repair damage that occurs, including, but not limited to, keeping barriers clean and free from graffiti, and maintaining structural integrity. Promptly repair or replace gaps, holes, and weaknesses in the barriers, and openings between, or under the units with new material.

D. The use of moveable noise barriers is a minimum noise control requirement that may not provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor's responsibility to meet these limits by other methods such as installing additional moveable noise barriers, installing noise barrier walls, and providing additional noise control measures specified in this Section as indicated.

**3.14 CONSTRUCTION METHODS – NOISE CONTROL CURTAIN**

A. Install noise control curtains in accordance with requirements of this Section for Noise Control Curtains, as required to meet the noise limits specified in this Section, to shield public from construction noise during the course of the Contract.

B. The noise control curtains shall be readily moveable so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance and Removal:

1. The noise control curtains shall be installed without any gaps such that the sound-absorptive side faces the construction activity to be shielded.

2. Maintain the noise control curtains and promptly repair any damage that may occur. Gaps, holes or weaknesses in the curtain, or openings between the curtain and the ground shall be promptly repaired by the Contractor.

**3.15 NOISE AWARENESS TRAINING**

All Contractor personnel on site shall participate in 15 minute Noise Awareness Training provided by Metro.

### 3.16 CONSTRUCTION SCHEDULE

When traffic restrictions allow, schedule saw cutting, jack hammering and other noisy activities during the day or early evening hours.

### 3.17 LOW IMPACT BACK-UP ALARMS

A. Use low impact back-up alarms on all equipment during nighttime hours. The equipment shall include, but not limited to, cranes, low boys, backhoes, loaders, concrete pumps, excavators, haulers, dump trucks, work trucks, and concrete mix trucks.

B. The low impact back-up alarms used by the Contractor shall comply with CCR Title 8, Section 1592, Warning Methods.

1. For equipment that must comply with CCR Title 8, Section 1592(a), equip these vehicles with compliant white sound, broadband and multi-frequency type back-up alarm devices.

2. For equipment subject to the requirements of CCR Title 8, Section 1592(b) and that the Contractor chooses to equip with automatic back-up audible alarms as the means for complying with this section; such alarms shall only be of a compliant white sound, broadband or multi-frequency back-up alarm type device.

3. The compliant white sound, broadband and multi-frequency type back-up alarm device shall be a self-adjusting, "smart" reversing, alarm that continually adjusts to 5 db above ambient. Acceptable manufacturers are Brigade, ECCO or approved equal.

4. The compliant white sound, broadband and multi-frequency type back-up alarm device shall be rated as medium duty or heavy duty, as the field conditions and/or usage would dictate.

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**TABLE 1 – ALLOWABLE SOUND LEVELS OF TOTAL CONSTRUCTION SITE NOISE BASED ON METRO's AMBIENT NOISE MEASUREMENTS**

### Wilshire/Rode Station

| Site No. | Measurement Location | Daytime Leq[a] | Evening Leq[a] | Nighttime Leq[a] |
|---|---|---|---|---|
| H | 210 N. Beverly Drive (MFR) | 77 dBA | 75 dBA | 74 dBA |
| I | 133-153 S. Reeves Drive (SFR/MFR) | 64 dBA | 61 dBA | 59 dBA |
| J | Sirtaj Hotel, 120 S. Reeves Drive | 63 dBA | 61 dBA | 57 dBA |
| K | 192 N. Canon Drive (Offices) | 73 dBA | 70 dBA | 70 dBA |
| L | 121-157 S. Canon Drive (SFR/MFR) | 66 dBA | 66 dBA | 62 dBA |
| M | AKA Beverly Hills Hotel, 155 N. Crescent Drive | 67 dBA | 65 dBA | 67 dBA |
| 1 | Beverly Sixty Hotel, 9360 Wilshire Boulevard | 81 dBA | 79 dBA | 77 dBA |
| 2 | The Rolex Building, 9420 Wilshire Boulevard (Offices) | 79 dBA | 77 dBA | 75 dBA |
| 3 | Sterling Plaza/Bank of California, 9441 Wilshire Boulevard (Offices) | 79 dBA | 77 dBA | 76 dBA |
| 4 | Beverly Wilshire Hotel, 9500 Wilshire Boulevard | 78 dBA | 77 dBA | 75 dBA |

Notes:
[a] Daytime is from 8:00 A.M. to 6:00 P.M., evening is from 6:00 P.M. to 9:00 P.M. and nighttime is from 9:00 P.M. to 8:00 A.M.
MFR – Multi-Family Residences
SFR – Single-Family Residences

### Century City/Constellation Station

| Site No. | Measurement Location | Nighttime Leq[a] | | |
|---|---|---|---|---|
| A | 1918-1952 Fox Hills Drive (MFR) | 63 dBA | | |
| B | 2050 Century Park West (MFR) | 64 dBA | | |
| C | Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars | 61 dBA | | |
| D | 2010 Century Park East (Offices) | 68 dBA | | |
| E | Century City Hospital & Medical Center, 2080 Century Park East – 1st floor | 68 dBA | | |
| E | Century City Hospital & Medical Center, 2080 Century Park East – 3rd floor | 64 dBA | | |
| E | Century City Hospital & Medical Center, 2080 Century Park East – 8th floor | 63 dBA | | |
| F | 2160 Century Park East (MFR) | 70 dBA | | |
| 6 | 1888 Century Park East (Offices) | 68 dBA | | |
| 7 | Century Plaza Towers, 2049 Century Park East (Offices) | 64 dBA | | |
| 8 | Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard | 61 dBA | | |
| 9 | Bain & Company Building, 1901 Avenue of the Stars | 66 dBA | | |
| 10 | The Century, 10 West Century Drive (Offices) | 62 dBA | | |
| 11 | Constellation Place, 10250 Constellation Boulevard (Offices) | 71 dBA | | |
| Sites G and 5 are in the City of Beverly Hills and subject to the Beverly Hills' Noise Code | | | | |
| | | Daytime[b] | Evening[b] | Nighttime[b] |
| G | 401 Shirley Place, Beverly Hills (SFR) | 68 dBA | 68 dBA | 63 dBA |
| 5 | Beverly Hills High School | 56 dBA | 53 dBA | 51 dBA |

Notes:
[a] Nighttime is from 9:00 P.M. to 7:00 A.M as defined by the City of Los Angles Municipal Code.
[b] Daytime is from 8:00 A.M. to 6:00 P.M., evening is from 6:00 P.M. to 9:00 P.M. and nighttime is from 9:00 P.M. to 8:00 A.M.MFR – Multi-Family Residences
SFR – Single-Family Residences

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**TABLE 2 – SUMMARY OF ALLOWABLE CONSTRUCTION SITE NOISE LEVELS (CITY OF LOS ANGELES AND CITY OF BEVERLY HILLS)**

| Construction Activity | Noise Limit[1], dBA |
|---|---|
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), general activities | 75 dBA |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), steady high-pitch noise or repeated impulsive noises | 70 dBA |
| City of Los Angeles Daytime (7:00 A.M.-9:00 P.M.), less than 15 minute duration in a period of 60 consecutive minutes | 80 dBA |
| City of Los Angeles Nighttime (9:00 P.M.-7:00 A.M.), all activities | Nighttime Ambient + 5dB |
| City of Beverly Hills Daytime (8:00 A.M.-6:00 P.M.), all activities | Daytime Ambient +5 dB |
| City of Beverly Hills Evening (6:00 P.M.-9:00 P.M.), all activities | Evening Ambient + 5dB |
| City of Beverly Hills Nighttime (9:00 P.M.-8:00 A.M.), all activities | Nighttime Ambient + 5 dB |
| Notes:<br>[1]Noise limit applies to the facade of the closest noise sensitive property. | |

**TABLE 3 – ALLOWABLE MAXIMUM INTERIOR GROUND-BORNE NOISE FROM UNDERGROUND CONSTRUCTION ACTIVITIES**

| Land Use Activity | Groundborne Noise Level Limits – $L_{max}$ (dBA) |
|---|---|
| Single-Family Dwellings | 40 |
| Multi-Family Dwellings | 45 |
| Hotel/Motel | 45 |
| Offices | 50 |
| Commercial Buildings | 55 |
| Concert Halls, Recording and TV Studios | 30 |
| Auditoriums and Music Rooms | 35 |
| Churches and Theaters | 40 |
| Hospital Sleeping Rooms | 45 |
| Schools and Libraries | 50 |

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**TABLE 4 – NOISE EMISSION LIMITS FOR CONSTRUCTION EQUIPMENT USED DURING NIGHTTIME HOURS; MEASURED AT 50 FEET FROM CONSTRUCTION EQUIPMENT(1)**

| Equipment Category | Lmax Level (dBA) |
|---|---|
| All other equipment > 5HP | 81 |
| Auger Drill Rig | 81 |
| Backhoe | 75 |
| Bar Bender | 75 |
| Boring Jack Power Unit | 80 |
| Chain Saw | 81 |
| Compactor | 75 |
| Compressor (2) | 65 |
| Compressor (other) | 75 |
| Concrete Mixer | 71 |
| Concrete Pump | 77 |
| Concrete Saw | 81 |
| Crane | 81 |
| Dozer | 81 |
| Dump Truck | 81 |
| Excavator | 81 |
| Flat Bed Truck | 81 |
| Front End Loader | 75 |
| Generator | 77 |
| Gradall | 81 |
| Grader | 81 |
| Horizontal Boring Hydraulic Jack | 80 |
| Jackhammer | 81 |
| Paver | 81 |
| Pickup Truck | 55 |
| Pneumatic Tools | 81 |
| Pumps | 77 |
| Rock Drill | 81 |
| Scraper | 81 |
| Soil Mix Drill Rig | 80 |
| Tractor | 79 |
| Vacuum Excavator (Vac Truck) | 81 |
| Vacuum Street Sweeper | 80 |
| Welder | 73 |
| Notes:<br>(1) Noise emission limits apply to equipment used at surface on the construction site during nighttime hours of 9 pm to 7 am.<br>(2) Portable Air Compressor that is rated at 75 cfm or greater and that operates at greater than 50 psi | |

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**TABLE 5 – NOISE SENSITIVE LOCATIONS**

**WILSHIRE/RODEO STATION**

210 N. Beverly Drive
133-153 S. Reeves Drive
Sirtaj Hotel,120 S. Reeves Drive
192 N. Canon Drive
121-157 S. Canon Drive
AKA Beverly Hills Hotel, 155 N. Crescent Drive
Beverly Sixty Hotel, 9360 Wilshire Boulevard
The Rolex Building, 9420 Wilshire Boulevard
Sterling Plaza/Bank of California, 9441 Wilshire Boulevard
Beverly Wilshire Hotel, 9500 Wilshire Boulevard

**CENTURY CITY/CONSTELLATION STATION**

1918-1952 Fox Hills Drive
2050 Century Park West
Hyatt Regency Century Plaza Hotel, 2025 Avenue of the Stars
2010 Century Park East
Century City Hospital & Medical Center, 2080 Century Park East
2160 Century Park East
1888 Century Park East
Century Plaza Towers, 2049 Century Park East
Annenberg Space for Photography and the Skylight Studios, 10050 Constellation Boulevard
Bain & Company Building, 1901 Avenue of the Stars
The Century, 10 West Century Drive
Constellation Place, 10250 Constellation Boulevard
401 Shirley Place
Beverly Hills High School

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**TABLE 6 – PRELIMINARY NOISE PROJECTIONS**
**(REFER TO DRAWING PREPARED ACCORDING TO REQUIREMENTS OF THIS SECTION.)**

| Activity | Typical Expected Leq Levels at 50 ft from Construction Equipment, with No Noise Control Measures (dBA) |
|---|---|
| | |
| | |
| | |
| | |

**TABLE 7 – ADJUSTMENTS FOR CLOSE-IN EQUIPMENT NOISE MEASUREMENTS**

| Measurement Values to be Subtracted from Measured Sound | |
|---|---|
| **Distance (Feet)** | **Level to Estimate Sound Level at 50 Feet (dBA)** |
| 19-21 | 8 |
| 22-23 | 7 |
| 24-26 | 6 |
| 27-29 | 5 |
| 30-33 | 4 |
| 34-37 | 3 |
| 38-42 | 2 |
| 43-47 | 1 |
| 48-50 | 0 |

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**TABLE 8 – CONSTRUCTION VIBRATION LIMITS FOR ANNOYANCE**

| Vibration Type | Permissible Aggregate Duration | Vibration Limit (peak particle velocity (PPV)) | Vibration Limit (VdB re $10^{-6}$ in/sec) |
|---|---|---|---|
| Sustained | >1 hour/day | 0.01 in/sec | 80 |
| Transient | <1 hour/day | 0.03 | 90 |
| Transient | <10 minutes/day | 0.10 | 100 |

**TABLE 9 – CONSTRUCTION VIBRATION LIMITS FOR DAMAGE RISK TO BUILDINGS**

| Building Category | Allowable Peak Vibration (peak particle velocity (PPV) in/sec) | Allowable Peak Vibration (VdB re $10^{-6}$ in/sec) |
|---|---|---|
| I. Reinforced-concrete, steel or timber (no plaster) | 0.50 | 114 |
| II. Engineered concrete and masonry (no plaster) | 0.30 | 110 |
| III. Non-engineered timber and masonry buildings | 0.20 | 106 |
| IV. Buildings extremely susceptible to vibration damage | 0.12 | 101 |

**TABLE 10 – VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT(1)**

| Equipment | Peak Vibration at 25 ft (peak particle velocity (PPV) in/sec) | Approximate RMS Vibration at 25 ft (VdB re 10-6 in/sec) |
|---|---|---|
| Pile Driver (impact) | 0.644 – 1.518 | 104 - 112 |
| Pile Driver (sonic/vibratory) | 0.170 – 0.734 | 93 - 105 |
| Clam Shovel Drop (slurry wall) | 0.202 | 94 |
| Hydromill (slurry wall) | Soil 0.008<br>Rock 0.017 | 66<br>75 |
| Vibratory Roller Compactor | 0.210 | 94 |
| Hoe Ram | 0.089 – 0.19 | 87 - 94 |
| Large Bulldozer | 0.089 | 87 |
| Caisson Drilling | 0.089 | 87 |
| Loaded trucks | 0.076 | 86 |
| Jackhammer | 0.035 | 79 |
| Small Bulldozer | 0.003 | 58 |
| Tunnel Boring Machine (2) | 0.055 AT 33 ft | 83 AT 33 ft |
| Tunnel Train (2) | 0.050 AT 50 ft | 82 AT 50 ft |
| Notes:<br>(1) This source data is preliminary in nature and it is up to the Contractor to verify and update information during construction (and, where possible, before construction).<br>(2) For underground sources, use the slant distance determined by calculating the hypotenuse of the triangle formed by the depth between the building and top-of-rail and the horizontal (plan) distance between the building and top-of-rail. | | |

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**TABLE 11 – CORRECTION FACTORS FOR VIBRATION CALCULATIONS**

| Vibration | Correction Factors (dB) |
|---|---|
| Vibration (VdB) to groundborne noise (dBA) | -20dBA |
| Building coupling and path to sensitive space | 4-stories or greater: -7 dB |

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**FIGURE 1**
**QUARTERLY NOISE CONTROL PLAN FORM - PART B**

QUARTERLY NOISE CONTROL PLAN (DUPLICATE AS NEEDED)

Contract No.: _____ Contract Name: _____

Contractor: _____ Site: _____

Date: _____ Land Use: _____

Resubmit every 3 months.

PART B: RESIDENTIAL, COMMERCIAL AND INDUSTRIAL PROPERTY NOISE LEVELS

| | Calculated Noise Levels (dBA)* | |
|---|---|---|
| | Calculated one hour Leq (dBA) | Calculated Lmax (dBA) |
| Nighttime | | |

**NOISE ABATEMENT MEASURES** **ANTICIPATED EFFECTS**

CALCULATIONS: Attach additional sheet(s) as needed.

Contract No(s): _____

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**FIGURE 2. NOISE MEASUREMENTS REPORT FORM**

Date: _____

Time:_____

NOISE MEASUREMENTS REPORT FORM

Measured By: _____ Of: _____
(Company)

Monitoring Address: _____
(Provide Sketch on Back)

Location No: _____ Wind Speed: _____ Km/Hr Direction:_____
(MPH x 1.6)

Location of Sound Level Meter: (No closer than 15 meters from equipment and 3 meters from building)

Monitoring was Conducted: _____ Meters from Equipment ( _____)
(Type(s): Leave Blank for Baseline)

Land Use: ☐ Residential/Institutional ☐ Business/Recreational ☐ Industrial

Sound Level Meter: Make and Model: _____ ☐ A - Weighted Sound Level (Slow)
☐ C - Weighted Sound Level (Fast)

Duration of Measurement:_____
(15 minutes to 1 hour)

| Calibration | | Field Notes (example: 2200-2205 H, Airplane 90 dB) |
|---|---|---|
| one-hour $L_{eq}$ | | |
| $L_{50}$ | | |
| $L_{10}$ | | |
| $L_{1.0}$ | | |
| $MAX_L$ | | |
| Allowable Noise Limit | | |

Check one of the following:

☐ Ongoing Construction ☐ Post-Construction: _____ ☐ Baseline Conditions
(Contract)

(Complete all that apply below)

Active Contract(s): _____
(List all contracts that contribute to measured noise)

Complaint Response: _____
(Describe: Include Log-In Number)

Abatement Follow-up: _____
(Describe)

Construction Noise and Vibration Control
C1120 01 56 19-35 Issued for Solicitation: 09.01.15

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**FIGURE 3**

**EQUIPMENT SOUND LEVEL DATA REPORTING FORM**

**EQUIPMENT SOUND LEVEL DATA REPORTING FORM**

**APPLICATION FOR CERTIFICATE OF EQUIPMENT NOISE COMPLIANCE**

Contractor Name: _____
Contract Name & Number: _____

Equipment Type: _____
Manufacturer & Model Number: _____
Identification Number: _____
Rated Power & Capacity: _____
Operating Condition During Test: _____

**Measured Sound Levels at 20 to 50 feet:**

Measured Values and Distance:
Right Side: _____ dBA (SLOW), at _____ feet
Left Side: _____ dBA (SLOW), at _____ feet

Estimated Values at 50-Foot Distance:
Right Side: _____ dBA (SLOW).
Left Side: _____ dBA (SLOW).

Maximum Values Allowed for this Equipment: _____ dBA (SLOW) at 50 feet.

If equipment sound level exceeds maximum value allowed, indicate action taken to achieve compliance:
_____
_____
_____

Name, Address & Phone No. _____
of Acoustical Engineer _____

Authorized Signature: _____ Date: _____
CONTRACTOR'S APPROVAL:
Authorized Signature: _____ Date: _____
ENGINEER'S CONCURRENCE:
Authorized Signature: _____ Date: _____

Los Angeles County Metropolitan Transportation Authority
Westside Purple Line Extension Project, Section 2

**FIGURE 4**
**QUARTERLY NOISE CONTROL PLAN FORM - PART A**

**QUARTERLY NOISE CONTROL PLAN - NIGHTTIME CONSTRUCTION ACTIVITIES AT THE SURFACE OF THE CONSTRUCTION SITE (DUPLICATE AS NEEDED)**

Contract No.: _____ Contract Name: _____ Contractor: _____

Site: _____ Date: _____Resubmit every three months

(ATTACH SITE SKETCH)

PART A: EQUIPMENT INVENTORY

| Code letter (a) | Equipment | | | | Noise Limit (f) | Estimated Noise at 50'* (g) | Date Begin (h) | Date End (i) |
|---|---|---|---|---|---|---|---|---|
| | Category (b) | Model (c) | ID# (d) | HP (e) | | | | |
| | | | | | | | | |
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**END OF SECTION 01 56 19**

Print Form

# Notice of Determination

**Appendix D**

**To:**

☒ Office of Planning and Research

*U.S. Mail:* P.O. Box 3044, Sacramento, CA 95812-3044

*Street Address:* 1400 Tenth St., Rm 113, Sacramento, CA 95814

☒ County Clerk
County of: Los Angeles
Address: 12400 Imperial Highway, Norwalk, CA 90650

**From:**
Public Agency: LACMTA
Address: One Gateway Plaza, Los Angeles, CA 90012
Contact: David Mieger
Phone: 213.922.3040

Lead Agency (if different from above):
Address:
Contact:
Phone:

***SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.***

State Clearinghouse Number (if submitted to State Clearinghouse): 2009031083

Project Title: Westside Subway Extension Transit Corridor

Project Applicant: LACMTA (Metro)

Project Location (include county): Los Angeles

Project Description:
In May 2012, the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) prepared by the Los Angeles County Metropolitan Transportation Authority (Metro) for the Westside Subway Extension Phases 2 and 3 was approved by the Metro Board of Directors. Subsequently, due to a proposed development at the corner of Avenue of the Stars and Constellation Boulevard, the selected construction staging area (Scenario A) can no longer be used for the project. Instead, the staging areas identified in the FEIR/FEIS as part of Scenario B will be used. A portion (less than 0.25 acres) of Area 1 will be required for the construction of the station entrance which is to remain

This is to advise that the Los Angeles County Metropolitan Transportation Authority (☒ Lead Agency or ☐ Responsible Agency) has approved the above described project on _____ (date) and has made the following determinations regarding the above described project.

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☒ was ☐ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:
Los Angeles County Metropolitan Transportation Authority, One Gateway Plaza, Los Angeles, CA 90012

Signature (Public Agency): _____ Title: Executive Officer

Date: _____ Date Received for filing at OPR: _____

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

**File #:** 2015-1600, **File Type:** Contract **Agenda Number:** 31.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

**SUBJECT: UNIVERSAL CITY PEDESTRIAN BRIDGE, CONTRACT NO. C1043**

**ACTION: AUTHORIZE INCREASE IN CONTRACT MODIFICATION AUTHORITY**

## RECOMMENDATION

APPROVING an increase in Contract Modification Authority (CMA) for **pending and future Contract Modifications in the amount of $400,000 for Contract No. C1043 Universal City Pedestrian Bridge, awarded to Griffith Company**, increasing the total CMA from $2,142,500 to $2,542,500. This action does not affect the Life of Project budget.

## ISSUE

To date the Contract is 52% complete and several unforeseen conditions have impacted construction activities. As a result, staff requests additional CMA in the amount of $400,000, to prevent possible delay to the construction completion.

Staff is not requesting an increase to the Life of Project (LOP) budget at this time. However, project contingency has fallen below 1.5% due to the aforementioned changes with 52% of construction complete. Staff is monitoring the LOP budget closely and should staff identify a need to increase the LOP, they will return to the Board at a later date.

## DISCUSSION

Metro issued the Notice to Proceed (NTP) for Design-Build (DB) Contract No. C1043 for the Universal City Pedestrian Bridge Project in January 2014. As of September 30, 2015, the Contractor, Griffith Company (Griffith) has completed all design activities and is approximately 52% complete with construction.

Some of the significant change orders executed to date include relocation of the transformer necessary to power the bridge equipment, modification of the structural member fabrication to meet more stringent code requirements, and implementation of major foundation design modifications to comply with the findings of the most current geotechnical report.

In addition to the above, Griffith has submitted several additional requests for contract changes,

including time extensions, which are currently under staff review. As of the end of September 2015, executed Contract Modifications equal $1,098,719, unexecuted Contract Modifications total $725,000, and pending Contract Modifications under review are $718,781, for a grand total of $2,542,500. All Contract Modifications are included as Attachment B.

The current approved CMA is $2,142,500; therefore, staff is requesting additional CMA in the amount of $400,000 to ensure that construction can proceed without any interruptions and avoid potential delays. The Universal City Pedestrian Bridge project is scheduled for substantial completion in late January 2016 with final acceptance in March 2016.

## DETERMINATION OF SAFETY IMPACT

The Board action will not have an impact on established safety standards.

## FINANCIAL IMPACT

The FY16 budget includes $8,660,000 in Cost Center 8510 (Construction Contracts/Procurement), Project 809382 (Universal City Pedestrian Bridge). The Life-of-Project (LOP) budget for this project is $27,300,000. Since Contract No. C1043 is a multi-year contract, the Cost Center Manager and Executive Director, Program Management, will be accountable for budgeting the cost in future years.

Impact to Budget

The sources of funds for this project are Proposition A 35% and contribution from NBC Universal. Proposition A 35% is eligible for rail operating and capital funds. No other sources were considered as these funds are programmed for this project.

## ALTERNATIVES CONSIDERED

The Board may choose to not authorize an increase to the CMA. This alternative is not recommended because without the availability of CMA construction may be interrupted causing a delay to contract completion.

## NEXT STEPS

Upon receipt of additional CMA, staff will continue to negotiate and execute contract modifications.

## ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - Contract Modification/Change Log
Attachment C - DEOD Summary

Prepared by: Milind Joshi, Director Project Engineering, (213) 922-7117
Tim Lindholm, Executive Officer, Capital Projects, (213) 922-7297

Reviewed by: Ivan Page, Interim Executive Director, Vendor/Contracts Management, (213) 922-6383
Richard Clarke, Executive Director, Program Management, (213) 922-7557



Phillip A. Washington
Chief Executive Officer

**ATTACHMENT A**

## PROCUREMENT SUMMARY

## UNIVERSAL CITY PEDESTRIAN BRIDGE
## CONTRACT NO. C1043

| | | | | |
|---|---|---|---|---|
| **1.** | **Contract Number**: C1043 | | | |
| **2.** | **Contractor**: Griffith Company | | | |
| **3.** | **Mod. Work Description**: Increase Contract Modification Authority (CMA) for pending modifications to support ongoing project. | | | |
| **4.** | **Contract Work Description**: See Attachment B | | | |
| **5.** | **The following data is current as of**: October 9,2015 | | | |
| **6.** | **Contract Completion Status**: | | | |
| | **Bids/Proposals Opened**: | 7/25/13 | **% Completion $s**: | 52% |
| | **Contract Awarded**: | 11/14/13 | **% Completion time**: | 81% |
| | **NTP**: | 1/9/14 | **Original Contract Days**: | 730 |
| | **Original Complete Date**: | 1/9/16 | **Change Order Days**: | 55 |
| | **Current Est. Complete Date**: | 3/3/16 | **Suspended Days:** | 0 |
| | | | **Total Revised Days**: | 785 |
| **7.** | **Financial Status**: | | | |
| | **Contract Award**: | | $21,425,000 | |
| | **Total Contract Modifications Approved**: | | $1,098,719 | |
| | **Current Contract Value**: | | $22,523,719 | |
| | **Total Contract Modification Authority** | | $2,142,500 | |
| | **Requested Additional CMA (See Attachment B)** | | $400,000 | |
| | **Contract Administrator**: Diana Sogomonyan | | **Telephone Number**: (213) 922-7243 | |
| **8.** | **Project Manager**: Milind Joshi | | **Telephone Number**: (213) 893-7117 | |

## A. Contract Action Summary

This Board action is to approve an increase in Contract Modification Authority (CMA).

The pending contract modifications will be processed in accordance with Metro's Acquisition Policy and the contract type is a Firm Fixed Price performing design and construction work of a new pedestrian bridge, hardscape plazas and landscaping, and a right turn lane.

History of the original procurement:

The Board authorized the Chief Executive Officer to solicit and award a Design-Build (D/B) contract for the Universal City Pedestrian Bridge on July 26, 2012, per Settlement Agreement and Pedestrian Crossing Agreement dated July 10, 2012, between Universal NBC and LACMTA.

Life of Project Budget was approved for increase by Board of Directors on October 24, 2013 in the amount of $27,300,000 and Metro's Chief Executive Officer approved Contract award to Griffith Company, a General Contractor located in Brea, California, on October 28, 2013. Griffith Company was determined to be the lowest price technically qualified responsible bidder and was awarded the D/B Contract on November 14, 2013. Griffith Company's price of $21,425,000 was determined to be fair and reasonable, based on adequate price and competition. The CMA of $2,142,500 was established per the Contract Price.

