



STAKEHOLDER OUTREACH
A Appendix

STAKEHOLDER OUTREACH

How parking for transit is provided is of interest to a wide variety of stakeholders. The outreach effort undertaken to support the development of the STPP Master Plan consisted of outreach to transit riders, agencies, including municipal transit operators, local jurisdictions throughout Los Angeles County and Metro departments. Transit rider outreach was geared toward understanding riders' needs and priorities with respect to Metro parking facilities and other travel modes for accessing transit stations. Agency and city outreach was intended to identify and address stakeholder concerns related to Metro parking facilities. Input received was considered and included in the development of the STPP Master Plan.

Appendix A provides details with regard to the meetings, surveys and other outreach efforts undertaken by Metro, and the Walker team, including Arellano Associates, in order to communicate the purpose of the STPP effort and obtain feedback regarding riders' and other stakeholders' interests, priorities and concerns in relation to parking serving transit within the LA Metro service area.



Metro

Supportive Transit Parking Program

Supportive Transit Parking Program

Workshops Summary Report

Prepared for

Los Angeles County Metropolitan Transportation Authority

Prepared by

Walker Parking Consultants

Arellano Associates

4/7/2016

Table of Contents

Introduction	2
Workshop Participants.....	3
Workshop Description	3
Key Findings	4
Next Steps	4
Appendix A: Workshop Invitation Letter	5
Appendix B: STPP Workshops Flyer	6
Appendix C: Agenda	7
Appendix D: Discussion Questions.....	8
Appendix E: Management Alternatives and Approaches.....	11
Appendix F: Management Alternatives by Station.....	12
Appendix G: Alternatives Map.....	13
Appendix H: Occupancy Map.....	14
Appendix I: PowerPoint Slides	15
Appendix G: Workshop Summary Reports	77

Introduction

In March 2016, the Los Angeles County Metropolitan Transportation Authority (Metro), in partnership with San Gabriel Valley Council of Governments (SGVCOG) and Gateway Cities Council of Governments (GCCOG), hosted three workshops for agency stakeholders including cities, transit agencies, and Transportation Management Associations in Los Angeles County. The workshops were focused on receiving input on parking policies as part of the development of the Supportive Transit Parking Program (STPP) Master Plan.

Information on date and location of the workshops can be found in the table below.

Workshop	Date and Time	Location
San Gabriel Valley	Tuesday, March 15, 2016 10:00 a.m. - 12:00 p.m.	Monrovia Community Center
Gateway Cities	Thursday, March 17, 2016 10:00 a.m. - 12:00 p.m.	Gateway Cities Council of Governments
Metro	Tuesday, March 29, 2016 10:00 a.m. - 12:00 p.m.	Metro Headquarters

The STPP will focus on parking facilities at Metro Rail, Orange and Silver Line Stations. The STPP will identify innovative strategies for management of Metro's parking facilities, including parking management policies, operations, enforcement, and maintenance and technology integration. Metro staff will present the STPP Master Plan to Metro's Board of Directors for final adoption in winter of 2017.

The purpose of the Workshops was to review the STPP approach and work completed to-date, including results of stakeholder outreach, and to solicit input from agency representatives on the parking management strategy alternatives under consideration. Metro will utilize the input provided as guidance in developing Metro parking policies.

The promotional campaign for the workshops included eblasts to Los Angeles County Cities, Transit Agencies, Transportation Management Agencies, and private sector stakeholders. In addition to eblasts, personalized letters were sent to City Managers, Public Works Directors and Transit Agencies' Directors inviting them to the workshops.

Workshop Participants

Information about the number of participants in each workshop can be found in the table below.

Workshop	Cities	Transit Agencies	Regional/ Subregional	TMAs	Private Sector	Total
San Gabriel Valley	5	1	-	1	1	8
Gateway Cities	7	-	1	-	1	9
Metro Headquarters	7	1	1	-	3	12

Workshop Description

The workshops included six segments:

The welcome, introductions and workshop goals were covered by Frank Ching (Metro) where he noted that the goal of this program is to make transit cost-effective for riders and Metro.

Bernard Lee (Walker Parking) followed up Mr. Ching's introduction with an overview of the STPP project, Metro's parking system, parking primer, and parking triangle.

Next, activities to-date was discussed in detail. Susan DeSantis (Arellano Associates) provided a recap of the recent transit rider and agency stakeholder survey results and Bernard Lee discussed facility assessment approaches and program management alternatives.

Mr. Ching then presented the Pilot Program components including Metro's efforts to take over ownership of Caltrans' stations, the development of parking guidance system, and Metro's decision to take over parking enforcement responsibilities from the County Sheriff's Department.

Ms. DeSantis facilitated the roundtable discussions as follow-up to the presentations, which covered STPP goals, management approaches, alternatives, pricing and spillover impacts.

As the final segment, Ms. DeSantis discussed next steps, including additional surveys targeted to those transit riders who drive and park.

Key Findings

One of the main segments of the workshop was the roundtable discussions. Participants from cities and agencies discussed Metro's policies on parking management and provided valuable feedback to the project team. Below is a list of key findings from workshop discussions:

- Participants emphasized that the goal of the Pilot Program should be more consistent with the holistic goal of Metro, which is to increase transit ridership throughout Los Angeles County and improve air quality by reducing greenhouse gas emissions. Participants also encouraged Metro to explore possible partnerships with transit agencies and the private sector to increase ridership.
- Public safety in stations was a major concern of the participants. Metro is looking into taking over parking enforcement from the County Sheriff's Department which will allow Sheriff Officers to focus on patrolling, security and other safety concerns at stations.
- Enhanced parking wayfinding was another point of emphasis throughout roundtable discussions. Metro is developing parking guidance system to address this concern.
- Dynamic rates for parking was discussed and it was explained that dynamic rates involve rate changes more than once per year, instead of rate changes for different times of day. Metro is also looking into adopting different rates for weekends and holidays.
- Exploring partnerships with ride-hailing services such as Uber and Lyft was another key finding of roundtable discussions. Metro prefers ride-hailing companies over taxi companies since they are constantly moving instead of taking up space by queuing at parking lots to wait for customers.
- Parking occupancy rates were discussed and Metro noted that if the daily price cap of \$5.00 is reached, and the occupancy rate is still high at 90% to 95%, Metro will make efforts to identify resources to increase parking supply.

