

## **APPENDIX C**

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### **Metro Supplemental Documents**

## ADJACENT CONSTRUCTION DESIGN MANUAL

## 1.0 INTRODUCTION

- 1.1 Parties planning construction over, under or adjacent to a Metropolitan Transportation Authority (MTA) facilities or structures are advised to submit for review ~~seven (7)~~ **two (2) hard** copies **and one (1) electronic copy** of their **design** drawings and ~~four (4)~~ copies of their calculations showing the relationship between their project and the MTA facilities, for MTA review. The purpose of the MTA review is to reduce the chance of conflict, damage, and unnecessary remedial measures for both MTA and the parties. Parties are defined as developers, agencies, municipalities, property owners or similar organizations proposing to perform or sponsor construction work near MTA facilities.
- 1.2 Sufficient drawings and details shall be submitted at each level of completion such as Preliminary, In-Progress, Pre-final and Final, etc. to facilitate the review of the effects that the proposed project may or may not have on the MTA facilities. An MTA review requires internal circulation of the construction drawings to concerned departments (~~usually includes Construction, Operations, Maintenance, and Real Estate~~) **for MTA departments review**. Parties shall be responsible for all costs related to ~~MTA drawing reviews by MTA~~. MTA costs shall be based upon the actual hours taken for review at the hourly rate of pay plus overhead charges. Drawings normally required for review are:
- A. Site Plan
  - B. Drainage Area Maps and Drainage Calculations
  - C. Architectural drawings
  - D. Structural drawings and calculations
  - E. Civil Drawings
  - F. Utility Drawings
  - G. Sections showing Foundations and MTA Structures
  - H. Column Load Tables
  - I. Pertinent Drawings and calculations detailing an impact on MTA facilities
  - J. A copy of the Geotechnical Report.
  - K. Construction zone traffic safety and detour plans: Provide and regulate positive traffic guidance and definition for vehicular and pedestrian traffic adjacent to the construction site to ensure traffic safety and reduce adverse traffic circulation impact.
  - L. Drawings and calculations should be sent to:  
**MTA Third Party Administration (Permits Administration)**  
**Los Angeles County Metropolitan Transportation Authority**  
One Gateway Plaza  
Los Angeles, California 90012

- 1.3 If uncertainty exists on the possible impacts a project may have on the MTA facilities, and before submitting a formal letter requesting a review of a construction project adjacent to the Metro System, the party or his agent may contact the MTA Third Party Administrator (Permits ). The Party shall review the complexity of the project, and **contact MTA to** receive an informal evaluation of the amount of detail required for the MTA review. In those cases, whereby it appears the project will present no risk to MTA, the Third Party Administrator (Permits) shall immediately route the design documents to **Engineering**, Construction, Operations, Maintenance, and Real Estate departments for a preliminary evaluation. If it is then confirmed that MTA risk is not present, the Administrator shall process an approval letter to the party.
- 1.4 A period of 30 working days should be allowed for review of the drawings and calculations. Thirty (30) work days should be allowed for each successive review as required. It is noted that preliminary evaluations are usually produced within 5 working days.
- 1.5 The party shall reimburse the MTA for any technical review or support services costs incurred that are associated with his/her request for access to the Metro **Transit**Rail System
- 1.6 The following items must be completed before starting any construction:
- A. Each part of the project's design may be reviewed and approved by the MTA. The prime concern of the MTA is to determine the effect of the project on the MTA structure and its transit operations. A few of the other parts of a project to be considered are overhead protection, dust protection, dewatering, and temporary use of public space for construction activities.
  - B. Once the Party has received written acceptance of the design of a given project then the Party must notify MTA prior to the start of construction, in accordance with the terms of acceptance.
- 1.7 Qualified Seismic, Structural and Geotechnical Oversight
- The design documents shall note the name of the responsible Structural Engineer and Geotechnical Engineer, licensed in the State of California.

## 2.0 REVIEW PROCEDURE

- 2.1 All portions of any proposed design that will have a direct impact on an MTA facility or structure will be reviewed to assure that the MTA facility or structure is not placed in risk at any time, and that the design meets all applicable codes and criteria. Any portion of the proposed design that is to form part of an MTA controlled area shall be designed to meet the MTA Design Criteria and Standards.
- 2.2 Permits, where required by the local jurisdiction, shall be the responsibility of the party. City of L.A. Dept. of Bldg. and Safety and the Bureau of Engineering permit review shall remain in effect. Party shall refer to MTA Third Party Administration policies and procedures, THD5 for additional information.
- 2.3 Monitoring of the temporary support of excavation structures for adjacent construction shall be required in all cases for excavations within the geotechnical zone of influence of MTA structures. The extent of the monitoring will vary from case to case.

- 2.4 Monitoring of the inside of MTA tunnels and structures shall be required when the adjacent excavation will unload or load the MTA structure or tunnel. Monitoring of vertical and horizontal distortions will include use of extensometers, inclinometers, settlement reference points, tiltmeters, groundwater observation wells, tape extensometer anchor points and load cells, as appropriately required. Acceptable limits of movement will depend on groundwater conditions, soil types and also the length of service the stations and tunnels have gone through. Escorts will be required for the survey parties entering the Metro operating system in accordance with MTA Operating Rules and Procedures. An MTA account number will be established and the costs for the escort monitoring and surveying service will be billed directly to the party or his agent as in section 1.2.
- 2.5 The calculations submitted for review shall include the following:
- A. A concise statement of the problem and the purpose of the calculation.
  - B. Input data, applicable criteria, clearly stated assumptions and justifying rationale.
  - C. References to articles, manuals and source material shall be furnished with the calculations.
  - D. Reference to pertinent codes and standards.
  - E. Sufficient sketches or drawing references for the work to be easily understood by an independent reviewer. Diagrams indicating data (such as loads and dimensions) shall be included along with adequate sketches of all details not considered standard by MTA.
  - F. The source or derivation of all equations shall be shown where they are introduced into the calculations.
  - G. Numerical calculations shall clearly indicate type of measurement unit used.
  - H. Identify results and conclusions.
  - I. Calculations shall be neat, orderly, and legible.
- 2.6 When computer programs are used to perform calculations, the following information shall accompany the calculation, including the following:
- A. Program Name.
  - B. Program Abstract.
  - C. Program Purpose and Applications.
  - D. Complete descriptions of assumptions, capabilities and limitations.
  - E. Instructions for preparing problem data.
  - F. Instructions for problem execution.
  - G. List (and explanation) of program acronyms and error messages.
  - H. Description of deficiencies or uncorrected errors.
  - I. Description of output options and interpretations.
  - J. Sample problem(s), illustrating all input and output options and hardware execution statements. Typically, these problems shall be verified problems.
  - K. Computer printout of all supporting calculations.

- L. The "User's Manual" shall also include a certification section. The certification section shall describe the methods and how they cover the permitted options and uses of the program.
- 2.7 Drawings shall be drawn, to scale, showing the location and relationship of proposed adjacent construction to existing MTA structures at various stages of construction along the entire adjacent alignment. The stresses and deflections induced in the existing MTA structures should be provided.
- 2.8 The short-term and long-term effects of the new loading due to the adjacent construction on the MTA structures shall be provided. The soil parameters and other pertinent geotechnical criteria contained in existing contract documents for the affected structure, plus any additional conditions shall be used to analyze the existing MTA structures.
- 2.9 MTA structures shall be analyzed for differential pressure loadings transferred from the adjacent construction site.

### 3.0 MECHANICAL CRITERIA

- 3.1 Existing services to MTA facilities, including chilled water and condenser water piping, potable and fire water, storm and sanitary sewer, piping, are not to be used, interrupted nor disturbed without written approval of MTA.
- 3.2 Surface openings of ventilation shafts, emergency exits serving MTA underground facilities, and ventilation system openings of surface and elevated facilities are not to be blocked or restricted in any manner. Construction dust shall be prevented from entering MTA facilities.
- 3.3 Hot or foul air, fumes, smoke, steam, etc., from adjacent new or temporary facilities are not to be discharged within 40 feet of existing MTA ventilation system intake shafts, station entrances or portals. Tunnel ventilation shafts are both intake and discharge structures.
- 3.4 Clear access for the fire department to the MTA fire department connections shall be maintained at all times. Construction signs shall be provided to identify the location of MTA fire department connections. No interruption to fire protection water service will be permitted at any time.
- 3.5 Modifications to existing MTA mechanical systems and equipment, including ventilation shafts, required by new connections into the MTA System, shall only be permitted with prior review and approval by MTA. If changes are made to MTA property as built drawings shall be provided reflecting these changes.

At the option of MTA, the adjacent construction party shall be required to perform the field tests necessary to verify the adequacy of the modified system and the equipment performance. This verification shall be performed within an agreed time period jointly determined by MTA and the Party on a case by case basis. Where a modification is approved, the party shall be held responsible to maintain original operating capacity of the equipment and the system impacted by the modification.

## 4.0 OPERATIONAL REQUIREMENTS

### 4.1 GENERAL

- A. Normal construction practices must be augmented to insure adequate safety for the general public entering Metro Stations and riding on Metro Trains and Buses. Design of a building, structure, or facility shall take into account the special safety considerations required for the construction of the facility next to or around an operating transit system.
- B. Projects which require working over or adjacent to MTA station entrances shall develop their construction procedures and sequences of work to meet the following minimum requirements:
  - 1. Construction operations shall be planned, scheduled and carried out in a way that will afford the Metro patrons and the general public a clean, safe and orderly access and egress to the station entrance during revenue hours.
  - 2. Construction activities which involve swinging a crane and suspended loads over pedestrian areas, MTA station entrances and escalators, tracks or Metro bus passenger areas shall not be performed during revenue hours. Specific periods or hours shall be granted on a case-by-case basis, **with the approval of Construction Work Plan by MTA Construction Safety Department.**
  - 3. All cranes must be stored and secured facing away from energized tracks, when appropriate.
  - 4. All activity must be coordinated through the MTA Track Allocation process in advance of work activity. **All members of the work crew will be required to attend MTA Safety Training.**
  - 5. **In order to provide a safe zone to maintain adjacent developments. All developments adjacent to Metro At-Grade Stations, Aerial Stations or Track Guideways shall provide a minimum 5 foot setback from the Metro and developer's shared property line to the outside face of the proposed structure at Metro or the developer's property for maintenance to be performed or installed from within the zone created by this setbacks.**

### 4.2 OVERHEAD PROTECTION - Station Entrances

- A. Overhead protection from falling objects shall be provided over MTA facilities whenever there is possibility, due to the nature of a construction operation, that an object could fall in or around MTA station entrances, bus stops, elevators, or areas designed for public access to MTA facilities. Erection of the overhead protection for these areas shall be done during MTA non-revenue hours.
  - 1. The design live load for all overhead protection shall be 150 pounds per square foot minimum. The design wind load on the temporary structures shall be 20 pounds per square foot, on the windward and leeward sides of the structure.
  - 2. The overhead protection shall be constructed of fire rated materials. Materials and equipment shall not be stored on the completed shield. The roof of the

shield shall be constructed and maintained watertight.

- B. Lighting in public areas and around affected MTA facilities shall be provided under the overhead protection to maintain a minimum level of twenty-five (25) footcandles at the escalator treads or at the walking surface. The temporary lighting shall be maintained by the Party.
- C. Wooden construction fencing shall be installed at the boundary of the areas with public access. The fencing shall be at least eight-feet high, and shall meet all applicable code requirements.
- D. An unrestricted public access path shall be provided at the upper landing of the entrance escalator-way in accordance with the following:
  - 1. A vertical clearance between the walking surface and the lowest projection of the shield shall be 8'-0".
  - 2. A clear pedestrian runoff area extending beyond the escalator newel shall be provided, the least dimension of which shall be twenty (20) feet.
  - 3. A fifteen (15) foot wide strip (other than the sidewalk) shall be maintained on the side of the escalator for circulation when the escalator is pointed away from a street corner.
  - 4. A clear path from any MTA emergency exit to the public street shall be maintained at all times.
- E. Temporary sidewalks or pedestrian ways, which will be in use more than 10 days, shall be constructed of four (4") inch thick Portland cement concrete or four (4") inches of asphaltic concrete placed **over a minimum four (4") inches of untreated base material**, and finished by a machine.

#### 4.3 OVERHEAD PROTECTION - Operating Right-of-Way Trackage

- A. MTA Rail Operations Control Center shall be informed of any intent to work above, on, or under the MTA right-of-way. Crews shall be trained and special flagging operations shall be directed by MTA Rail Operations Control Center. The party shall provide competent persons to serve as Flaggers. These Flaggers shall be trained and certified by MTA Rail Operations prior to any work commencing. All costs incurred by MTA shall be paid by the party.
- B. A construction project that will require work over, under or adjacent to the at grade and aerial MTA right-of-way should be aware that the operation of machinery, construction of scaffolding or any operation hazardous to the operation of the MTA facility shall require that the work be done during non-revenue hours and authorized through the MTA Track Allocation process.
- C. MTA flagmen or inspectors from MTA Operations shall observe all augering, pile driving or other work that is judged to be hazardous. Costs associated with the flagman or inspector shall be borne by the Party.