Notice to Proceed was issued to Griffith Company on January 9, 2014, with Period of Performance of 730 Calendar Days.

Refer to Attachment B for modifications issued to date to add/delete work, and the proposed modification currently pending authorization.

## B. Cost/Price Analysis

The negotiated price for the proposed changes that is merited will be determined to be fair and reasonable based upon clarification of scope of work, fact finding, an independent cost estimate, cost analysis, technical evaluation, and audit as required.

See list of pending changes in Attachment B.

**ATTACHMENT B**

## CONTRACT MODIFICATION/CHANGE LOG

## UNIVERSAL CITY PEDESTRIAN BRIDGE
## CONTRACT NO. C1043

| Mod/CO No. | Description | Status | Contract Value (A) | Mod/CO Value (B) | Board Approved CMA (C) |
|---|---|---|---|---|---|
| N/A | Initial Award | | $21,425,000 | | $2,142,500 |
| CO No. 1 | Perforated Panel Design Change | Approved | | $46,637 | |
| Mod No. 1 | Conversion to Metro CADD Standards | Approved | | $49,251 | |
| Mod No. 3 | Transformer Relocation (Design Change) | Approved | | $38,520 | |
| Mod No. 5 | Additional Traffic Control | Approved | | $37,733 | |
| Mod No. 6 | Additional Plaza Lighting | Approved | | $91,781 | |
| Mod No. 7 | CIDH Pile Installation and Pile Splice Zone | Approved | | $46,083 | |
| Mod No. 8 | Transformer Relocation (Construction) | Approved | | $320,000 | |
| Mod No. 10 | Bridge Mid Chord Connection (Design and Construction) | Approved | | $468,714 | |
| **Subtotal – Approved Changes** | | | | **$1,098,719** | |
| Mod No. 4 | Revise DEOD SBE Contract Compliance Manuel | Pending | | $0.00 | |
| TBD | Design Directive Drawings for CSS (CN NO. 10) | Pending | | $57,000 | |
| TBD | Field Directive Labor Materials (Museum Signage) (CN No. 11) | Pending | | $3,000 | |
| TBD | Use CIDH Pile Foundation and Grade Beams in Place of Spread Footings (CN No. 13) | Pending | | $425,000 | |
| TBD | Perforated Metal Wall Panels Design and Construction (CN No. 14) | Pending | | $200,000 | |
| TBD | Silicate Carbide Asphalt | Pending | | $103,000 | |
| TBD | TIA 6: Design Changes Metal Cladding | Pending | | $100,000 | |
| TBD | Material Hauling Off-site | Pending | | $70,000 | |
| TBD | Differing Site Conditions Including Concrete at Water | Pending | | $120,000 | |

| | | | | | |
|---|---|---|---|---|---|
| | Line, Drain Line and Unknown Duckbank | | | | |
| TBD | HVAC Scope | Pending | | $200,000 | |
| TBD | Painting Specification Change | Pending | | $7,000 | |
| TBD | TIA 1: LABOE Pushover Analysis | Pending | | $50,000 | |
| TBD | Additional Traffic Control for UNBC | Pending | | $30,000 | |
| TBD | Miscellaneous | Pending | | $38,781 | |
| **Subtotal – Pending Changes** | | | | **$1,443,781** | |
| **Subtotal Approved and Pending Changes** | | | | **$2,542,500** | |
| TBD | Holding Tanks at Station 1-3 | Pending | | ($100,000)***** | |
| **Subtotal Approved and Pending Changes Including Credits** | | | | **$2,442,500** | |
| **Total Contract Value(Including Approved and Pending Changes and Credits) $21,425,000 + $2,442,500 =** | | | **$23,867,500** | | |
| **Prior CMA Authorized by the Board** | | | | | **$2,142,500** |
| **Approved Changes** | | | | | **$1,098,719** |
| **Remaining CMA for Future Changes** | | | | | **$1,043,781** |
| **Pending Changes** | | | | | **$1,443,781** |
| **Increased CMA for this Recommended Action** | | | | | **$400,000*** |

*Credit value totaling $100,000 is not included in the CMA request.

**ATTACHMENT C**

## DEOD SUMMARY

## UNIVERSAL CITY PEDESTRIAN BRIDGE / C1043

### A. Small Business Participation

Griffith Company made a 10% Small Business Enterprise (SBE) commitment for this solicitation. The project is 52% complete and the current SBE participation is 9.01%.

| SMALL BUSINESS COMMITMENT | 10% SBE | SMALL BUSINESS PARTICIPATION | 9.01% SBE |
|---|---|---|---|

| | SBE Subcontractors | % Commitment | % Participation[1] |
|---|---|---|---|
| 1. | Excelsior Elevator | 8.37% | 5.02% |
| 2. | Intueor Consulting | 0.83% | 1.70% |
| 3. | Diaz Yourman | 0.80% | 1.24% |
| 4. | Precision Engineering | Added | 0.32% |
| 5. | RT Engineering | Added | 0.19% |
| 6. | Langford & Carmichael | Added | 0.11% |
| 7. | Morgner Technology Management | Added | 0.43% |
| | **Total Commitment** | **10.00%** | **9.01%** |

[1] *Current Participation = Total Actual amount Paid-to-Date to SBE firms ÷Total Actual Amount Paid-to-date to Prime.*

### B. Project Labor Agreement / Construction Careers Policy (PLA/CCP)

The Contractor has committed to complying with PLA/CCP requirements for this project. This project is 52% complete and the contractor is not achieving the 40% Targeted Worker Goal at 32.89%, achieving the 20% Apprentice Worker Goal at 26.62%, and achieving the Disadvantaged Worker Goal at 10.31%). Staff has met with the contractor on several occasions throughout the project to address meeting the hiring goals for this project. The contractor has ensured staff that they will achieve the hiring targets for this project, and staff will continue to monitor and report the contractor's progress toward meeting the PLA/CCP goals.

### C. Living Wage Service Contract Worker Policy

The Living Wage and Service Contract Worker Retention Policy is not applicable to this modification.

## D. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

**File #:** 2015-1593, **File Type:** Budget **Agenda Number:** 48.

**CONSTRUCTION COMMITTEE**
**NOVEMBER 19, 2015**

## SUBJECT: ROOF REPLACEMENT IN CONJUNCTION WITH SOLAR POWER PURCHASE AGREEMENT PROJECT

## ACTION: APPROVE USE OF DESIGN-BUILD CONTRACTING DELIVERY APPROACH FOR ROOF REPLACEMENTS

## RECOMMENDATION

A. FINDING that utilizing design-build delivery pursuant to Public Utilities Code ("PUC") Section 130242 will achieve private sector efficiencies in the **integration of the design, project work, and components related to the construction and installation of new roofs at Divisions 11 and 22 to later enable the installation of solar photovoltaic ("PV") systems at Divisions 9, 11, 22 and the Expo Yard**;

(REQUIRES TWO-THIRDS VOTE)

B. AUTHORIZING the Chief Executive Officer to solicit a design-build contract for **design, construction and installation of new roofs for Divisions 11 and 22**, pursuant to PUC Section 130242

C. INCREASING the Life of Project Budget for the **Lighting Retrofit at two Rail Divisions project** (CP#204801) from $1,557,000 by $2,648,100 to include design and construction of new roofs for Divisions 11 and 22; the new LOP amount will be $4,205,100.

## ISSUE

Pursuant to Metro's Renewable Energy Policy attached as Attachment A, Metro has committed to a 66% renewable energy use goal by 2020. One of the strategies that Metro has employed to achieve that goal is to install solar PV systems on its facilities at various Metro properties (*see* Funding and Operating Sustainability-Related Infrastructure report, attached as Attachment B). Staff has conducted assessment and evaluation studies to determine optimal locations among Metro's real property assets for the installation of solar PV systems. As a result of such studies, Metro Divisions 9, 11, 22, and the Expo Yard have been proposed as the sites for the future installation of rooftop solar PV systems by a third party, to be selected through a competitive solicitation process (such proposed project will be referred to in this report as the "Solar PPA Project"). The solar PV systems

would generate energy for Metro's consumption that will offset a portion of the utility-provided energy at such sites, and result in energy cost savings.

During the investment study conducted at Divisions 9, 11, 22, and the Expo Yard, it was determined that roof replacement ("Roof Replacement Work") is necessary to support the installation of PV equipment at Divisions 11 and 22. This is necessary for two reasons: 1) the roofs at these Divisions are nearing their end of useful life and are already being scheduled to be replaced and 2) existing structures need to be reinforced to accommodate the future solar PV systems load.

Metro is authorized to enter into design-build contracts pursuant to PUC Section 130242, which requires that the Board make a finding that the work will achieve private sector efficiencies, which is why staff are seeking to use the DB method of construction. As discussed further in this report, staff is seeking Board authority to solicit a design-build contract for the Roof Replacement Work at Divisions 11 and 22, in order to ready these two sites for the future installation of the solar PV systems

## DISCUSSION

As described above, the proposed Roof Replacement Work is necessary in order to facilitate the installation of the Solar PPA Project. The Solar PPA Project (and related Roof Replacement Work) is consistent with the agency's intent to reduce the cost of energy as outlined in Metro's Environmental Policy and Energy Conservation and Management Plan. Completion of the Solar PPA Project will allow Metro to get closer to fulfilling our renewable energy goals, decrease our carbon footprint, increase our energy independence, and reduce our operational costs. An estimate of projected energy cost savings to be realized from the Solar PPA Project is provided in Attachment C. In order to facilitate the Solar PPA Project, staff will need to issue two concurrent solicitations, one for the Roof Replacement Work (via a design-build contracting delivery approach) and one for the Solar PPA Project (via a power purchase transaction with ancillary property license agreement). This section of the report provides a discussion of these two proposed means of project delivery.
.

*Solar PPA Project*

Staff anticipates that the Solar PPA Project will be implemented by way of a public-private partnership in the form of a solar PV Power Purchase Agreement ("PPA") transaction authorized pursuant to Government Code ("GC") Section 4217.10 *et seq*. GC Section 4217.10 *et. seq.* permits public agencies (including Metro) to (i) develop energy conservation, cogeneration, and alternate energy supply sources on the public agency's property, provided that certain findings are met under the statute, and (ii) request proposals from qualified persons for energy conservation projects and award such contracts through a competitive best value Request for Proposal (RFP) selection process that may take into account, among other things, the experience of the contractor, the type of technology employed by the contractor, and the cost to the agency. A PPA transaction is among the various alternative financing strategies that have been identified by staff for project delivery, as described in the attached report on Alternative Financing Mechanisms for Energy Projects dated May 15, 2013, attached as Attachment D. In a PPA transaction, Metro would license or lease its property to a third

party solar energy provider ("Power Provider"). The Power Provider installs the solar PV system on Metro's property, and Metro purchases solar energy from the Power Provider at a negotiated cost, which cost is projected to be less than the anticipated marginal cost to the agency that would have otherwise been consumed from other sources. The Power Provider, selected through a competitive solicitation process pursuant to Section 4217.10 *et. seq.*, will design, finance, and furnish the solar PV system, and maintain the system for at least twenty (20) years. The amount of energy produced by the solar PV system and the net monetary savings to Metro shall be guaranteed in the form of PPA performance incentives that focus on kilowatt hours to be generated and costs avoided.

Upon completion of the analysis of the best solar PV system/PPA, staff will seek Board approval for the award of the PPA contract compliance with the requirements of GC Section 4217.10 *et seq*.

*Roof Replacement Work*

The roofs at Divisions 11 and 22 were installed 26 and 21 years ago, respectively. Maintenance service requests files reviewed by staff show repairs made due to roof leaks, drywall repair, repainting, and mold remediation among others. It is therefore timely that the repair off these roofs occur in conjunction with the Solar PPA Project. The Roof Replacement Work will be conducted according to or consistent with all applicable codes, and furthermore, the technical specifications will require that the roofs have the structural capacity to accommodate solar PV system facilities.

The Roof Replacement Work will be solicited via a design-build contracting delivery approach. Utilization of a design-build process is allowed under Public Utilities Code Section 130242, which provides for award of a design-build contract to the lowest responsive and responsible bidder. The primary benefit of the design-build process is a shortened project schedule where the design-builder is able to start demolition/construction while the design is being completed as well as including additional efficiencies in project management, administration and coordination, all of which benefits, facilitate, and expedite project completion.

The design-build contracting delivery approach was slected for the Roof Replacement Work based on the following considerations:

- A single point of responsibility for design and construction will increase the time and management efficiency on the implementation of the projects;
- Staff project development resources are limited, so more budgeted projects can be accomplished by adding design-build capability;
- Metro's design risks are shifted to design-builder, while changes related to design are minimized;
- The project requires standard or minimal design effort and is therefore more conducive to being implemented by design-build contractors with general engineering and contracting capacity.

Approval of the action described in this report would allow staff to proceed with a solicitation utilizing the design-build contracting delivery approach pursuant to Public Utilities Code Section 130242 for the Roof Replacement Work.

## DETERMINATION OF SAFETY IMPACT

This Board action will not have an adverse impact on safety standards for Metro. It will however increase safety for Metro maintenance and contractor personnel that may be required to maintain the PV equipment as well as other projects that should become more energy and operationally efficient.

## FINANCIAL IMPACT

The current FY16 budget for this project is $554,000. The FY16 $1,000,000 funding increase for this project will partially come from Project Number 450003, Miscellaneous Contingency-Capital Construction, in Cost Center 8510. The additional $1,648,100 will be included as part of the FY17 Capital Program for a total project budget of $2,648,100.

Since this is a multi-year capital project, the cost center manager and Executive Director, Program Management and the Executive Officer, Environmental Compliance and Sustainability will be responsible for budgeting in future years.

Impact to Budget

The initial $1,000,000 source of FY16 funds for this project will come from Project 450003, Miscellaneous Contingency-Capital Construction and the Green Fund which is used to support the execution of sustainability-related infrastructure projects. The balance of the FY16 funding required for this project comes from Proposition A 35% cash/bonds. The additional future funding for the LOP increase will also be Proposition A 35% cash / bonds which impacts Rail Operating and Capital budgets.

The Solar PPA Project will be funded and financed by the Power Provider who will be awarded the PPA contract at a later date, following Board approval. Staff will provide additional information at the time that staff seeks Board approval for awarding of the contract for the Roof Replacement Work and Solar PPA Project.

## ALTERNATIVES CONSIDERED

Metro has committed to using up to 66% of its energy from renewable energy sources. Installation of solar panels at our facilities has been employed for some time. We have an opportunity through this project to replace roofs that are at the end of their useful life at Divisions 11 and 22 as an integral part of our renewable energy program.

The Board may reject the request to contract for the Roof Replacement Work; and consequently force Metro to wait until an unknown future time that the roofs are replaced before we can install any

solar PV systems. This will have a cumulative effect on our achievement of our renewable energy use goal.

## NEXT STEPS

After the recommended Board Action is approved, staff will release an Invitation for Bids (IFB) to solicit a design-build contractor to install the new roofs at Divisions 11 and 22. In parallel, staff will also release an RFP to solicit a Power Provider to install, operate and maintain the solar PV systems at Divisions 9, 11, 22 and the Expo Yard. Upon evaluation of the IFB bids and RFP proposals for each respective solicitation, staff will seek Board approval prior to awarding or the two contemplated contracts. Approval of the two contracts will include determinations of compliance with the requirements of PUC Section 13242 (for the Roof Replacement Work) and GC Section 4217.10 *et seq.* (for the Solar PPA Project).

## ATTACHMENTS

Attachment A - Renewable Energy Policy
Attachment B - Funding and Operating Sustainability-Related Infrastructure report dated September 18, 2014
Attachment C - Solar PPA Estimated Energy and Operational Costs Avoided Over 25- years
Attachment D - Report on Alternative Financing Mechanisms for Energy Projects dated May 15, 2013

Prepared by:
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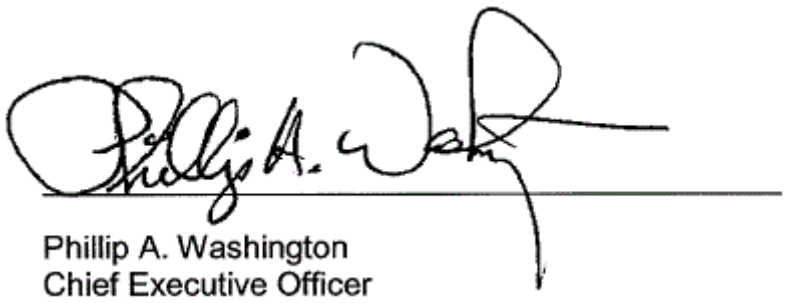
Bryan Pennington, Deputy Executive Director, Program Management (213) 922-7449

Reviewed by:
Richard Clarke, Executive Director, Program Management (213) 922-7557



Phillip A. Washington
Chief Executive Officer

Attachment A

6

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**AD HOC SUSTAINABILITY COMMITTEE**
**SEPTEMBER 14, 2011**

**SUBJECT: RENEWABLE ENERGY POLICY**

**ACTION: ADOPT RENEWABLE ENERGY POLICY**

## RECOMMENDATION

Adopt the Los Angeles County Metropolitan Transportation Authority (LACMTA) Renewable Energy Policy to develop and implement renewable energy technology applications, where feasible and practicable, to minimize non-renewable energy use in all of LACMTA capital assets or projects.

## ISSUE

Sustainability and energy efficiency is a central LACMTA focus and commitment, cutting across virtually all aspects of the agency's mission, vision, values, and core business goals. We annually spend on average approximately $26 million for electricity. About $7 million of this total amount is for operation of bus and rail maintenance facilities, layovers, terminals, and headquarter buildings. The remaining are for propulsion power.

As the years progress, we have seen electricity costs rise due to periodic utility rate adjustments. We believe that in the volatile and costly energy market, embracing sustainability, energy efficiency, conservation, and implementation of renewable energy sources is a primary pathway towards gaining control of, and reducing our energy usage and costs and gaining energy independence.

LACMTA has already deployed and is using over two megawatts of electricity from renewable energy sources (i.e., photovoltaic sources exclusively) at three of our Bus Divisions and the Metro Support Services Center. One megawatt of power can power approximately 800 to 1,000 homes. This current portfolio represents approximately 2% of the energy needs of our agency.

A motion was passed by our Board of Directors in February 2011 calling for the establishment of a "Metro Renewable Energy Policy". The motion recognized that

under Measure R and the 30/10 plan, the projected expansion of the Metro system, including approximately 70 miles of light and heavy rail lines, will have substantial effect upon the projected cost of energy required in order to operate the Metro system.

The motion called for a review of the following elements:

- Assessment of technical feasibility for off-track, and on-track renewable power, including canopies, substations, parking lots and park 'n rides, landscaped areas, utility poles, tunnels, garages, maintenance buildings, etc., as well as creative renewable energy solutions.

- Life-cycle financial considerations including cost (i.e., initial capital as well as maintenance and replacement costs and life-cycle cost analysis).

- Use of creative financing mechanisms (such as Feed-in-Tariff, Power Purchase Agreements, ground leases, Public/Private Partnerships and State and Federal grants).

- Inclusion of life-cycle cost analyses for renewable energy use in awarding construction contracts for new lines.

- Existing industry and government guidelines for evaluating renewable energy and energy efficiency in new transit projects and discussion of their potential application to Metro projects.

- Retrofitting existing light rail, subway and bus rapid transit corridors for solar and other renewable power systems.

- Opportunities to partner with local power utilities.

The motion also called for a proposed plan of action and identification of specific opportunities for incorporating renewable energy (solar and other renewable power systems) and energy efficiency measures into existing and new transit projects. The motion requires that the Renewable Policy and plan should include the installation of a demonstration renewable energy system (preferably but not limited to solar panels) on at least one existing station as a demonstration project.

An amendment to the motion further indicated that the review and study of a proposed agency Policy, plan of action, and identification of specific opportunities be initially assigned to the Ad Hoc Sustainability Committee in order to put a greater focus on the issues during the development period. Once the policy has been developed with a Plan of Action and opportunities identified, the Renewable Energy Policy and project opportunities would return to the Operations Committee for the pursuit of implementation.

## DISCUSSION

There have already been a number of staff initiated assessments on the subject of renewable energy such as the completion of a Solar Assessment Feasibility Study for all facilities; the completion of a Wind Energy Feasibility Study for our North San Fernando Valley bus divisions; and the completion of a wind energy study in our subway tunnels. Staff is also currently conducting an on-board energy conservation and technology study for rail vehicles; and an energy efficiency assessment of all Metro facilities to assess utility use and cost baseline as part of a feasibility study on opportunities to deploy energy-efficiency strategies leading to the Leadership in Energy and Environmental Design-Existing Building Operations and Maintenance (LEED®-EBOM) certification of the buildings.

Staff is developing a comprehensive Energy Conservation and Management Plan (Energy Plan) that outlines both our supply and demand strategies to reduce energy use and costs in the maintenance and operation of our overall system. The Energy Plan further provides the guiding principles and implementation procedures in the management of the use and supply of electricity and natural gas, and identifies a proposed management plan to implement the identified energy strategies.

Renewable energy-related pilot or demonstration efforts are currently being planned or underway such as the following:

1. *Wind Tunnel Energy – Subway Lines – projected to be installed along Red Line*: Staff has conducted tests to understand the feasibility of wind tunnel renewable energy generation at our Red Line subway tunnel. Results indicate the potential of the technology. Staff had recently completed a Transit Investment for Greenhouse Gas and Energy Reduction (TIGGER) grant application for use in a pilot scale demonstration. A related procurement will be carried out to implement the pilot project when TIGGER funds are secured.

2. *Solar Panels – Buildings – project selected at El Monte Station on Silver Line*: Solar panels will be deployed at the new facility being constructed at our El Monte Station on the Silver Line and procurement will soon be advertised. This project will be used to demonstrate how solar panels are installed on new transit infrastructures.

3. *Renewable Energy Project – Transit Facilities/Large Scale – project not yet selected*: Following adoption of the proposed policy, LACMTA will begin the evaluation of one or more large-scale demonstration projects. The relatively large size and type of these projects will most likely require the approval of the procurement by the LACMTA Board in advance of issuing a solicitation document. While a potential scope of work has been considered, Metro will need further consultation with our agency's procurement team to better understand the types of proposals that may be feasible for such a comprehensive and large scale renewable energy project. Examples of the

types of parcels where this can be implemented include, but are not limited to: linear right of way corridors; vacant or excess land not currently in use; park and ride lots; and similar types of parcels.

4. *Solar Panels – Transit Facilities/Small Scale – project selected along the Blue Line*: It has been suggested that the Pico Station be the initial location for this pilot. This project will illustrate implementation of solar installations at relatively small scale structures. However, there is likelihood that the Pico Station would be modified when the proposed football stadium plans are finalized. As this policy will already be in place at that time; along with a requirement to rebuild the Pico Station, there should be a consideration of a much larger cost-neutral renewable energy source at the location. Other locations will be considered for possible implementation of this type of pilot project.

While there is now significant staff initiated momentum in exploring renewable energy sources and implementation of energy efficiency strategies, the adoption of a focused Renewable Energy Policy allows for the strategic implementation and expansion of functional and cost-effective renewable energy technologies within the Metro system. The provisions of the proposed Renewable Energy Policy complement the intent of our existing Environmental Policy and Energy and Sustainability Policy.

Staff further recommends that a measurable goal be incorporated into the Renewable Energy Policy to accomplish the policy's intentions. LACMTA currently uses approximately 20% of its total energy from renewable energy sources. These come from within our own renewable energy portfolio as well as those from the utilities.

There is already a state mandate for California utility companies to procure 33% of their total energy supplies from certified renewable resources by the year 2020. However, factors such as:

- local constraints that includes current and near-term economic conditions;
- decreasing availability and amount of energy rebates;
- viability of incorporating renewable energy projects in the context of accelerated Measure R projects' implementation;
- lack of control over unit costs of energy;
- as well as fast evolving renewable technology advances that may create operations and maintenance challenges if deployment of existing technologies is carried out significantly ahead of more cost-effective ones

altogether present challenges for a non-utility organization like the LACMTA.

Nonetheless, staff recommends a stretch goal of an additional 13% renewable energy use by 2020 above our current usage baseline of 20%. This will be achieved through the continued deployment of applicable, feasible, and practicable renewable energy sources at our sites as well as accounting for the increase in renewable energy portfolios of utilities supplying energy to our agency.

Staff recommends that this renewable energy goal be reviewed every five years to assess the continued viability of such a goal and make adjustments, if needed, to ensure the continued incorporation of renewable energy into Measure R and other agency capital assets and projects.

## FINANCIAL IMPACT

Renewable energy project development and deployment requires higher up-front capital investment than conventional energy sources. At the same time, the associated benefits are not necessarily reflected in these project capital costs. Innovative strategies are needed to increase investment, spread cost over the life-cycle, and reflect the multiple benefits of renewable energy and energy efficiency.

Cost is however one of the primary considerations in the selection of appropriate renewable energy technologies that will be considered in any of our capital assets and projects. The Cost criteria examines the cost-competitiveness of the renewable energy technology based upon the cost of constructing the project(s) or retrofitting existing facilities or equipment; their on-going short-term and long-term operation and maintenance; and their overall life-cycle expenses costs relative to the baseline cost of non-renewable energy to achieve the same functional objective. In existing facilities, energy efficiency retrofits and retro-commissioning shall be compared together with renewable energy technology applications for combined life-cycle cost-effectiveness.

Staff will be examining various financial mechanisms, including incentives, subsidies, and deal structures that can aid in the development and deployment of renewable energy projects. Included in the analysis are financial mechanisms that are available to renewable energy developers including incentives and subsidies (feed-in tariffs, rebate programs, state and federal grants, and loans) and deal structures (power purchase agreements, ground leases and public-private partnerships). Any of these mechanisms are applicable and feasible to aid in the development and deployment of renewable energy in any of our capital assets and projects.

No Measure R funds will be used in the implementation of renewable energy projects. Staff will deploy renewable energy projects that will be as close to cost-neutral to the agency as possible.

## ALTERNATIVES CONSIDERED

Rejection of the recommended Board action is inconsistent with the intent of the Board approved motion to develop a comprehensive renewable energy policy for Metro. LACMTA will also miss the revenue-generation opportunities that may be associated with some of the incentives or deal structures, for example feed-in-tariffs. Feed-in-tariff

revenue can possibly offset maintenance costs associated with previously deployed renewable energy projects.

## NEXT STEPS

After the proposed Renewable Energy Policy is adopted by the LACMTA Board, staff will continue the procurement of the identified pilot or demonstration renewable energy projects. The finalized Energy Plan will also be implemented as the guide to manage our use and management of energy resources in general; including the increase in our renewable energy portfolio.

A Request for Information and Qualification will be developed to solicit interest in developing the most comprehensive renewable energy program that can be implemented at LACMTA both short-term and long-term to achieve our renewable energy goal as close to cost-neutral as possible.

## ATTACHMENT

A. Los Angeles County Metropolitan Transportation Authority Renewable Energy Policy

Prepared by: Cris B. Liban, Environmental Compliance and Services Department Manager

Krishniah N. Murthy
Executive Director, Project Transit Delivery

Lonnie Mitchell
Chief Operations Officer

Arthur T. Leahy
Chief Executive Officer

**ATTACHMENT A**

## LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY RENEWABLE ENERGY POLICY

## POLICY STATEMENT

The Los Angeles County Metropolitan Transportation Authority (LACMTA) will develop and implement renewable energy technology applications, where feasible and practicable, to reduce non-renewable energy use in all LACMTA capital assets or projects.