Next Steps

The project team will review and analyze workshop findings and will refine the program management alternatives accordingly. In addition, public outreach efforts will be continued by launching the second round of transit rider surveys.

Appendix A: Workshop Invitation Letter



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

March 3, 2016

Mr. James Parker
Director of Transportation
City of Norwalk
38300 Sierra Hwy
Norwalk, CA 90650

Dear James,

On Thursday, March 17, 2016 the Los Angeles County Metropolitan Transportation Authority (Metro) and the Gateway Cities Council of Governments are co-hosting a Workshop for our agency stakeholders including cities, transit agencies, and Transportation Management Associations in Los Angeles County for input on parking policies as part of the development of the Supportive Transit Parking Program (STPP) Master Plan.

Metro is currently in the process of developing the STPP Master Plan. The STPP will focus on its parking facilities at Metro Rail, Orange and Silver Line Stations. The STPP will identify innovative strategies for management of Metro's parking facilities, including parking management policies, operations, enforcement, and maintenance and technology integration. Metro staff will present the STPP Master Plan to Metro's Board of Directors for final adoption in fall of 2016.

As part of the study, Metro is holding stakeholder workshops. The goal of this Workshop is to review the STPP approach and work completed to-date, including results of stakeholder outreach, and to solicit input from agency representatives on the parking management strategy alternatives under consideration. Metro will utilize the input you provide as guidance in developing Metro parking policies.

The time and location of the event is provided below.

Date & Time: Thursday, March 17, 2016
10:00 a.m. - 12:00 p.m.

Location: Gateway Cities Council of Governments
16401 Paramount Blvd.
Paramount, CA 90723

If you have any questions about the STPP Master Plan or the workshop, please contact Susan DeSantis, Arellano Associates at (SDeSantis@ArellanoAssociates.com). Susan is coordinating this Workshop on behalf of the Project Team. If you have technical questions about the STPP Master Plan, you may contact Adela Felix, Metro's Project Manager (Felixa@Metro.net) or Bernard Lee, Consultant Team Project Manager at Walker Parking (Bernard.Lee@WalkerParking.com). For more information, please see the [FAQ](#) or visit our website at www.metro.net/parking.

Thank you in advance for your assistance on this Metro parking initiative.

Best Regards,

Frank Ching

Director of Parking Management
Countywide Planning and Development
Los Angeles County Metropolitan Transportation Authority

Appendix B: STPP Workshops Flyer



M Metro Supportive Transit Parking Program

Supportive Transit Parking Program (STPP) Master Plan Workshop

You are cordially invited to join with cities, transit agencies, and TMA's in Los Angeles County to provide input on Metro's Supportive Transit Parking Program. Parking facilities at Metro Rail, Orange and Silver Line Stations will be discussed.

The goal of the workshops is to receive input from agency representatives on the innovative parking management strategy alternatives under consideration. Metro will utilize the input that you provide as guidance in developing Metro parking policies.

The time and location of the workshops is provided below.

	Date	Time	Location
Workshop 1 RSVP	03/15/2016	10:00 a.m. - 12:00 p.m.	Monrovia Community Center 119 W Palm Ave. Monrovia, CA 91016
Workshop 2 RSVP	03/17/2016	10:00 a.m. - 12:00 p.m.	Gateway Cities Council of Governments 16401 Paramount Blvd. Paramount, CA 90723
Workshop 3 RSVP	03/29/2016	10:00 a.m. - 12:00 p.m.	Metro Headquarters One Gateway Plaza Los Angeles, CA 90012 Gateway Conference Room, 3rd Floor

These workshops are being co-hosted by Metro with the San Gabriel Valley Council of Governments and the Gateway Cities Council of Governments.

If you have technical questions about the STPP Master Plan, you may contact Adela Felix, Metro's Project Manager (Felixa@Metro.net) or Bernard Lee, Consultant Team Project Manager at Walker Parking (Bernard.Lee@WalkerParking.com).

For more information, please see the [FAQ](#) or visit Metro's website at www.metro.net/parking.

Appendix C: Agenda



AGENCY WORKSHOP AGENDA

LA METRO SUPPORTIVE TRANSIT PARKING PROGRAM


DATE & TIME: Tuesday, March 29, 2016
10:00 a.m. - 12:00 p.m.

LOCATION: Metro Headquarters
One Gateway Plaza
Gateway Conference Room, 3rd Floor
Los Angeles, CA 90012

TOPICS FOR DISCUSSION:

1. Welcome and Opening Remarks (2 min)
2. STPP project overview (10 min)
3. Activities to-date
 - a. Stakeholder Outreach
 - i. Transit rider outreach (5 min)
 - ii. Agency stakeholder outreach (10 min)
 - b. Research and Analysis
 - i. Facility assessments (5 min)
 - ii. Ridership versus parking demand model (5 min)
 - c. Program management alternatives (10 min)
4. Parking Management Pilot Program (10 min)
5. Roundtable Discussions and Input on Program Management Alternatives (60 min)
6. Next steps (2 min)
7. Adjournment

Appendix D: Discussion Questions¹



M Metro Supportive Transit Parking Program

11:00 AM Discussion Questions

1. STPP Program Goals

- To make parking available to the Metro Transit Riders in as efficient and cost effective manner (for riders and Metro) as possible,
- To improve the public's access to the transit station by increasing the efficiency and utilization of existing parking spaces and the other transportation options that are available, in partnership with local agencies i.e. the entire transportation system that serves the transit station.

Questions:

- Are these the right goals?
- How would you refine them?

2. STPP Management Approaches

Improvements and Incentives

- Parking and pedestrian wayfinding
- Parking surface conditions
- Cleanliness
- Safety
- Permit parking

Common management measures for all Management Alternatives

- Parking and pedestrian wayfinding
- Enforcement
- Amenities
 - Good lighting
 - High level of cleanliness and maintenance
 - High level of security
- Access
 - Good bus service to station
 - Good bike and pedestrian access to station
 - Bike parking
 - Bikeshare
 - Carshare

1

¹ The discussion questions were refined based on the input received in the first two workshops.



Metro

Supportive Transit Parking Program

- Dedicated carpool/vanpool spaces
- Pick-up/drop-off areas

Questions:

- Are these the right improvements and incentives?
- What should be added or deleted?