- D. The party shall request access rights or track rights to perform work during non-revenue hours. The request shall be made through the MTA Track Allocation process.-

#### 4.4 OTHER METRO FACILITIES

- A. Access and egress from the public streets to fan shafts, vent shafts and emergency exits must be maintained at all times. The shafts shall be protected from dust and debris. See Exhibit A for details.
- B. Any excavation in the vicinity of MTA power lines feeding the Metro System shall be through hand excavation and only after authorization has been obtained through the MTA Track Allocation process. MTA Rail Operations Control Center shall be informed before any operations commences near the MTA power system.
- C. Flammable liquids shall not to be stored over or within 25 feet horizontally of MTA underground facilities. If installed within 25 to 100 feet horizontally of the structure, protective encasement of the tanks shall be required in accordance with NFPA STD 130. Existing underground tanks located within 100 feet horizontally of MTA facilities and scheduled to be abandoned are to be disposed of in accordance with Appendix C of NFPA STD 130. NFPA STD 130 shall also be applied to the construction of new fuel tanks.

- D. Isolation of MTA Facilities from Blast

Subsurface areas of new adjacent private buildings where the public has access or that cannot be guaranteed as a secure area, such as parking garages and commercial storage and warehousing, will be treated as areas of potential explosion. NFPA 130, Standard for Fixed Guideway Transit Systems, life safety separation criteria will be applied that assumes such spaces contain Class I flammable, or Class II or Class III Combustible liquids. For structural and other considerations, isolation for blast will be treated the same as seismic separation, and the more restrictive shall be applied.

- E. Any proposed facility that is located within 20 feet radius of an existing Metro facility will require a blast and explosion study and recommendations to be conducted by a specialist who is specialized in the area of blast force attenuation. This study must assess the effect that an explosion in the proposed non-Metro facility will have on the adjacent Metro facility and provide recommendations to prevent any catastrophic damage to the existing Metro facility. Metro must approve the qualifications of the proposed specialist prior to commencement of any work on this specialized study.

#### 4.5 SAFETY REGULATIONS

- A. Comply with Cal/OSHA Compressed Air Safety Orders Title 8, Division 1, Chapter 4, Subchapter 3. Comply with California Code of Regulations Title 8, Title 29 Code of Federal Regulations; and/or the Construction Safety and Health Manual ( Part F ) of the contract whichever is most stringent in regulating the safety conditions to be maintained in the work environment as determined by the Authority. The Party recognizes that government promulgated safety regulations are minimum standards and that additional safeguards may be required



- B. Comply with the requirements of Chemical Hazards Safety and Health Plan, (per 29 CFR 1910.120 entitled, ( Hazardous Waste Operations and Emergency Response) with respect to the handling of hazardous or contaminated wastes and mandated specialty raining and health screening.
- C. Party and contractor personnel while within the operating MTA right-of-way shall coordinate all safety rules and procedures with MTA Rail Operations Control Center.
- D. When support functions and electrical power outages are required, the approval MUST be obtained through the MTA Track Allocation procedure. Approval of the support functions and power outages must be obtained in writing prior to shutdown.

## **5.0 CORROSION**

### **5.1 STRAY CURRENT PROTECTION**

- A. Because stray currents may be present in the area of the project, the Party shall investigate the site for stray currents and provide the means for mitigation when warranted.
- B. Installers of facilities that will require a Cathodic Protection (CP) system must coordinate their CP proposals with MTA. Inquiries shall be routed to the Manager, Third Party Administration.
- C. The Party is responsible for damage caused by its contractors to MTA corrosion test facilities in public right-of-way.

**End of Section**

Los Angeles County  
Metropolitan Transportation Authority

# METRO ADJACENT DEVELOPMENT HANDBOOK

A GUIDE FOR CITIES AND DEVELOPERS

MAY 2018



**Metro**

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# Introduction

The Metro Adjacent Development Handbook provides guidance to local jurisdictions and developers constructing on, adjacent, over, or under Metro right of way, non-revenue property, or transit facilities to support transit-oriented communities, reduce potential conflicts, and facilitate clearance for building permits. The Handbook should be used for guidance purposes only. The Metro Adjacent Construction Design Manual and Metro Rail Design Criteria are documents that shall be strictly adhered to for obtaining approval for any construction adjacent to Metro facilities.

## Who is Metro?

The Los Angeles County Metropolitan Transportation Authority (Metro) plans, funds, builds, and operates rail and bus service throughout Los Angeles County. Metro moves close to 1.3 million riders on buses and trains daily, traversing many jurisdictions in Los Angeles County. With funding from the passage of *Measure R* (2008) and *Measure M* (2016), the Metro system will expand significantly, adding over 100 miles of new transit corridors and up to 60 new stations. New and expanded transit lines will improve mobility across Los Angeles County, connecting riders to more destinations and expanding opportunities for adjacent construction and *Transit Oriented Communities (TOCs)*. Metro's bus and rail service spans over 1,433 square miles and includes the following transit service:



**Metro Rail** connects close to 100 stations along 98.5 miles of track and operates underground in tunnels, at grade within roadways and dedicated *rights-of-way (ROW)*, and above grade on aerial guideways. The Metro Rail fleet includes *heavy rail* and *light rail* vehicles. Heavy rail vehicles are powered by a third rail through a conductor along the tracks and light rail vehicles are powered by an *overhead catenary system (OCS)*. To operate rail service, Metro owns traction power substations, maintenance yards and shops, and supporting infrastructure.



**Metro Bus-Rapid-Transit (BRT)** operates accelerated bus transit, which serves as a hybrid between rail and traditional bus service. *BRT* operates along a dedicated ROW, separated from vehicular traffic to provide rapid service. Metro BRT may run within the center of a freeway or may be separated from traffic in its own corridor. BRT station footprints vary from integrated, more spacious stations to compact boarding areas along streets.



**Metro Bus** serves 15,967 bus stops, operates 170 routes and covers 1,433 square miles with a fleet of 2,228 buses. Metro "Local" and "Rapid" bus service runs within the street, typically alongside vehicular traffic, though occasionally in "bus-only" lanes. Metro bus stops are typically located on sidewalks within the public right-of-way, which is owned and maintained by local jurisdictions.



**Metrolink/Regional Rail:** Metro owns much of the ROW within Los Angeles County on which the *Southern California Regional Rail Authority (SCRRA)* operates *Metrolink* service. Metrolink is a commuter rail system with seven lines that span 388 miles throughout Los Angeles, Orange, Riverside, San Bernardino, Ventura, and North San Diego counties. As a SCRRA member agency and property owner, Metro reviews development activity adjacent to Metrolink ROW.

# Introduction

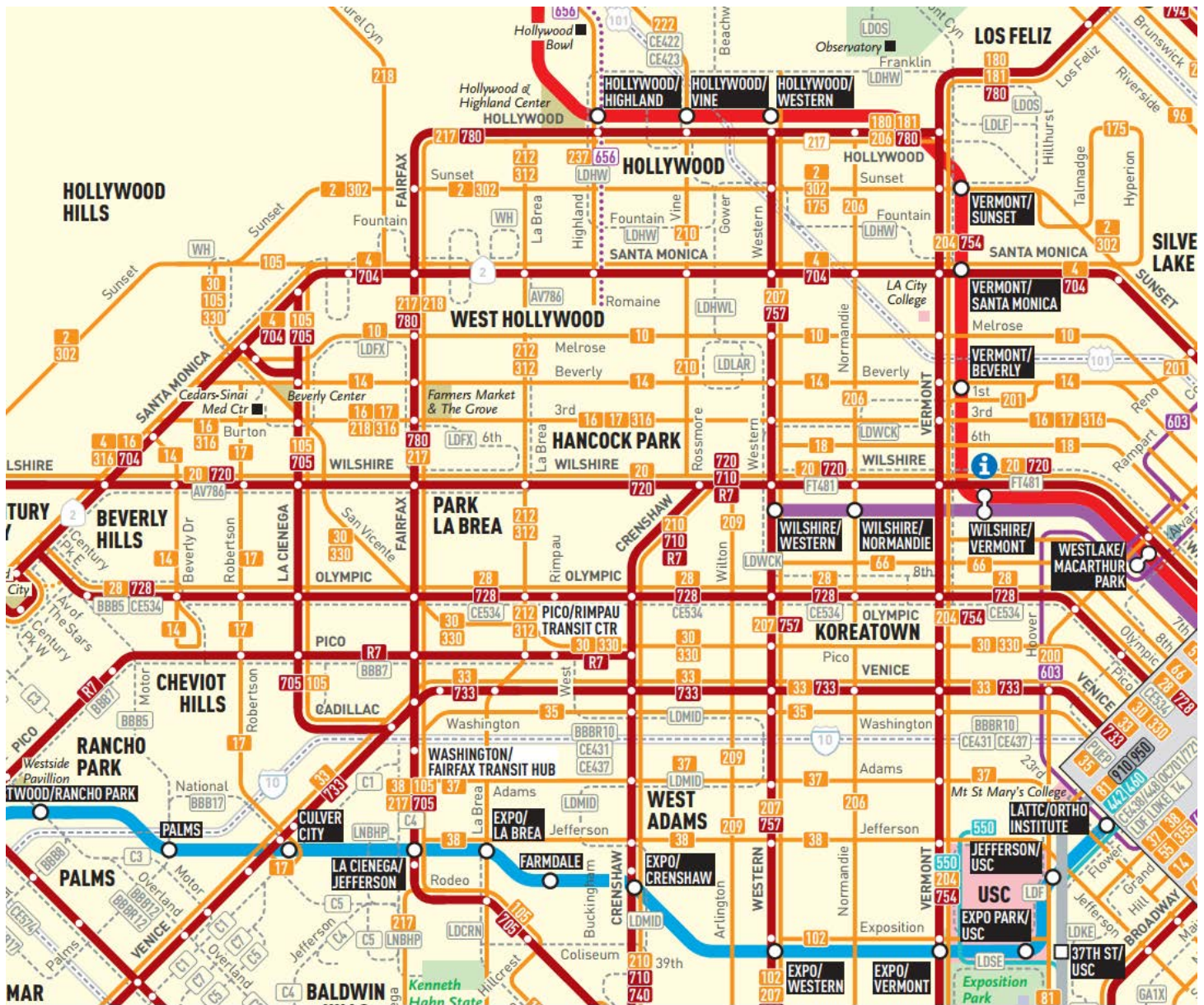
## Metro and Regional Rail Map



Metro is currently undertaking the largest rail infrastructure expansion effort in the United States. A growing fixed guideway system presents new adjacency challenges, but also new opportunities to catalyze land use investment and shape livable communities along routes and around stations.



## Metro Bus and Rail System Map (Excerpt)



As a street-running transit service, Metro’s “Rapid” and “Local” buses share the public ROW with other vehicles, cyclists, and pedestrians, and travel through the diverse landscapes of Los Angeles County’s 88 cities and unincorporated areas.



# Introduction

## Why is Metro Interested in Adjacent Development?

### Metro Supports Transit Oriented Communities

Metro is redefining the role of the transit agency by expanding mobility options, promoting sustainable urban design, and helping transform communities throughout Los Angeles County. Leading in this effort is Metro's vision to create TOCs, a mobility and development approach that is community-focused and context-responsive at its core. The TOC approach goes beyond the traditional transit oriented development (TOD) model to focus on shaping vibrant places that are compact, walkable, and bikeable community spaces, and acknowledge mobility as an integral part of the urban fabric.

### Adjacent Development Leads to Transit Oriented Communities

Metro supports private development adjacent to transit as this presents a mutually beneficial opportunity to enrich the built environment and expand mobility options for users of developments. By connecting communities, destinations, and amenities through improved access to public transit, adjacent developments have the potential to reduce car dependency and greenhouse gas emissions; promote walkable and bikeable communities that accommodate more healthy and active lifestyles; improve access to jobs and economic opportunities; and create more opportunities for mobility – highly desirable features in an increasingly urbanized environment.

Metro is committed to working with stakeholders across the County to support the development of a sustainable, welcoming, and well-designed environment around its transit services and facilities. Acknowledging an unprecedented opportunity to influence how the built environment throughout Los Angeles County develops along and around transit and its facilities, Metro has created this Handbook – a resource for municipalities, developers, architects, and engineers to use in their land use planning, design, and development efforts. This Handbook presents a crucial first step in active collaboration with local stakeholders; finding partnerships that leverage Metro initiatives and support TOCs across Los Angeles County; and ensuring compatibility with transit infrastructure to minimize operational, safety, and maintenance issues.



# Metro Adjacent Development Handbook

## What are the Goals of the Handbook?

Metro is committed to partnering with local jurisdictions and providing information to developers early in project planning to identify potential synergies associated with building next to transit and reduce potential conflicts with transit infrastructure and services. Specifically, the Handbook is intended to guide the design, engineering, construction, and maintenance of structures within 100 feet of Metro ROW, including underground easements, on which Metro operates or plans to operate service, as well as in close proximity to or on Metro-owned non-revenue property and transit facilities.

**Metro is interested in reviewing projects within 100 feet of its ROW** – measured from the edge of the ROW outward – both to maximize integration opportunities with adjacent development and to ensure the structural safety of existing or planned transit infrastructure. As such, the Handbook seeks to:

- Improve communication, coordination, and understanding between developers, municipalities, and Metro.
- Streamline the development review process by coordinating a seamless, comprehensive agency review of all proposed developments near Metro facilities and properties.
- Highlight Metro operational needs and requirements to ensure safe, continuous service.
- Identify common concerns associated with developments adjacent to Metro ROW.
- Prevent potential impacts to Metro transit service or infrastructure.
- Maintain access to Metro facilities for patrons and operational staff.
- Avoid preventable conflicts resulting in increased development costs, construction delays, and safety impacts.
- Make project review transparent, clear, and more efficient.
- Assist in the creation of overall marketable and desirable developments.