## PURPOSE

This policy provides guidance in 1) identifying criteria that can be applied to the feasibility, selection and application of a renewable energy technologies; 2) applicability of the Renewable Energy Policy; and 3) collaborative opportunities for funding the implementation of feasible and practicable renewable energy-related projects on or any LACMTA capital asset or project.

## COMMITMENT

This Renewable Energy Policy complements the implementation of the LACMTA Environmental Policy and Sustainability and Energy Policy to identify cost-effective solutions to reducing non-renewable energy usage and increasing costs; and to ensure that our current and future energy-related activities would have minimal human health, environmental, and climate change impacts.

The LACMTA also commits to a renewable energy use stretch goal of 13% above its current baseline of 20% by the year 2020. This goal will be measured as the percentage of energy use from any renewable source (including those from the utilities' sources) compared to the amount of total energy used by LACMTA. This goal will be revisited every five years and will be adjusted accordingly to ensure the continued implementation of Measure R projects. Measure R funds will not be used to achieve this goal nor to implement the intent of this policy.

## RENEWABLE ENERGY SELECTION CRITERIA

The LACMTA will consider the feasibility, selection, and implementation of applicable, feasible, and practicable renewable energy technologies at any of our capital assets and projects by comparing renewable energy technologies to one another considering the following criteria:

1) *Cost*: Potential renewable energy applications shall be analyzed for cost competitiveness based upon the cost of constructing the project(s) or retrofitting existing facilities or equipment; their on-going short-term and long-

term operation and maintenance; and their overall life-cycle expenses costs relative to the baseline cost of non-renewable energy to achieve the same functional objective. In existing facilities, energy efficiency retrofits and retro-commissioning shall be compared together with renewable energy technology applications for combined life-cycle cost-effectiveness.

2) *Environmental Benefit*: Renewable energy alternatives or low emissions high-efficiency energy applications, shall be analyzed for environmental benefits relative to the baseline utility electricity (or natural gas, for some solar water heat systems) based on greenhouse gas emissions that would be avoided, and as appropriate, environmental and public health and safety benefits.

3) *Land Use Efficiency*: Renewable energy applications shall reflect efficient land use in terms of the area a renewable energy project or system occupies for each unit of power it can generate.

4) *Peak Shaving Benefit*: The ability for renewable energy alternatives to offset peak non-renewable energy consumption shall be quantified.

5) *Hedging Benefit*: Renewable energy alternatives shall have their ability to contribute to or enhance price and supply certainty to LACMTA quantified relative to baseline energy use.

6) *Local Content Use*: Renewable energy applications shall utilize, where cost-effective and appropriate, equipment manufactured within Southern California.

## APPLICABILITY

Once the field of possible renewable energy projects have been evaluated and compared to one other and applicable, feasible, and practicable renewable energy technologies are selected, they will be applied to capital assets and projects as follows:

- *New Facilities and Transit Corridors and Projects:* Selected renewable energy technologies shall be considered in all new projects from the early development, design and procurement stages, where practicable and feasible. Where applicable, feasible, and practicable, the selected project level renewable energy technology shall be combined with energy efficiency technologies.

- *Existing Facilities and Capital Assets:* Energy efficiency retrofits and retro-commissioning shall precede renewable energy technology applications. Renewable energy technology considerations will only commence after energy use is optimized. The LACMTA recognizes that renewable energy applications may precede energy efficiency retrofits if upfront cost and life-cycle benefits of renewable energy applications significantly outweigh those of energy efficiency retrofits.

In both cases, selected renewable energy technologies shall be compared with baseline energy supply for life-cycle benefits and costs to determine whether to proceed with the renewable energy technology for the project.

## FUNDING AND COOPERATIVE OPPORTUNITIES

LACMTA shall work cooperatively with Federal, State, and local jurisdictions, Energy Services Corporations, utility companies, and other third parties to explore, develop, and engage in the innovative financing strategies to increase renewable energy investment and usage, spread cost over the life-cycle, and reflect the multiple benefits of renewable energy and energy efficiency in all LACMTA capital assets and projects. Deployment of any renewable energy technology at any capital asset or project shall be to the maximum benefit of the LACMTA.

## QUANTIFICATION AND REPORTING OF RENEWABLE ENERGY USAGE AND BENEFITS

No later than 18 months after policy adoption and annually thereafter, LACMTA shall incorporate in the annual Sustainability Report the information generated from the implementation and operation of this Renewable Energy Policy including:

1) A description of the renewable energy projects planned or deployed;
2) Quantification of the resulting greenhouse gas emissions, cost savings, and revenue generated (if any) resulting from the use of renewable energy technologies and energy retrofits (in the case of existing buildings, facilities and equipment);
3) A description of other appropriate measures of progress;
4) A description of implementation challenges; and
5) Recommendations for any policy changes.

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**EXECUTIVE MANAGEMENT COMMITTEE**
**SEPTEMBER 18, 2014**

**SUBJECT: FUNDING AND OPERATING SUSTAINABILITY-RELATED INFRASTRUCTURE**

**ACTION: ADOPT METRO SUSTAINABILITY INFRASTRUCTURE IMPLEMENTATION AND OPERATIONAL PLAN**

## RECOMMENDATION

Authorize the Chief Executive Officer (CEO) to:

1. adopt and implement a long-term financial and operational plan for sustainability-related projects to maintain their optimum performance and maximize environmental benefits; and

2. use proceeds from Low Carbon Fuel Standard (LCFS) credits sales along with any cost-savings, utility allowances and incentives, and any interest earned from the investment of these funds that are generated from sustainability-related infrastructure to specifically continue the implementation, operations, and maintenance of Metro's sustainability-related infrastructure.

## ISSUE

Metro's ongoing investment in its sustainability-related infrastructure continues an almost decade-long commitment to dedicating resources to further advance resource-saving assets. Since 2005, Metro has completed 37 projects, realizing nearly $2 million in yearly cost savings from the operation of these assets.

On February 27, 2014, the Metro Board of Directors approved a motion by Director Ridley-Thomas on Sustainability-Related Infrastructure, Operations and Maintenance. This Board Report is a response to Section 2 of the Motion to: a) assess how the current sustainability-related infrastructure (including renewable energy projects, green buildings and related assets) are operated and maintained; and b) develop a long-term financial and operational plan to maintain the optimum performance of sustainability related-infrastructure which includes a plan to use the Low Carbon Fuel Standard (LCFS) credits, along with any cost-savings generated from current and future

sustainability-related infrastructure to specifically continue the implementation, operations, and maintenance of Metro's sustainability-related infrastructure; and a comprehensive implementation plan to ensure that financial, infrastructural, and operational elements of sustainability-related infrastructure are incorporated in all of Metro's activities.

The Board's continued support of our on-going sustainability-related infrastructure demonstrates its confidence in the value that these projects bring to our agency. In addition, these projects reflect Metro's continued commitment to continually reduce the agency's environmental impacts while simultaneously creating cost-effective and resource conserving value to the projects that we are building to expand our current rail and bus system.

All of our best practices are concurrently being documented through the Federal Transit Administration (FTA) initiated Environmental Management System (EMS) under a process of continual improvement. As evidenced by numerous and varied recognitions and financial support from Federal, state and local funding organizations, *Metro has evolved as a world class sustainability and environmental leader in the transit industry.*

Large-scale investments in solar photovoltaic systems dominate our current sustainability-related infrastructure. These are valuable assets that are devoid of any electricity costs and contribute toward meeting Metro's Renewable Energy Policy goals of 33% renewable energy use by 2020. A more recent focus on implementing energy efficiency, energy cost management, and implementation of other utility cost-saving protocols and processes in new and existing buildings has resulted in a more balanced and diversified portfolio of sustainability-related assets. Such a shift allows Metro to implement future cost-savings projects while meeting concurrent Environmental, Energy, Sustainability, and Renewable Energy Policy goals. In addition, staff has also recognized other opportunities in the areas of water conservation, storm water re-use, energy recovery processes, and reduction in waste generation that are being developed (and in many cases already being implemented) as future sustainability assets.

Annual Board authorized funding to implement cost-saving ideas has been the cornerstone of these innovations; and serve to continually feed new feasible construction and operationally cost-effective projects, such as those being built as part of Measure R-funded infrastructure. More importantly, as their implementation are managed through the plan-do-check-act protocol of the EMS, agency-wide barriers are broken down and projects ideally should be conceptualized and planned, constructed or installed, and operated and maintained seamlessly.

The assessment of the existing sustainability-related infrastructure at Metro (Attachment A) identified gaps in the current approach; specifically for maintaining the current asset base to ensure the realization of projected cost-savings. This therefore requires action to address different aspects of current and future sustainability investments and maintain them in a state of good repair. These gaps provide a very clear signal that continued maintenance deferment of sustainability-related infrastructure will reduce and

eventually eliminate the unique benefits that arise from investments made by our agency in these assets.

A sustainability infrastructure implementation and operational plan that details a transparent process to evaluate, implement, and maintain the portfolio of potential future sustainability project investments; and a financial plan for identifying and securing funding for these investments that mitigates the financial impact on our agency are necessary to ensure ongoing implementation and proper operation and maintenance of sustainability-related projects under a comprehensive continual improvement process in an EMS framework.

## DISCUSSION

As a public transportation agency, Metro is, at its core, a sustainability asset. Specifically throughout the last ten years, Metro's longstanding commitment to improving operational efficiency and reducing the financial and environmental impact of its operations has also yielded an extensive inventory of assets that must be both maintained and kept in a state of good repair. However, along with other public transportation agencies throughout the country, Metro also faces the challenge of simultaneously addressing:

- Aging infrastructure and deferred maintenance;
- Decreasing operational budgets;
- Expanding system resource demands; and
- Increasing regulations.

Metro's environmental program and organizational sustainability initiatives have operated under an ISO 14001-certified EMS framework and benefited from a comprehensive process of evaluating and implementing value-creating and cost-saving projects. Within this framework, staff at all levels of the organization in any Metro business unit are able to collaboratively provide input for the implementation of innovative ideas that reduce overall Metro environmental impacts from its operations while simultaneously enhancing the safety of our existing and future system. In the past six years since the FTA's technical assistance to establish EMS here at Metro, staff was able to identify and address many of the long-term operational environmental and safety issues through sustainability-related capital improvements and projects. If not for these efforts, many repeatedly identified issues would not have been solved due primarily to the lack of available funding that can be programmed for the forthcoming fiscal year.

Metro's structural deficit is real and implementing cost-saving measures to create greater operational and infrastructural value will further reduce costs to operate the current and future expansion of our system. Identification of a number of resource efficiency and cost saving measures in the past few years through studies, pilots, and audits has enhanced the robustness of our sustainability efforts. We are now able to implement many of these projects initially as pilots, and once proven to be of significant benefit and feasible for agency-wide implementation are rolled out agency-wide into

existing facilities and into new major construction or part of capital improvement projects.

Metro sustainability-related infrastructure includes investments that are made in Metro's facilities, technologies, fleet, people, and processes that:

- directly contribute to the reduction in resource usage beyond an established baseline for electricity, natural gas, other non-renewable fuels, water, hazardous substances, or
- directly reduce greenhouse gas emissions (GHGs), other air emissions, wastewater, solid waste, other environmental impacts, or
- directly increase operational efficiency, staff productivity and well-being, and customer satisfaction beyond standard operations, while maintaining safety and system reliability.

Given the breadth of Metro's sustainability activities in all facets of the organization, we establish boundaries of this definition (for the purposes of the use of available future self-funding mechanisms) to include direct impacts from a capital program, like reduced energy and water usage in operations, and leave out the numerous indirect benefits associated with operating a public transit system.

Metro's list of sustainability-related assets includes, for example, the construction of energy efficient buildings, generation of approximately two megawatts of renewable energy through solar photovoltaic systems, energy recovery and materials recycling projects, water and water-reuse conservation projects (including those that recycle carwash water and store or re-use storm water), and recycling of construction and demolition debris (such as the use of recycled concrete from the I-405 demolition for use as sub-base in the Metro Orange Line Extension). These efforts have reduced energy and resource use, generated operational cost savings, created productive work spaces, and reduced the environmental impacts of Metro's construction and operations. Utility partners have also paid Metro cash incentives to buy down the cost and enhance the region's resource efficiency. Staff continues to explore new and innovative technologies to improve the agency's environmental performance and reduce costs.

Metro contributes to the sustainability of the Los Angeles region by improving air quality, reducing congestion, and providing mobility. In the past few years, the agency has fully developed existing sustainability-related infrastructure that has and continues to generate significant value and cost-savings to our overall operations. Investment in projects that actually reduce operational costs is critical and very important as Metro phases in the forthcoming operation of Measure R projects. Funding for any planned sustainability and sustainability-related projects is approved on an annual basis.

Reporting of our progress in these projects is provided through the annual Sustainability/Energy and Resource Report as well as through the Annual Energy Management Program update. Metro measures itself against metrics that have been developed through the American Public Transportation Association (APTA)

Recommended Practice process. Metro is the first and currently only Platinum Level APTA Sustainability Commitment Recognition awardee in the whole nation. This serves as testament to our excellence in environmental stewardship.

All capital projects are now also required to develop and implement a Sustainability Plan with required reporting to advise Metro of the project's adherence to Metro adopted policies. Such reporting encourages the development and implementation of innovative ideas and tasks within any size construction project; and ensures the steady progression towards the completion of these projects in the most cost-effective way.

The Office of Management and Budget manages Metro's annual capital program to successfully meet the needs of Metro's operations. Staff has conformed to these guidelines in the implementation of sustainability capital projects. Metro's EMS framework provides for a mechanism to regularly monitor and report sustainability infrastructure performance in addition to the identification and implementation of future opportunities. The recently concluded sustainability-related infrastructure assessment identified lower than expected performance from several key sustainability assets such as Metro's solar photovoltaic (PV) systems.

Sustainability-related infrastructure can and will increasingly directly affect operations in ways that may be outside standard operating procedures. New sustainability assets are likely to involve greater technology sophistication and alternative systems and processes. To maximize their benefits, there is a need to ensure that proper maintenance requirements of these assets are also instituted. Metro's solar PV systems represent a primary example of this challenge.

Solar PV systems require a specific set of maintenance procedures to operate properly. Until recently, Metro made limited provisions to provide staff with the appropriate training in this area because the cost and responsibility to do so has not been properly planned and assigned. Metro currently has installed solar PV systems at five locations, with a sixth location at Division 13. Historically, the project costs of all new solar PV systems, with the exception of the Central Maintenance Facility (CMF), only accounted for the upfront cost of construction. The project costs did not allocate funds for future operations and maintenance that falls outside of the standard operations for this new technology.

By way of comparison, the solar PV project at CMF included a Full-Time Equivalent to maintain the system. This system has never underperformed its projected electric generation targets; and is a successful model for Metro's ability to properly maintain this valuable asset.

As sustainability-related investments often bring new technologies and innovative process improvements into the Metro system, staff is proactively addressing the challenges associated with the current maintenance of solar PV systems so future sustainability infrastructure does not suffer similar challenges.

Based on the recently concluded assessment, we observed that more collaborative and detailed upfront project development can allow for proper troubleshooting of issues and execution of preventative maintenance practices. Requiring the incorporation of anticipated future costs and development of skill sets into the project life-cycle is an important first step in mitigating these challenges. Evaluation of these future costs and requirements must occur in close coordination with the division and system-level managers and staff responsible for the future asset maintenance. Metro's EMS framework provides a clear foundation from which to further improve the ongoing maintenance of these valuable assets.

The plan to fulfill this goal is provided as Attachment B. This plan further provides for the opportunity to reinvest resource cost savings in the expanding sustainability-related infrastructure across Metro's system. The plan identifies the combination of cost-savings, utility allowances and incentives, and any interest earned from the investment of these funds with the proceeds of Metro's Low Carbon Fuel Standard credit sales into the Green Fund to support both the implementation of sustainability assets and ongoing activities related to these assets. In other words, the combined funds will be restricted for use in the funding of the implementation and operations and maintenance of sustainability-related capital construction/installation projects deployed on any Metro-controlled sites.

These projects would include, but are not limited to:

- energy conservation and energy efficiency projects,
- renewable energy installation/construction and their operation and maintenance,
- resource management initiatives (e.g., water, air, storm water, industrial wastewater impact and cost-reduction; including waste to energy projects such as those derived for example from non-hazardous/non-human biowaste), and
- any other related cost-saving and process efficiency generating activities that result in carbon footprint reductions and are operated and maintained within a Metro facility.

These assets include those that can be implemented and maintained agency-wide and have already been proven through related pilot projects. These are new, innovative, cost-saving, and environmentally friendly and financially sustainable technologies that are pre-determined to be applicable to Metro's operations; but have not been fully integrated agency-wide.

Cost savings reinvestment is a new approach for Metro. This approach will establish an internal accounting process for identifying and re-allocating savings resulting from sustainability-related infrastructure projects. This accounting model for reinvesting resource savings has many different structures. However, staff proposes to implement a Return on Investment (ROI) model wherein the Green Fund accrues the cost-savings on an annual basis up until the project has reached its simple payback.

## DETERMINATION OF SAFETY IMPACT

This Board action will not have an impact on safety standards for Metro. The execution of the proposed action will assist in increased safety as new and existing sustainability-related infrastructure will require an integrated operations and maintenance element to maximize use and benefit throughout the life cycle of the asset.

## FINANCIAL IMPACT

The initial funding for this project are included in the FY15 budget under Project Number 450004 – Carbon Emissions and Greenhouse, Cost Center 8420 Environmental Compliance and Services, Account 50316 Professional And Technical Services. The initial funding provided under Project Number 450004 will be reimbursed once program funds, as described below, are generated and available. Since this is a multi-year project, the cost center manager and Executive Director, Engineering & Construction will be responsible for budgeting in future fiscal years.

### Impact to Budget

There will be no net impact to Bus and Rail Operating Budgets. The initial source of funds for this project is the General Fund which can be used to fund Bus and Rail Operations. The quantification of the amount of savings to be allocated on an annual basis will be predetermined and approved prior to installation or construction of the sustainability-related infrastructure. The verification of the magnitude of an asset's projected savings will be monitored throughout the life-cycle of the project until such time that the asset's full value is achieved by the cost-savings.

Thereafter, the program funds can be designated as self-funded utilizing the combination of other project cost-savings in an amount up to the pre-determined and approved costs associated with implementing sustainability-related infrastructure projects, ongoing operations and maintenance cost for the life of the asset, and cost for periodic measurement and verification of the asset; utility allowances and incentives; any interest earned from the investment of these funds; and combined with the proceeds of Metro's LCFS credits sales to support both the implementation of sustainability assets and ongoing activities related to these assets.

As sustainability-related infrastructure projects are identified, criteria identified under the Sustainability Infrastructure Financial and Operations Implementation and Management Plan (Attachment B) will be used to initially identify classification of the project as a potential sustainability-related infrastructure. Thereafter, Metro's capital selection processes will be used to initiate and request utilization of the modified Green Fund for this purpose. A portion of operations and maintenance costs for existing sustainability related infrastructure installations such as green buildings, renewable energy, and energy efficiency projects can also be drawn from these funds to maintain the infrastructures in a state of good repair.

For example, the cost savings realized from the implementation of the sustainability-related infrastructure assets will be allocated to the Green Fund up to the dollar amount needed for project implementation, ongoing operation and maintenance (O&M), and other related costs. In the example below, the Funding Requirements - Sample Project section identifies the project costs, estimated ongoing O&M and measurement and verification (M&V) costs while the Funding Source section identifies potential funding sources, which adds up to the cost of the project. The total cost of the project (installation, O&M, and M&V) will equal the amount to be recovered from the cost savings. All of the cost estimates in the example below account for the time value of money in the calculation.

| Funding Requirements - Sample Project | Lighting Retrofit at Division X | |
|---|---|---|
| Project First Costs | $225,000 | one-time |
| Ongoing O&M Costs | $500 | annual |
| M&V Costs | $1,000 | every 4 years |
| Expected Useful Life | 20 | Years |
| ***Total Life Project Cost (nominal)*** | ***$240,000*** | |
| ***Funding Sources*** | | |
| OMB FY16 Capital Program | $175,000 | one-time |
| Green Fund | $50,000 | one-time |
| Green Fund | $10,000 | $500/yr x 20 yrs |
| Alternative Financing Mechanism | $500 | utility incentive |
| ***Total Funding Identified*** | ***$240,000*** | |

## ALTERNATIVES CONSIDERED

If the Board chooses not to approve the sustainability infrastructure financial and operations plan and the re-investment of related cost-savings to the implementation and operations and maintenance of the sustainability-related infrastructure project, the agency will effectively continue with the status quo. That is, sustainability-related infrastructure will continually be completed to fulfill the requirements and objectives of Metro Board policies on environment and sustainability. However, full benefits of these investments will be limited given the lack of integrated and consistent process and funding to maintain and operate the infrastructure throughout its life-cycle.

Not combining cost-savings, utility allowances and incentives, and any interest earned from the investment of these funds with the proceeds of Metro's LCFS credits sales will introduce a pronounced vulnerability of a self-funding mechanism to operate and maintain sustainability-related infrastructure over asset life-cycle.

## NEXT STEPS

After Board approval of this action, staff will implement the sustainability infrastructure financial and operations plan using identified current and potential resources.

## ATTACHMENTS

A. 2014 Metro Sustainability-Related Infrastructure Assessment
B. Metro Sustainability Infrastructure Implementation and Operational Plan

Prepared by: Cris B. Liban, DEO, Environmental Compliance and Services, (213) 922-2471

Bryan Pennington
Executive Director, Engineering & Construction

Arthur T. Leahy
Chief Executive Officer

**ATTACHMENT A**
**2014 Metro Sustainability-Related Infrastructure Assessment**

# 2014 Metro Sustainability-Related Infrastructure Assessment

## Executive Summary

The February 27, 2014 Los Angeles County Metropolitan Transportation Authority's (Metro) Board motion on Metro's "Sustainability-Related Infrastructure, Operations and Maintenance" directed staff to perform an assessment of the operation and maintenance of Metro's current sustainability-related infrastructure, and requested the development of long-term financial and operational and comprehensive implementation plans for sustainability-related infrastructure.

The comprehensive sustainability-related infrastructure at Metro consists of individual sustainability assets that Metro has installed and implemented to meet environmental, energy, and sustainability goals and objectives. For the purpose of this assessment report, and for future Metro planning, implementation, and ongoing operations and maintenance procedures, the term ***sustainability-related assets*** are defined as follows:

> Investments made in facilities, technologies, fleet, people, and processes that:
>
> 1) *directly contribute to the reduction in resource usage beyond an established baseline for: electricity, natural gas, other non-renewable fuels, water, hazardous substances, or*
> 2) *directly reduce greenhouse gas emissions (GHGs), other air emissions, wastewater, solid waste, other environmental impacts, or*
> 3) *directly increase operational efficiency, staff productivity and well-being, and customer satisfaction beyond standard operations, while maintaining safety and system reliability.*

The term ***sustainability-related assets*** is intended to include only those investments made or actions taken by Metro to meet internal operational and policy objectives and goals and where Metro operates and oversees the maintenance of the asset over its useful life.

Assessment of sustainability-related assets, as defined above, will occur within the context of Metro's agency-wide mission, vision, and Environmental Policy to operate an efficient transit system by reducing, re-using and recycling all internal resources while reducing greenhouse gas emissions.[1]

This sustainability-related infrastructure assessment of existing and under-construction projects intends to support future activities and decision-making related to internal investments in sustainability-related assets. Metro recognizes that external

[1] http://www.metro.net/about/agency/mission/

sustainability objectives and projects, such as those addressed under the Countywide Sustainability Planning Policy, are vitally important in the development of a strategic sustainability program. Ongoing coordination between the Environmental Compliances and Services Department (ECSD) and Countywide Planning will continue to take place in support of those goals.

The foundation of Metro's sustainability commitment began with the Board's adoption of the 2007 Energy and Sustainability Policy. In 2008, the Board adopted the Metro Sustainability Implementation Plan to further prioritize project planning and funding. In the years since, Metro has adopted several more policies, plans, and initiatives that support investments in new sustainability infrastructure. These guiding documents lay the framework for strategic sustainability planning and investment across Metro. The management framework for the implementation of Metro's Environmental Policies is structured according to ISO 14001 Environmental Management System (EMS) standards. This assessment has incorporated the resulting projects from each guiding document wherever feasible. Key sustainability guiding documents for Metro include:

- Construction and Demolition Debris Recycling and Reuse Policy
- Energy and Sustainability Policy
- Renewable Energy Policy
- Environmental Policy
- Environmental Liabilities Assessment and Reporting
- Green Construction Policy
- Water Use and Conservation Policy
- Countywide Sustainability Planning Policy.

This report builds upon the foundation laid through the adoption of these policies and plans. In response to the requirements of the February 27, 2014 Board motion, this report includes the following components:

- Inventory of Metro's current sustainability assets
- Assessment of current asset operations and maintenance
- Calculated project level cost benefit analysis from current sustainability assets
- List of potential future sustainability-related projects.

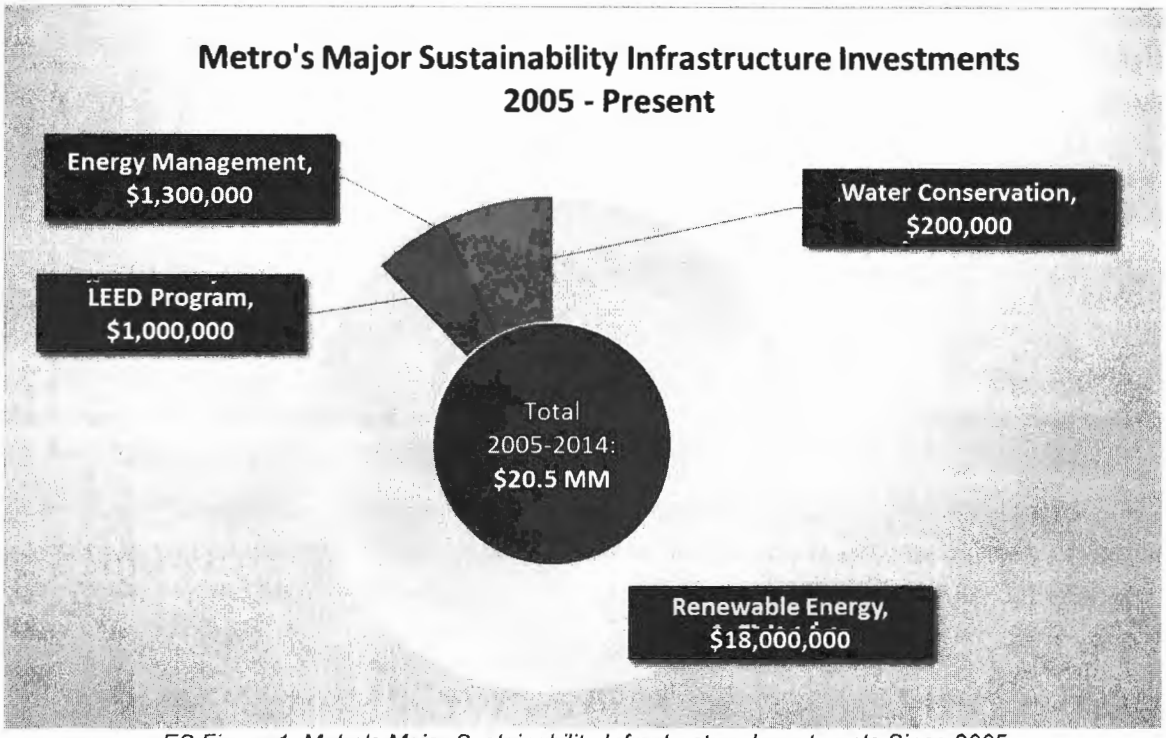
Attachment B: Sustainability Infrastructure Implementation and Operational Plan, describes the structure and process for future planning, development, implementation, and maintenance of sustainability assets, and details a long-term financial management approach for current and future sustainability-related assets.