3. Alternatives

- **Alternative 1**
 - Parking occupancy threshold of 90%+
 - Paid parking with higher rate for non-transit parkers
 - Identify resources to increase parking inventory
- **Alternative 2**
 - Parking occupancy of 70-89%
 - Paid parking with higher rate for non-transit parkers
- **Alternative 3**
 - Parking occupancy of 0-69%
 - Free parking
 - Actively market to increase occupancy
 - Some locations may have alternate uses

Questions:

- Are these the right Alternatives?
- Are the thresholds on target?
- Are the Management Approaches on target?

4. Parking Pricing

- Rate adjustments at least once per year, possibly more often depending on frequency of data collection
- Discounted rates for riders with discounted TAP cards and carpoolers
- Special event rates on weekends at some locations

Questions:

- How often should rates be adjusted?
- Should any other groups receive discounted rates?
- How should special event rates be determined?

2



Metro

Supportive Transit Parking Program


5. Spillover Impacts

- What impacts do you experience from spillover parking from Metro Parking Facilities into adjacent neighborhoods?
- What potential solutions do you have or are you exploring to address these impacts?

11:50 AM Select an individual to present the Small Group's Report to the larger group

12:00 PM Promptly adjourn and rejoin the larger group

Appendix E: Management Alternatives and Approaches²



Supportive Transit Parking Program

STPP Management Alternatives and Approaches

Standard Typologies:	Alt 1	Alt 2	Alt 3
MANAGEMENT STRATEGY			
WAYFINDING			
Consistent static parking wayfinding signage			
Leading to facility			
Within facility			
Dynamic wayfinding signage			
Leading to facility			
Between facilities (where applicable)			
Consistent pedestrian wayfinding signage			
Within facility			
PARKING REGULATION			
Enforcement			
ACCESS & AMENITIES			
Good lighting			
High level of cleanliness and maintenance			
High level of security			
Good bus service to station			
Good pedestrian access to station			
Good bicycle access to station			
Bike racks			
Bike lockers			
Bikeshare			
Carshare			
Dedicated carpool/vanpool spaces			
Kiss-and-ride drop-off and pick-up areas			
PARKING RATES			
Free parking			
Transit rider paid parking			
Daily			
Monthly			
Discounted for riders with discounted TAP cards			
Discounted for carpoolers			
Non-transit rider			
Daily (higher rate than transit rider)			
Ability to charge on weekends for special events			
PARKING SUPPLY			
Identify resources to increase parking inventory			
Work with local jurisdictions to establish programs to limit parking spillover			
MONITORING			
Occupancy monitoring -			
At least once every 6 months			
At least once every 12 months			
Parking user group monitoring - at least once every 12 months			
Actively marketing parking availability to increase occupancy			

² The alternatives were refined based on the input received in the first two workshops.

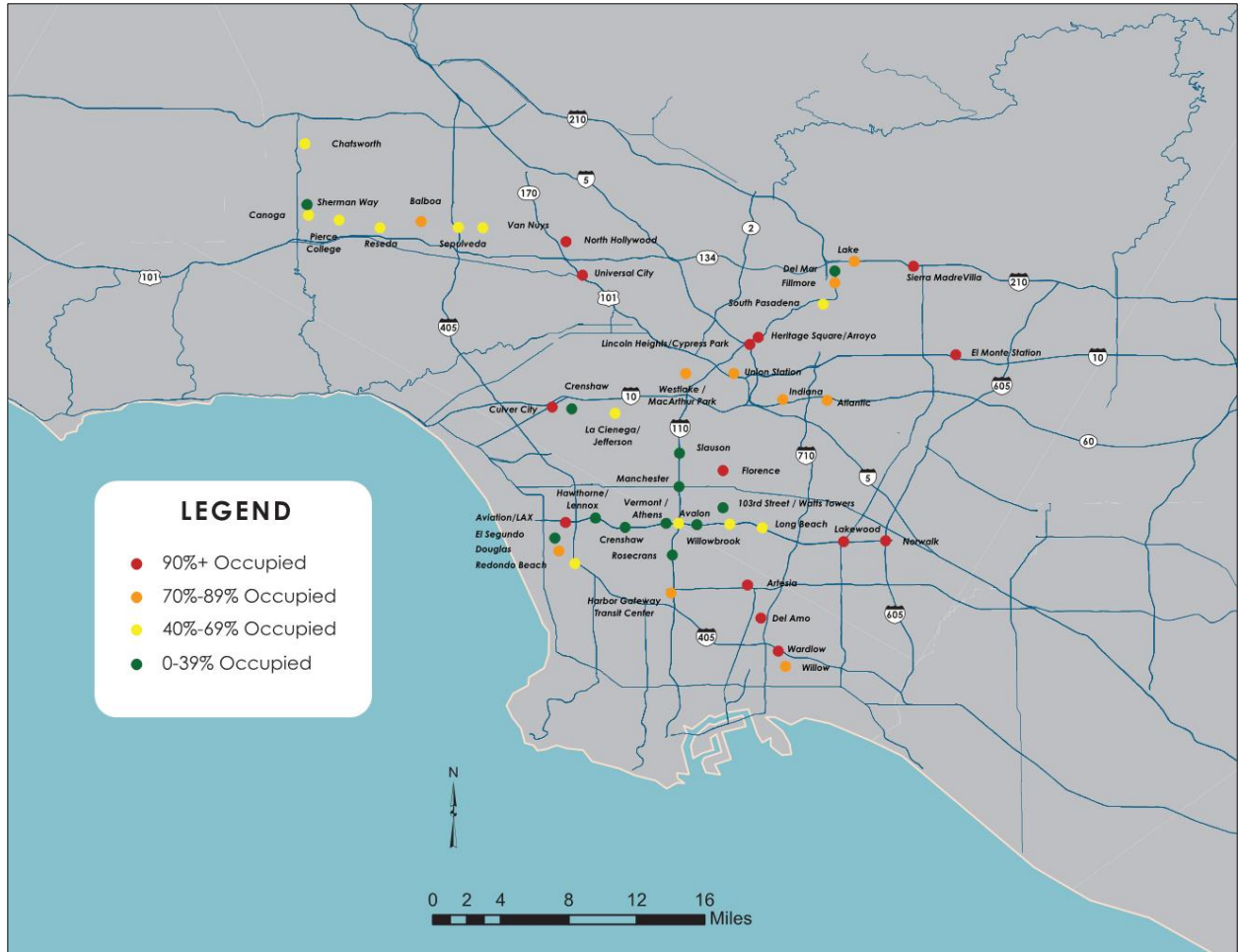
Appendix F: Management Alternatives by Station