## Who Should Use the Handbook?

The Handbook is intended to be used by:

- Local jurisdictions who review, entitle, and permit development projects and/or develop policies related to land use, development standards, and mobility
- Developers, Project sponsors, architects, and engineers
- Entitlement consultants
- Property owners
- Builders/contractors
- Real estate agents
- Utility owners
- Environmental consultants

# Metro Adjacent Development Handbook

## How Should the Handbook be Used?

The Handbook complements requirements housed in the *Metro Adjacent Construction Design Manual*, which accompanies the *Metro Rail Design Criteria (MRDC)* and other governing documents that make up the *Metro Design Criteria and Standards*. This Handbook provides an overview and guide related to opportunities, common concerns, and issues for adjacent development and is organized into three categories to respond to different stages of the development process:



### 1 Site Planning & Design



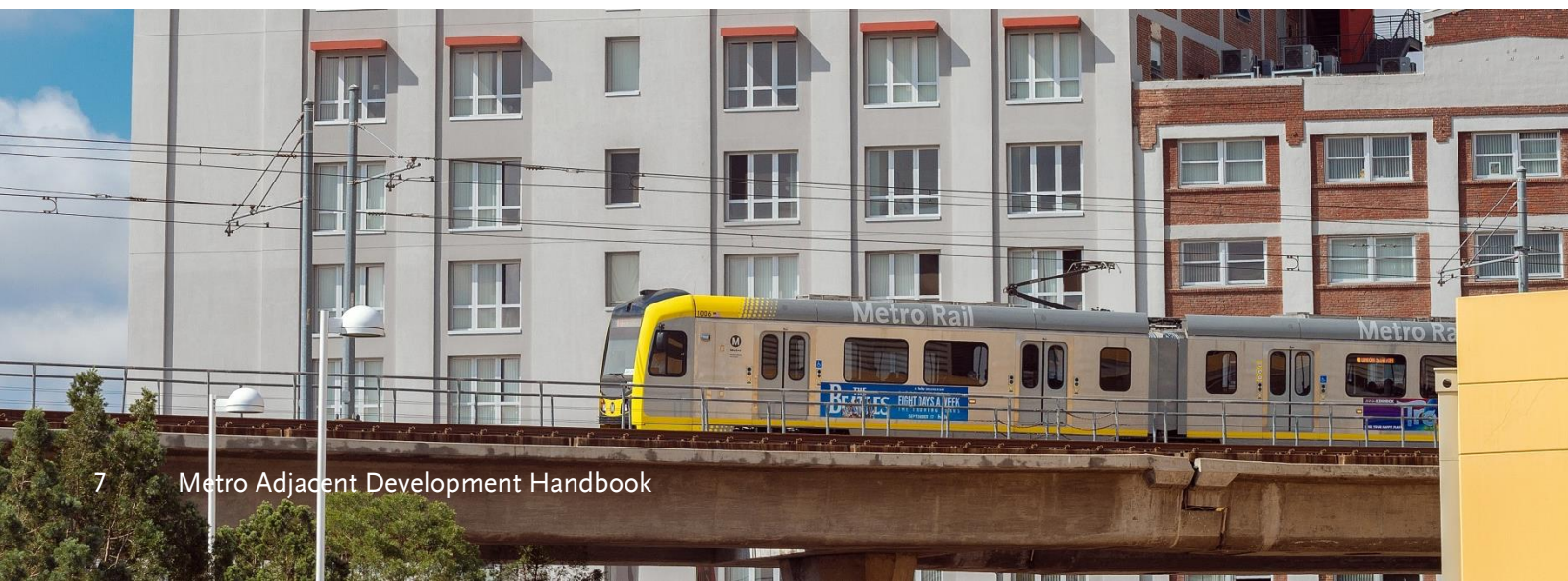
### 2 Engineering



### 3 Construction Safety & Monitoring

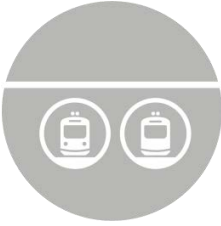





Each page of the Handbook focuses on a specific issue and provides best practices to avoid potential conflicts and/or create compatibility with the Metro transit system. Links to additional resources listed at the bottom of each page may be found under Resources at the end of the Handbook. Definitions for words listed in *italics* may also be found at the end of this Handbook in the Glossary.

Metro will continue to revise the Handbook, as needed, to capture input from all parties and reflect evolving Best Practices in safety, operations, and transit-supportive development.





## Types of Metro ROW & Transit Assets

Conditions	Description	Common Concerns for Metro with Adjacent Development
 <p>UNDERGROUND ROW</p>	Transit operates below ground in tunnels.	<ul style="list-style-type: none"> <li>• Excavation support/tiebacks</li> <li>• Underground utilities</li> <li>• Shoring and structures</li> <li>• Ventilation shafts and street/sidewalk surface penetrations</li> <li>• Appendages (emergency exits, vents, etc.)</li> <li>• Surcharge loading of adjacent construction</li> <li>• Explosions</li> <li>• Noise and vibration/ground movement</li> </ul>
 <p>ELEVATED ROW</p>	Transit operates on elevated structures, typically supported by columns.	<ul style="list-style-type: none"> <li>• Upper level setbacks</li> <li>• Excavation support/tiebacks</li> <li>• Clearance from the OCS</li> <li>• Crane swings &amp; overhead protection</li> <li>• Column foundations</li> </ul>
 <p>OFF-STREET ROW</p>	Transit operates in dedicated ROW at street level, typically separated from private property or roadway by a fence or wall.	<ul style="list-style-type: none"> <li>• Building setbacks from ROW</li> <li>• Travel sight distance/cone of visibility</li> <li>• Clearance from OCS</li> <li>• Crane swings &amp; overhead protection</li> <li>• Storm water drainage for low impact development</li> <li>• Noise/vibration</li> <li>• Trackbed stability</li> </ul>
 <p>ON-STREET ROW</p>	Transit operates within roadway at street level and is separated by fencing or a mountable curb.	<ul style="list-style-type: none"> <li>• Setbacks from ROW</li> <li>• Travel sight distance/cone of visibility impeded by structures near ROW</li> <li>• Clearance from OCS</li> <li>• Crane swings &amp; overhead protection</li> <li>• Driveways near ROW crossings</li> <li>• Noise/vibration</li> <li>• Trackbed stability</li> </ul>
 <p>ON-STREET BUSES</p>	Metro buses operate on city streets. Bus stops are located on public sidewalks.	<ul style="list-style-type: none"> <li>• Lane closures and re-routing</li> <li>• Bus stop access and temporary relocation</li> </ul>
 <p>NON-REVENUE/ OPERATIONAL ASSETS</p>	Metro owns and maintains non-operational ROW and property used to support the existing and planned transit system (e.g. bus and rail maintenance facilities, transit plazas, traction power substations, park-and-ride lots).	<ul style="list-style-type: none"> <li>• Adjacent structure setbacks</li> <li>• Adjacent excavation support/tiebacks</li> <li>• Ground movement</li> <li>• Underground utilities</li> <li>• Drainage</li> <li>• Metro access</li> </ul>

# Metro Adjacent Development Handbook

## Metro Review Phases

To facilitate early and continuous coordination with development teams and municipalities, and to maximize opportunities for project-transit synergy, Metro employs a four-phase development review process for projects within 100 feet of its ROW and properties:



### PRELIMINARY CONSULTATION

Project sponsor submits Metro In-Take Form and conceptual plans. Metro reviews and responds with preliminary considerations.

1. Project information is routed to impacted Metro departments for review and comment.
2. Metro coordinates a meeting at the request of the project sponsor or if Metro determines it necessary following preliminary review.
3. Metro submits comment letter with preliminary considerations for municipality and/or project sponsor. Metro recorded drawings and standards are provided as necessary.

2 Weeks



### ENTITLEMENT

Metro receives CEQA notice from local municipality and responds with comments and considerations.

1. If project has not previously been reviewed, Metro routes project information to stakeholder departments for review and comment. If Project has been reviewed, Metro transmits the correspondence to departments to determine if additional comments are warranted. Municipality and project sponsor are contacted if additional information is required.
2. Metro coordinates design review meetings at the request of the project sponsor or if Metro determines them necessary following drawings review.
3. Metro prepares comment letter in response to CEQA notice and submits to municipality. Metro Engineering coordinates with project sponsor as necessary to approve project drawings.

2-4 Weeks



## ENGINEERING & REFINEMENT

Dependent on the nature of the adjacent development, project sponsor submits architectural plans and engineering calculations for Metro review and approval.

1. Metro Engineering reviews project plans, calculations, and other materials. Review fees are paid as required.
2. Metro Engineering provides additional comments for further consideration or approves project drawings.
3. If required, Metro and project sponsor host additional meetings and maintain on-going coordination to ensure project design does not adversely impact Metro operations and facilities.

2-4 Weeks



## CONSTRUCTION SAFETY & MONITORING

Dependent on the nature of the adjacent development, Metro coordinates with project sponsor to facilitate and monitor construction near transit services and structures.

1. As requested by Metro, project sponsor submits a Construction Work Plan for review and approval.
2. Project sponsor coordinates with Metro to temporarily relocate bus stops, reroute bus service, allocate track, and/or complete safety procedures in preparation for construction.
3. Metro representative monitors construction and maintains communication with project sponsor to administer the highest degree of construction safety provisions near Metro facilities.

Varies

# Metro Coordination

## Best Practices for Municipality Coordination

Metro suggests that local jurisdictions take the following steps to streamline the coordination process:

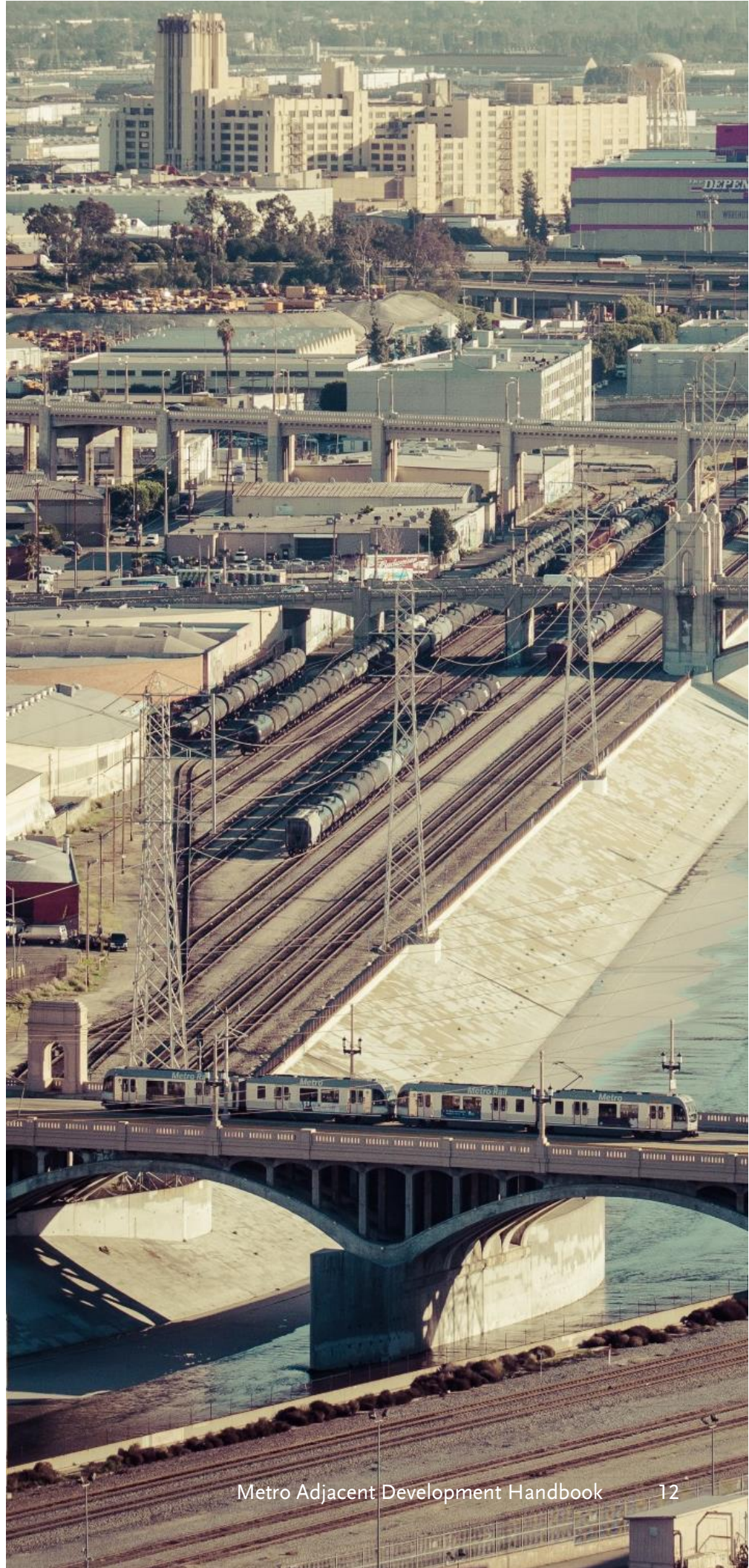
1. **Update GIS instruments with Metro ROW:** Integrate Metro ROW files into City GIS and/or Google Earth Files for all planning and development review staff.
2. **Flag Parcels:** Create an overlay zone through Specific Plans and/or Zoning Ordinance that “tags” parcels within 100’ from Metro ROW to require coordination with Metro early during the development process [e.g. City of Los Angeles Zone Information and Map Access System (ZIMAS)].
3. **Provide Resources:** Direct all property owners and developers interested in parcels within 100’ from Metro ROW to Metro resources (e.g. website, Handbook, In-Take Form, etc.).