**Summary of Findings**

This 2014 assessment report on Metro's sustainability-related infrastructure examined four major program areas managed through the ECSD and in conjunction Metro's agency-wide EMS. These include:

- **Renewable Energy Program** – Includes projects that contribute to meeting Metro's Renewable Energy Policy Goals and includes the planning, deployment and management of renewable energy technologies. Renewable energy technologies reduce Metro's electricity purchasing costs.
- **Energy Management Program** – Includes projects that contribute toward meeting Metro's Energy and Sustainability Policy goals. This program area targets projects that reduce the cost and consumption of fuel and power required to carry out core Metro operations.
- **Leadership in Energy and Environmental Design (LEED™) Program** – Includes projects that contribute to meeting the Energy and Sustainability Policy requirement to achieve U.S. Green Building Council's LEED Silver Certification or better for Metro facilities. Projects implemented in this program area are designed to achieve LEED Certification for existing and new facilities. LEED Certified Green Buildings operate efficiently and can result in both energy and water usage reduction with resultant cost savings.
- **Water Conservation Program** – Includes projects that contribute toward meeting Metro's Water Use and Conservation Policy. These projects support the implementation of the Water Action Plan and other projects intended to reduce water use resulting in lower water costs.

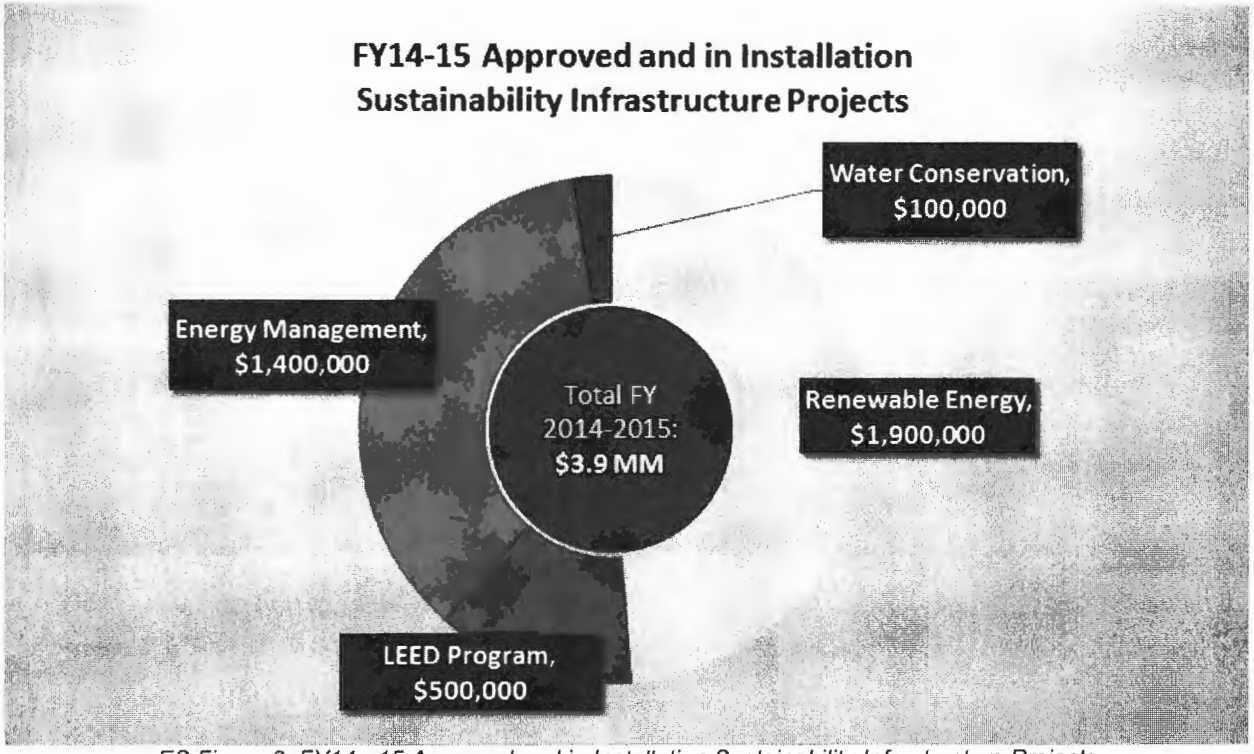
Within each of these programs, Metro has made targeted and strategic investments in sustainability-related assets (projects) that collectively represent the current sustainability-related infrastructure. Metro's investments in sustainability-related assets predates formal adoption of Environmental Policies and shows the long term interest and commitment of executive leadership and staff to develop a sustainable transit system. Since the first solar PV system installation in 2005, investments in these four program areas have increased to meet Metro's sustainability policy objectives, while at the same time providing long-term financial returns. ES Figure 1 shows the over $20 million in major sustainability investments Metro has made since 2005 by program area. Metro's utility partners have supported the adoption of renewable energy and energy efficiency by offering incentives to buy down the cost of the projects. The projects below received a total of $6.5 million (about 33% of original capital costs) in utility incentive funding lowering the net costs to $13.5 million.




*ES Figure 1: Metro's Major Sustainability Infrastructure Investments Since 2005*

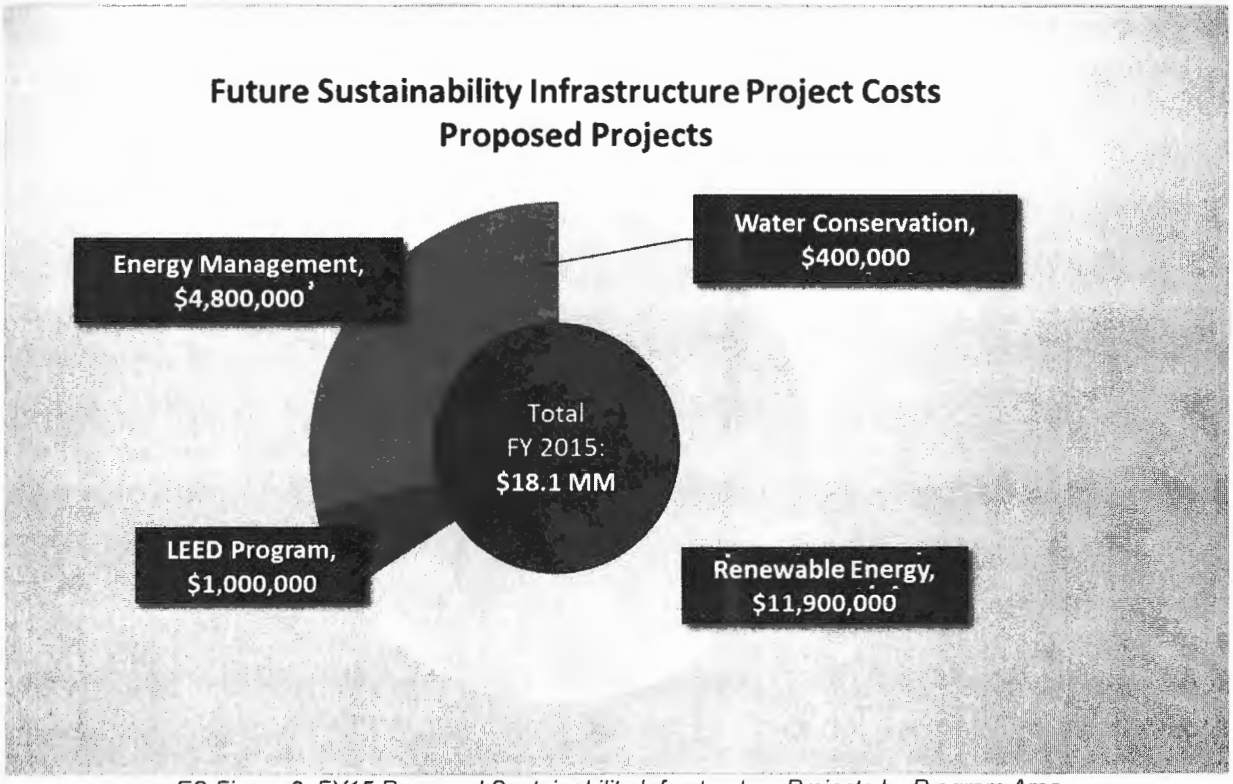
Historically, the costs of the Renewable Energy Program's solar PV systems far exceeded the expenditures in other program areas. In the current fiscal year, the planned expenditures by program area are more diversified across program areas indicating a shift toward cost saving projects such as energy efficiency.

As of August 2014, an additional $3.9 million of sustainability-related projects are under construction or approved as shown by program area in ES Figure 2. The largest investments within the approved and under construction portfolio are in energy efficiency projects which yield immediate resource cost savings and the installation of a solar PV system at Division 13 which yields avoided electricity purchases. Metro has reserved over $450,000 of utility incentives for the in-progress projects in ES Figure 2. These incentives decrease the total project implementation costs by nearly 12% to just under $3.5 million.




*ES Figure 2: FY14 - 15 Approved and in Installation Sustainability Infrastructure Projects*

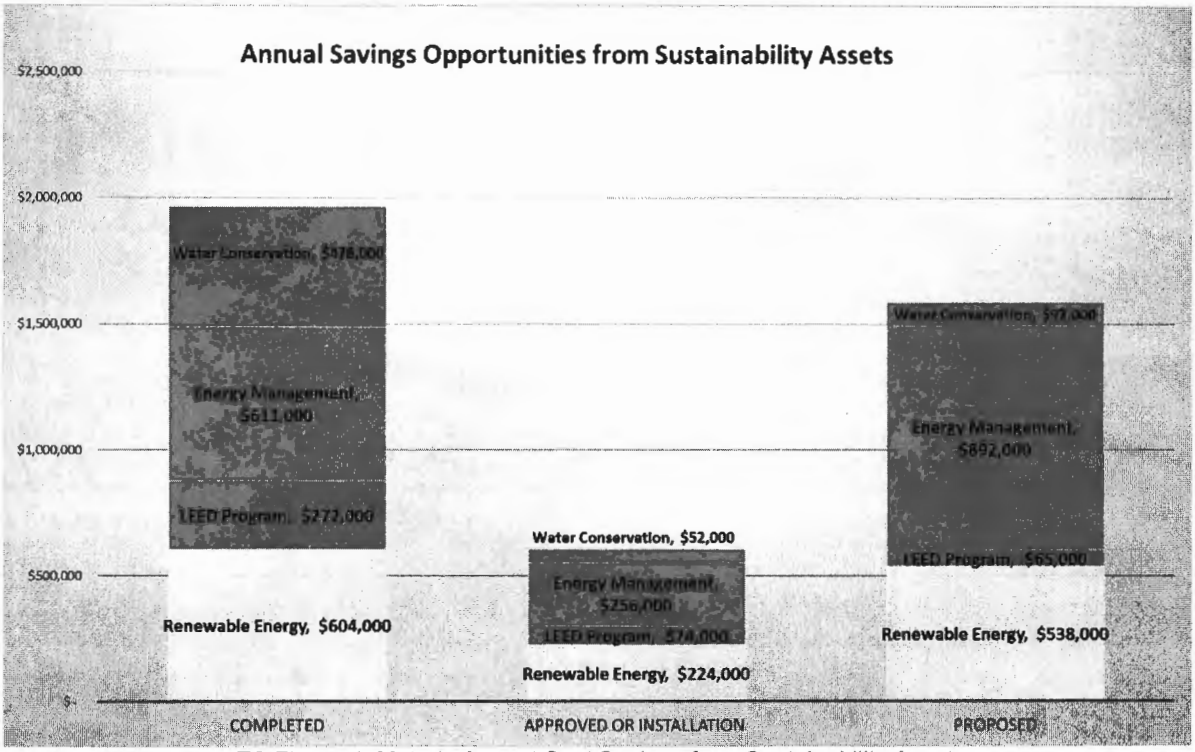
Metro has a robust pipeline of potential future sustainability projects with over $18 million of proposed projects. The projects are awaiting evaluation, approval and funding and are shown by program area in ES Figure 3. Metro has identified external grants and utility incentives to directly reduce the implementation costs of these resource-saving projects and minimize budget impacts across Metro operations. Metro's utility service providers have already authorized nearly $7 million of incentives to support the installation of all proposed projects. In addition, ECSD staff is actively pursuing alternative financing mechanisms to avoid capital expenditures by Metro and take advantage of public-private partnerships.




*ES Figure 3: FY15 Proposed Sustainability Infrastructure Projects by Program Area*

Many of the investments in sustainability assets provide direct costs savings to Metro through the reduced use of energy and water resources, which Metro would otherwise pay for in utility bills. Additionally, once installed, some assets can directly reduce air pollution and greenhouse gas emissions that may fall under tighter State and Regional regulation compliance requirements in the future. LEED Certification of Metro facilities contributes to cost savings through automation of data collection, reducing administrative burdens and enhancing the operability of HVAC systems through Retro-Commissioning processes. Many other benefits such as increased recycling, increasing supply of fresh outdoor air and natural daylighting all produce healthy and more productive work environments.

Metro realizes approximately $2 million in current annual cost savings from existing sustainability-related assets. ES Figure 4 shows these savings by program area. The savings estimates from approved and current installation projects bring the annual savings estimates to $2.6 million. Metro has identified an additional annual resource cost savings opportunity of $1.6 million from the currently proposed projects.




*ES Figure 4: Metro's Annual Cost Savings from Sustainability Assets*

With a growing and well-maintained sustainability-related infrastructure, the annual aggregate cost savings directly reduces the impact of the upfront investments in future sustainability-related assets. Consideration of green attributes and progress towards meeting sustainability policy objectives further augments the value of these real and measureable cost efficiencies. As the sustainability-related infrastructure is not static, the savings estimates can vary with the varied expected useful life of assets within the portfolio. Maintaining and managing these resources is critical to capturing the long-term savings opportunities from these investments.

By their very nature, sustainability-related assets tend to include technology-based and innovative approaches, which can differ from standard operating procedures. As part of this comprehensive assessment of Metro's sustainability-related infrastructure, staff evaluated the current process of funding, management, and training required to maintain sustainability assets in a state of good repair. The analysis identified key opportunities to update the current processes, such as staff training and a preventative maintenance program that will result in the appropriate resources and skills development for the successful management of current and new sustainability assets. The recent rollout of Metro's EMS with a defined process of continual improvement will provide the foundation on which to build a successful management and oversight approach to ongoing operation and maintenance of these assets. The EMS framework brings together relevant stakeholders to execute the new process and provide oversight into the future.

Attachment B: Metro Sustainability Infrastructure Implementation and Operational Plan, includes a transparent sustainability infrastructure investment plan and an operations

process to effectively manage these unique resources in order to allow Metro to realize their long-term cost and resource savings benefits.

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## Introduction

In response to Sections 2a and 2b of Metro Board Motion 57, carried by the Board on February 27, 2014, this report provides an assessment of the sustainability-related infrastructure currently installed and under-construction at Metro. The Board approved Item 48 in May 2014 and represents the formal response to Sections 1a and 1b of Board Motion 57. This document (as well as that of Attachment B) provides the requested additional insight into the maintenance and operations of the existing sustainability-related assets at Metro and to establish implementation and operational plans for investing and managing future sustainability assets.

This document outlines the results of an evaluation that complements the annual agency-wide review of sustainability metrics "Moving Towards Sustainability". It is intended to evaluate the specific infrastructure investment in projects that result in the creation of "sustainability-related assets" rather than the system aggregate sustainability performance.[2]

Given the inherent inclusiveness of the term sustainability, it is important to identify what infrastructure at Metro would qualify as a sustainability-related asset versus a non-sustainability-related asset (e.g., code compliance vs high efficiency). In order to make this determination, and to distinguish scope of this assessment, the term ***sustainability-related asset*** is defined as follows:

> *Investments made in facilities, technologies, fleet, people, and processes that:*
>
> *1) directly contribute to the reduction in resource usage beyond an established baseline for: electricity, natural gas, other non-renewable fuels, water, hazardous substances, or*
>
> *2) directly reduce greenhouse gas emissions (GHGs), other air emissions, wastewater, solid waste, other environmental impacts, or*
>
> *3) directly increase operational efficiency, staff productivity and well-being, and customer satisfaction beyond standard operations, while maintaining safety and system reliability.*

With this definition, the individual sustainability-related asset investments that have been approved and implemented within existing Metro operations to meet Metro's environmental, energy and sustainability goals and objectives, collectively comprise Metro's comprehensive sustainability-related infrastructure.

## Building a Sustainable Infrastructure at Metro

As a public transportation agency, Metro, is, at its core, a sustainability asset. However, Metro's longstanding commitment to improving operational efficiency and reducing the

[2] http://media.metro.net/projects_studies/sustainability/images/Sustainability_Report_2013.pdf

impact of its operations on the environment has already yielded an extensive infrastructure of assets that reduce costs and increase environmental performance.

Along with public transportation agencies throughout the country, Metro faces the challenge of simultaneously addressing:

- Aging infrastructure and deferred maintenance;
- Decreasing operational budgets;
- Expanding system resource demands; and
- Increasing regulations.

In 2010, U.S. transit agencies spent $16.6 billion on capital investments, of which Federal funding represented only 26.6 percent, with a one-time Federal American Recovery and Reinvestment Act making up another 14.5 percent of the total.[3] As a result, passenger fares and other State and local sources must cover nearly 60 percent of the funding for system preservation and expansion capital projects. [4] Investment in sustainability-related assets offers one potential avenue to achieve both improved performance and significant cost savings over the life of the asset. *However, this only occurs when these assets receive proper maintenance and operate in a state of good repair, ensuring that the investment will reap the full lifecycle benefits.*

This report provides a comprehensive inventory and assessment of Metro's sustainability-related infrastructure. The results will serve as a baseline from which to enhance existing processes, or establish new processes to maintain and effectively manage these valuable resources going forward. To this end, Attachment B: Sustainability Infrastructure Implementation and Operational Plan contains a process and funding mechanism to support the ongoing development and management of Metro's Sustainability Program assets.

This assessment is limited to an internal examination of those investments made under the direct influence or management of Metro's resources. These assets largely resulted from investment decisions aimed at achieving internal sustainability, energy, and environmental policy objectives. At this time, this assessment does not extend to the large scale expansion of the Metro system, Metro Countywide Planning Policy Implementation activities, or wider collaborative efforts that Metro has made with community and partner stakeholders; nor to projects funded by Metro but have not been operated by the agency.

**Metro's Road to Sustainability**

The current sustainability initiatives at Metro are a result of years of efforts, which primarily stem from two parts of the agency: the Environmental Compliance and Services Department (ECSD) and the Countywide Sustainability Planning (CSP). With

[3] http://www.fhwa.dot.gov/policy/2013cpr/es.htm
[4] http://www.fhwa.dot.gov/policy/2013cpr/es.htm

complementary approaches, both ECSD and CSP are working to achieve Metro's Vision and Mission for Sustainability, adopted in 2008[5]:

> **Vision**: *We will be the leader in maximizing sustainability efforts and its benefits to Los Angeles County's people, finances, and environment.*
> **Mission**: *We will provide leadership in sustainability within the Los Angeles region without compromising our core mission of moving people efficiency and effectively.*

As *Figure 1* illustrates, CSP focuses on the long-range sustainability planning and the necessary external community engagement to achieve large scale and longer term goals. ECSD focuses on the development of sustainability opportunities within Metro's day-to-day operations. ECSD's efforts in evaluating and either directly implementing, or facilitating the implementation of sustainability investments, occur in accordance with multiple core department responsibilities, which include:

- Resource management (air quality, water, energy and waste)
- Climate response (mitigation, adaptation, and resiliency)
- Environmental management (Environmental Management System (EMS), green building, training, storm water and industrial wastewater, and site remediation)




*Figure 1: Metro's Sustainability Program Components*

Metro's existing sustainability infrastructure was constructed through the work and management of the Engineering & Construction Division. The development of future assets and their ongoing management are now being fully integrated into the EMS framework and includes input and feedback from across the organization.

[5] Metro Sustainability Implementation Plan, June 17, 2008
http://media.metro.net/about_us/sustainability/images/Sustainability.pdf

Since 2010, Metro has been comprehensively assessing its overall path to sustainability in the annual *Moving Towards Sustainability* and *Energy and Resource Report*, and uses APTA recommended metrics to monitor performance year-over-year.

This 2014 sustainability asset assessment report builds on this effort by providing a targeted analysis into the specific investments made toward meeting Metro's sustainability objectives for those projects that qualify as sustainability assets. The goals of this assessment are to:

1) Compile a comprehensive inventory of existing sustainability assets,
2) Evaluate the current approach to managing the operation and maintenance of current assets, and
3) Present opportunities for expanding Metro's existing sustainability infrastructure.

The result of this assessment informed the development of Attachment B: Sustainability Infrastructure Implementation and Operational Plan, which aims to improve visibility, funding management, and ongoing management of future implementation efforts.

**The Sustainability-Related Asset**

This assessment is a detailed review of the operating status and the existing processes for maintaining sustainability related infrastructure. Going forward, ECSD is recommending an annual review of sustainability-related assets, as detailed in Attachment B: Metro Sustainability Infrastructure Implementation and Operational Plan.

A Metro sustainability-related asset is defined for this assessment to allow for a clear determination of which investments qualify for inclusion in this assessment, and which investments are part of standard Metro operations. Given the breadth of potential sustainability activities, it is useful to establish boundaries that only include "direct" impacts, such as reduced energy and water usage in operations, and leave out the numerous indirect benefits associated with operating a public transit system.

There are several different types of assets that can fall under the above definition.

Table 1 provides the definitions for the three asset types in this assessment that categorize Metro's investments. Distinguishing between these definitions recognizes that there is considerable variety in sustainability-related asset types. No single solution or approach will, on its own, work for implementing and maintaining future assets. Categorizing asset types in this way affords a better understanding of how sustainability-related investments are improving the existing Metro facility infrastructure and processes.

*Table 1: Asset Type Definition*

| Asset Type | Definition | Example |
|---|---|---|
| *New Asset* | Equipment added to a Metro facility or a new process that was not there previously | Solar PV system, reclaimed water system connection, wayside energy storage system |
| *Process Improvement* | Project that improves efficiency/sustainability of an existing process. Can be asset-based or administrative. May change the O&M requirements for existing process. | Air dryer redesign, Domestic Hot Water energy recovery, Heating Ventilation and Air Conditioning (HVAC) redesign, water reclamation |
| *Existing Asset Replacement* | Project that replaces existing equipment with a more sustainable option | Boiler replacement, HVAC replacement, lighting retrofit |

Historically, investments in the Renewable Energy Program area have resulted in new assets for Metro, whereas the Water Conservation and Energy Management Programs have typically led to process improvements resulting resource cost savings. Replacement projects, while not considered new assets for Metro, upgrade the current infrastructure with an asset that operates more efficiently to reduce resource usage.

## Current Sustainability-Related Infrastructure

This section provides results for the assessment of current sustainability infrastructure including assets installed or under construction, and follows this order:

- Overview of Metro's major sustainability assets that make up the current infrastructure
- Description of the current asset management approach
- Estimation of the cost and resource savings attributable to these assets .

Figure 2 shows the four major program areas that ECSD is managing to support the development of Metro's sustainability infrastructure.

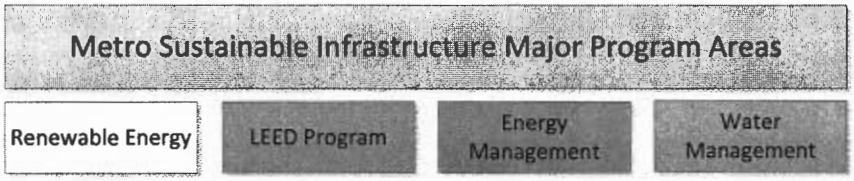



*Figure 2: Sustainable Infrastructure Program Areas*

Metro's investments in each of these program areas support existing policy goals and objectives as follows:

*Table 2: Metro Sustainability Program Areas*

| | |
|---|---|
| **Renewable Energy** | Currently consists of only solar photovoltaic systems, but would include any future wind or other renewable energy investments. This program area supports Metro's Renewable Energy Policy goals. |
| **LEED Program** | Includes all investments made to achieve certification of Metro facilities under the U.S. Green Building Council's LEED green building program. This program area supports Metro's Energy and Sustainability Policy goals. |
| **Energy Management** | Includes energy efficiency and conservation measures and process improvement projects to reduce energy use at Metro facilities. This program area represents Metro's implementation of the Energy Conservation and Management Plan and supports the Energy and Sustainability Policy goals. |
| **Water Conservation** | Includes all investments made to reduce and recycle water used in operations. This program area supports Metro's Water Use and Conservation Board policy goals. |

Since the first solar PV system installation in 2005, Metro has invested over $20 million in additional sustainability-related projects. The investments in solar panels, facilities upgrades, green building certifications, and water conservation collectively make up the existing sustainability infrastructure at Metro. Figure 3 shows the breakdown of major

investments in sustainability assets since 2005 by program area. With an early focus on solar PV, the large solar investments dwarfed the other program area investments, representing nearly 90 percent of expenditures to date. Metro expects that future expenditures and associated resource cost savings for the sustainability-related infrastructure will achieve more balance across the program areas.

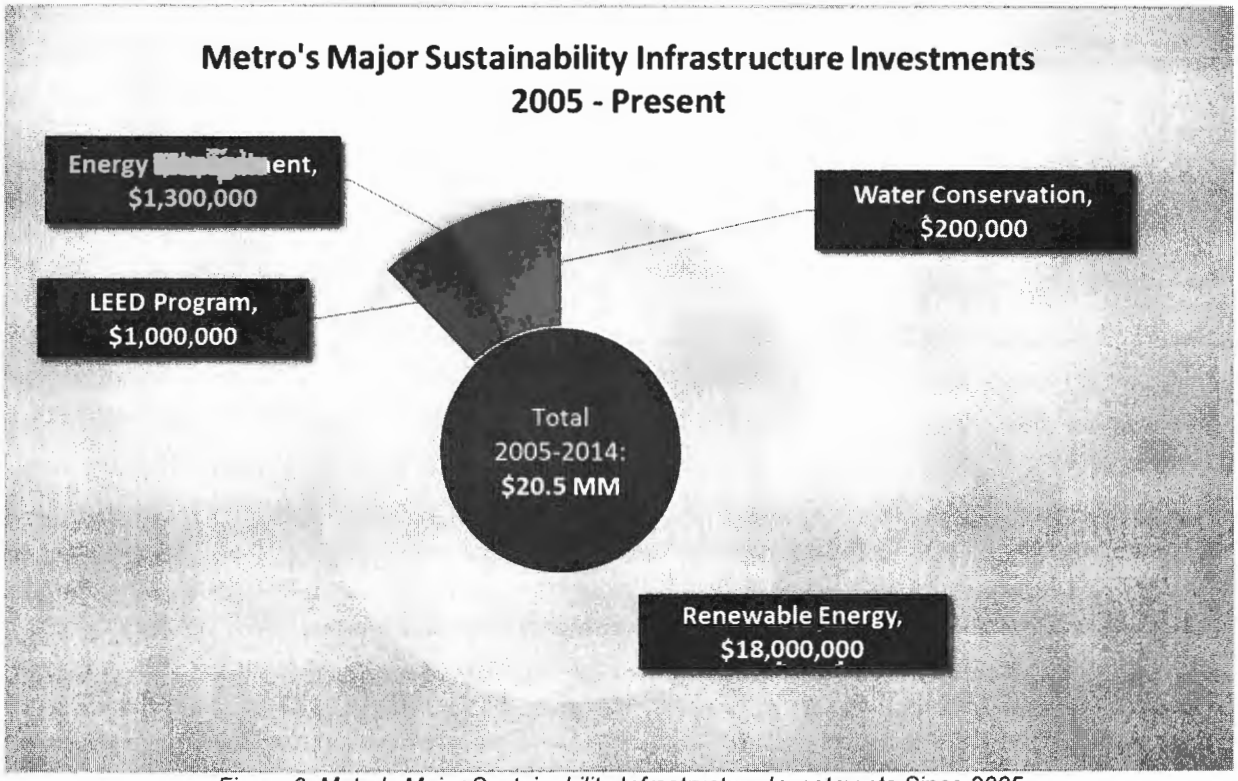



*Figure 3: Metro's Major Sustainability Infrastructure Investments Since 2005*

## Current Sustainability-Related Asset Inventory

Table 3 through Table 6 list Metro's current sustainability-related infrastructure assets by program area. Current sustainability-related assets are those investment projects that are either in the installation phase or completed and operational. Projects listed as "approved" have been funded and approved but have not begun installation. Any projects still in the proposed or design phase are listed as potential future sustainability-related assets.