Management Alternatives			
Station	Jurisdiction	Station	Jurisdiction
Blue Line		Orange Line	
Wardlow	City of Long Beach	Balboa Station	City of Los Angeles
Artesia	City of Compton	Pierce College Station	City of Los Angeles
Del Amo	County of Los Angeles	Van Nuys Station	City of Los Angeles
Florence	County of Los Angeles	Canoga Station	City of Los Angeles
Willow	City of Long Beach	Chatsworth Station	City of Los Angeles
Willowbrook (Rosa Parks)	County of Los Angeles	Reseda Station	City of Los Angeles
103rd Street / Watts Towers	City of Los Angeles	Sepulveda Station	City of Los Angeles
		Sherman Way Station	City of Los Angeles
Expo Line		Red Line	
Culver City	City of Culver City	North Hollywood	City of Los Angeles
La Cienega / Jefferson	City of Los Angeles	Universal City	City of Los Angeles
Expo / Crenshaw	City of Los Angeles	Westlake / McArthur Park	City of Los Angeles
		Union Station	City of Los Angeles
Gold Line		Sliver Line	
Heritage Square / Arroyo	City of Los Angeles	El Monte Station	City of El Monte
Lincoln Heights / Cypress Park	City of Los Angeles	Harbor Gateway Transit Center	City of Los Angeles
Sierra Madre Villa	City of Pasadena	Harbor Freeway	City of Los Angeles
Fillmore	City of Pasadena	Harbor Transitway / Rosecrans	City of Los Angeles
Atlantic	County of Los Angeles	Harbor Transitway / Manchester	County of Los Angeles
Lake	City of Pasadena	Harbor Transitway / Slauson	City of Los Angeles
Indiana	County of Los Angeles		
South Pasadena	City of South Pasadena		
Del Mar	City of Pasadena		
Green Line		Legend	
Lakewood	City of Downey	Alt 1	
Aviation / LAX	County of Los Angeles	Alt 2	
Norwalk	City of Norwalk	Alt 3	
Douglas	City of El Segundo	N/A	
Long Beach	City of Lynwood		
Redondo Beach	City of Redondo Beach		
Crenshaw	County of Los Angeles		
Hawthorne / Lennox	City of Hawthorne		
El Segundo	City of El Segundo		
Avalon	City of Los Angeles		
Vermont / Athens	County of Los Angeles		

Appendix G: Alternatives Map



Appendix H: Occupancy Map



Appendix I: PowerPoint Slides

Supportive Transit Parking Plan Workshop

Parking Management
March 29, 2016



Agenda

- Welcome and Opening Remarks (2 min)
- STPP project overview (10 min)
- Activities to-date
 - Stakeholder Outreach
 - Transit rider outreach (5 min)
 - Agency stakeholder outreach (10 min)
 - Research and Analysis
 - Facility assessments (5 min)
 - Ridership versus parking demand model (5 min)
 - Program management alternatives (10 min)
- Parking Management Pilot Program (10 min)
- Roundtable Discussions and Input on Program Management Alternatives (60 min)
- Next steps (2 min)
- Adjournment



STPP Project Overview

LA Metro STPP

Metro Parking System

Parking Primer

Metro Parking Facilities Map

Parking Triangle

LA Metro STPP

- Who we are
- Goals
- Key work elements
- Schedule
- Connection to other Metro efforts



LA Metro Parking System

- Parking spaces
 - Approximately 22,800 today
 - 23,800 future after opening of Expo II
- Locations
 - 54 today
 - 58 future after opening of Expo II
- Multiple owners: Metro, jurisdictions, Caltrans
- Serves transit riders and other parkers