## Best Practices for Developer Coordination

Metro suggests that developers of projects adjacent to Metro ROW take the following steps to facilitate Metro project review and approval:

1. **Review Metro resources and policies:** The Metro Adjacent Development Review webpage and Handbook provide important resources for those interested in constructing on, adjacent, over, or under Metro right of way, non-revenue property, or transit facilities. Developers should familiarize themselves with these resources and keep in mind common adjacency concerns when planning a project.
2. **Contact Metro early during design process:** Metro welcomes the opportunity to provide feedback early in project design, allowing for detection and resolution of important adjacency issues, identification of urban design and system integration opportunities, and facilitation of permit approval.
3. **Maintain communication:** Frequent communication with stakeholder Metro departments during project design and construction will reinforce relationships and allow for timely project completion.











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# Site Planning & Design



## 1.1 Supporting Transit Oriented Communities

Adjacent development plays a crucial role in shaping TOCs along and around Metro transit services and facilities. TOCs require an intentional orchestration of physical, aesthetic, and operational elements, and close coordination by all stakeholders, including Metro, developers, and municipalities.

**Recommendation:** Conceive projects as an integrated system that acknowledges context, builds on user needs and desires, and implements elements of placemaking. Metro is interested in collaborating with projects and teams that, in part or wholly:

- Integrate a mix of uses to create lively, vibrant places that are active day and night.
- Include a combination of buildings and public spaces to define unique and memorable places.
- Explore a range of densities and massing to optimize building functionality while acknowledging context-sensitive scale and architectural form.
- Activate ground floor with retail and outdoor seating/activities to bring life to the public environment.
- Prioritize pedestrian scaled elements to create spaces that are comfortable, safe, and enjoyable.
- Provide seamless transitions between uses to encourage non-motorized mobility, improve public fitness and health, and reduce road congestion.
- Reduce and hide parking to focus on pedestrian activity.
- Prevent crime through environmental design.
- Leverage regulatory TOD incentives to design a more compelling project that capitalizes on transit adjacency and economy of scales.
- Utilize Metro policies and programs supporting a healthy, sustainable, and welcoming environment around transit service and facilities.



*The Wilshire/Vermont Metro Joint Development project leveraged existing transit infrastructure to catalyze a dynamic and accessible urban environment. The project accommodates portal access into the Metro Rail system and on-street bus facilities.*

Links to Metro policies and programs may be found in the [Resources Section](#) of this Handbook.



## 1.2 Enhancing Access to Transit

Metro seeks to create a comprehensive, integrated transportation network and supports infrastructure and design that allows safe and convenient access to its multimodal services. Projects in close proximity to Metro's services and facilities present an opportunity to enhance the public realm and connections to/from these services for transit patrons as well as users of the developments.

**Recommendation:** Design projects with transit access in mind. Project teams should capitalize on the opportunity to improve the built environment and enhance the public realm for pedestrians, bicyclists, persons with disabilities, seniors, children, and users of green modes. Metro recommends that projects:

- Orient major entrances to transit service, making access and travel intuitive and convenient.
- Plan for a continuous canopy of shade trees along all public right-of-way frontages to improve pedestrian comfort to transit facilities.
- Add pedestrian lighting along paths to transit facilities and nearby destinations.
- Integrate wayfinding and signage into project design.
- Enhance nearby crosswalks and ramps.
- Ensure new walkways and sidewalks are clear of any obstructions, including utilities, traffic control devices, trees, and furniture.
- Design for seamless, multi-modal pedestrian connections, making access easy, direct, and comfortable.



*The City of Santa Monica leveraged investments in rail transit and reconfigured Colorado Avenue to form a multi-modal first/last mile gateway to the waterfront from the Expo Line Station.*

### Additional Resources:

[Metro Active Transportation Strategic Plan](#)

[Metro Complete Streets Policy](#)

[Metro First/Last Mile Strategic Plan](#)

[Metro Transit Supportive Planning Toolkit](#)





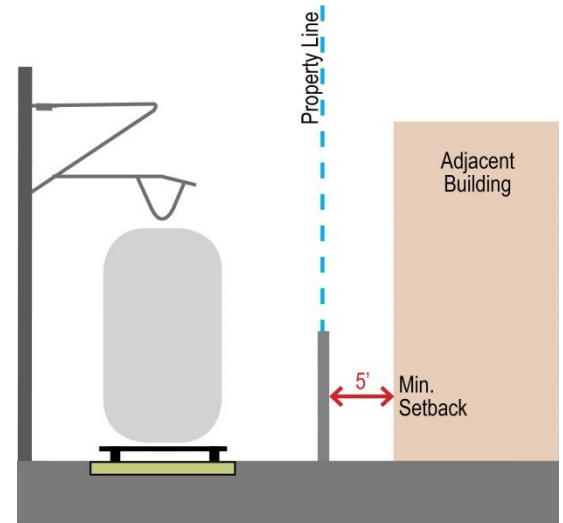
## 1.3 Building Setback

Buildings and structures with a zero lot setback abutting Metro ROW are of prime concern to Metro. Encroachment onto Metro property to construct or maintain buildings is strongly discouraged as this presents safety hazards and may disrupt transit service and/or damage Metro infrastructure.

**Recommendation:** Metro strongly encourages development plans include a minimum setback of five (5) feet to buildings from the Metro ROW property line to accommodate the construction and maintenance of structures without the need to encroach upon Metro property. As local jurisdictions also have building setback requirements, new developments should comply with the greater of the two requirements.

Entry into the ROW by parties other than Metro and its affiliated partners requires written approval. Should construction or maintenance of a development necessitate temporary or ongoing access to Metro ROW, a Metro *Right of Entry Permit* must be requested and obtained from Metro Real Estate for every instance access is required. Permission to enter the ROW is granted solely at Metro's discretion.

Refer to Section 3.2 –Track Access and Safety for additional information pertaining to ROW access in preparation for construction activities.



*A minimum setback of five (5) feet between an adjacent structure and Metro ROW is strongly encouraged.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)



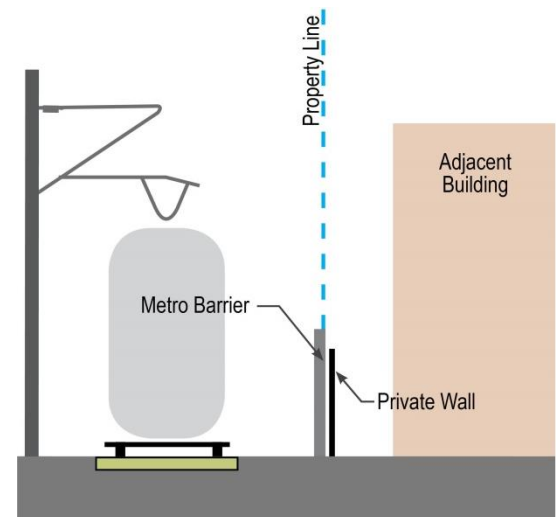
## 1.4 Shared Barrier Construction & Maintenance

In areas where Metro ROW abuts private property, barrier construction and maintenance responsibilities can rise to be a point of contention with property owners. When double barriers are constructed, the gap created between the Metro-constructed fence and a private property owner's fence can accumulate trash and make regular maintenance challenging without accessing the other party's property.

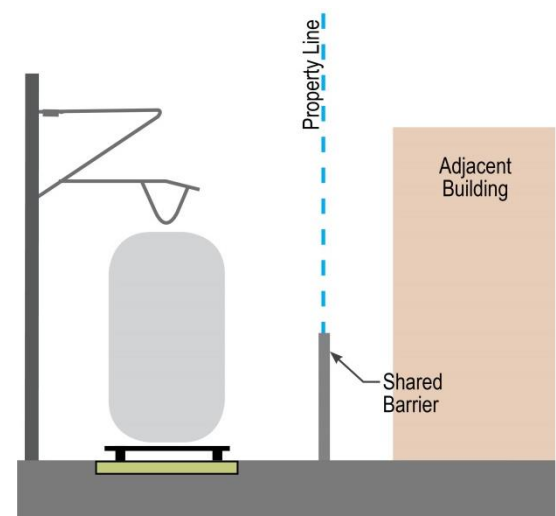
**Recommendation:** Metro strongly prefers a single barrier condition along its ROW property line. With an understanding that existing conditions along ROW boundaries vary throughout Los Angeles County, Metro recommends the following, in order of preference:

1. Enhance existing Metro barrier: if structural capacity allows, private property owners and developers should consider physically affixing improvements onto and building upon Metro's existing barrier. Metro is amenable to barrier enhancements such as increasing barrier height and allowing private property owners to apply architectural finishes to their side of Metro's barrier.
2. Replace existing barrier(s): if conditions are not desirable, remove and replace any existing barrier(s), including Metro's, with a new single barrier built on the property line.

Metro is amenable to sharing costs for certain improvements that allow for clarity in responsibilities and adequate ongoing maintenance from adjacent property owners without entering Metro's property. Metro Real Estate should be contacted with case-specific questions and will need to approve shared barrier design, shared-financing, and construction.



*Double barrier conditions allow trash accumulation and create maintenance challenges for Metro and adjacent property owners.*



*Metro prefers a single barrier condition along its ROW property line.*



## 1.5 Project Orientation & Noise Mitigation

Metro may operate in and out of revenue service 24 hours per day, every day of the year, and can create noise and vibration (i.e. horns, power washing). Transit service and maintenance schedules cannot be altered to avoid noise for adjacent developments. However, noise and vibration impacts can be reduced through building design and orientation.

**Recommendations:** Use building orientation, programming, and design techniques to reduce noise and vibration for buildings along Metro ROW:

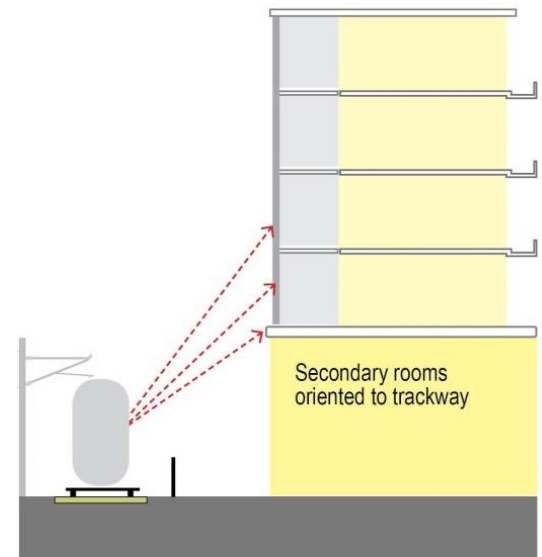
- Locate “back of house” rooms (e.g. bathrooms, stairways, laundry rooms) along ROW, rather than noise sensitive rooms (e.g. bedrooms and family rooms)
- Use upper level setbacks and locate living spaces away from ROW.
- Enclose balconies.
- Install double-pane windows.
- Include language disclosing potential for noise, vibration, and other impacts due to transit proximity in terms and conditions for building lease/sale agreements to protect building owners/sellers from tenant/buyer complaints.

Developers are responsible for any noise mitigation required, which may include engineering designs for mitigation recommended by Metro or otherwise required by local municipalities. A recorded *Noise Easement Deed* in favor of Metro may be required for projects within 100' of Metro ROW to ensure notification to tenants and owners of any proximity issues.