*Table 3: Renewable Energy Assets Completed, Under Construction and Planned*

| Renewable Energy Assets | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| Solar PV Project | Division 08 | Completed |
| Solar PV Project | Division 15 | Completed |
| Solar PV Project | Division 18 | Completed |
| Solar PV Project | Location 30 | Completed |

| Renewable Energy Assets (continued) | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| Solar PV Project | Terminal 19 | Completed |
| Solar PV Project | Division 13 | Installation |
| Wayside Energy Storage | Gold Line | Installation |
| Wayside Energy Storage | Red Line | Installation |

Investments in solar photovoltaics (PV) come at a high price, but provide directly attributable and measureable avoided costs and provide long-term value to Metro. As energy prices increase the yearly benefits increase and provide a strategy for hedging price volatility. Additionally, solar PV is a major infrastructure asset that can receive support from a variety of finance mechanisms, including direct ownership and power-purchase agreements, which have the potential to result in resource cost saving benefits while minimizing the impact Metro's capital budgets. The systems currently in place or under construction represent an important and highly visible opportunity for Metro to meet its sustainability objectives. Collectively, the installed systems are contributing $604,000 in yearly cost savings. The ECSD team is actively evaluating future opportunities to incorporate more advanced systems to expand solar PV as a mechanism for achieving the Renewable Energy Policy goals within Metro's operations.

*Table 4: LEED Program Assets Completed, Under Construction and Planned*

| LEED Program Assets | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| LEED-New Construction (NC) Certification – Maintenance Annex | Division 03 | Completed |
| LEED-NC Certification – Maintenance Building Renovation | Division 03 | Completed |
| Sub-metering system | Division 07 | Completed |
| Sub-metering system | Division 08 | Completed |
| Sub-metering system | Division 09 | Completed |
| LEED-NC Certification – Transportation Building | Division 09 | Completed |
| LEED-Existing Building Operation & Maintenance (EBOM) Certification – Division-wide | Division 10 | Completed |
| Sub-metering system | Division 10 | Completed |
| Sub-metering system | Division 15 | Completed |
| Sub-metering system | Division 20 | Completed |
| LEED-NC Certification – Bauchet St. Warehouse | Division 30 | Completed |
| Sub-metering system | Division 30 | Completed |
| Sub-metering system | Location 61 | Completed |
| Sub-metering system | Location 99 | Completed |
| LEED-EBOM Certification – Gateway Building | Location 99 | Completed |

| LEED Program Assets (continued) | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| LEED-NC Certification – El Monte Terminal | Terminal 19 | Completed |
| LEED-EBOM Certification – Division-wide | Division 07 | Installation |
| Sub-metering system | Division 21 | Installation |
| LEED-EBOM Certification – Division-wide | Division 30 | Installation |
| LEED - EAc3.2 – HVAC System Retro-Commissioning | Division 30 | Installation |
| LEED-NC – Maintenance Building | Expo Maintenance | Installation |

Metro's Energy and Sustainability Policy established the goal to pursue LEED certification in all new construction projects larger than 10,000 square feet. This commitment to green building practices is also facilitating LEED Certification at existing maintenance facilities. The assets produced from these efforts include the acquired certification of the green building or division, installed sub-metering systems, and projects carried out as required for certification such as improvements to HVAC systems through retro-commissioning and low or no-cost energy process improvements.

Typically, LEED Certified Green Buildings contribute cost savings to Metro as result of process improvement implementation. Process improvements may include improved visibility into resource usage through sub-metering system installation, low flow water fixture installations and implementing HVAC system retro-commissioning to optimize their operation and controls. To date, completed projects within the LEED Program contribute $272,000 in total operational cost savings annually. Additionally, many of the benefits and drivers of the LEED Program are non-financial such as the testing and improvement of outdoor air delivery, increasing recycling rates, use of green cleaning chemicals and improved pest management and irrigation practices. Each contribute to certifying the building as a nationally recognized green building and providing a healthy, productive and efficiently operating working spaces for Metro's biggest asset, its employees.

The LEED Program supports an ongoing effort to comply with Metro's Energy and Sustainability Policies, and will remain part of an established ongoing plan to expand Metro's green building infrastructure.

*Table 5: Energy Management Program Assets Completed, Under Construction and Planned*

| Energy Management Program Assets | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| High Bay Lighting Retrofit | Division 09 | Completed |
| Tire Shop LED Lighting Upgrades | Division 10 | Completed |
| Bus Wash Air Dryer Process Improvement | Division 10 | Completed |
| Maintenance Building Lighting Upgrades | Division 15 | Completed |
| Maintenance Building T5 Retrofits | Division 18 | Completed |
| Shop Lighting Upgrades | Division 20 | Completed |
| Lighting Retrofits | Location 30 | Completed |
| Compressed Air | Location 30 | Completed |
| Package Unit | Location 30 | Completed |
| Building Management System | Location 30 | Completed |
| Cooling Tower Replacement | Location 99 | Completed |
| 3rd Floor LED Lighting Upgrades | Location 99 | Completed |
| Boiler Replacement | Location 99 | Completed |
| RCx Chilled Water Reset | Location 99 | Completed |
| TOU 8 Tariff switch | Division 09 | Completed |
| Interior & Exterior Lighting Upgrades | Division 02 | Installation |
| Interior and Exterior Lighting Upgrades | Division 05 | Installation |
| LED Fixtures & Daylight sensors | Division 07 | Installation |
| HVAC RCx | Division 07 | Installation |
| T8 and LED Retrofits | Division 11 | Installation |
| High Bay Lighting Retrofit | Division 22 | Installation |
| Wireless Lighting Control System | Division 22 | Installation |
| Blue Line 5th Street Station Lighting Retrofit | Blue Line Stations | Installation |
| Blue Line 1st Street Station Lighting Retrofit | Blue Line Stations | Installation |
| Blue Line Downtown Long Beach Station Lighting Retrofit | Blue Line Stations | Installation |
| Blue Line Pacific Av Station Lighting Retrofit | Blue Line Stations | Installation |
| Blue Line Anaheim Station Lighting Retrofit | Blue Line Stations | Installation |
| Blue Line Willow Street Station Lighting Retrofit | Blue Line Stations | Installation |
| Phase II - Full Site Lighting Retrofit | Division 07 | Approved |
| Domestic Hot Water Energy Recovery | Location 99 | Approved |

The Energy Management Program activities have significantly increased as a result of the implementation of the 2011 Energy Conservation and Management Plan. ECSD has implemented a robust facility audit effort to proactively identify sustainability projects using the EMS framework. Lighting projects represent an immediate opportunity to achieve resource savings, and will continue to do so into the future. However, comprehensive energy efficiency is needed to pull out all opportunities and maximize energy savings and overall energy performance. The volume of potential energy management projects included in this assessment is a direct result of the focused effort on one of the most cost-effective sustainability infrastructure opportunities available to Metro. Installed energy efficiency project savings are already outpacing renewable energy investments with $611,000 in yearly energy savings, with multiple projects being completed each year.

*Table 6: Water Conservation Assets Completed, Under Construction and Planned*

| Water Conservation Assets | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| Steam Rack - Water Recycling | Division 09 | Completed |
| Reclaimed Water Project | Division 03 | Installation |
| Div 13 - Water Cistern | Division 13 | Installation |
| Reclaimed Water Project | Orange Line | Installation |
| Linear Kinetic Cell Project | Division 03 | Approved |
| Linear Kinetic Cell Project | Division 05 | Approved |
| Linear Kinetic Cell Project | Division 08 | Approved |
| Steam Rack Water Recycling | Division 18 | Approved |

The current water conservation assets represent investments in projects not already included in the other Program activities. In addition to the projects listed in Table 6, Metro has installed low-flow water conservation devices, which were driven and therefore accounted for in LEED Program metrics. Metro anticipates that this program will present the largest growth in opportunities for future sustainability projects, as the agency has not yet addressed the low-hanging fruit for water conservation projects. The annual cost savings Metro currently realizes from completed projects in the four program areas is $2 million, as Figure 4 shows.




*Figure 4: Annual Cost Savings from Current Sustainability-Related Infrastructure*

## Current Approach to Managing Sustainability Assets

The Office of Management and Budget manages Metro's annual capital program to successfully meet the needs of Metro's capital program and operations. Sustainability-related capital projects have been following this same process, which has led to many successful implementations. Metro's EMS framework provides for oversight to regularly monitor and report sustainability-related infrastructure performance in addition to the identification and implementation of future opportunities. Annual reporting of progress through the EMS framework identified lower than expected performance from several key sustainability assets such as Metro's solar PV systems. This section provides an assessment for how the current sustainability-related infrastructure is operated and maintained.

Metro identifies and implements capital projects to meet day-to-day operational needs. Typical projects may include division expansion, process equipment replacement, or new equipment installation or rotation (e.g., buses). In these cases, the operational state of the installed equipment directly impacts staff's ability to perform the core functions of the organization. Consequently, staff is able to quickly identify, prioritize, and address equipment and maintenance issues. Metro has a well-established process to plan and budget for maintenance support.

Sustainability assets can and will increasingly directly affects operations in ways that may be outside standard operating procedures. New sustainability assets are likely to involve greater technology sophistication and alternative systems and processes.

When this occurs, staff often does not have the budget, training, available time or necessary oversight to effectively address the maintenance requirements of assets outside of standard operations. Metro's solar PV systems represent a primary example of this challenge.

Solar PV systems require a specific set of maintenance procedures to operate properly. Until recently, Metro made limited provisions to provide staff with the appropriate training in this area because the cost and responsibility was have been properly planned and assigned. Metro currently has installed solar PV systems at five locations. Historically, the project costs of all new solar PV systems, with the exception of the Central Maintenance Facility (CMF), only accounted for the upfront cost of construction. The project costs did not allocate funds for future operations and maintenance that falls outside of the standard operations for this new technology. The facilities maintenance resources now responsible for solar PV system operations and maintenance (for most Metro systems) are already over-burdened and must prioritize those projects that support day-to-day operations rather than those that reduce energy and operational costs. In these cases, this assessment marked a decrease in the performance of these installed solar PV systems. The investment of these assets were based on realizing their full cost reducing potential, which are now in jeopardy.

By way of comparison, the solar PV project at CMF included a Full-Time Equivalent to maintain the system. This system has never underperformed its projected electric generation targets and is a successful model for Metro's ability to properly maintain this valuable asset.

As sustainability investments often bring new technologies and innovative process improvements into the Metro system, staff is proactively addressing the challenges associated with the current maintenance of solar PV systems so future sustainability infrastructure does not suffer similar shortfalls.

Based on this assessment, we observed that more collaborative and detailed upfront project development can allow for proper troubleshooting of issues and execution of preventative maintenance practices. Requiring the incorporation of anticipated future costs and development of skill sets into the project lifecycle is an important first step in mitigating these challenges. Evaluation of these future costs and requirements must occur in close coordination with the division-level managers and staff responsible for the future asset maintenance. Metro's EMS framework provides a clear foundation from which to further improve the ongoing maintenance of these valuable assets.

Standardized sustainability project development, implementation, and ongoing oversight through process changes or centralization can provide a clear path towards maintaining a state of good repair for the life of installed equipment. Attachment B: Sustainability Infrastructure Implementation and Operational Plan outlines a step by step implementation process that meets the desire for a long term operational plan for incorporating these recommendations into the current development and ongoing management of future sustainability assets.

## Sustainability-Related Asset Cost Savings Estimates

This assessment reports the resource cost savings based on measured savings whenever possible, and includes an estimated cost savings for other assets. Going forward and as described in Attachment B: Sustainability Infrastructure Implementation and Operational Plan, specific measurement and verification (M&V) protocols are recommended for different types of sustainability investments that will allow Metro to regularly track and report on performance of these assets.

Figure 5 shows the overall cost savings on an annual basis for Metro's four major program areas. Annually, the completed assets yield nearly $2 million in resource cost savings. With the addition of the FY 14-15 approved projects and those currently in the installation phase, the aggregate annual savings resulting from these projects increases to nearly $2.6 million.

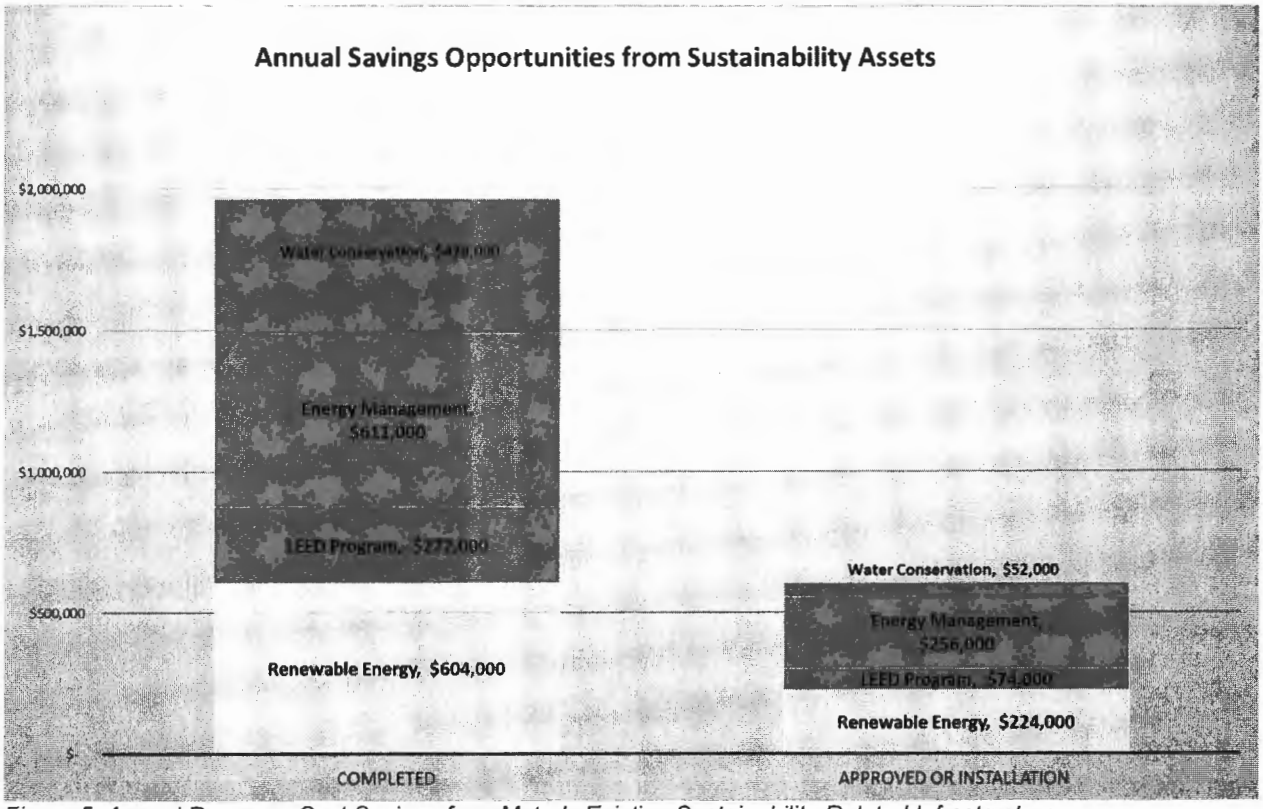



*Figure 5: Annual Resource Cost Savings from Metro's Existing Sustainability-Related Infrastructure*

Beyond the annual resource cost savings allocated to the various Metro sustainability-related asset investments, these projects secured $7 million in incentives. Figure 6 and Figure 7 show the incentives secured for all projects that are designated approved, installation or completed. Incentives help reduce future infrastructure investments capital expenditures while still providing attractive annual resource cost savings. Metro will continue to receive utility incentives as revenue to the organization and incorporate these net costs into annual reporting and proposed project metrics.

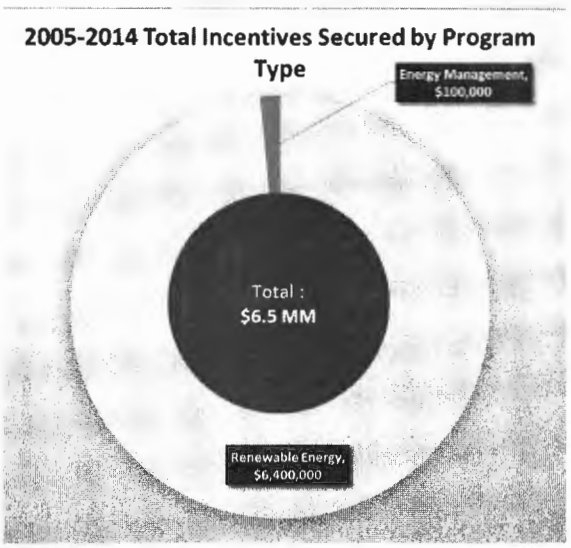



*Figure 6: Incentives Received or Reserved for Projects from 2005-2014*

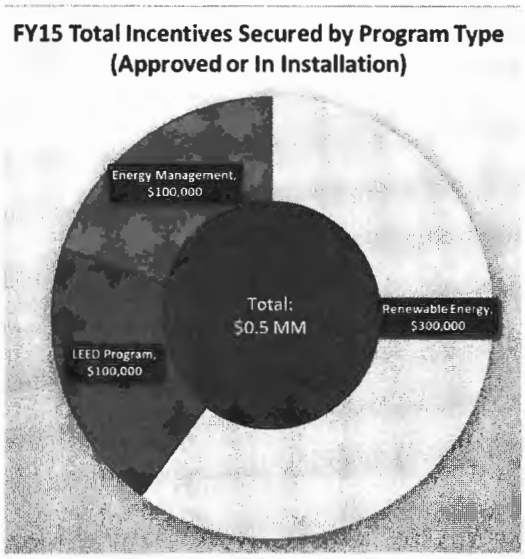



*Figure 7: Reserved Incentives for Approved or in Installation Projects*

Annual cost savings from the implementation of sustainability-related assets provides a significant benefit to Metro. Figure 8 quantifies the cumulative cost savings realized to date and anticipated by the end of the current fiscal year.

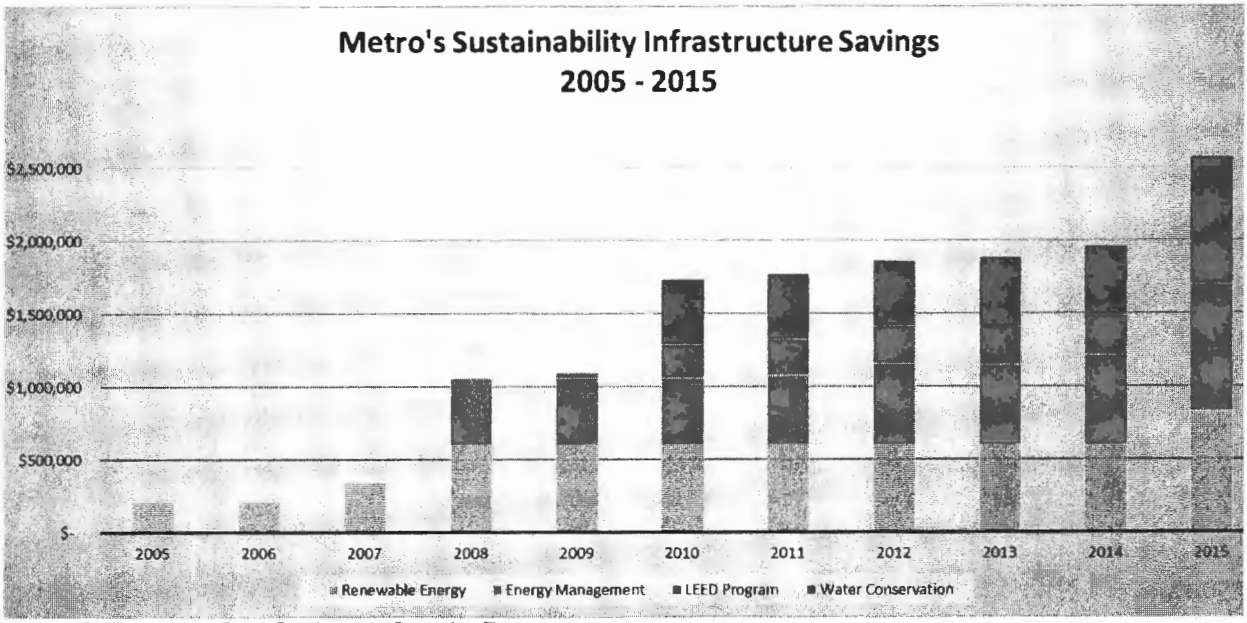



*Figure 8: Resource Cost Savings to Date by Program*

As a portfolio of assets with varying useful lives and resource savings values, the cumulative benefits from these investments needs to be effectively managed to maintain the cost savings over time. As with any physical asset, degradation and depreciation over time will decrease and ultimately can eliminate the cost savings resulting from that asset. Attachment B: Sustainability Infrastructure Implementation and

Operational Plan shows how the EMS process will support the planning, implementation and oversight of Metro's existing and future sustainability infrastructure.

**Potential Future of Sustainability-Related Assets**

Metro's sustainability and environmental policies ultimately direct the identification and development of projects that comprise the listing potential future sustainability assets. Figure 9 and Figure 10 display the costs and benefits of the range of potential future projects by Program. These projects have been vetted by Metro staff and several have funding and alternative financing mechanisms identified to support their implementation but have not yet been fully approved. All identified projects fall within the definition of a Metro sustainability-related asset and represent only a subset of the potential projects Metro could implement in future years. For example, we have identified Energy Management Program projects through energy audits at only six divisions. These projects represent an average 12% cost reduction at each facility with the opportunity for greater resource cost savings across other Metro facilities.

There is variety in the size, scale and complexity of the potential future sustainability assets but all are designed to result in cost effective reductions in both Metro operating costs and Metro's impact on the environment.




*Figure 9: Proposed Sustainability Infrastructure Project Costs by Program*

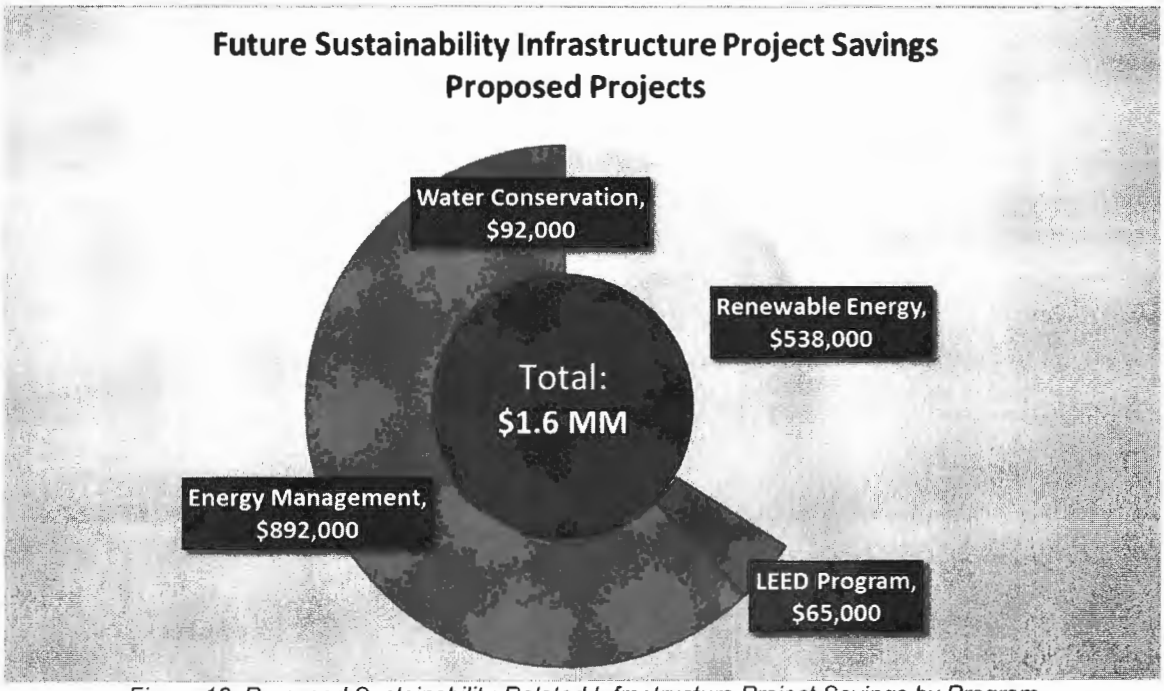



*Figure 10: Proposed Sustainability-Related Infrastructure Project Savings by Program*

Proposed future projects are geographically distributed and Figure 11 below shows the number of identified projects at each site. The average project cost by program differs greatly but there are performance improvement opportunities at all sites.