LA Metro System-wide Parking Facilities Map

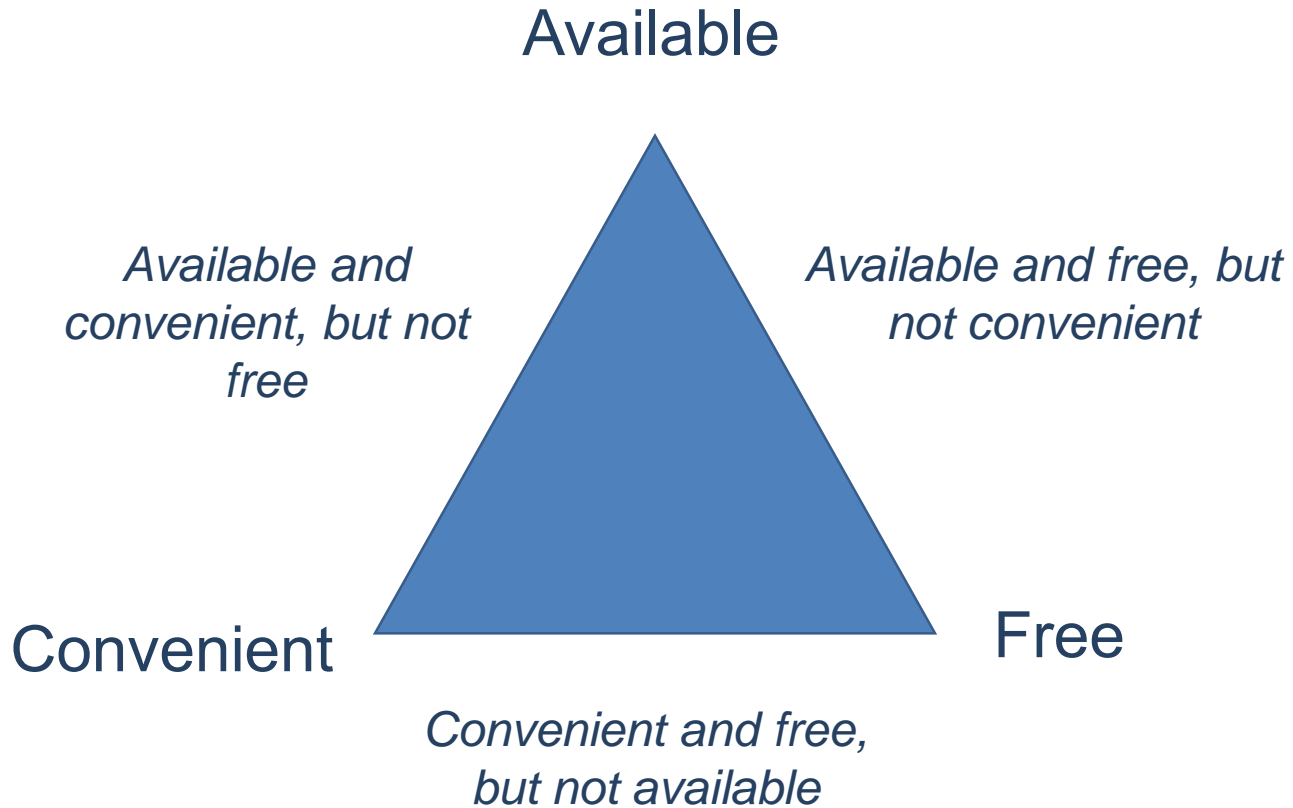


Parking Primer

- What is parking?
- Demand reflects adjacent uses
- Demand levels fluctuate
- Different physical configurations
- Costs to build and costs to maintain



Parking Triangle



Metro



Activities To Date

Stakeholder Outreach

Transit rider outreach (5 min)

Agency stakeholder outreach (10 min)



Supportive Transit Parking Program

Final Survey Results Overview
February 3, 2015

Visitor Summary

Total Participants/Visitors:	11933
Total Responses:	9015
English Responses:	8933
Spanish Responses:	82
Response Rate:	75%