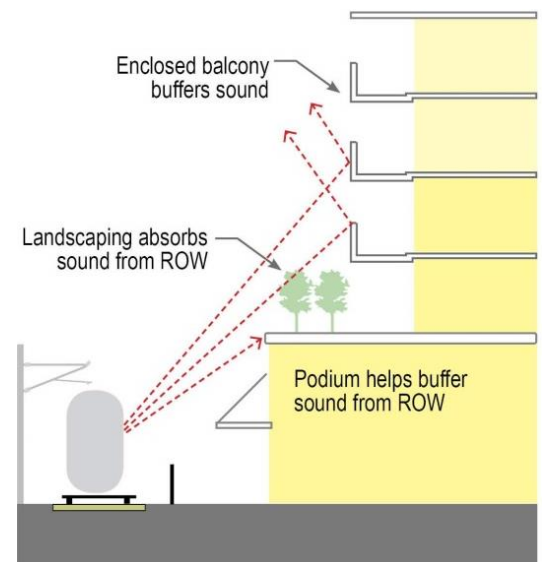
### Additional Resources:

[Noise Easement Deed](#)

[MRDC, Section 2 – Environmental Considerations](#)



*Building orientation can be designed to face away from tracks, reducing the noise and vibration impacts.*



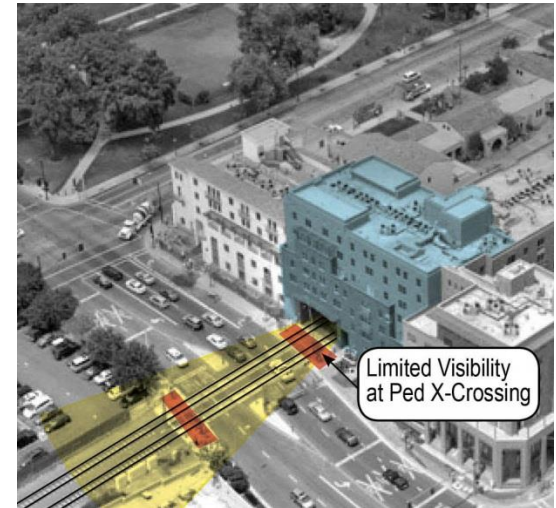
*Strategic placement of podiums and upper-level setbacks on developments near Metro ROW can reduce noise and vibration impacts.*



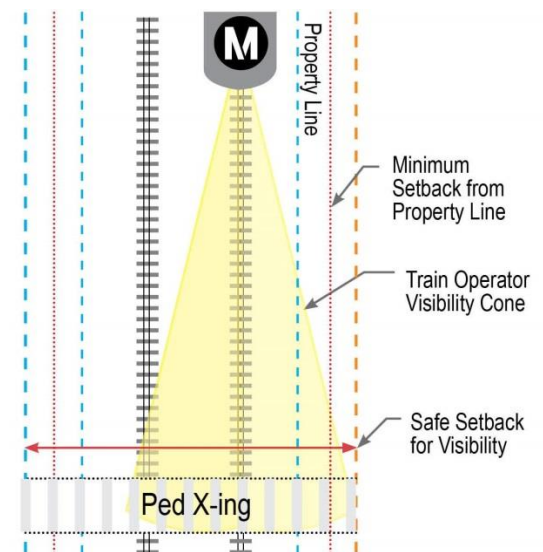
## 1.6 Sightlines at Crossings

Developments adjacent to Metro ROW can present visual barriers to transit operators approaching vehicular and pedestrian crossings. Buildings and structures in close proximity to transit corridors can reduce sightlines and create blind corners where operators cannot see pedestrians. This requires operations to reduce train speeds, which decreases the efficiency of transit service.

**Recommendation:** Design buildings to maximize transit service sightlines at crossings, leaving a clear *cone of visibility* to oncoming vehicles and pedestrians. Metro Operations will review, provide guidance, and determine the extent of operator visibility for safe operations. If the building envelope overlaps with the visibility cone near pedestrian and vehicular crossings, a building setback may be needed to ensure safe transit service. The cone of visibility at crossings and required setback will be determined based on vehicle approach speed.



*Limited sightlines for trains approaching street crossings create unsafe conditions.*



*Visibility cones allow train operators to respond to safety hazards.*

### Additional Resources:

[MRDC, Section 4 – Guideway and Trackwork](#)

[MRDC, Section 12 – Safety, Security, & System Assurance](#)



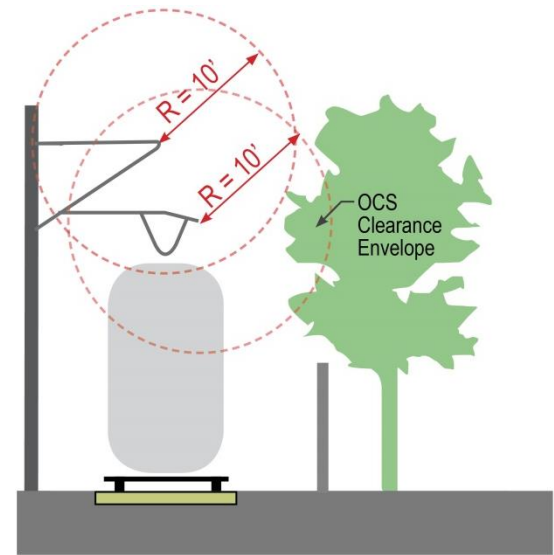


## 1.7 Transit Envelope Clearance

Metro encourages density along and around transit service as well as greening of the urban environment through the addition of street trees and landscaping. However, building appurtenances, such as balconies, facing rail ROW may pose threats to Metro service as clothing or other décor could blow into the OCS. Untended landscaping and trees can also grow into the OCS above light rail lines, creating electrical safety hazards as well as visual and physical impediments for trains.

**Recommendation:** Project elements facing or located adjacent to the ROW should be designed to avoid potential conflicts with Metro transit vehicles and infrastructure. Metro recommends that projects:

- Maintain building appurtenances and landscaping at a minimum distance of ten (10) feet from the OCS and support structures.
- Plan for landscape maintenance from private property and not allow growth into the Metro ROW. Property owners will not be permitted to access Metro property to maintain private development.
- Design buildings such that balconies do not provide direct access to ROW access.



*Adjacent structures and landscaping should be sited to avoid conflicts with the rail OCS.*

### Additional Resources:

[MRDC, Section 4 – Guideway and Trackwork](#)

[MRDC, Section 6 – Architectural](#)

[MRDC, Section 12 – Safety, Security, & System Assurance](#)

# 1 Site Planning & Design



## 1.8 Bus Stops & Zones Design

Metro Bus serves 15,967 bus stops throughout the diverse landscape that is Los Angeles County. Typically located on sidewalks within the public right-of-way owned and maintained by local jurisdictions, existing bus stop conditions vary from well-lit and sheltered spaces to uncomfortable and unwelcoming zones. Metro is interested in working with developers and local jurisdiction to create a vibrant public realm around new developments by strengthening multi-modal access to/from Metro transit stops and enhancing the pedestrian experience.

**Recommendation:** When designing around existing or proposed bus stops, Metro recommends project teams:

- Review Metro's Transit Service Policy: Appendix D, which provides standards for design and operation of bus stops and zones for near-side, far-side, and mid-block stops. In particular, adjacent projects should:
  - Accommodate 6' x 8' landing pads at bus doors.
  - Install a concrete bus pad within each bus stop zone to avoid asphalt damage.
- Replace stand-alone bus stop signs with bus shelters that include benches and adequate lighting.
- Design wide sidewalks (15' preferred) that accommodate bus landing pads as well as street furniture, landscape, and user travel space.
- Ensure final design of stops and surrounding sidewalk allows passengers with disabilities a clear path of travel.
- Place species of trees in quantities and spacing that will provide a continuous shade canopy in paths of travel to access transit stops. These must be placed far enough away from the curb and adequately maintained to prevent visual and physical impediments for buses when trees reach maturity.
- Locate and design driveways to avoid conflicts with on-street services and pedestrian traffic.

### Additional Resources:

[Metro Transit Service Policy](#)



*Well-designed and accessible bus stops are beneficial amenities for both transit riders and users of adjacent developments.*

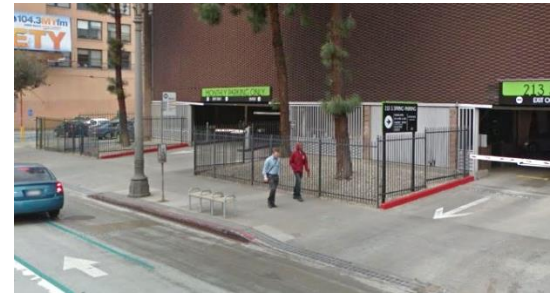


## 1.9 Driveways/Access Management

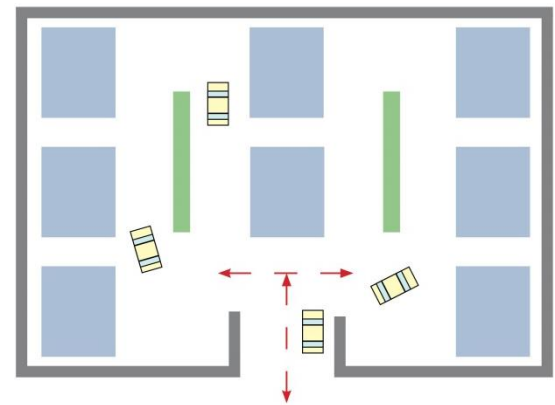
Driveways adjacent to on-street bus stops can create conflict for pedestrians walking to/from or waiting for transit. Additionally, driveways accessing parking and loading at project sites near Metro Rail and BRT crossings can create queuing issues along city streets and put vehicles in close proximity with fast moving trains and buses.

**Recommendation:** Metro encourages new developments to promote a lively public space mutually beneficial to the project and Metro by providing safe, comfortable, convenient, and direct connections to transit. Metro recommends that projects:

- Place driveways along side streets and alleys, away from on-street bus stops and transit crossings to minimize safety conflicts between active tracks, transit vehicles, and people, as well as queuing on streets.
- Locate vehicular driveways away from transit crossings or areas that are likely to be used as waiting areas for transit services.
- Program loading docks away from sidewalks where transit bus stop activity is/will be present.
- Consolidate vehicular entrances and reduce width of driveways.
- Raise driveway crossings to be flush with the sidewalk, slowing automobiles entering and prioritizing pedestrians.
- Separate pedestrian walkways to minimize conflict with vehicles and encourage safe non-motorized travel.



*Driveways in close proximity to each other compromise safety for those walking to/from transit and increase the potential for vehicle-pedestrian conflicts.*



*A consolidated vehicular entrance greatly reduces the possibility for vehicle-pedestrian conflicts.*

### Additional Resources:

[Metro First/Last Mile Strategic Plan](#)  
[MRDC, Section 3 – Civil](#)











# 2 Engineering

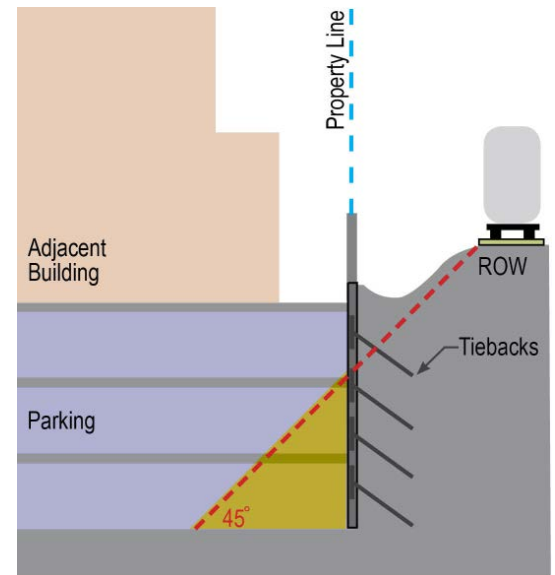


## 2.1 Excavation Support System Design

Excavation near Metro ROW has the potential to disturb adjoining soils and jeopardize the support of existing Metro infrastructure. Any excavation which occurs within the geotechnical *foul zone* is subject to Metro review and approval. The geotechnical zone of influence shall be defined as the area below the track-way as measured from a 45-degree angle from the edge of the rail track ballast. Construction within this vulnerable area poses a potential risk to Metro service and safety and triggers additional safety regulations.

**Recommendation:** Coordinate with Metro Engineering staff for review and approval of structural and support of excavation drawings prior to the start of excavation or construction. Tie backs encroaching into Metro ROW may require a tie back easement or license, at Metro's discretion.

Any excavation/shoring within Metrolink operated and maintained ROW would require compliance with Metrolink Engineering standards and guidelines.



*An underground structure located within the ROW foul zone would require additional review by Metro.*

### Additional Resources:

[Metrolink Engineering & Construction Requirements](#)

[MRDC, Section 3 – Civil](#)

[MRDC, Section 5 – Structural/Geotechnical](#)

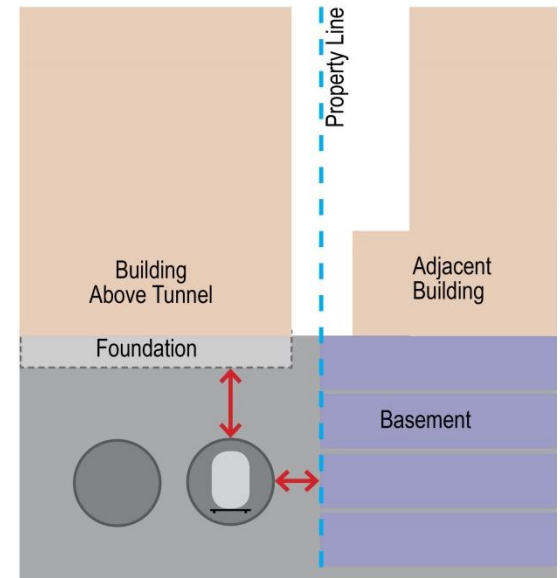


## 2.2 Proximity to Stations & Tunnels

Metro supports development of commercial and residential properties near transit services and understands that increasing development near stations represents a mutually beneficial opportunity to increase ridership and enhance transportation options for the users of the developments. However, construction adjacent to, over, or under underground Metro facilities (tunnels, stations and appendages) is of great concern and should be coordinated closely with Metro Engineering.

**Recommendation:** Dependent on the nature of the adjacent construction, Metro will need to review the geotechnical report, structural foundation plans, sections, shoring plan sections and calculations. Metro typically seeks to maintain a minimum eight (8) foot clearance from existing Metro facilities to new construction (shoring or tiebacks). It will be incumbent upon the developer to demonstrate, to Metro's satisfaction, that both the temporary support of construction and the permanent works do not adversely affect the structural integrity, safety or continued efficient operation of Metro facilities.