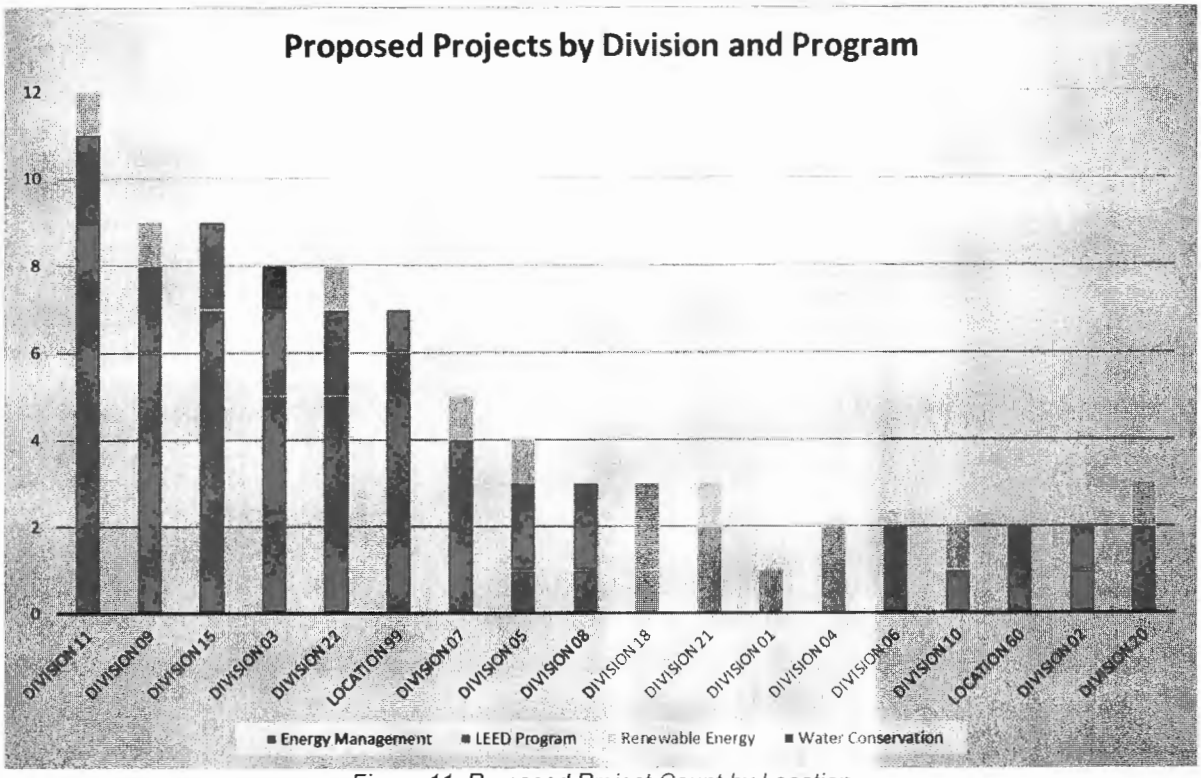



*Figure 11: Proposed Project Count by Location*

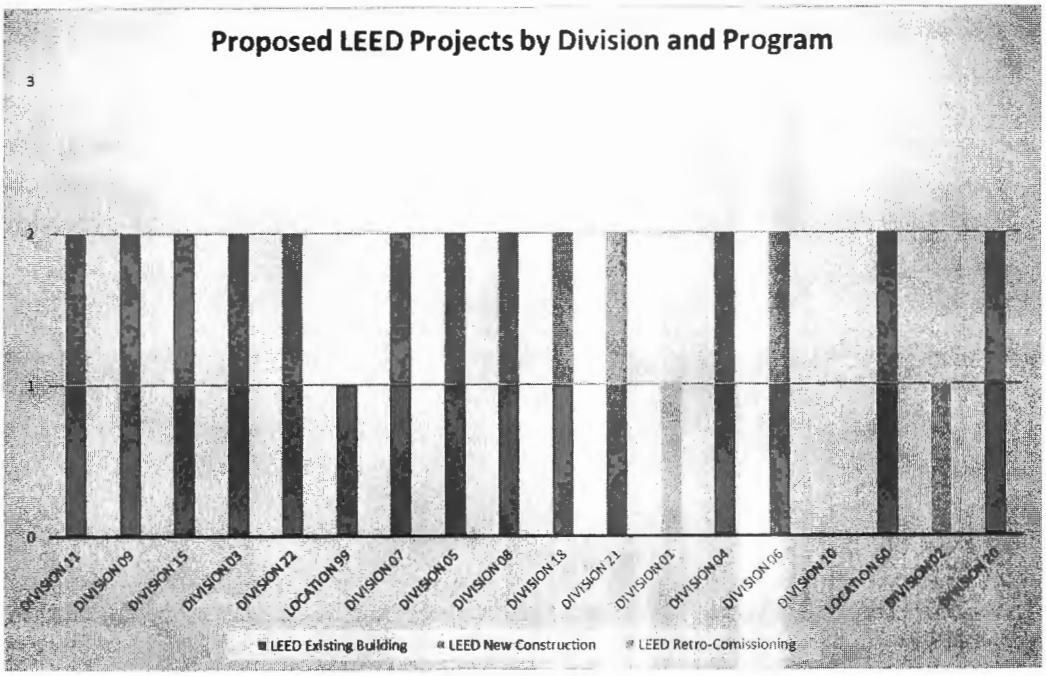
Table 7 shows an inventory of the Future Renewable Energy projects that make up the nearly $12 million of investment opportunity. Metro has analyzed all potential PV system locations and selected these eight sites as the most cost effective candidates for large scale deployment. Implementation of all systems in Table 7 would increase the existing PV system capacity by 150%.

*Table 7: Proposed Future Renewable Energy Projects*

| Future Renewable Energy Projects | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| Parking Structure PV Installation | Division 07 | Proposed |
| Solar PV System | Division 09 | Proposed |
| Solar PV System | Division 10 | Proposed |
| Solar PV System | Division 11 | Proposed |
| Solar PV System | Division 22 | Proposed |
| Solar PV System | Division 20 | Proposed |
| Solar PV System | Division 05 | Proposed |
| Solar PV System | Division 21 | Proposed |

Over the coming years the LEED Program, through the EMS process, will continue to aggressively pursue LEED strategies to fulfill the intent of Metro's Environmental Policy and Energy and Sustainability Policy. All existing buildings will perform retro-commissioning to optimize HVAC system operation. The collection of no- and low-cost process improvement projects implemented through the LEED strategy implementation will ultimately result in more comfortable and efficient buildings.

*Table 8: Proposed Future LEED Program Projects*



Metro's most cost-effective option for reducing its resource costs and GHG emissions is through the implementation of energy conservation and efficiency projects. The Energy Management Program projects can be broken down into the building systems affected by a given project. For example, in Metro facilities energy is used for the following purposes:

- Lighting
- Domestic Hot Water (DHW)
- Heating, Ventilating & Air Conditioning (HVAC)
- Compressed Natural Gas (CNG)
- Plug Loads
- Process Equipment (Tools and Machines).

Figure 12 displays the number of projects proposed to date within each of these asset types. Projects range in complexity from full air conditioning system replacement to a light bulb replacements and everything in between. We are continuing to conduct facility audits of existing facilities to identify energy savings projects and expect a three-fold increase in the number of energy efficiency projects for Metro to consider. Figure 13 shows a breakdown of the total Energy Management Program savings for proposed projects by specific project type.

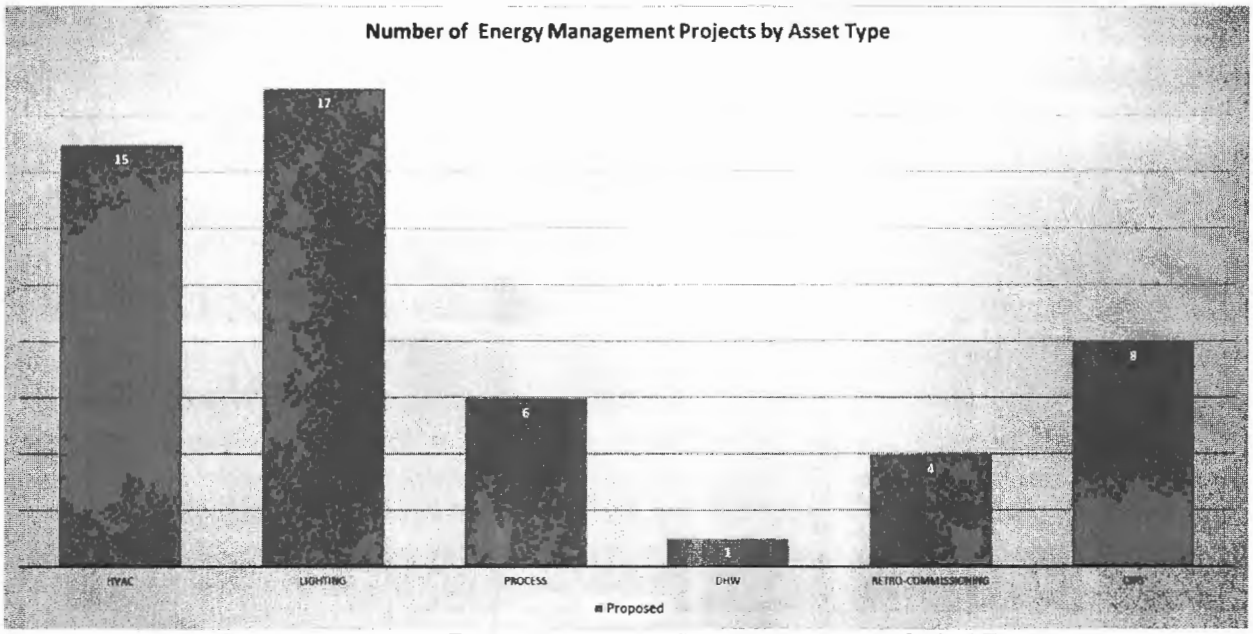



*Figure 12: Proposed Energy Management Program Projects by Project Type*

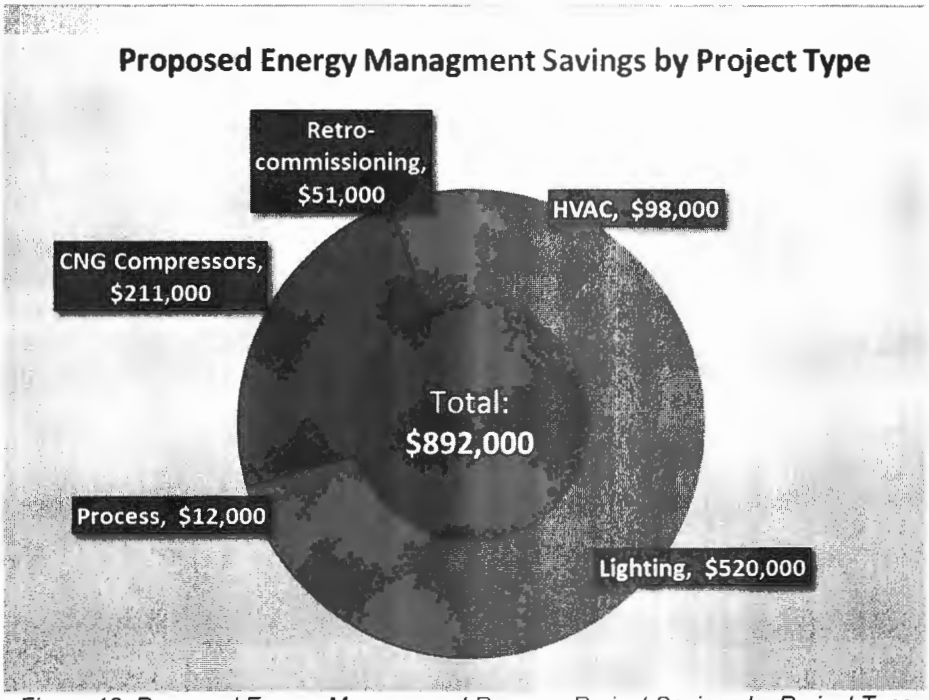



*Figure 13: Proposed Energy Management Program Project Savings by Project Type*

Water Conservation Program projects aim to reduce the water usage throughout Metro operations. Given the current drought conditions, the importance of these projects is increasing by the day. Metro's EMS will be focusing intently on increasing the number of water conservation projects.

*Table 9: Proposed Future Water Conservation Projects*

| Future Water Conservation Projects | | |
|---|---|---|
| **Project Name** | **Location** | **Status** |
| Bus Wash Recycled Water System Project | Division 01 | Proposed |
| Recycled Water System | Division 03 | Proposed |

## Conclusions

Metro's ongoing investment in its sustainability-related infrastructure continues a decade-long commitment to dedicating resources to further advance resource-saving assets. Since 2005, Metro has completed over thirty-seven projects, realizing nearly $2 million in yearly cost savings from these assets and $6.4M in cash rebates from utility partners. The organization is identifying additional projects for implementation through the agency-wide EMS, which is advancing sustainability goals and employee engagement across and at all levels. Continued support for the growth of Metro's Sustainability-Related Infrastructure will continue the implementation of operational cost reduction strategies as evidenced by the targeting of an additional $1.6M in yearly cost savings.

Large-scale investments in solar PV systems dominate the current infrastructure. These are valuable assets that are devoid of any electricity costs and contribute toward meeting Metro's Renewable Energy Policy goals. A more recent focus on the Energy Management and LEED Program areas has resulted in a more balanced and diversified portfolio of sustainability-related assets, which will allow Metro to implement future cost-savings projects while meeting Energy, Sustainability, and Renewable Energy Policy goals. ECSD also recognizes an opportunity for expansion of the Water Conservation Program area to include future sustainability projects.

This assessment identified gaps in the current approach for maintaining the current asset base. If Metro does not maintain these assets appropriately, the agency will not benefit from the resource cost savings that uniquely arise from investments in sustainability-related assets. Attachment B: Metro Sustainability Infrastructure Implementation and Operational Plan provides a detailed operational plan for a transparent process to evaluate, implement, and maintain the portfolio of potential future sustainability project investments, and a financial plan for identifying and securing funding for these investments that mitigates the financial impact on the Metro organization.

**ATTACHMENT B**
**Metro Sustainability Infrastructure Implementation and Operational Plan**

## Metro Sustainability Infrastructure Implementation and Operational Plan

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## Introduction

Over the past decade, the Los Angeles County Metropolitan Transportation Authority (Metro) has invested in a growing number of capital and operating improvements to improve the long-term environmental sustainability of the agency. Maximizing the benefits of Metro's sustainability infrastructure requires ongoing attention to maintain a state of good repair across the agency, and careful consideration of future sustainability improvements. This plan integrates wherever possible with existing systems to provide a financial and operational process for establishing oversight and identifying financial resources to maintain existing and future sustainability asset performance, along with guidance for identifying needed investment in additional sustainability assets that will benefit Metro into the future.

In the context of this plan, Metro sustainability assets include operational *investments made in Metro facilities, technologies, fleet, people, and processes that:*

1) *directly contribute to the reduction in resource usage beyond an established baseline for electricity, natural gas, other non-renewable fuels, water, hazardous substances, or*
2) *directly reduce greenhouse gas emissions (GHGs), other air emissions, wastewater, solid waste, other environmental impacts, or*
3) *directly increase operational efficiency, staff productivity and well-being, and customer satisfaction beyond standard operations, while maintaining safety and system reliability.*

This sustainability infrastructure implementation and management plan provides for the selection and implementation of sustainability-related investments and the ongoing measurement and verification of investment performance. This plan also identifies an approach for Metro to establishing the necessary funding and ongoing operations and maintenance requirements for sustainability assets prior to implementation.

## Sustainability Infrastructure Management

The Environmental Compliance and Services Department (ECSD), within the Engineering & Construction Division in working with key Metro internal stakeholders, will use established procedures and processes to facilitate:

- Sustainability project selection, development, and implementation;
- Measurement and verification of sustainability asset performance;
- Long-term planning (financial and operational);
- Sustainability project-related training;
- Sustainability reporting on infrastructure for Board, Management, and Metro Sustainability Report; and
- Necessary stakeholder engagement related to the sustainability asset management activities (internal and external coordination)

The implementation and management of sustainability-related assets will support the reduction of operational costs over time by increasing operational efficiency and will support the implementation of Metro's Environmental Policies. Metro's ISO 14001 Environmental Management System (EMS) provides the framework for coordinating and organizing the reduction of Metro's impact on the environment. EMS procedures and processes will be used to manage and document the implementation and management of Metro's sustainability infrastructure.

Figure 14 outlines the cross-functional process for the future development of new sustainability-related assets at Metro. The primary Metro groups involved in the implementation and management of sustainability infrastructure are listed in the left column and include existing ECSD staff, Metro Management, Operations (Facilities Maintenance), Office of Management and Budget (OMB), Engineering & Construction, and Procurement Departments.

**Roles and Responsibilities**

The sustainability infrastructure implementation and management plan will be implemented and managed using existing staff, processes and management systems. This plan calls for a coordinated approach for the continual operations and maintenance of Metro's sustainability assets. The administrative and technical requirements outlined herein will be executed using existing Environmental Compliance and Services Department (ECSD) staff. Management and budget estimates for supporting the implementation of this effort will be considered as part of the ECSD annual budget projections. Such activities will be facilitated through the EMS Admin Team who will have the responsibility of aligning implementation with overall environmental and organizational goals and objectives at the frontline level. This diverse group, as well as the internal stakeholders outlined in Figure 1, will be critical to the success of this plan and long term operation and maintenance of Metro's sustainability-related infrastructure. Numerous variables, including the total number of projects, their complexity, and the rate at which they undergo implementation, will determine the level of effort required.

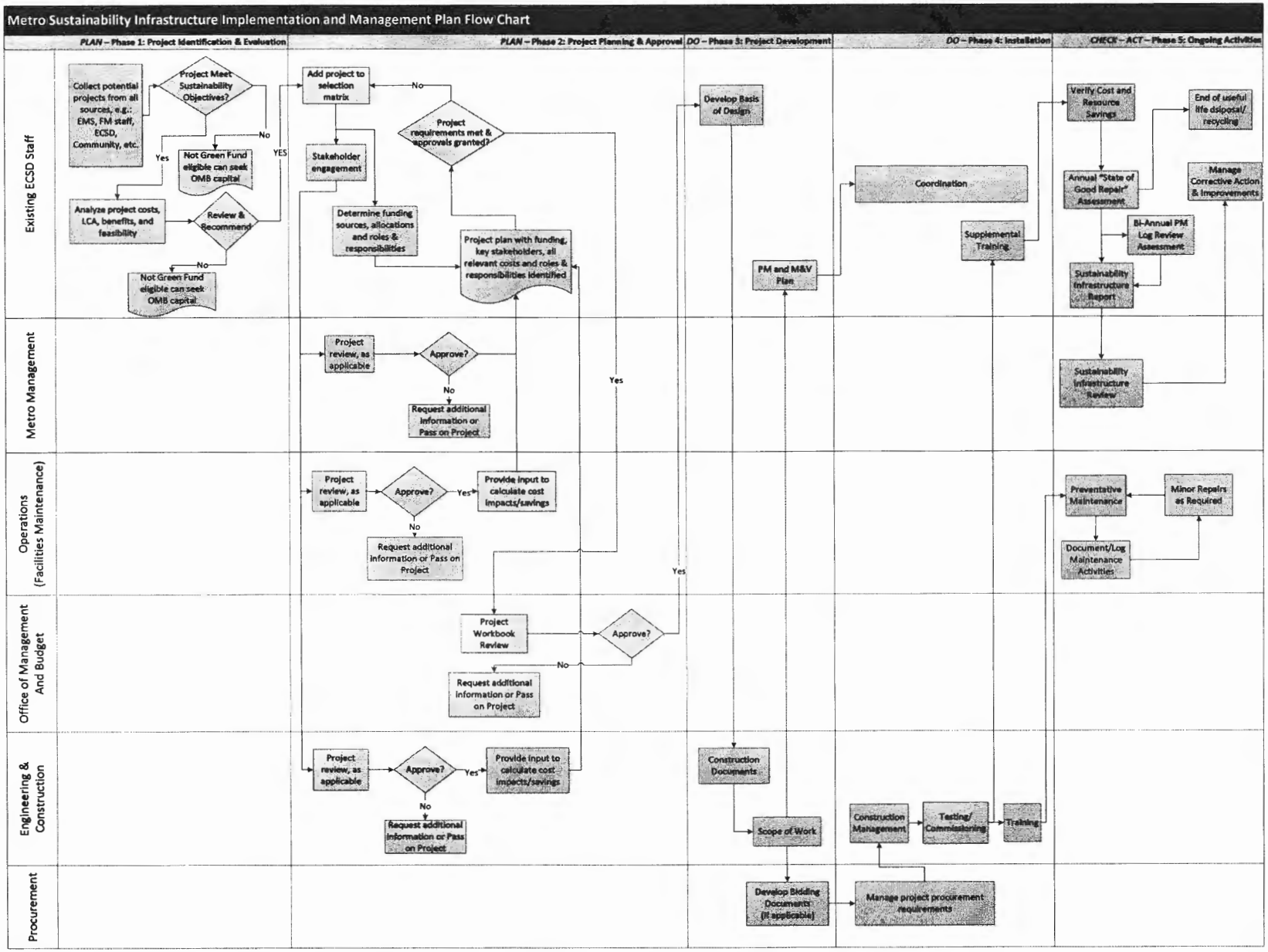



*Figure 14: Sustainability Infrastructure Implementation and Management Plan Flow Chart*

## Sustainability Infrastructure Implementation and Management Plan

The sustainability infrastructure implementation and management plan is designed to be a transparent and collaborative approach. Successful sustainability projects require cross-Agency coordination that begins with initial planning and carries through long-term operations and maintenance. Metro's agency-wide EMS framework is a proven and successful process for engaging stakeholders across the organization and will be utilized in the support and ongoing management of sustainability assets. The execution of this plan will help Metro anticipate and address challenges throughout each project's useful life.

The sustainability infrastructure development and management process follows five phases that generally align with Metro's current capital project planning and conforms to the EMS plan-do-check-act (PDCA) model of continual improvement. Due to the nature of sustainability projects, additional considerations at each phase are highlighted in Table 10. Each phase is described in detail below.

*Table 10: Sustainability Infrastructure Implementation and Management Plan Phases and Considerations*

| | Implementation Phases | Project Considerations |
|---|---|---|
| PLAN | Phase 1: Project Identification and Evaluation | • Potential projects are collected from across the agency through the EMS and not limited by facility location, bus or rail projects<br>• Projects undergo basic life-cycle analyses at the outset |
| | Phase 2: Project Planning & Approval | • Agency-wide stakeholder engagement as necessary to seek support and buy-in for new projects<br>• Detailed costs, savings and ongoing management costs are developed and incorporated<br>• Funds identified and allocated through capital program approval process |
| DO | Phase 3: Project Development | • Inclusion of preventative maintenance, operations and maintenance (O&M) and measurement and verification (M&V) plans<br>• Assignment of roles and responsibilities |
| | Phase 4: Installation | • Additional training for assets as required |
| CHECK – ACT | Phase 5: Ongoing Activities and Continual Improvement | • Implementing O&M and M&V plans according to approved project plan<br>• Savings reinvestment opportunity, state of good repair assessments |

## Metro's Sustainability Long-Term Financial and Operational Plan

### Sustainability Infrastructure Funding Sources

Metro allocates funding for the implementation of sustainability-related assets from a variety of different sources, with the primary funding coming from OMB's annual Capital Program. The existing sources of funding the implementation of sustainability-related infrastructure include:

- **Office of Management & Budget Annual Capital Program:** These allocations have funded most of Metro's existing sustainability infrastructure to date. Represents Metro's annual and off-cycle capital approval process.
- **Sustainability Implementation Program:** This is a capital program that allocates funds annually for sustainability pilot projects.
- **Alternative Financing Mechanisms:** Sustainability projects are often eligible to receive external grants or may enter into cost-sharing arrangements with entities external to Metro. This funding is project-based and can vary widely from year to year. However, it can fund large portions of individual sustainability infrastructure projects.

Metro is seeking to support sustainability project development, maintenance, and operations through the "Green Fund" established as part of the approval of Item 48 of the June 2014 Board meeting. The fund, as described in detail at the end of this document, would have three funding sources in addition to the interest generated from their investment. These include:

- **Low Carbon Fuel Standard (LCFS) Credit Proceeds:** This potential funding source comes from the sale of Metro-earned LCFS credits through a market based system. As requested by the Board during the February 2014 Item 57 Board Motion, Metro has developed a revenue optimization plan for the LCFS credit sales to maximize the potential funding opportunity to maintain sustainability investments. This is a relatively new and small market with highly variable market prices for credits and a potential sunset in year 2020; estimated proceeds range from $300,000 to $3M annually. Metro recognizes the inherent volatility of this funding source. This plan presumes that this new source of funding is available for budget planning and will remain so as long as Metro generates credits and the market for these credits continues to operate.
- **Sustainability-Related Infrastructure Cost Savings Reinvestment:** This potential funding source reinvests cost savings generated from the operation of sustainability assets in future projects and the ongoing operation of existing sustainability-related infrastructure. The savings contribution value of each project would be identified as part of an approved project plan explained in Phase 3 and executed in Phase 5 of this plan. Agreed upon and verified savings values would be applied through an internal budget reallocation mechanism.

- **Utility Incentive and Rebate Reinvestment:** Metro's utility partners are incentivized by the California Public Utility Commission to buy down the cost of the equipment described herein as sustainability-related infrastructure. Nearly $6.5M of such funding has come in the form of cash revenue to Metro since 2005. Future funding would be applied through an internal deposit or allocation mechanism upon receipt of incentive checks.

Asset (Project) Implementation Funding

The assets included in the 2014 Sustainability Infrastructure Assessment Report represent current assets and a list of identified and proposed future assets. Phase 5: Ongoing Activities and Continual Improvement includes discussion on financial planning for the existing assets. This section details how a potential project becomes a Metro sustainability asset. Table 2 details the three different types of assets and an example of existing Metro examples of each. Asset Types classify the operation and maintenance requirement approach required to ensure it brings desired benefits throughout its useful life.

*Table 11: Asset Type Definition*

| Asset Type | Definition | Examples |
|---|---|---|
| *New Asset* | Equipment added to a Metro facility or a new process that did not previously exist. | • Solar photovoltaic (PV) system<br>• Domestic Hot Water Heat Recovery System |
| *Process Improvement* | Project that improves efficiency/sustainability of an existing process: can be asset-based or administrative, may change the operations and maintenance (O&M) requirements for existing process. | • Bus dryer redesign<br>• Heating Ventilation and Cooling (HVAC) redesign<br>• Control systems<br>• Water Recycling System |
| *Existing Asset Replacement* | Project that replaces existing equipment with a more sustainable option. | • Boiler replacement<br>• HVAC replacement<br>• Lighting retrofit |

Metro's sustainability project implementation process consists of five iterative phases, each with a corresponding financial decision to inform movement to the next phase. Each phase consists of project review and approval, allowing for transparency and coordination throughout the process. Figure 15 outlines each phase and the corresponding, required decision.

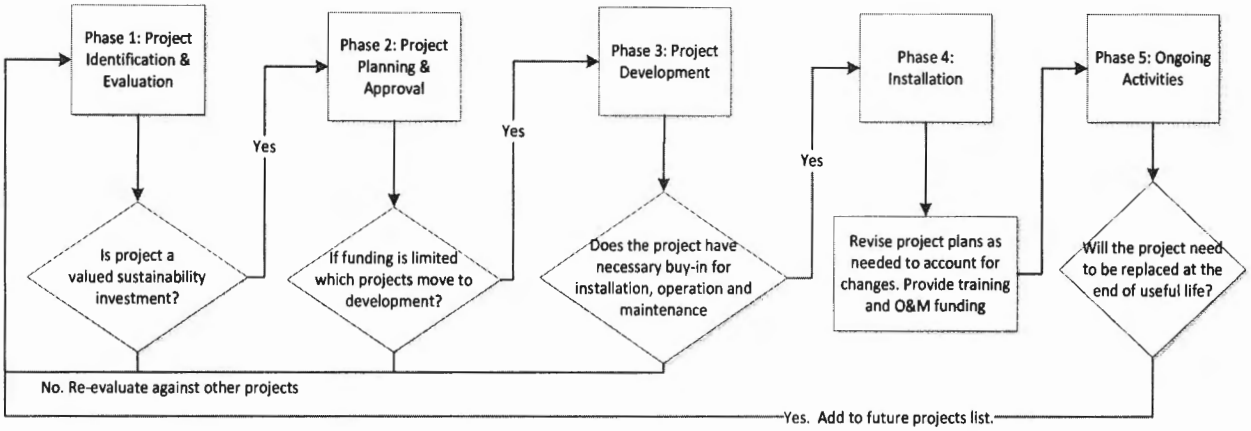
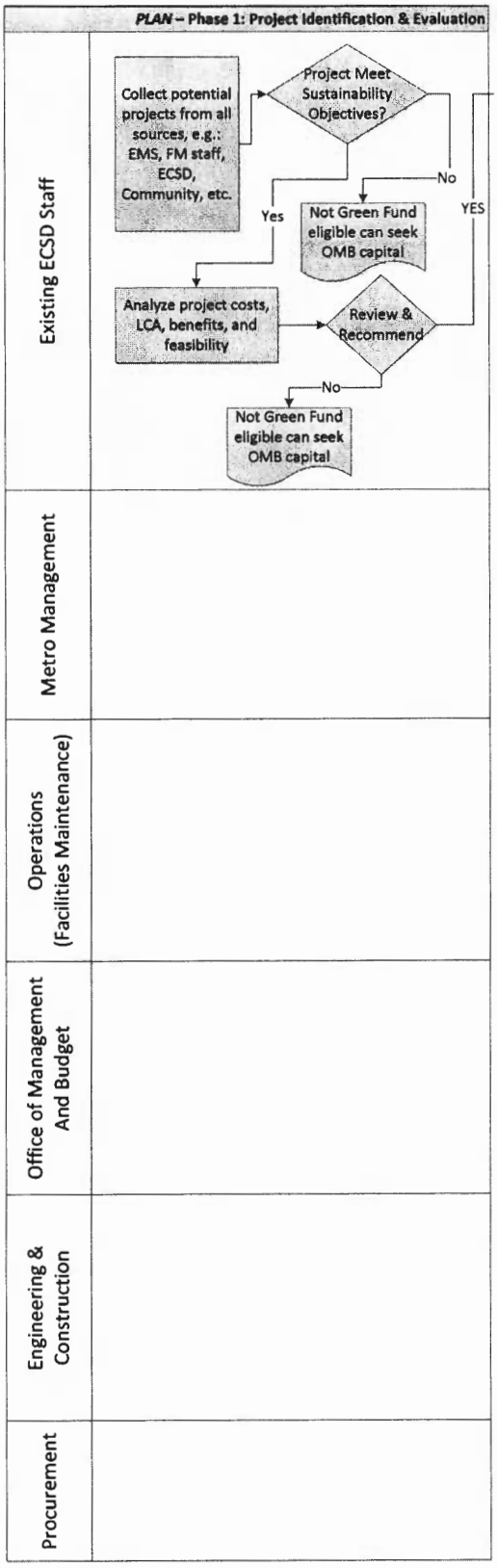



*Figure 15: Funding decision flow within implementation and management plan*

## ***PLAN***-DO-CHECK-ACT

### Phase 1: Project Identification and Evaluation




In this phase, a list of potential sustainability-related infrastructure projects will be created as they are identified. To include a potential project on the list, staff will verify that the project meets, at a minimum, the definition of a Metro sustainability asset. This early evaluation of potential projects will reveal anticipated results, however a full accounting of the potential costs and benefits of the project investment is not necessary until later in the process.