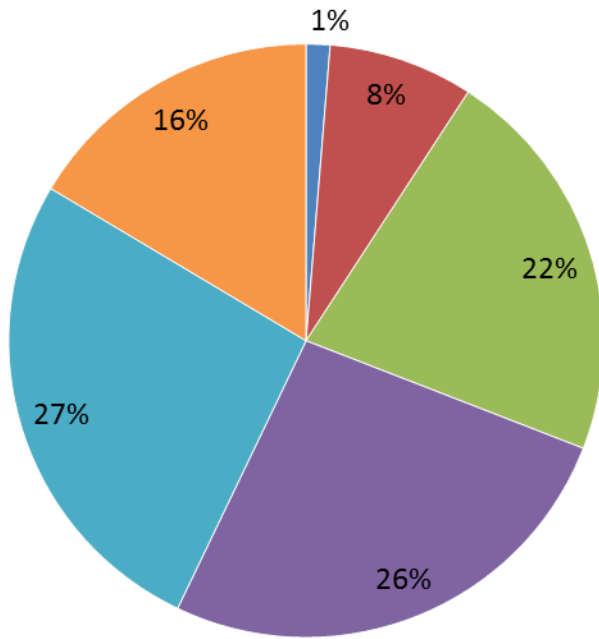
Metro

4/20/2016

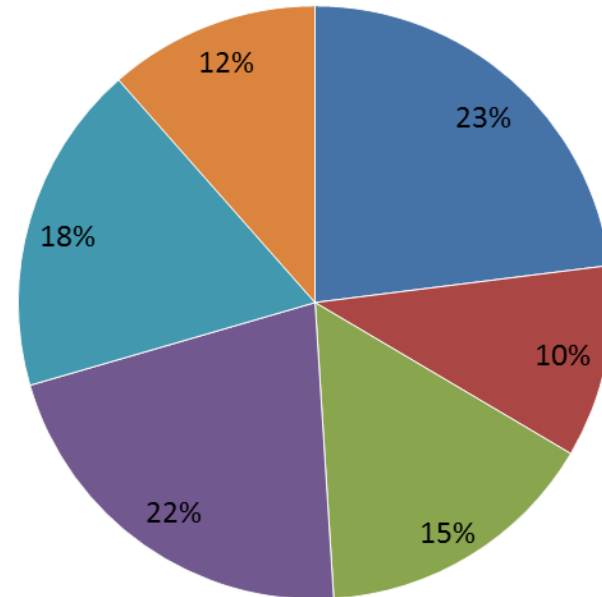


Demographics - Age

Respondents



LA County



■ Younger than 18 ■ 18-24 ■ 25-34 ■ 35-49 ■ 50-64 ■ 65 or more

Total Respondents = 8,736



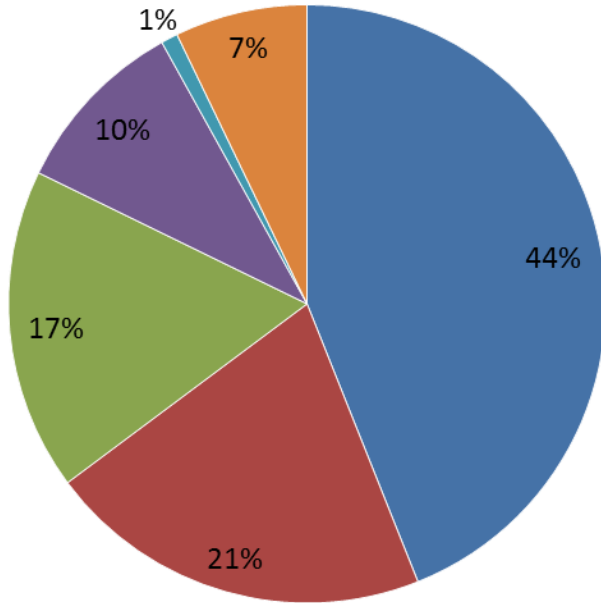
Metro

4/20/2016

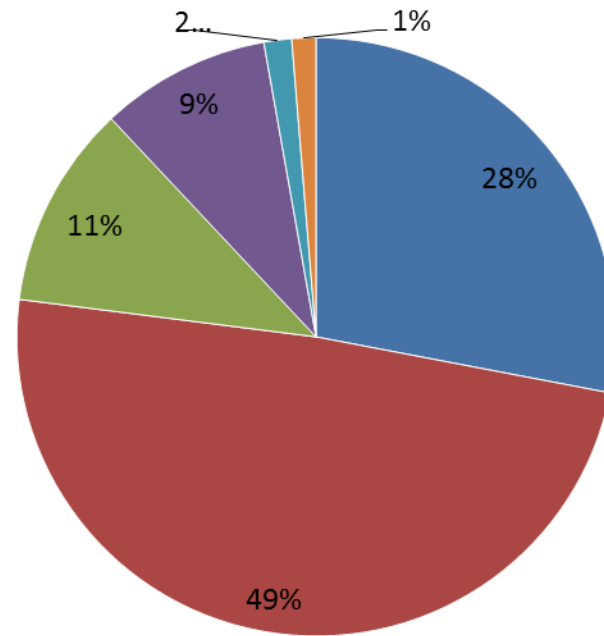


Demographics - Ethnicity

Respondents



LA County



■ White ■ Latino ■ Asian/pacific Islander ■ Black ■ American Indian ■ Other

Total Respondents = 8,698

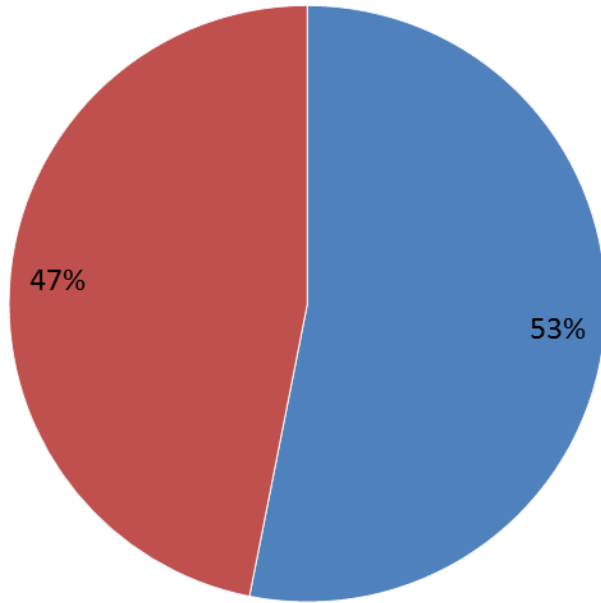


Metro
4/20/2016

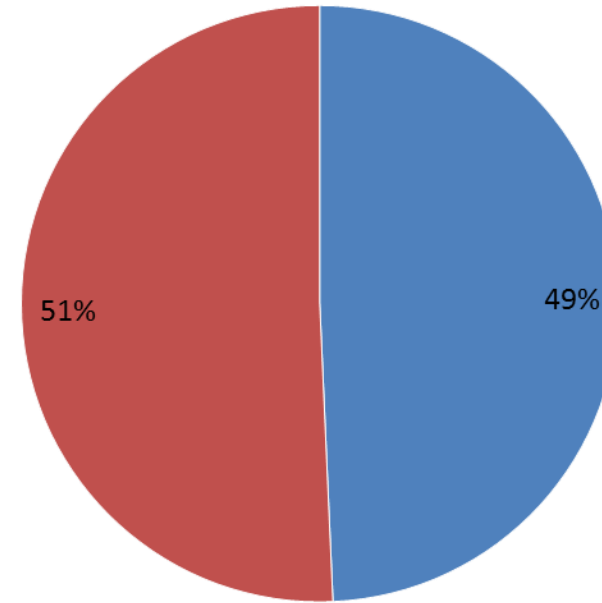


Demographics - Gender

Respondents



LA County



■ Male ■ Female

Total Respondents = 8,725

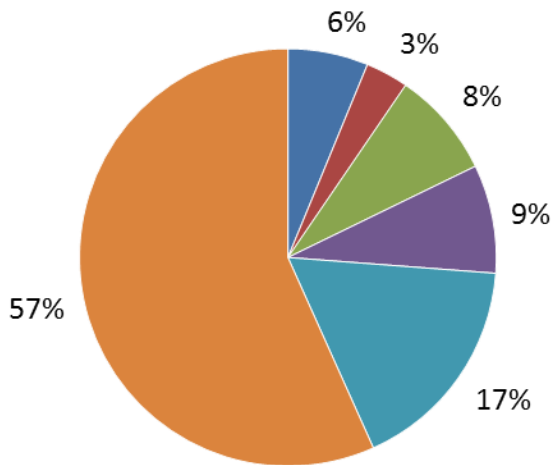


Metro
4/20/2016

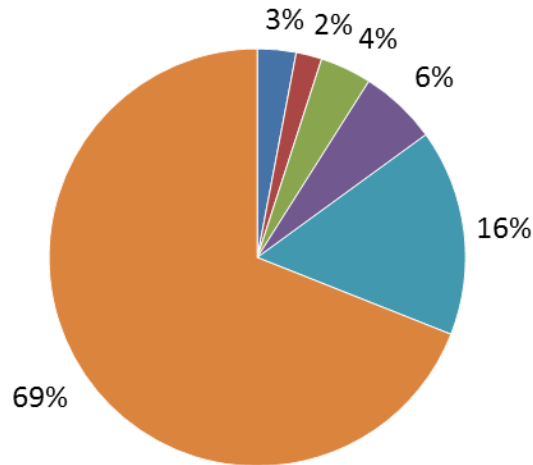


Demographics - Income

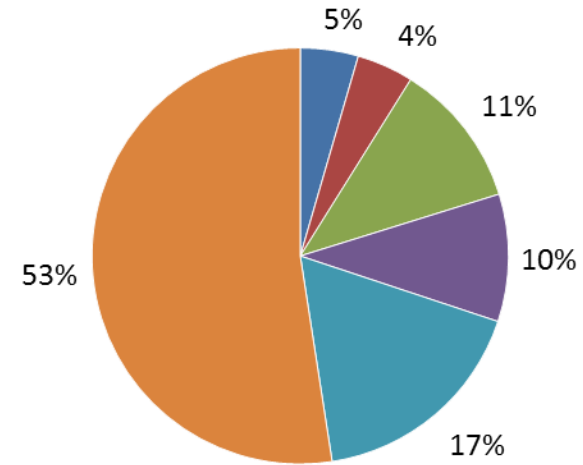
All Respondents



All Parkers



LA County Overall



■ Under \$5,000 ■ \$5,000-\$9,999 ■ \$10,000-\$19,999 ■ \$20,000-\$29,999 ■ \$30,000-\$49,999 ■ \$50,000 or more