Metro may require monitoring where such work will either increase or decrease the existing overburden (i.e. weight) to which the tunnels or facilities are subjected. When required, the monitoring will serve as an early indication of excessive structural strain or movement. Additional information regarding monitoring requirements, which will be determined on a case-by-case basis, may be found in Section 3.4, Excavation Drilling/Monitoring.



*Underground tunnels in close proximity to adjacent basement structure.*

### Additional Resources:

[MRDC, Section 3 – Civil](#)

[MRDC, Section 5 – Structural/Geotechnical](#)

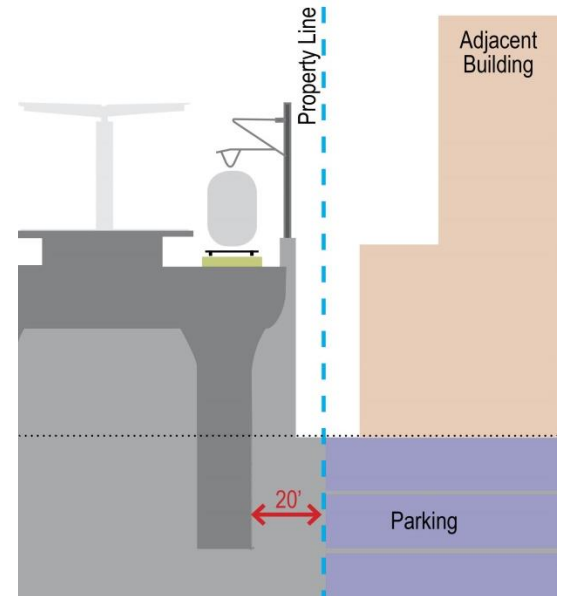




## 2.3 Protection from Explosion/Blast

Metro is obligated to ensure the safety of public transit infrastructure from potential explosive sources which could originate from adjacent underground structures or from at grade locations, situated below elevated *guideways* or stations. Blast protection setbacks or mitigation may be required for large projects constructed near critical Metro facilities.

**Recommendation:** Avoid locating underground parking or basement structures within twenty (20) feet from an existing Metro tunnel or facility (exterior face of wall to exterior face of wall). Adjacent developments which are within this 20-foot envelope may be required to undergo a *Threat Assessment and Blast/Explosion Study* subject to Metro review and approval.



*An underground structure proposed within twenty (20) feet of a Metro structure may require a threat assessment and blast/explosion study.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)

[MRDC, Section 3 – Civil](#)

[MRDC, Section 5 – Structural/Geotechnical](#)











# 3

## Construction Safety & Monitoring

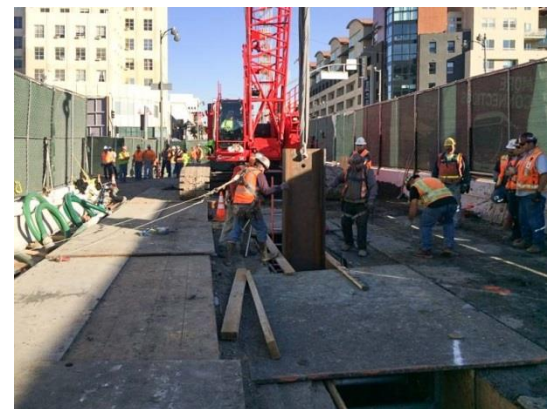
# 3 Construction Safety & Monitoring



## 3.1 Pre-Construction Coordination

Metro is concerned with impacts on service requiring single tracking, line closures, speed restrictions, and *bus bridging* occurring as a result of adjacent project construction. Projects that will require work over, under, adjacent, or on Metro property or ROW and include operation of machinery, scaffolding, or any other potentially hazardous work are subject to evaluation in preparation for and during construction to maintain safe operations and passenger wellbeing.

**Recommendation:** Following an initial screening of the project, additional coordination may be determined to be necessary. Dependent on the nature of the adjacent construction, developers may be requested to perform the following as determined on a case-by-case basis:



*Metro staff oversees construction for the Purple Line extension.*

- Submit a construction work plan and related project drawings and specifications for Metro review.
- Submit a contingency plan, show proof of insurance coverage, and issue current certificates.
- Provide documentation of contractor qualifications.
- Complete pre-construction surveys, perform baseline readings, and install movement instrumentation.
- Complete readiness review and perform practice run of shutdown per contingency plan.
- Confirm a ROW observer or other safety personnel and an inspector from the parties.
- Establish a coordination process for access and work in or adjacent to ROW for the duration of construction.

Project teams will be responsible for the costs of adverse impacts on Metro transit operations caused by work on adjacent developments, including remedial work to repair damage to Metro property, facilities, or systems. Additionally, a review fee may be assessed based on an estimate of required level of effort provided by Metro.

All projects adjacent to Metrolink infrastructure will require compliance with SCRRRA Engineering Standards and Guidelines.

### Additional Resources:

[Metrolink Engineering & Construction Requirements](#)

[Metro Adjacent Construction Design Manual](#)



# 3 Construction Safety & Monitoring



## 3.2 Track Access and Safety

Permission is needed from Metro to enter Metro property for construction and maintenance along, above, or under Metro ROW as these activities can interfere with Metro utilities and service and pose a safety hazard to construction teams and transit riders. Track access is solely at Metro's discretion and is discouraged to prevent electrocution and collisions with construction workers or machines.

**Recommendation:** To work in or adjacent to Metro ROW, the following must be obtained and/or completed:

- Right-of-Entry Permit/Temporary Construction Easement: All access to and activity on Metro property, including easements necessary for construction of adjacent projects, must be approved through a Right-of-Entry Permit and/or a Temporary Construction Easement obtained from Metro Real Estate and may require a fee.
- Track Allocation: All work on Metro Rail ROW must receive prior approval from Metro Rail Operations Control. Track Allocation identifies, reserves, and requests changes to normal operations for a specific track section, line, station, location, or piece of equipment to allow for safe use by a non-Metro entity.
- Safety Training: All members of the project construction team will be required to attend Metro Safety Training in advance of work activity.
- Construction Work Plan: Dependent on the nature of adjacent construction, Metro may request a construction work plan, which describes means and methods and other construction plan details, to ensure the safety of transit operators and patrons.



*Trained flaggers ensure the safe crossing of pedestrians and workers of an adjacent development.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)

[Safety Training](#)

[Track Allocation](#)

# 3 Construction Safety & Monitoring

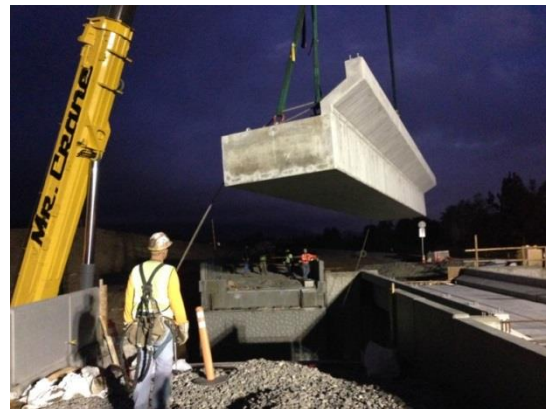


## 3.3 Construction Hours

To maintain public safety and access for Metro riders, construction should be planned, scheduled, and carried out in a way to avoid impacts to Metro service and maintenance. Metro may limit hours of construction which impact Metro ROW to night or off-peak hours so as not to interfere with Metro revenue service.

**Recommendations:** In addition to receiving necessary construction approvals from the local municipality, all construction work on or in close proximity to Metro ROW must be scheduled through the Track Allocation Process, detailed in Section 3.2.

Metro prefers that adjacent construction that has the potential to impact normal, continuous Metro operations take place during non-revenue hours (approximately 1:00a.m.-4:00a.m.) or during non-peak hours to minimize impacts to service. The project sponsor may be responsible for additional operating costs resulting from disruption to normal Metro service.



*Construction during approved hours ensures the steady progress of adjacent development construction as well as performance of Metro's transit service.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)

[MRDC, Section 10 – Operations](#)

[Track Allocation](#)

# 3 Construction Safety & Monitoring



## 3.4 Excavation/Drilling Monitoring

Excavation is among the most hazardous construction activities and can pose threats to the structural integrity of Metro's transit infrastructure.

**Recommendation:** Excavation and shoring plans adjacent to the Metro ROW shall be reviewed and approved by Metro Engineering prior to commencing construction.

Geotechnical instrumentation and monitoring will be required for all excavations occurring within Metro's *geotechnical zone of influence*, where there is potential for adversely affecting the safe and efficient operation of transit vehicles. Monitoring of Metro facilities due to adjacent construction may include the following as determined on a case-by-case basis:

- Pre- and post-construction condition surveys
- Extensometers
- Inclinometers
- Settlement reference points
- Tilt-meters
- Groundwater observation wells
- Movement arrays
- Vibration monitoring



*Rakers and tiebacks provide temporary support during construction.*



*A soldier pile wall supports adjacent land during construction.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)

[MRDC, Section 3 – Civil](#)

[MRDC, Section 5 – Structural/Geotechnical](#)

# 3 Construction Safety & Monitoring

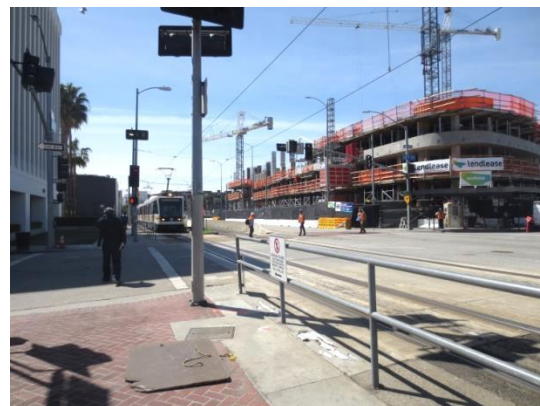


## 3.5 Crane Operations

Construction activities adjacent to Metro ROW will often require moving large, heavy loads of building materials and machinery by cranes. Cranes referred to in this section include all power operated equipment that can hoist, lower, and horizontally move a suspended load. There are significant safety issues to be considered for the operators of crane devices as well as Metro patrons and operators.

**Recommendations:** Per California Occupational Safety and Health Administration (Cal/OSHA) standards, cranes operated near the OCS must maintain a twenty (20) foot clearance from the OCS. In the event that a crane or its load needs to enter the 20-foot envelope, OCS lines must be de-energized.

Construction activities which involve swinging a crane and suspended loads over Metro facilities or bus passenger areas shall not be performed during revenue hours. The placement and swing of this equipment are subject to Metro review and possible work plan.



*Construction adjacent to the Pico Rail Station in Downtown Los Angeles.*



*Construction adjacent to the Chinatown Rail Station.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)  
[Cal/OSHA](#)



# 3 Construction Safety & Monitoring



## 3.6 Construction Barriers & Overhead Protection

During construction, falling objects can damage Metro facilities, and pose a safety concern to the patrons accessing them.

**Recommendations:** Vertical construction barriers and overhead protection compliant with Metro and Cal OSHA requirements shall be constructed to prevent objects from falling into the Metro ROW or areas designed for public access to Metro facilities. A protection barrier shall be constructed to cover the full height of an adjacent project and overhead protection from falling objects shall be provided over Metro ROW as necessary. Erection of the construction barriers and overhead protection for these areas shall be done during Metro non-revenue hours.



*A construction barrier is built at the edge of the site to protect tracks from adjacent work.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)

# 3 Construction Safety & Monitoring



## 3.7 Pedestrian & Emergency Access

Metro's ridership relies on the consistency and reliability of access and *wayfinding* to/from stations, stops, and facilities. Construction on adjacent developments must not obstruct fire department access, emergency egress, or otherwise present a safety hazard to Metro operations, its employees, patrons, and the general public. Fire access and safe escape routes within all Metro stations, stops, and facilities must be maintained.

**Recommendations:** The developer shall ensure pedestrian access to Metro stations, stops, and transit facilities is compliant with the Americans with Disabilities Act (ADA) and maintained during construction:

- Temporary fences, barricades, and lighting should be installed and watchmen provided for the protection of public travel, the construction site, adjacent public spaces, and existing Metro facilities.
- Temporary signage should be installed where necessary and in compliance with the latest California Manual on Uniform Traffic Control Devices and in coordination with Metro Art and Design Standards.
- Emergency exits shall be provided and be clear of obstructions at all times.
- Access shall be maintained for utilities such as fire hydrants, stand pipes/connections, and fire alarm boxes as well as Metro-specific infrastructure such as fan and vent shafts.



*Sidewalk access is blocked for construction project, forcing pedestrians into street or to use less direct paths to the Metro facility.*

### Additional Resources:

[California Manual on Uniform Traffic Control Devices](#)

[Metro Adjacent Construction Design Manual](#)

[Metro Signage Standards](#)

# 3 Construction Safety & Monitoring



## 3.8 Impacts to Bus Routes & Stops

During construction, bus stops and routes may need to be temporarily relocated. Metro needs to be informed of activities that require removal and/or relocation in order to ensure uninterrupted service.