Potential sustainability projects at Metro can come from several sources including but not limited to:

- initiatives from EMS Administrative Team or Facility EMS Core Teams;
- suggestions from other internal Metro departments (solicited);
- results of energy and resource audits;
- projects requiring additional funding to upgrade from standard to sustainable;
- end-of-useful-life replacement; and
- unsolicited proposals from internal stakeholders and third parties.

Projects will be collaboratively evaluated to determine whether or not the proposed projects will enhance Metro's sustainability-related infrastructure. The initial evaluation of potential projects will consider both quantitative (e.g., resource cost savings) and qualitative (e.g., fulfillment of policy mandates). For example, will the potential project reduce an environmental impact, increase resource efficiency or generate renewable energy that contributes to meeting the Renewable Energy Policy goals?

At this phase in the process, some evaluation questions may not have sufficient answers. Staff will seek out additional information as needed to determine an expected overall (quantitative and qualitative) project value. Potential projects shall remain in the evaluation phase until enough

information exists to answer the key decision for this phase:

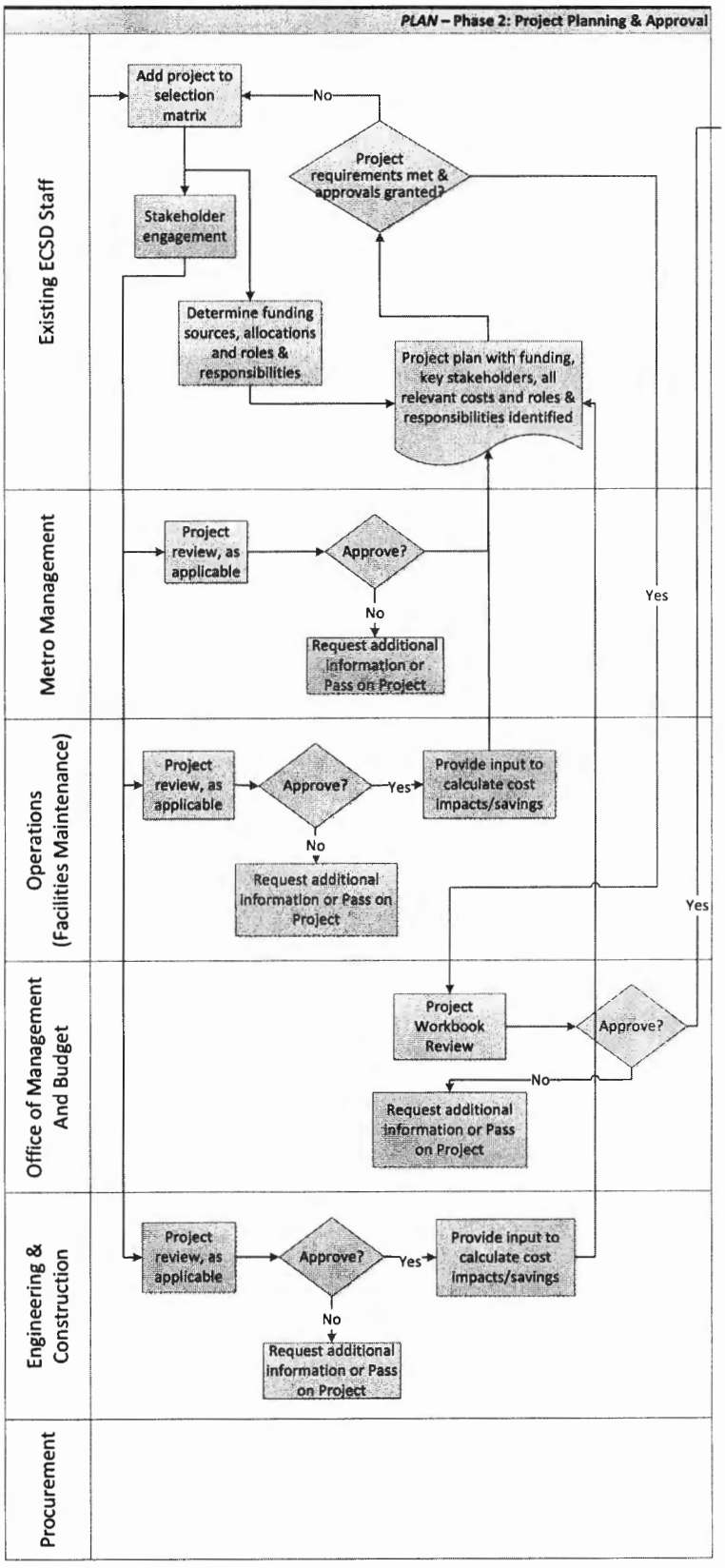
*Is this project a valued sustainability investment for Metro*?

If the answer is "yes," then the project is eligible to be moved on to Phase 2: Project Planning and Approval. If the answer is "no", then the project can either return to the tracking list or removed from further consideration.

ECSD staff will maintain a comprehensive list of potential projects passing through to Phase 2, and will make this list available to Metro internal stakeholders using the existing project dashboard database to allow for easy viewing and ad hoc reporting. The projects on this list are under active consideration for implementation. However, the listing does not indicate that any projects have received budgeting or approval. Phase 2, below, outlines how staff will compare the potential projects against one another for funding consideration that is available in a given fiscal year.

## ***PLAN***-DO-CHECK-ACT

### Phase 2: Project Planning and Approval




Potential projects that move into Phase 2 will begin the more rigorous planning and budgeting process, including a life-cycle cost evaluation and initial stakeholder assessment to provide a more thorough and comprehensive evaluation. A selection team will be convened to apply standardized project evaluation metrics across all potential projects to allow for accurate comparison of financial performance including cost, savings and ongoing operation. After collecting and evaluating key project information, potential assets will combine to develop a portfolio of projects that most cost-effectively meet Policy and EMS stated objectives and targets. The team will employ a Project Portfolio Management approach to determine which proposed projects move to Phase 3 (Project Development). The key financial question to move through this phase is:

*If funding is limited, which projects will move to development?*

**Project Budgeting**

Each project team will develop a detailed project budget and plan, consisting of specific proposed funding sources, and expected time frames for development and installation based on standardized forms and methods. Cost analysis will

incorporate the entire useful life of the equipment. As Table 12 shows, Metro's sustainability-related infrastructure projects face several project funding scenarios that allow for project implementation within specific Metro parameters. In collaboration with other Department sponsors/Project Managers, ECSD staff will seek to identify opportunities to offset Metro's project cost requirement for sustainability-related infrastructure through rebates and other alternative financing mechanisms whenever possible, up to full cost of the proposed project.

*Table 12: Internal Metro Project Cost Responsibility Scenarios*

| Funding Scenarios | Green Fund | Other Funding |
|---|---|---|
| *Full Cost Responsibility* | 100% of project costs associated with development, installation and ongoing O&M | None |
| *Cost Share* | Partially fund project implementation. Examples could include additional design and commissioning costs, cost of purchasing more efficient equipment, or percentage splits based on budget shortfall | Partial funding for project implementation derived from the use of capital funds as allocated by OMB |
| *No Cost Responsibility* | Basic review to gather project information and ensure proper evaluation of O&M costs | 100% of project implementation derived from the use of capital funds as allocated by OMB |

Working other Department sponsors/Project Managers, ECSD staff will provide support to identify the anticipated project lifecycle cost requirements, available funding sources, and project leads for key roles as part of the overall project plan. Direct input from across the organization will be included to allow for appropriate checks and balances on both project costs and feasibility. As the section below describes, key identified metrics such as cost savings will have supporting documentation. Information will be centrally located for all stakeholders to access and review.

Table 13 presents an example of a Phase 2 level project budget with major costs, funding sources, and project leads identified. Note that project-level leads are project specific, can represent different departments, and do not necessarily assume ongoing asset management responsibilities. The time value of money has been considered in this example.

*Table 13: Example Project Budget*

| Example Project | Lighting Retrofit at Division X | |
|---|---|---|
| Project First Costs | $225,000 | one-time |
| Ongoing O&M Costs | $500 | annual |
| M&V Costs | $1,000 | every 4 years |
| Expected Useful Life | 20 | Years |
| ***Total Life Project Cost (nominal)*** | ***$240,000*** | |
| ***Funding Sources*** | | |
| OMB FY16 Capital Program | $175,000 | one-time |
| Green Fund | $50,000 | one-time |
| Green Fund | $10,000 | $500/yr x 20 yrs |
| Alternative Financing Mechanism | $500 | utility incentive |
| ***Total Funding Identified*** | ***$240,000*** | |
| **Project Leads** | | |
| Metro Project Manager | | Project Staff |
| Environmental Compliance and Services Lead | | ECSD Staff |
| Facility Maintenance Lead | | FM Staff |
| Operations Lead | | Division Staff |
| Procurement Lead | | Procurement Staff |

Proposed sustainability project budgets will be approved and funded though the existing capital projects process. Not all potential projects will be sent to OMB for approval. The sustainability project portfolio selection process will prioritize projects that best meet Metro's financial and sustainability objectives. The selection process explained below is designed to provide a transparent method for determining which projects are eligible for sustainability funds and best meet Metro's overarching policy and agency-wide EMS goals.

### Sustainability Project Portfolio Selection

Relying on the principles of portfolio management, the EMS Admin Team and existing ECSD staff will employ a standardized selection approach for potential sustainability-related investments. Companies and organizations use many different models to apply similar principles to maximize benefit and minimize risk for their asset investments. The approach for Metro's future sustainability assets is designed using a pillar of portfolio management theory: Matrix Scoring. Consistent with the EMS process, matrix scoring takes the most important project attributes as determined by the desired outcomes such as cost savings and meeting sustainability goals. Those attributes are weighted to account for their relative importance. A portfolio of potential sustainability-related investment projects will be scored in each project criteria to arrive at a final score. Those scoring the best to represent those projects that minimize risk, whether financial, technology, or customer-based and maximize benefits. This approach will provide additional transparency for accountability, compliance, and other requirements Metro faces as a publicly agency.

As with Metro's Annual Capital Program, there are several key criteria to consider when making portfolio decisions. This section describes a proposed approach based on interviews and analysis. Collectively, the following criteria are intended to provide a thorough review of the expected financial and organizational costs and benefits of the sustainability investment portfolio.

- **Return on Investment (ROI)**: This criterion aligns with Metro's capital budgeting process and represents the financial value to Metro. Standard Metro assumptions will be documented and used including discount rates, depreciation, tax and other rates used to calculate sustainability project ROI. Sustainability related ROI calculations will also consider the long-term O&M and M&V costs for managing the assets throughout their useful life.
- **Life-cycle Cost-Savings**: This criterion is a calculated estimate of the long-term, or useful life period, cost-savings resulting from the investment in the sustainability project. Staff will use industry-recognized standards along with other protocols for calculating project savings to determine the value for this criterion. Calculations will include all costs associated with O&M, oversight and verification of project savings.
- **Technology Viability**: This criterion is a qualitative measure of the risk of investing in a new technology, system or process. The Project Team shall consider stakeholder support or opposition and any internal and external opportunities and barriers when scoring this criterion.
- **Probability of Success**: This criterion is a qualitative measure of the probability that the project will move to installation, will be operate properly, and will receive appropriate maintenance throughout its useful life. The project team shall consider stakeholder support or opposition and any internal and external opportunities and barriers when scoring this criterion.
- **Sustainability Policy Objectives:** This criterion is a measure of the degree to which the project meets Metro's approved sustainability policy objectives. (e.g., GHG reductions, water conservation, solid waste reduction). Metro's EMS selects similar objectives and targets that will also impact the relative importance of the project in relation to others.
- **Mission Criticality:** This criterion captures Metro's need for the project to be implemented. Projects with a higher project priority value represent immediate or critical infrastructure projects needed to avoid negative operational impacts.

The selection criteria above (and proposed weighting as shown in Figure 3 below) will be used to screen and validate proposed projects' relative importance to both sustainability and overall organizational goals. A re-evaluation of these criteria will take place periodically to allow for the realignment of the project selection process to respond to any key changes in Metro's sustainability related objectives and priorities.

On a rolling basis throughout the year, at least quarterly, the portfolio can accept newly-identified or high-priority projects as available funds allow. An example of the proposed quantitative scoring approach is shown in Figure 3 below. This is an illustrative example of the proposed evaluation and selection matrix. The transparency will minimize confusion and maximize the use of each dollar spent to achieve desired goals. Ranking the potential projects in order of total score from high to low identifies Metro's priorities and an order in which to release funding. Using the results of this evaluation, only the highest impact projects will be submitted for OMB approval using the newly available funds. Projects receiving full implementation budgets will move to Phase 3: Project Development.

| *Example Criteria Weighting* | | *25%* | *25%* | *15%* | *15%* | *20%* |
|---|---|---|---|---|---|---|
| **Example Project List** | **Total Budget** | **Return on Investment** | **Lifecycle Cost Savings** | **Technology Viabiliy** | **Probability of Success** | **Mission Criticality** |
| Project 1 | $ 25,000 | 7 | 7 | 10 | 10 | 10 |
| Project 2 | $ 575,000 | 5 | 5 | 10 | 5 | 5 |
| Project 3 | $ 2,800,000 | 2 | 2 | 10 | 7 | 7 |
| Project 4 | $ 1,000,000 | 5 | 5 | 1 | 5 | 5 |
| Project 5 | $ 80,000 | 5 | 5 | 10 | 1 | 5 |
| Project 6 | $ 650,000 | 1 | 3 | 5 | 10 | 2 |
| Project 7 | $ 165,000 | 5 | 5 | 5 | 5 | 1 |
| **Total FY Funds Required** | **$ 5,295,000** | | | | | |
| **FY available funds** | **$ 5,000,000** | 10 = $$$$ | 10 = $$$$ | 10 = Common Practice | 10 = High | 10 = Time of essence |
| **Difference** | **($295,000)** | 5 = $$ | 5 = $$ | 5 = Emerging but tested | 5 = Medium | 5 = Future critical need |
| | | 1 = $ | 1 = $ | 1 = New / untested | 1 = Low | 1 = No material difference |

| **Total Score** | **Remaining Budget Total** | **Selected?** |
|---|---|---|
| 85 | $ 4,975,000 | YES |
| 57.5 | $ 4,400,000 | YES |
| 49.5 | $ 1,600,000 | YES |
| 44 | $ 600,000 | YES |
| 51.5 | $ 520,000 | YES |
| 36.5 | $ (130,000) | NO |
| 42 | $ (295,000) | NO |

*Figure 16: Example of Potential Sustainability Infrastructure Portfolio Selection Matrix*

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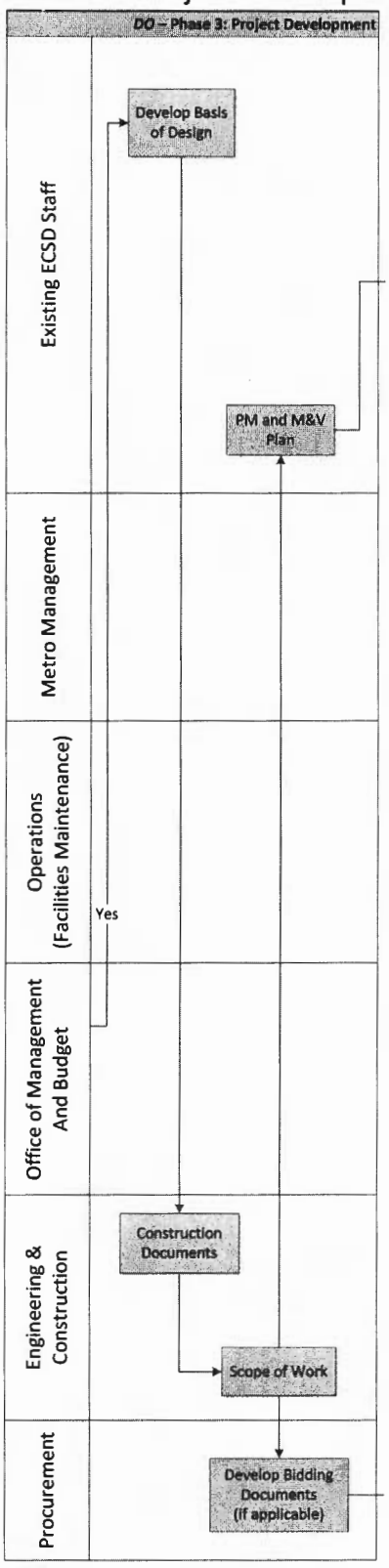
## Phase 3: Project Development




The project development phase will align with the existing Metro Capital Project Approval processes. At the conclusion of this phase, funding requirements will be finalized from implementation through the ongoing operations and maintenance.

The following core deliverables for this phase are common to all best practice construction projects:

- Project Basis of Design
- Construction Documents
- Scope of Work

Given the non-standard equipment necessary for some sustainability-related assets, the next set of deliverables under the project development process clearly identifies project requirements and a plan for the operation and maintenance throughout the equipment's expected useful life:

- Preventative Maintenance Plan
- M&V Plan
- End of Useful Life Assessment.

**Preventative Maintenance Plan**

The Preventative Maintenance Plan will provide a forum to plan for the incorporation of the proposed asset into day-to-day Metro operations. The project team will use the Metro EMS program framework to identify maintenance, training, safety and other requirements that can be tracked using EMS documentation. This phase will incorporate feedback from stakeholders through existing EMS Core Teams, such as maintenance and operational staff. Different assets will require varying levels of sophistication in the development of this plan. ECSD staff will facilitate the development of technical and financial resource requirements to implement the Preventative Maintenance Plan for the life of the asset within the upfront project costs requiring approval.

Recent work between Facilities Maintenance and ECSD related to existing solar PV systems, demonstrates how

this approach can be successful. Upfront identification and assignment of responsibility provides transparency and accountability in the ongoing maintenance of Metro's existing solar systems. Each asset will have a unique Preventative Maintenance Plan with appropriate staff resources assigned. Future projects will benefit from similar projects already completed and are familiar with the process.

**Measurement and Verification (M&V) Plan**

The M&V plan will detail the process for measuring and verifying the efficient operation and cost savings of the proposed project. The section below, titled M&V Asset Savings Determination, details the varying approaches that will vary slightly by project depending on variables such as complexity, size or repeatability.

The costs of implementing the approved M&V approach will be finalized by developing this plan as part of the project's development. At this point in the process, the proposed budget includes the estimated level of M&V anticipated. The development of the M&V Plan will finalize the approach and appropriate resource requirements for each specific project. ECSD staff will facilitate through the EMS the execution of the proposed M&V plan as written during this phase of the project's development.

**End of Useful Life Assessment**

To plan, budget and account for the end-of-useful-life disposal or recycling requirements, the project will follow a life-cycle assessment approach. The expected life-cycle of installed assets will provide a general time horizon for the planning for future projects. An annual state of good repair assessment and funding availability will determine the proper and opportune time to decommission an asset. Sustainability-related assets will continue through the same implementation process outlined above, but may receive priority over the implementation of new assets as project needs warrant.

Project development activities for sustainability-related projects, as well as co-funding of enhanced design or efficient equipment, will be facilitated through ECSD. OMB management's review and approval of the complete project plan documentation represents the completion of Phase 3 activities.

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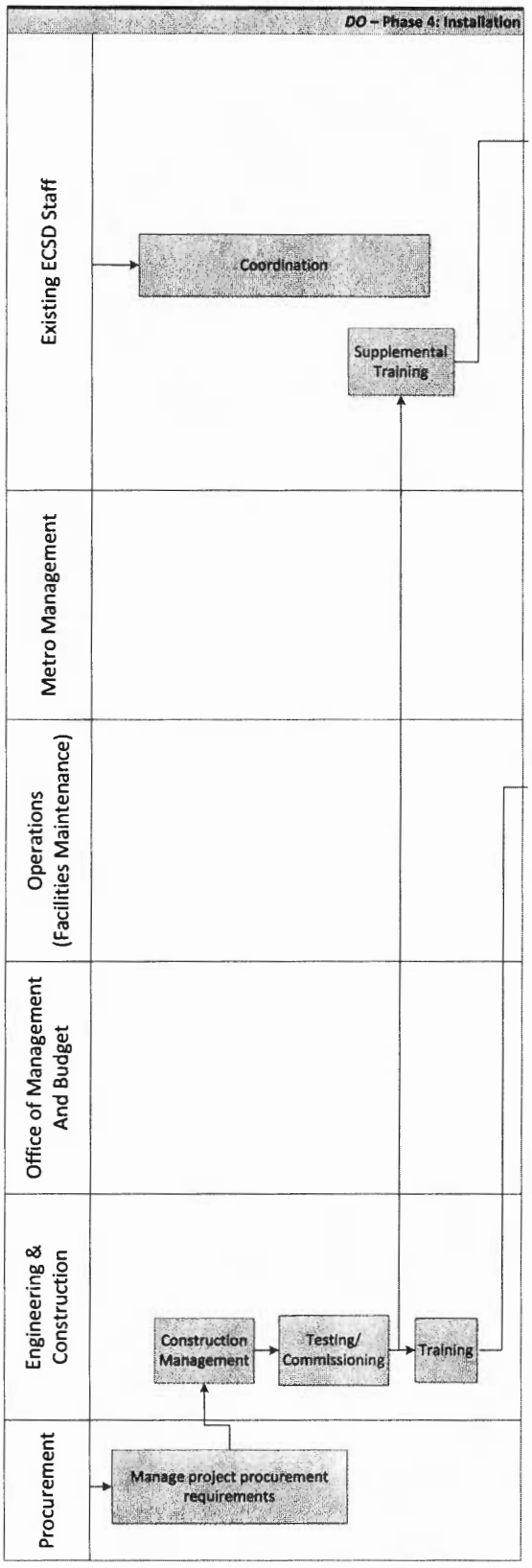
## Phase 4: Installation




Identified project team members will collaborate on the required level of involvement depending on the project delivery mechanism. In many cases existing project delivery approaches and departments will have primary responsibility for the procurement, construction, and commissioning activities needed to implement sustainability assets.

The project team will evaluate any opportunities for alternative financing and delivery mechanisms for sustainability-related projects. However, as with non-sustainability projects at Metro, the Office of Management and Budget will provide project approval and funding while Metro's Procurement department will administer the bidding and purchasing requirements for sustainability projects. This aligned structure provides continuity and affords a series of checks and balances to support transparency throughout the process.

Similar to other capital projects, the primary financial and management hurdles associated with the installation phase is the funding and management of scope changes or project overruns that may occur during the installation, construction, and commissioning of a sustainability project.

ECSD staff will coordinate closely with the implementation team to manage resource needs and changes during this phase. Finally, the EMS Document Control Procedure will guide any necessary changes to project documentation such as those previously developed as part of Phase 3: Project Development.

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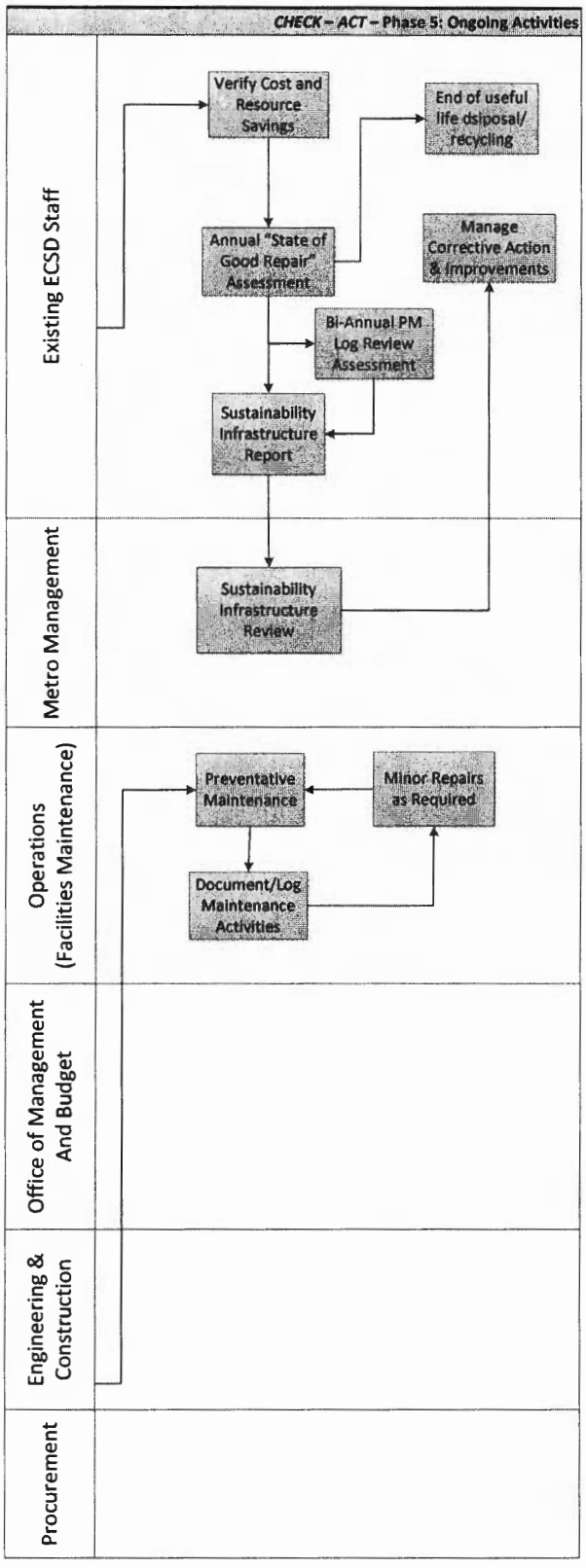
Phase 5: Ongoing Activities and Continual Improvement




After a new sustainability-related asset goes through installation and commissioning, it becomes part of Metro's sustainability infrastructure. An asset remains in this phase through the remainder of its useful life.

Phase 5: Ongoing Activities and Continual Improvement covers the operation of the implemented project and the execution of both the Preventative Maintenance and M&V Plan. ECSD staff will work with internal stakeholders to carry out these plans and continually evaluate their contents to improve future projects and current plans.