Total Respondents = 8,459

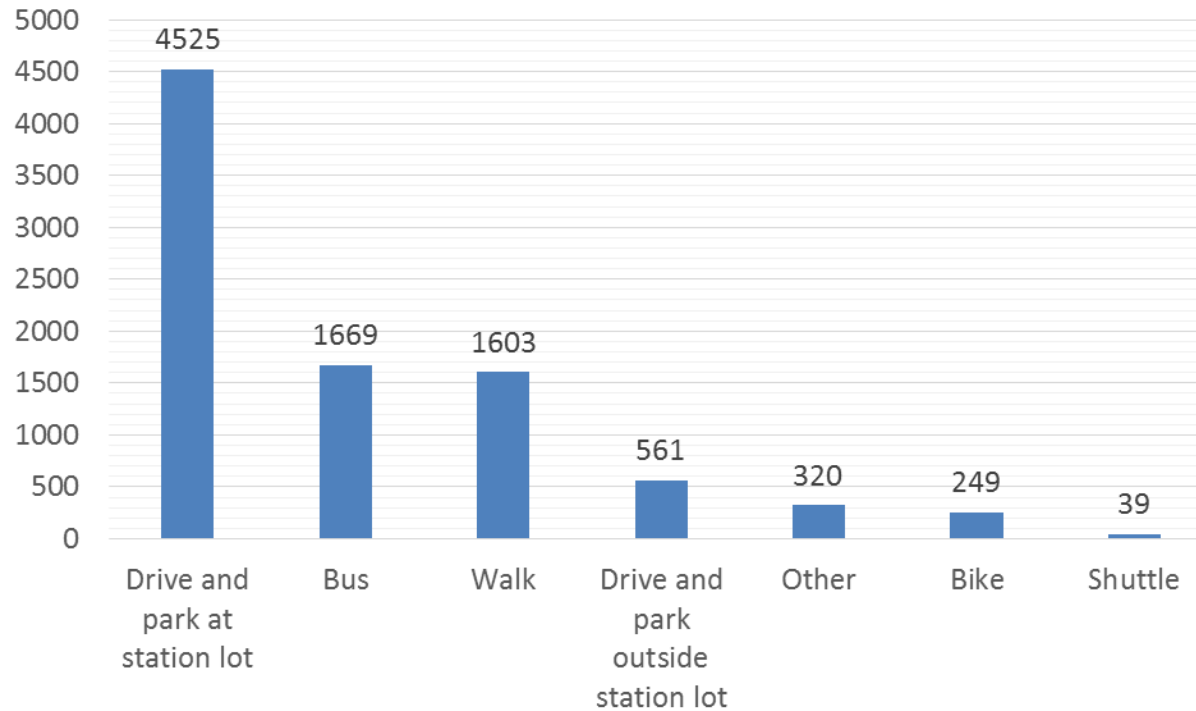


Metro
4/20/2016



Transportation Choices

“How do you arrive at the Metro Station?”



Total Respondents = 8,966



Metro

4/20/2016



Metro Parkers

It takes

up to
6 minutes



for a **majority** of respondents to find a parking spot in a **Metro** parking facility.

Most respondents park in a **Metro** station parking facility



4-5 times a week.

7-8 a.m.

is the time **most** respondents arrive at a **Metro** parking facility.



A **majority** of respondents park in a **Metro** parking station for

4-10 hours.

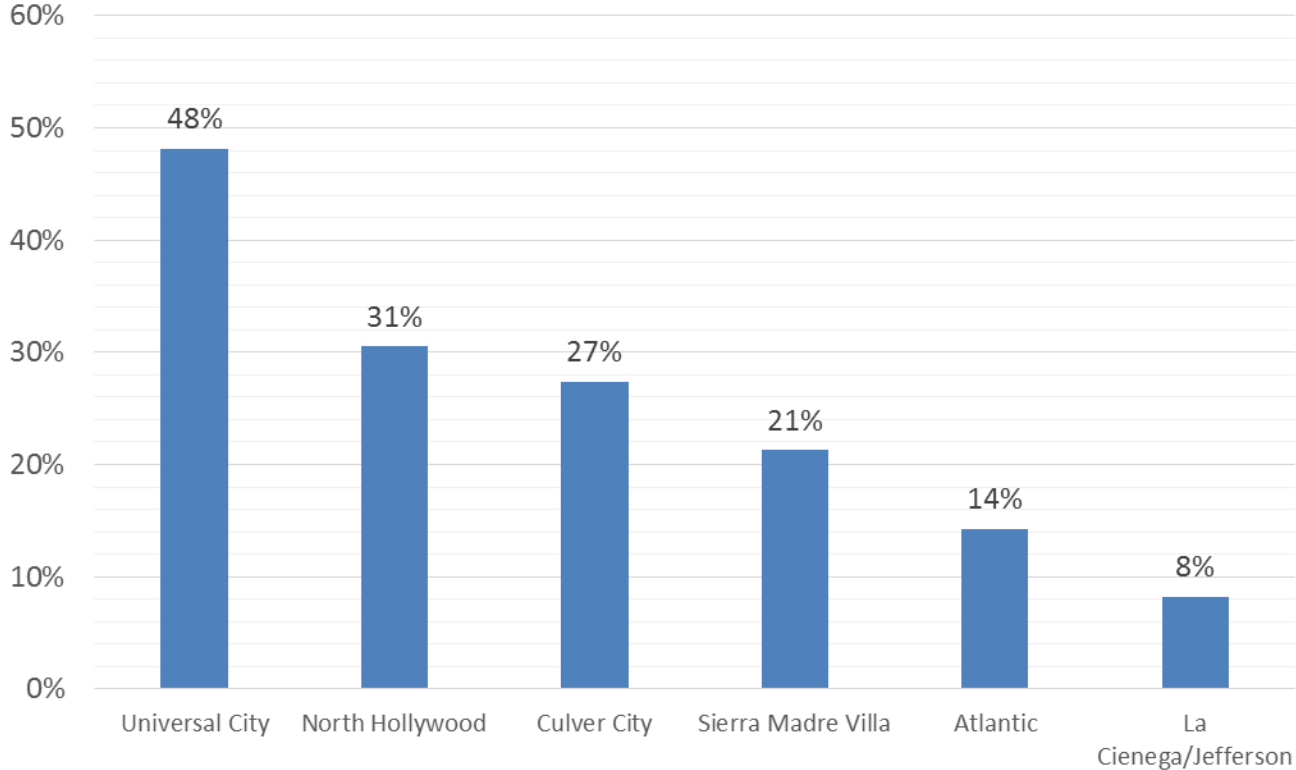


Metro

4/20/2016



Percentage of respondents who park in these facilities and require at least 6 minutes to find a space