**Recommendations:** During construction, existing bus stops must be maintained or relocated consistent with the needs of Metro Bus Operations. Design of temporary and permanent bus stops and surrounding sidewalk area must be ADA-compliant and allow passengers with disabilities a clear path of travel to the transit service. Metro Bus Operations Control Special Events and Metro Stops & Zones Department should be contacted at least 30 days in advance of initiating construction activities



*Temporary and permanent relocation of bus stops and layover zones will require coordination between developers, Metro, and other municipal bus operators, and local jurisdictions.*

### Additional Resources:

[Metro Transit Service Policy](#)  
[MRDC, Section 3 – Civil](#)

# 3 Construction Safety & Monitoring



## 3.9 Utility Coordination

Construction has the potential to interrupt utilities that Metro relies on for safe operations and maintenance. Utilities of concern to Metro include but are not limited to: condenser water piping, potable/fire water, and storm and sanitary sewer lines, as well as electrical/telecommunication services.

**Recommendations:** Temporary and permanent utility impacts and relocation near Metro facilities should be addressed during project design and engineering to avoid conflicts during construction.

The contractor shall protect existing aboveground and underground Metro utilities during construction and coordinate with Metro to receive written approval for any utilities pertinent to Metro facilities that may be verified, used, interrupted, or disturbed.

When electrical power outages or support functions are required, the approval must be obtained through Metro Track Allocation.



*Coordination of underground utilities is critical.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)



# 3 Construction Safety & Monitoring



## 3.10 Air Quality & Ventilation Protection

Hot or foul air, fumes, smoke, steam, and dust from adjacent construction activities can negatively impact Metro facilities, service, and users.

**Recommendation:** Hot or foul air, fumes, smoke, and steam from adjacent facilities must not be discharged within 40 feet of existing Metro facilities, including but not limited to: ventilation system intake shafts or station entrances. Should fumes be discharged within 40 feet of Metro intake shafts, a protection panel around each shaft shall be required.



*A worker breaks up concrete creating a cloud of silica dust.*

### Additional Resources:

[Metro Adjacent Construction Design Manual](#)  
[MRDC, Section 8 – Mechanical](#)

# Resources

The following provides Metro contact information and a list of programs, policies, and online resources that should be considered when planning projects within 100 feet of Metro ROW – including underground easements – and in close proximity to non-revenue transit facilities and property:



*Metro encourages developers and municipalities to leverage digital resources and data sets to maximize opportunities inherent in transit adjacency.*

## Metro Adjacent Development Contact Information & Resources

Please direct any questions to the Metro Adjacent Development team at:

- 213-418-3484
- [DevReview@metro.net](mailto:DevReview@metro.net)

Metro Adjacent Development Review Webpage:

<https://www.metro.net/projects/devreview/>

## Metro Right-of-Way GIS Data

Metro maintains a technical resource website housing downloadable data sets and web services. Developers and municipalities should utilize available Metro right-of-way GIS data to appropriately plan and coordinate with Metro when proposing projects within 100' of Metro right-of-way:

<https://developer.metro.net/portfolio-item/metro-right-of-way-gis-data/>

## Metro Design Criteria & Standards

Metro standard documents are periodically updated and are available upon request:

- Metro Adjacent Construction Design Manual
- Metro Rail Design Criteria (MRDC)
- Metro Rail Directive Drawings
- Metro Rail Standard Drawings
- Metro Signage Standards

## Metrolink Standards & Procedures

Engineering & Construction

<https://www.metrolinktrains.com/about/agency/engineering--construction/>

## Metro Policies & Plans

Active Transportation Strategic Plan, 2016

<https://www.metro.net/projects/active-transportation-strategic-plan/>

Complete Streets Policy, 2014

<https://www.metro.net/projects/countywide-planning/metros-complete-streets-policy-requirements/>

Countywide Sustainability Planning Policy & Implementation Plan, 2012

[https://media.metro.net/projects\\_studies/sustainability/images/countywide\\_sustainability\\_planning\\_policy.pdf](https://media.metro.net/projects_studies/sustainability/images/countywide_sustainability_planning_policy.pdf)

First/Last Mile Strategic Plan, 2014

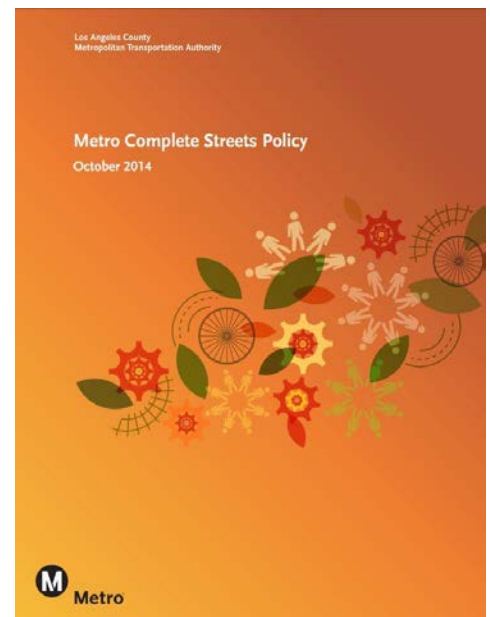
[https://media.metro.net/docs/First\\_Last\\_Mile\\_Strategic\\_Plan.pdf](https://media.metro.net/docs/First_Last_Mile_Strategic_Plan.pdf)

Transit Service Policy, 2015

[https://media.metro.net/images/service\\_changes\\_transit\\_service\\_policy.pdf](https://media.metro.net/images/service_changes_transit_service_policy.pdf)



*Major construction at the Metrolink San Bernardino Station.*



*Metro Complete Streets Policy*

# Resources



*Metro Bike Hub at Los Angeles Union Station*

## Metro Programs & Toolkits

### Bike Hub

<https://bikehub.com/metro/>

### Bike Share for Business

<https://bikeshare.metro.net/for-business/>

### Green Places Toolkit

<https://www.metro.net/interactives/greenplaces/index.html>

### Transit Oriented Communities

<https://www.metro.net/projects/transit-oriented-communities/>

### Transit Passes

*Annual and Business Access Passes*

<https://www.metro.net/riding/eapp/>

*College/Vocational Monthly Pass*

<https://www.metro.net/riding/fares/collegevocational/>

### Transit Supportive Planning Toolkit

<https://www.metro.net/projects/tod-toolkit/>

## Useful Policies & Resources

### ADA Standards for Accessible Design, 2010

U.S. Department of Justice.

[https://www.ada.gov/2010ADASTandards\\_index.htm](https://www.ada.gov/2010ADASTandards_index.htm)

### California Manual on Uniform Traffic Control Devices.

State of California Department of Transportation

<http://www.dot.ca.gov/trafficops/tcd/signcharts.html>

### California Occupational Safety and Health Administration (Cal/OSHA)

State of California Department of Industrial Relations

<http://www.dir.ca.gov/dosh/>





# Glossary

**Cone of Visibility** – a conical space at the front of moving transit vehicles allowing for clear visibility of travel way and/or conflicts.

**Construction Work Plan (CWP)** – project management document outlining the definition of work tasks, choice of technology, estimation of required resources and duration of individual tasks, and identification of interactions among the different work tasks.

**Flagger/Flagman** – person who controls traffic on and through a construction project. Flaggers must be trained and certified by Metro Rail Operations prior to any work commencing in or adjacent to Metro ROW.

**Geotechnical Foul Zone** – area below a track-way as measured from a 45-degree angle from the edge of the rail track ballast.

**Guideway** – a channel, track, or structure along which a transit vehicle moves.

**Heavy Rail Transit (HRT)** – Metro HRT systems include exclusive ROW (mostly subway) trains up to six (6) cars long (450') and utilize a contact rail for traction power distribution (e.g. Metro Red Line).

**Light Rail Transit (LRT)** – Metro LRT systems include exclusive, semi-exclusive, or street ROW trains up to three (3) cars long (270') and utilize OCS for traction power distribution (e.g. Metro Blue Line).

**Measure R** – half-cent sales tax for Los Angeles County approved in November 2008 to finance new transportation projects and programs. The tax expires in 2039.

**Measure M** – half-cent sales tax for LA County approved in November 2016 to fund transportation improvements, operations and programs, and accelerate projects already in the pipeline. The tax will increase to one percent in 2039 when Measure R expires.

**Metrolink** – a commuter rail system with seven lines throughout Los Angeles, Orange, Riverside, San Bernardino, Ventura, and North San Diego counties governed by the Southern California Regional Rail Authority.

**Metro Adjacent Construction Design Manual** – Volume III of the Metro Design Criteria & Standards which outlines the Metro adjacent development review procedure as well as operational requirements when constructing over, under, or adjacent to Metro facilities, structures, and property.

**Metro Bus** – Metro “Local” and “Rapid” bus service runs within the street, typically alongside vehicular traffic, though occasionally in “bus-only” lanes.

**Metro Bus Rapid Transit (BRT)** – high quality bus service that provides faster and convenient service through the use of dedicated ROW, branded vehicles and stations, high frequency and intelligent transportation systems, all door boarding, and intersection crossing priority. Metro BRT generally runs within the center of freeways and/or within dedicated corridors.

**Metro Design Criteria and Standards** – a compilation of documents that govern how Metro transit service and facilities are designed, constructed, operated, and maintained.

**Metro Rail** – urban rail system serving Los Angeles County consisting of six lines, including two subway lines (Red and Purple Lines) and four light rail lines (Blue, Green, Gold, and Expo Lines).

**Metro Rail Design Criteria (MRDC)** – Volume IV of the Metro Design Criteria & Standards which establishes design criteria for preliminary engineering and final design of a Metro Project.

**Metro Transit Oriented Communities** – land use planning and community development program that seeks to

maximize access to transportation as a key organizing principle and promote equity and sustainable living by offering a mix of uses close to transit to support households at all income levels, as well as building densities, parking policies, urban design elements and first/last mile facilities that support ridership and reduce auto dependency.

**Noise Easement Deed** – easement completed by property owners abutting Metro ROW acknowledging use and possible results of transit vehicle operation on the ROW.

**Overhead Catenary System (OCS)** – one or more electrified wires (or rails, particularly in tunnels) situated over a transit ROW that transmit power to light rail trains via pantograph, a current collector mounted on the roof of an electric vehicle. Metro OCS is supported by hollow poles placed between tracks or on the outer edge of parallel tracks.

**Right of Entry Permit** – written approval granted by Metro Real Estate to enter Metro ROW and property.

**Right of Way (ROW)** – the composite total requirement of all interests and uses of real property needed to construct, maintain, protect, and operate the transit system.

**Southern California Regional Rail Authority (SCRRA)** – a joint powers authority made up of an 11-member board representing the transportation commissions of Los Angeles, Orange, Riverside, San Bernardino and Ventura counties. SCRRA governs and operates Metrolink service.

**Threat Assessment and Blast/Explosion Study** – analysis performed when adjacent developments are proposed within twenty (20) feet from an existing Metro tunnel or facility.

**Track Allocation/Work Permit** – permit granted by Metro Rail Operations Control to allocate a section of track and perform work on Metro Rail ROW. This permit should be

submitted for any work that could potentially foul the envelope of a train.

**Wayfinding** – signs, maps, and other graphic or audible methods used to convey location and directions to travelers.



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Metropolitan Transportation Authority

One Gateway Plaza  
Los Angeles, CA 90012-2952

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## **Congestion Management Program**

Metro must notify the Project Sponsor of state requirements. A Transportation Impact Analysis (TIA), with roadway and transit components, is required under the State of California Congestion Management Program (CMP) statute. The CMP TIA Guidelines are published in the “2010 Congestion Management Program for Los Angeles County,” Appendix D (attached). The geographic area examined in the TIA must include the following, at a minimum:

1. All CMP arterial monitoring intersections, including monitored freeway on/off-ramp intersections, where the proposed Project will add 50 or more trips during either the a.m. or p.m. weekday peak hour (of adjacent street traffic).
2. If CMP arterial segments are being analyzed rather than intersections, the study area must include all segments where the proposed Project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections.
3. Mainline freeway-monitoring locations where the Project will add 150 or more trips, in either direction, during either the a.m. or p.m. weekday peak hour.
4. Caltrans must also be consulted through the NOP process to identify other specific locations to be analyzed on the state highway system.

The CMP TIA requirement also contains two separate impact studies covering roadways and transit, as outlined in Sections D.8.1 – D.9.4. If the TIA identifies no facilities for study based on the criteria above, no further traffic analysis is required. However, projects must still consider transit impacts. For all CMP TIA requirements please see the attached guidelines.

If you have any questions, please contact David Lor by phone at 213-922-2883, by email at [lord@metro.net](mailto:lord@metro.net), or by mail at the following address:

**Metro Development Review  
One Gateway Plaza MS 99-22-3  
Los Angeles, CA 90012-2952**

# GUIDELINES FOR CMP TRANSPORTATION IMPACT ANALYSIS

*Important Notice to User: This section provides detailed travel statistics for the Los Angeles area which will be updated on an ongoing basis. Updates will be distributed to all local jurisdictions when available. In order to ensure that impact analyses reflect the best available information, lead agencies may also contact MTA at the time of study initiation. Please contact MTA staff to request the most recent release of "Baseline Travel Data for CMP TIAs."*

## D.1 OBJECTIVE OF GUIDELINES

The following guidelines are intended to assist local agencies in evaluating impacts of land use decisions on the Congestion Management Program (CMP) system, through preparation of a regional transportation impact analysis (TIA). The following are the basic objectives of these guidelines:

- ☐ Promote consistency in the studies conducted by different jurisdictions, while maintaining flexibility for the variety of project types which could be affected by these guidelines.
- ☐ Establish procedures which can be implemented within existing project review processes and without ongoing review by MTA.
- ☐ Provide guidelines which can be implemented immediately, with the full intention of subsequent review and possible revision.