The EMS has a strongly documented and controlled process for Monitoring and Measuring environmental performance. This framework will be used to document the following process. Working with Metro Operations, on an annual basis, ECSD will conduct a high-level assessment of the state of good repair requirements for Metro's existing sustainability asset base. On a two-year rolling basis, the team will review the preventative maintenance performance logs and necessary documentation for the installed portfolio. The documented results can be reviewed by the EMS Admin Team as part of the Check and Act framework. In the case that assets are not maintained in a good state of repair, as could be identified through audits, spec evaluations or corrective action requests, ECSD will conduct a more detailed review of the O&M operations in conjunction with the lead Facilities Maintenance and Operations staff. If this process identifies new projects, those will be added to the future projects list in Phase 1. Table 14 describes the proposed

assessment scale that this process will use which may involve either on-site inspections or surveys with personnel operating the assets for their intended purpose.

*Table 14: State of Good Repair Assessment Values by Sustainability Asset Type*

| Asset Category | 1 Poor | 2 Marginal | 3 Adequate | 4 Good | 5 Excellent | Assessment Type |
|---|---|---|---|---|---|---|
| Solar PV | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of panels + inverter + storage + monitoring equipment in good working order (visual equipment inspection) |
| Lighting | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of lamps, ballasts, controls in good working order (visual equipment inspection) |
| HVAC | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of affected personnel report "good working order" (requires survey) |
| LEED - Green Buildings | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of affected personnel report "good working order" (requires survey) |
| Water-conservation Devices | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of devices in good working order (visual equipment inspection) |
| Process Improvements | <40% | 41%-60% | 61%-75% | 76%-90% | > 91% | of affected personnel report "good working order" (requires survey) |

Installed assets remain in the Ongoing Activities and Continual Improvement phase throughout their useful life or until a new project related to this asset will be identified and sent back to Phase 1 of this process. This can be triggered by a failed state of good repair assessment or when one of the following occur:

- A major maintenance requirement exceeds typical O&M requirements
- A process improvement opportunity is identified
- A partial retrofit is required
- A full-asset replacement is required (due to failure, technology improvement, or other cause)
- End-of-useful life disposal/recycling required
- Other circumstances requiring a change in the status quo.

When one of these conditions are identified, appropriate staff will receive notification so that a new project can be developed and added to the list in Phase 1 of this iterative planning process.

## Metro's Green Fund

This plan provides for the opportunity to reinvest resource cost savings into the expanding sustainability infrastructure across Metro's system. The Green Fund is one of several funding sources for supporting both the implementation of sustainability assets and ongoing activities as described in Phase 5: Ongoing Activities and Continual Improvement. The establishment of the Green Fund came with the approval of Item 48 during the May 2014 Board Meeting in response to the first part of the February 2014 Item 57 Motion. The intent of this fund is to support implementation and ongoing management of sustainability assets while minimizing the financial and budgetary impacts on the rest of Metro's operations.

Metro's Green Fund will be funded from the following sources:

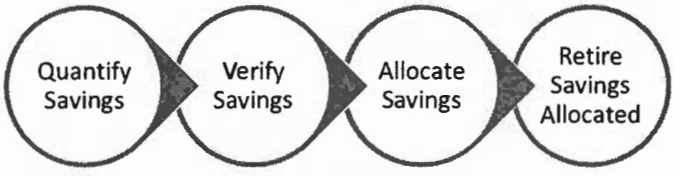
1. Any proceeds from the sale of LCFS credits (per the LCFS revenue optimization plan)
2. Savings reinvestment allocations from internal Metro accounting
3. Any up-front capitalized O&M or M&V funds
4. Incentives received for sustainability projects (e.g. utility incentives)
5. Interest earned on Green Fund investments.

The Green Fund will be used for funding the O&M of sustainability-related capital construction/installation projects deployed on any Metro-controlled sites. These projects would include, but are not limited to:

(a) energy conservation and energy efficiency projects;
(b) renewable energy installation/construction and their operation and maintenance;
(c) resource management initiatives (e.g., water, air, stormwater, industrial wastewater impact and cost-reduction; including waste to energy projects such as those derived for example from non-hazardous/non-human biowaste); and
(d) any other related cost-saving and process efficiency generating activities that has a positive carbon footprint reducing benefit.

## Cost Savings Reinvestment to Green Fund

The sustainability asset reinvestment is a new approach for Metro. This approach will establish an internal accounting process for identifying and re-allocating savings resulting from sustainability-related projects. While the actual implementation of the accounting and tracking practices is more complex, the figure below illustrated the basic components.



This accounting model for reinvesting resource savings has many different structures. Metro is seeking to implement a Return on Investment (ROI) model as shown in Figure 17. In the ROI model, the fund accrues savings on an annual basis up until the project has reached its simple payback. Stated another way, savings will accrue until the fund receives the net cost of the project.

The quantification of the amount of savings to be allocated on an annual basis will be pre-determined and approved prior to installation. The verification that an asset's approved savings values are being achieved throughout the approved period will be executed as described in each project's M&V Plan.

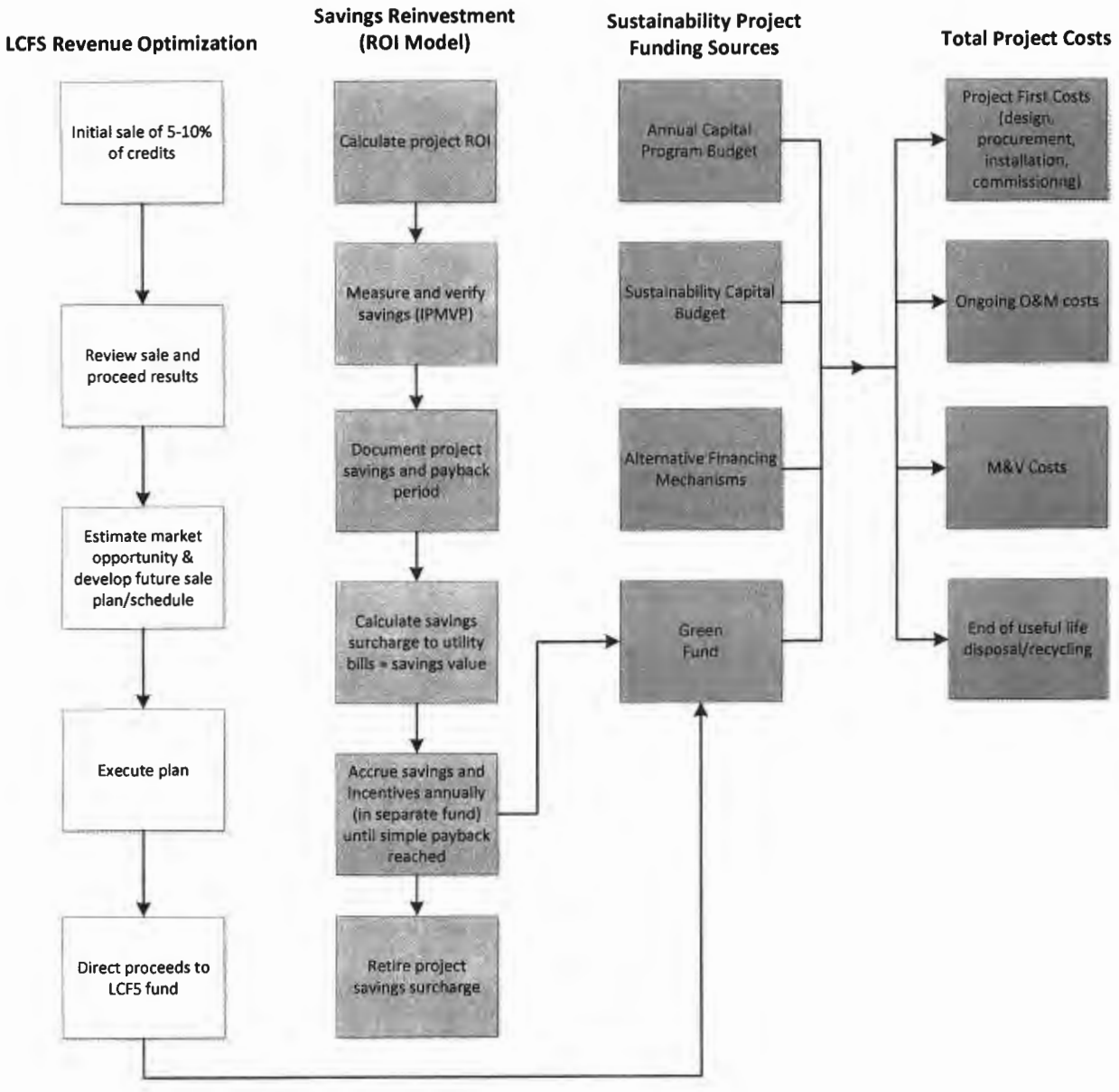



*Figure 17: Sustainability Infrastructure Funding Mechanisms*

## M&V Asset Savings Determination

M&V savings determinations are an important factor in the long-term success of Metro's Sustainability Infrastructure Implementation and Management Plan. Resource cost savings from projects will go through the M&V process and the results will represent the verified savings values that are eligible for reinvestment into the Green Fund. To provide accurate and supported determinations for re-allocation of savings, consistent M&V protocols and international industry established techniques will justify the proposed values.

Project costs may absorb the costs associated with the necessary M&V through the initial purchase of monitoring equipment or through a separate cost incurred throughout the life of the asset. During Phase 2, the project team will estimate these costs and further refine them as applicable in Phase 3, and will include them in the final approved M&V Plan and project budget.

International Performance Measurement and Verification Protocol

Metro's determination of asset savings will be governed by the established International Performance Measurement and Verification Protocol (IPMVP®).[6] This is an established methodology for estimating and calculating savings of energy and water resources with varying levels of complexity for different types of projects. Both energy and water industries have used and refined the M&V approach to determine resource savings over the last two decades. Accurate and reliable financial accounting for measuring and reporting savings from efficiency projects is critical for continued buy-in and support for energy and water saving projects. In California, the California Public Utilities Commission, California Energy Commission and all the investor owned utilities rely upon the IPMVP as the industry standard to determine resource savings values and progress to efficiency goals. Further, California established the existence of the Database Energy Efficiency Resource (DEER), which lists average savings for thousands of efficiency improvements that are researched, tested and updated regularly. ECSD plans to use these established approaches to determine savings with the IPMVP being the preferred approach.

The IPMVP includes different M&V approaches, or Options. Option A is the simplest method for calculating savings, while Option D is the most complex. The relative level of effort required to conduct the measurement and verification of savings typically aligns with the complexity of the approach. **Error! Reference source not found.** provides an overview of the IPMVP Options A through D, along with an example of how to use each option to measure a current asset.

[6] http://www.evo-world.org/index.php?view=download&alias=641-overviewsummary-of-ipmvp-28-38&option=com_docman&Itemid=1585&lang=en

*Table 15: IPMVP Options with Metro Asset Examples*

| IPMVP Options | Short Description | Savings methodology | Current Asset Example |
|---|---|---|---|
| Option A | Retrofit Isolation | Field measurement of key parameters, estimates for non-key parameters | Gateway Building Low Flow Toilet and Waterless Urinal Retrofit; Divsision 7 Maintenance Bay Lighting Retrofit |
| Option B | All parameter measurement | Field measurement of all parameters | Division 8 Solar PV |
| Option C | Whole Facility | Field measurement and monitoring of the entire facility | Division 10 LEED Certification/Green Building |
| Option D | Calibrated Simulation | Computer simulation calibrated to the specific conditions of the facility | Gold Line Wayside Energy Storage |

During Phase 3 project development activities, the project lead must select an IPMVP Option, or a similarly proven alternative, for any projects seeking to reinvest cost savings during the operational phase of that asset's life. The option selected for an asset should provide a reasonable level of savings estimation assurance for accounting, while maintaining a level-of-effort in-line with the project savings value to Metro. Frequency of performance will depend on the life of the asset combined with its complexity and amount of claimed savings. At a minimum, after initial commissioning and M&V of a new asset, a review of asset conditions will occur as part of the annual state of repair assessment.

**ATTACHMENT C**

## Solar PPA Estimated Energy and Operational Costs Avoided Over 25-years

| Year | Division 9 | | | Division 11 | | | Division 22 | | | Expo Line Yard | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Utility Price/kWh | Energy Cost w/o PV | Avoided Costs w/PV | Utility Price/kWh | Energy Cost w/o PV | Avoided Costs w/PV | Utility Price/kWh | Energy Cost w/o PV | Avoided Costs w/PV | Utility Price/kWh | Energy Cost w/o PV | Avoided Costs w/PV |
| 2017 | $0.127 | $135,436 | $20,315 | $0.144 | $184,081 | $27,612 | $0.136 | $97,779 | $14,667 | $0.140 | $67,794 | $10,169 |
| 2018 | $0.129 | $137,467 | $22,347 | $0.146 | $186,843 | $30,373 | $0.138 | $99,246 | $16,134 | $0.142 | $68,811 | $11,186 |
| 2019 | $0.131 | $139,529 | $24,409 | $0.149 | $189,645 | $33,176 | $0.140 | $100,735 | $17,622 | $0.144 | $69,843 | $12,218 |
| 2020 | $0.133 | $141,622 | $26,502 | $0.151 | $192,490 | $36,021 | $0.142 | $102,246 | $19,133 | $0.146 | $70,891 | $13,266 |
| 2021 | $0.135 | $143,746 | $28,626 | $0.153 | $195,377 | $38,908 | $0.144 | $103,779 | $20,667 | $0.149 | $71,954 | $14,329 |
| 2022 | $0.137 | $145,903 | $30,782 | $0.155 | $198,308 | $41,839 | $0.146 | $105,336 | $22,224 | $0.151 | $73,033 | $15,408 |
| 2023 | $0.139 | $148,091 | $32,971 | $0.158 | $201,283 | $44,813 | $0.148 | $106,916 | $23,804 | $0.153 | $74,129 | $16,504 |
| 2024 | $0.141 | $150,313 | $35,192 | $0.160 | $204,302 | $47,833 | $0.151 | $108,520 | $25,407 | $0.155 | $75,241 | $17,616 |
| 2025 | $0.143 | $152,567 | $37,447 | $0.162 | $207,366 | $50,897 | $0.153 | $110,148 | $27,035 | $0.158 | $76,369 | $18,745 |
| 2026 | $0.145 | $154,856 | $39,735 | $0.165 | $210,477 | $54,008 | $0.155 | $111,800 | $28,687 | $0.160 | $77,515 | $19,890 |
| 2027 | $0.147 | $157,179 | $42,058 | $0.167 | $213,634 | $57,165 | $0.157 | $113,477 | $30,364 | $0.162 | $78,678 | $21,053 |
| 2028 | $0.149 | $159,536 | $44,416 | $0.170 | $216,838 | $60,369 | $0.160 | $115,179 | $32,067 | $0.165 | $79,858 | $22,233 |
| 2029 | $0.152 | $161,929 | $46,809 | $0.172 | $220,091 | $63,622 | $0.162 | $116,907 | $33,794 | $0.167 | $81,056 | $23,431 |
| 2030 | $0.154 | $164,358 | $49,238 | $0.175 | $223,392 | $66,923 | $0.165 | $118,660 | $35,548 | $0.170 | $82,271 | $24,647 |
| 2031 | $0.156 | $166,824 | $51,703 | $0.178 | $226,743 | $70,274 | $0.167 | $120,440 | $37,328 | $0.172 | $83,505 | $25,881 |
| 2032 | $0.159 | $169,326 | $54,206 | $0.180 | $230,144 | $73,675 | $0.170 | $122,247 | $39,134 | $0.175 | $84,758 | $27,133 |
| 2033 | $0.161 | $171,866 | $56,746 | $0.183 | $233,597 | $77,127 | $0.172 | $124,081 | $40,968 | $0.178 | $86,029 | $28,405 |
| 2034 | $0.163 | $174,444 | $59,324 | $0.186 | $237,101 | $80,631 | $0.175 | $125,942 | $42,829 | $0.180 | $87,320 | $29,695 |
| 2035 | $0.166 | $177,061 | $61,940 | $0.188 | $240,657 | $84,188 | $0.177 | $127,831 | $44,718 | $0.183 | $88,630 | $31,005 |
| 2036 | $0.168 | $179,716 | $64,596 | $0.191 | $244,267 | $87,798 | $0.180 | $129,748 | $46,636 | $0.186 | $89,959 | $32,334 |
| 2037 | $0.171 | $182,412 | $67,292 | $0.194 | $247,931 | $91,462 | $0.183 | $131,695 | $48,582 | $0.188 | $91,309 | $33,684 |
| 2038 | $0.173 | $185,148 | $70,028 | $0.197 | $251,650 | $95,181 | $0.186 | $133,670 | $50,558 | $0.191 | $92,678 | $35,053 |
| 2039 | $0.176 | $187,926 | $72,805 | $0.200 | $255,425 | $98,955 | $0.188 | $135,675 | $52,563 | $0.194 | $94,068 | $36,444 |
| 2040 | $0.179 | $190,745 | $75,624 | $0.203 | $259,256 | $102,787 | $0.191 | $137,710 | $54,598 | $0.197 | $95,479 | $37,855 |
| 2041 | $0.181 | $193,606 | $78,485 | $0.206 | $263,145 | $106,676 | $0.194 | $139,776 | $56,663 | $0.200 | $96,912 | $39,287 |
| 2042 | $0.184 | $196,510 | $81,389 | $0.209 | $267,092 | $110,623 | $0.197 | $141,872 | $58,760 | $0.203 | $98,365 | $40,740 |
| | | **$4,268,116** | **$1,274,987** | | **$5,801,134** | **$1,732,936** | | **$3,081,415** | **$920,492** | | **$2,136,454** | **$638,209** |

Estimated total saving after 25-years = **$4,560,000**

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**FINANCE, BUDGET AND AUDIT COMMITTEE**
**MAY 15, 2013**

**SUBJECT: ALTERNATIVE FINANCING MECHANISMS FOR ENERGY PROJECTS**

**ACTION: AUTHORIZE CEO TO UTILIZE ALTERNATIVE FINANCING TO ACCELERATE ENERGY PROJECTS**

## RECOMMENDATION

A. Authorize the Chief Executive Officer (CEO) to Apply Utility-Related Financing in Accelerating Energy Program Implementation; and

B. Authorize the CEO to use Project Number 450001 funds for administration of projects developed using Utility-Related Financing.

## ISSUE

On March 20, 2013, Metro staff presented to the Finance, Budget and Audit Committee its findings from a comprehensive survey of the various alternative financing strategies and identified specific funding mechanisms that can be available for energy and sustainability-related capital projects potentially available to the agency. The Committee responded favorably towards the presentation of alternative financing opportunities and encouraged the pursuit of these opportunities that are easily implemented.

## DISCUSSION

Management of the agency's energy and resource consumption and efficiency matters is handled by the Environmental Compliance and Services Department (ECSD). In this capacity, Metro ECSD is working closely with our utility service providers, through the formation of Metro's Energy Blue Ribbon Collaborative (Energy BRC). The Energy BRC is chaired by Metro's CEO and currently consists of executives from the Los Angeles Department of Water and Power, Southern California Edison, Southern California Gas Company and a professor from UCLA's Luskin Institute.

Among other things, the Energy BRC has been working to identify incentives, rebates, and other financing mechanisms to promote the agency's energy efficiency projects. It is also designed to ensure seamless cooperation on all identified energy-related collaborative efforts that simultaneously support regional energy as well as individual Energy BRC member goals. The Energy BRC work is very important to Metro as staff anticipates a significant increase in energy use and most importantly cost (up to 100% increase) during this time of transit and facility expansion. The Energy BRC work is aligned with staff's internal sustainability program.

As presented to the Finance, Budget and Audit Committee, the following are some of the alternative financing opportunities available for energy related projects:

- **On Bill Financing (OBF) / Repayment Programs** – some utilities offer low to no interest "On Bill Financing" to their customers. On Bill Financing or similar financing mechanisms help to fund qualifying energy efficiency projects by providing loans that are repaid as a line item on monthly bills. Qualifying equipment funded through OBF is then eligible for incentives through the rebate programs described above. Some of the anticipated projects noted under the Energy Efficiency Incentive Programs category, may also be eligible for this financing mechanism. These may include:
    - Retrofit of lighting systems
    - Replacement of outdated, inefficient building systems
    - Completion of retro-commissioning activities on energy systems

- **Renewable Energy Programs** – There are three main types of renewable Energy Programs or Financing Structures. Incentive programs like described above offer on time revenue and would be realized if and when LACMTA installs its own renewable energy systems. Project support can be in the form of Renewable Energy Power Purchase Agreements. This mechanism allows for guaranteed revenue to repay the investment of renewable energy systems or rental of land or roof space to 3rd party providers. Feed in Tariff Programs allow for guaranteed revenue from the utility to repay the investment of renewable energy systems that Metro would need to finance. Anticipated projects eligible for this financing mechanism include:
    - Installation of solar (PV) panels as part of the construction of Division 13, a new bus maintenance in the downtown Los Angeles area
    - Installation of solar (PV) panels at two locations as part of the Energy Efficiency and Renewable Energy projects submitted for funding under the FY14 Capital Program

- **Grants and Other Opportunities** – Metro diligently searches for and prepares grant applications to pursue new innovative energy efficiency ideas that may lead to an expanded project that will reap greater energy saving benefits. Some of these grant opportunities are done in partnership with entities who have secured

grants for installation of value-creating or cost-saving projects along our system. Projects currently using this financing mechanism include:

- Metro Red Line Westlake/MacArthur Park Station Wayside Energy Storage System (FTA: $4.5M)
- Metro Gold Line Wayside Energy Storage System (SCAQMD: $800,000)
- Metro Electric Vehicle Charger Stations (CEC: $180,000)

Authorization to use these alternate financing mechanisms will contribute to funding for energy efficiency projects that will increase savings realized from a reduction in energy consumption and an accelerated payback period due to offset of project costs.

In conjunction with the Energy BRC, Metro staff is developing project packages for lighting retrofit and other energy-related projects; and will explore grant opportunities. The energy audits, cost estimates, cost-benefit analysis efforts are intended to identify priority locations to implement all of these anticipated projects.

## DETERMINATION OF SAFETY IMPACT

This program will have no impact on safety.

## FINANCIAL IMPACT

Administrative funding for these projects are included in the FY13 budget in cost center 8420, Environmental Compliance and Services, under project number 450001, Task Order 1.01.

Since these are going to be multi-year project, the cost center manager and Executive Director, Transit Project Delivery will be accountable for budgeting the cost in future years.

### Source of funds

As specific energy-related projects are identified that are associated with utility-related financing, Capital Project workbooks will be developed and request for funding will be requested from the annual capital funding program or if already associated with a capital project, from their associated project budget, upon approval by the responsible Project Manager. If the technology is innovative and a pilot is needed, Board approved Sustainability Capital funding will be used to commence project. Examples of projects that have already been identified in FY13 to FY14 are included in Attachment A.

### Impact to Budget

There will be no net impact to the Bus and Rail Operating and Capital Budgets. There will initially be an impact to the budgets from this action as qualifying equipment will be more expensive than lowest cost options. Utility-related financing require better

performing products that command a premium but cost savings over project life cycle will offset these added costs.

## ALTERNATIVES CONSIDERED

Rejection of the recommended Board action will reduce staff's ability to pursue alternative financing options that will otherwise be available to Metro. Rejection of the staff recommendation is also inconsistent with the provisions of our Board adopted Environmental Policy, Sustainability and Energy Policy, and Renewable Energy Policy that specifically commits to specific actions in pursuing all available options to reduce energy costs, meet agency-wide renewable energy use of 33% by 2020, and enhance energy performance in all existing facilities.

## NEXT STEPS

After Board approval of this action; 1) discuss proposed energy efficiency projects with our Energy BRC partners to identify alternative financing opportunities; 2) prepare project workbooks to establish project budgets; and 3) initiate energy related projects using alternative financing mechanism.

## ATTACHMENT

A. Example of Energy-Related Projects

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Arthur T. Leahy
Chief Executive Officer

**ATTACHMENT A**

## Example of Energy-Related Projects

| Natural Gas Projects | Facility | Est. Annual Gas Savings (Therms) | Estimated Project Cost | Estimated Annual Cost Savings | Incentive Amount |
|---|---|---|---|---|---|
| Boiler Replacement | Gateway Bldg | 21,183 | $370,644 | $13,769 | $6,000 |
| RCx: Increase Deadband | Gateway Bldg | 2,711 | $8,000 | $1,762 | $2,711 |
| RCx: Boiler Lockout | Gateway Bldg | 29,596 | $40,000 | $19,238 | $29,596 |
| New Construction—Comprehensive | Expo Phase II | 3,944 | $113,300 | $28,743 | $3,944 |
| | | 57,434 | $531,944 | $63,512 | $42,251 |
| **Electricity Projects** | **Facility** | **Est. Annual Electricity Savings (kWh)** | **Estimated Project Cost** | **Estimated Annual Cost Savings** | **Incentive Amount** |
| High Bay Lighting Retrofit | Division 7 | 638,122 | $226,219 | $70,193 | $19,144 |
| High Bay Lighting Retrofit | Division 9 | 115,328 | $54,373 | $13,839 | $3,460 |
| Office Retrofit | Division 18 | 62,862 | $1,660 | $7,229 | - |
| Full Building Lighting Retrofit | Division 11 | 2,235,832 | $915,088 | $245,942 | $67,075 |
| Full Building Lighting Retrofit | Division 22 | 1,530,276 | $636,873 | $168,330 | $45,908 |
| Full Building Lighting Retrofit | Division 7 | 58,473 | $35,888 | $6,432 | $1,754 |
| Full Building Lighting Retrofit | Division 9 | 682,007 | $332,198 | $75,021 | $20,460 |
| New Construction—Comprehensive | Expo Phase II | 117,138 | $267,900 | $28,743 | $59,761 |
| Full Building Lighting Retrofit | Gateway Bldg | 1,343,966 | $829,452 | $147,836 | $103,140 |
| Parking Structure Lighting Retrofits | Gateway Bldg | 538,600 | $431,800 | $62,700 | |
| Cooling Tower VFD | Gateway Bldg | | $60,000 | | |
| 3rd Floor RC | Gateway Bldg | 3,698 | $30,000 | $444 | |
| HHW VFD - Boiler Replacement | Gateway Bldg | | $22,000 | | |
| RCx: Increase Deadband | Gateway Bldg | 29,837 | $6,000 | $3,282 | $2,387 |
| RCx: Supply Duct Static Pressure Reset | Gateway Bldg | 62,941 | $37,000 | $6,923 | $5,035 |
| RCx: Boiler Lockout | Gateway Bldg | 86,667 | $6,000 | $9,533 | $6,933 |
| RCx: Chilled Water Reset | Gateway Bldg | 45,693 | $4,000 | $5,026 | $3,655 |
| RCx: Condensor Water Supply Temp. Reset | Gateway Bldg | 157,529 | $12,500 | $17,328 | $12,602 |
| Office Retrofit | Division 15 | 24,866 | $1,545 | $2,984 | - |
| | | 7,733,835 | $3,910,496 | $871,786 | $351,315 |
| **Solar (PV) Panel Projects** | **Facility** | **Est. Annual Electricity Production (kWh)** | **Estimated Project Cost** | **Est. Annual Cost Savings** | **Incentive Amount** |
| Rooftop PV Installation - Main Shop | Division 20 | 1,132,603 | $2,331,829 | $117,677 | $732,860 |
| Rooftop PV Installation - Maintenance Bldg | Division 10 | 407,316 | $958,392 | $42,320 | $263,558 |
| | | 1,539,919 | $3,290,221 | $159,998 | $996,418 |