These guidelines are based on specific requirements of the Congestion Management Program, and travel data sources available specifically for Los Angeles County. References are listed in Section D.10 which provide additional information on possible methodologies and available resources for conducting TIAs.

## D.2 GENERAL PROVISIONS

Exhibit D-7 provides the model resolution that local jurisdictions adopted containing CMP TIA procedures in 1993. TIA requirements should be fulfilled within the existing environmental review process, extending local traffic impact studies to include impacts to the regional system. In order to monitor activities affected by these requirements, Notices of Preparation (NOPs) must be submitted to MTA as a responsible agency. Formal MTA approval of individual TIAs is not required.

The following sections describe CMP TIA requirements in detail. In general, the competing objectives of consistency & flexibility have been addressed by specifying standard, or minimum, requirements and requiring documentation when a TIA varies from these standards.



### D.3 PROJECTS SUBJECT TO ANALYSIS

In general a CMP TIA is required for all projects required to prepare an Environmental Impact Report (EIR) based on local determination. A TIA is not required if the lead agency for the EIR finds that traffic is not a significant issue, and does not require local or regional traffic impact analysis in the EIR. Please refer to Chapter 5 for more detailed information.

CMP TIA guidelines, particularly intersection analyses, are largely geared toward analysis of projects where land use types and design details are known. Where likely land uses are not defined (such as where project descriptions are limited to zoning designation and parcel size with no information on access location), the level of detail in the TIA may be adjusted accordingly. This may apply, for example, to some redevelopment areas and citywide general plans, or community level specific plans. In such cases, where project definition is insufficient for meaningful intersection level of service analysis, CMP arterial segment analysis may substitute for intersection analysis.

### D.4 STUDY AREA

The geographic area examined in the TIA must include the following, at a minimum:

- ☐ All CMP arterial monitoring intersections, including monitored freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic).
- ☐ If CMP arterial segments are being analyzed rather than intersections (see Section D.3), the study area must include all segments where the proposed project will add 50 or more peak hour trips (total of both directions). Within the study area, the TIA must analyze at least one segment between monitored CMP intersections.
- ☐ Mainline freeway monitoring locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.
- ☐ Caltrans must also be consulted through the Notice of Preparation (NOP) process to identify other specific locations to be analyzed on the state highway system.

**If the TIA identifies no facilities for study based on these criteria, no further traffic analysis is required. However, projects must still consider transit impacts (Section D.8.4).**

### D.5 BACKGROUND TRAFFIC CONDITIONS

The following sections describe the procedures for documenting and estimating background, or non-project related traffic conditions. Note that for the purpose of a TIA, these background estimates must include traffic from all sources without regard to the exemptions specified in CMP statute (e.g., traffic generated by the provision of low and very low income housing, or trips originating outside Los Angeles County. Refer to Chapter 5, Section 5.2.3 for a complete list of exempted projects).

**D.5.1 Existing Traffic Conditions.** Existing traffic volumes and levels of service (LOS) on the CMP highway system within the study area must be documented. Traffic counts must

be less than one year old at the time the study is initiated, and collected in accordance with CMP highway monitoring requirements (see Appendix A). Section D.8.1 describes TIA LOS calculation requirements in greater detail. Freeway traffic volume and LOS data provided by Caltrans is also provided in Appendix A.

**D.5.2 Selection of Horizon Year and Background Traffic Growth.** Horizon year(s) selection is left to the lead agency, based on individual characteristics of the project being analyzed. In general, the horizon year should reflect a realistic estimate of the project completion date. For large developments phased over several years, review of intermediate milestones prior to buildout should also be considered.

At a minimum, horizon year background traffic growth estimates must use the generalized growth factors shown in Exhibit D-1. These growth factors are based on regional modeling efforts, and estimate the general effect of cumulative development and other socioeconomic changes on traffic throughout the region. Beyond this minimum, selection among the various methodologies available to estimate horizon year background traffic in greater detail is left to the lead agency. Suggested approaches include consultation with the jurisdiction in which the intersection under study is located, in order to obtain more detailed traffic estimates based on ongoing development in the vicinity.

## **D.6 PROPOSED PROJECT TRAFFIC GENERATION**

Traffic generation estimates must conform to the procedures of the current edition of Trip Generation, by the Institute of Transportation Engineers (ITE). If an alternative methodology is used, the basis for this methodology must be fully documented.

Increases in site traffic generation may be reduced for existing land uses to be removed, if the existing use was operating during the year the traffic counts were collected. Current traffic generation should be substantiated by actual driveway counts; however, if infeasible, traffic may be estimated based on a methodology consistent with that used for the proposed use.

Regional transportation impact analysis also requires consideration of trip lengths. Total site traffic generation must therefore be divided into work and non-work-related trip purposes in order to reflect observed trip length differences. Exhibit D-2 provides factors which indicate trip purpose breakdowns for various land use types.

For lead agencies who also participate in CMP highway monitoring, it is recommended that any traffic counts on CMP facilities needed to prepare the TIA should be done in the manner outlined in Chapter 2 and Appendix A. If the TIA traffic counts are taken within one year of the deadline for submittal of CMP highway monitoring data, the local jurisdiction would save the cost of having to conduct the traffic counts twice.

## **D.7 TRIP DISTRIBUTION**

For trip distribution by direct/manual assignment, generalized trip distribution factors are provided in Exhibit D-3, based on regional modeling efforts. These factors indicate Regional Statistical Area (RSA)-level tripmaking for work and non-work trip purposes.

(These RSAs are illustrated in Exhibit D-4.) For locations where it is difficult to determine the project site RSA, census tract/RSA correspondence tables are available from MTA.

Exhibit D-5 describes a general approach to applying the preceding factors. Project trip distribution must be consistent with these trip distribution and purpose factors; the basis for variation must be documented.

Local agency travel demand models disaggregated from the SCAG regional model are presumed to conform to this requirement, as long as the trip distribution functions are consistent with the regional distribution patterns. For retail commercial developments, alternative trip distribution factors may be appropriate based on the market area for the specific planned use. Such market area analysis must clearly identify the basis for the trip distribution pattern expected.

## **D.8 IMPACT ANALYSIS**

CMP Transportation Impact Analyses contain two separate impact studies covering roadways and transit. Section Nos. D.8.1-D.8.3 cover required roadway analysis while Section No. D.8.4 covers the required transit impact analysis. Section Nos. D.9.1-D.9.4 define the requirement for discussion and evaluation of alternative mitigation measures.

**D.8.1 Intersection Level of Service Analysis.** The LA County CMP recognizes that individual jurisdictions have wide ranging experience with LOS analysis, reflecting the variety of community characteristics, traffic controls and street standards throughout the county. As a result, the CMP acknowledges the possibility that no single set of assumptions should be mandated for all TIAs within the county.

However, in order to promote consistency in the TIAs prepared by different jurisdictions, CMP TIAs must conduct intersection LOS calculations using either of the following methods:

- ☐ The Intersection Capacity Utilization (ICU) method as specified for CMP highway monitoring (see Appendix A); or
- ☐ The Critical Movement Analysis (CMA) / Circular 212 method.

Variation from the standard assumptions under either of these methods for circumstances at particular intersections must be fully documented.

TIAs using the 1985 or 1994 Highway Capacity Manual (HCM) operational analysis must provide converted volume-to-capacity based LOS values, as specified for CMP highway monitoring in Appendix A.

**D.8.2 Arterial Segment Analysis.** For TIAs involving arterial segment analysis, volume-to-capacity ratios must be calculated for each segment and LOS values assigned using the V/C-LOS equivalency specified for arterial intersections. A capacity of 800 vehicles per hour per through traffic lane must be used, unless localized conditions necessitate alternative values to approximate current intersection congestion levels.

**D.8.3 Freeway Segment (Mainline) Analysis.** For the purpose of CMP TIAs, a simplified analysis of freeway impacts is required. This analysis consists of a demand-to-capacity calculation for the affected segments, and is indicated in Exhibit D-6.

**D.8.4 Transit Impact Review.** CMP transit analysis requirements are met by completing and incorporating into an EIR the following transit impact analysis:

- ☐ Evidence that affected transit operators received the Notice of Preparation.
- ☐ A summary of existing transit services in the project area. Include local fixed-route services within a ¼ mile radius of the project; express bus routes within a 2 mile radius of the project, and; rail service within a 2 mile radius of the project.
- ☐ Information on trip generation and mode assignment for both AM and PM peak hour periods as well as for daily periods. Trips assigned to transit will also need to be calculated for the same peak hour and daily periods. Peak hours are defined as 7:30-8:30 AM and 4:30-5:30 PM. Both “peak hour” and “daily” refer to average weekdays, unless special seasonal variations are expected. If expected, seasonal variations should be described.
- ☐ Documentation of the assumption and analyses that were used to determine the number and percent of trips assigned to transit. Trips assigned to transit may be calculated along the following guidelines:
  - Multiply the total trips generated by 1.4 to convert vehicle trips to person trips;
  - For each time period, multiply the result by one of the following factors:
    - 3.5% of Total Person Trips Generated for most cases, except:
      - 10% primarily Residential within 1/4 mile of a CMP transit center
      - 15% primarily Commercial within 1/4 mile of a CMP transit center
      - 7% primarily Residential within 1/4 mile of a CMP multi-modal transportation center
      - 9% primarily Commercial within 1/4 mile of a CMP multi-modal transportation center
      - 5% primarily Residential within 1/4 mile of a CMP transit corridor
      - 7% primarily Commercial within 1/4 mile of a CMP transit corridor
      - 0% if no fixed route transit services operate within one mile of the project

To determine whether a project is primarily residential or commercial in nature, please refer to the CMP land use categories listed and defined in Appendix E, *Guidelines for New Development Activity Tracking and Self Certification*. For projects that are only partially within the above one-quarter mile radius, the base rate (3.5% of total trips generated) should be applied to all of the project buildings that touch the radius perimeter.

- ☐ Information on facilities and/or programs that will be incorporated in the development plan that will encourage public transit use. Include not only the jurisdiction’s TDM Ordinance measures, but other project specific measures.



- ☐ Analysis of expected project impacts on current and future transit services and proposed project mitigation measures, and;
- ☐ Selection of final mitigation measures remains at the discretion of the local jurisdiction/lead agency. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the existing mitigation monitoring requirements of CEQA.

## D.9 IDENTIFICATION AND EVALUATION OF MITIGATION

**D.9.1 Criteria for Determining a Significant Impact.** For purposes of the CMP, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ( $V/C \geq 0.02$ ), causing LOS F ( $V/C > 1.00$ ); if the facility is already at LOS F, a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity ( $V/C \geq 0.02$ ). The lead agency may apply a more stringent criteria if desired.

**D.9.2 Identification of Mitigation.** Once the project has been determined to cause a significant impact, the lead agency must investigate measures which will mitigate the impact of the project. Mitigation measures proposed must clearly indicate the following:

- ☐ Cost estimates, indicating the fair share costs to mitigate the impact of the proposed project. If the improvement from a proposed mitigation measure will exceed the impact of the project, the TIA must indicate the proportion of total mitigation costs which is attributable to the project. This fulfills the statutory requirement to exclude the costs of mitigating inter-regional trips.
- ☐ Implementation responsibilities. Where the agency responsible for implementing mitigation is not the lead agency, the TIA must document consultation with the implementing agency regarding project impacts, mitigation feasibility and responsibility.

Final selection of mitigation measures remains at the discretion of the lead agency. The TIA must, however, provide a summary of impacts and mitigation measures. Once a mitigation program is selected, the jurisdiction self-monitors implementation through the mitigation monitoring requirements contained in CEQA.

**D.9.3 Project Contribution to Planned Regional Improvements.** If the TIA concludes that project impacts will be mitigated by anticipated regional transportation improvements, such as rail transit or high occupancy vehicle facilities, the TIA must document:

- ☐ Any project contribution to the improvement, and
- ☐ The means by which trips generated at the site will access the regional facility.

**D.9.4 Transportation Demand Management (TDM).** If the TIA concludes or assumes that project impacts will be reduced through the implementation of TDM measures, the TIA must document specific actions to be implemented by the project which substantiate these conclusions.

---

**D.10 REFERENCES**

1. *Traffic Access and Impact Studies for Site Development: A Recommended Practice*, Institute of Transportation Engineers, 1991.
2. *Trip Generation*, 5th Edition, Institute of Transportation Engineers, 1991.
3. *Travel Forecast Summary: 1987 Base Model - Los Angeles Regional Transportation Study (LARTS)*, California State Department of Transportation (Caltrans), February 1990.
4. *Traffic Study Guidelines*, City of Los Angeles Department of Transportation (LADOT), July 1991.
5. *Traffic/Access Guidelines*, County of Los Angeles Department of Public Works.
6. *Building Better Communities*, Sourcebook, Coordinating Land Use and Transit Planning, American Public Transit Association.
7. *Design Guidelines for Bus Facilities*, Orange County Transit District, 2nd Edition, November 1987.
8. *Coordination of Transit and Project Development*, Orange County Transit District, 1988.
9. *Encouraging Public Transportation Through Effective Land Use Actions*, Municipality of Metropolitan Seattle, May 1987.