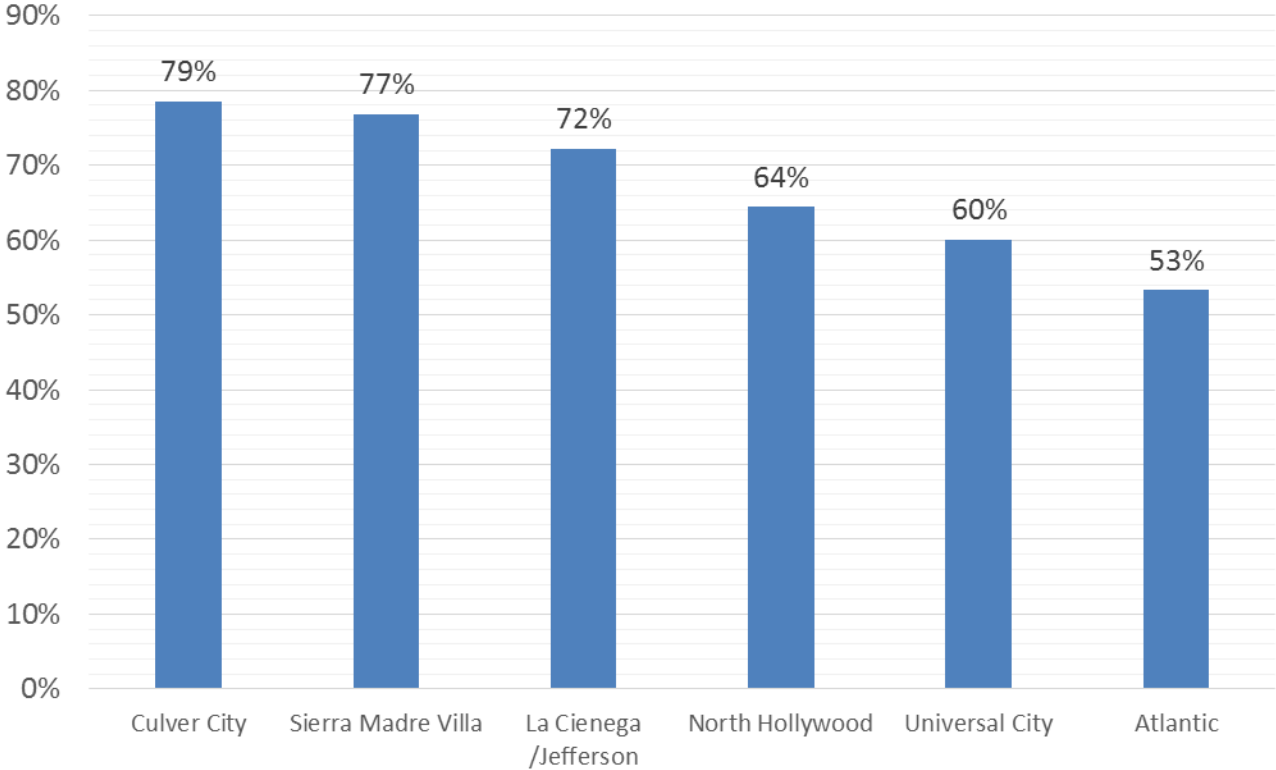


Metro

4/20/2016



Percentage of respondents who park in these facilities and report household total annual earnings over \$50,000



Non-Metro Parkers

Top three reasons respondents park outside of a **Metro** parking facility:

47% Can't find parking in lot/garage

31% No **Metro** lot/garage available

13% Convenience

41% of respondents park **near** a **Metro** station parking facility



4-5 times a week.

It takes most respondents who **do not** park in a **Metro** facility

4-6 minutes

to find a parking space **near** a station.



Same as Metro parkers, a **majority** of respondents park **near** a **Metro** parking station for

4-10 hours.



Metro

4/20/2016



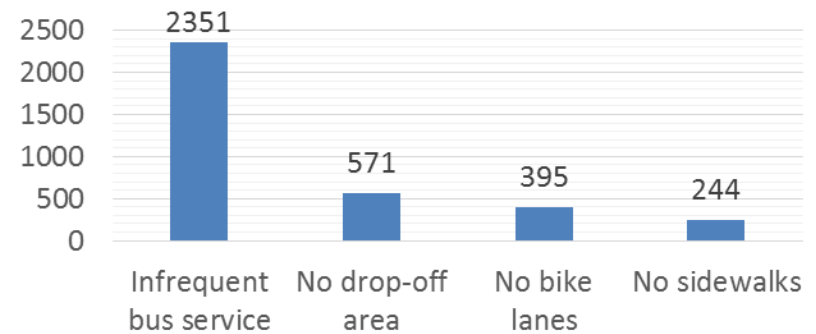
Non-Drivers

“What is your biggest challenge to get to the Metro station?”



Infrequent bus service

is the biggest challenge to get to the Metro station for most respondents who do not drive to a station.

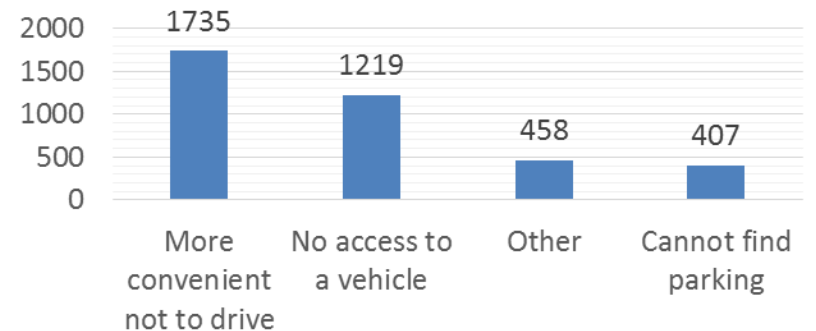


“Why don't you drive to the Metro station?”



It is more convenient

not to drive to a Metro parking facility for a majority of respondents who do not drive to a station.



Metro

4/20/2016





Supportive Transit Parking Program

Stakeholder Survey Results Overview

February 16, 2016

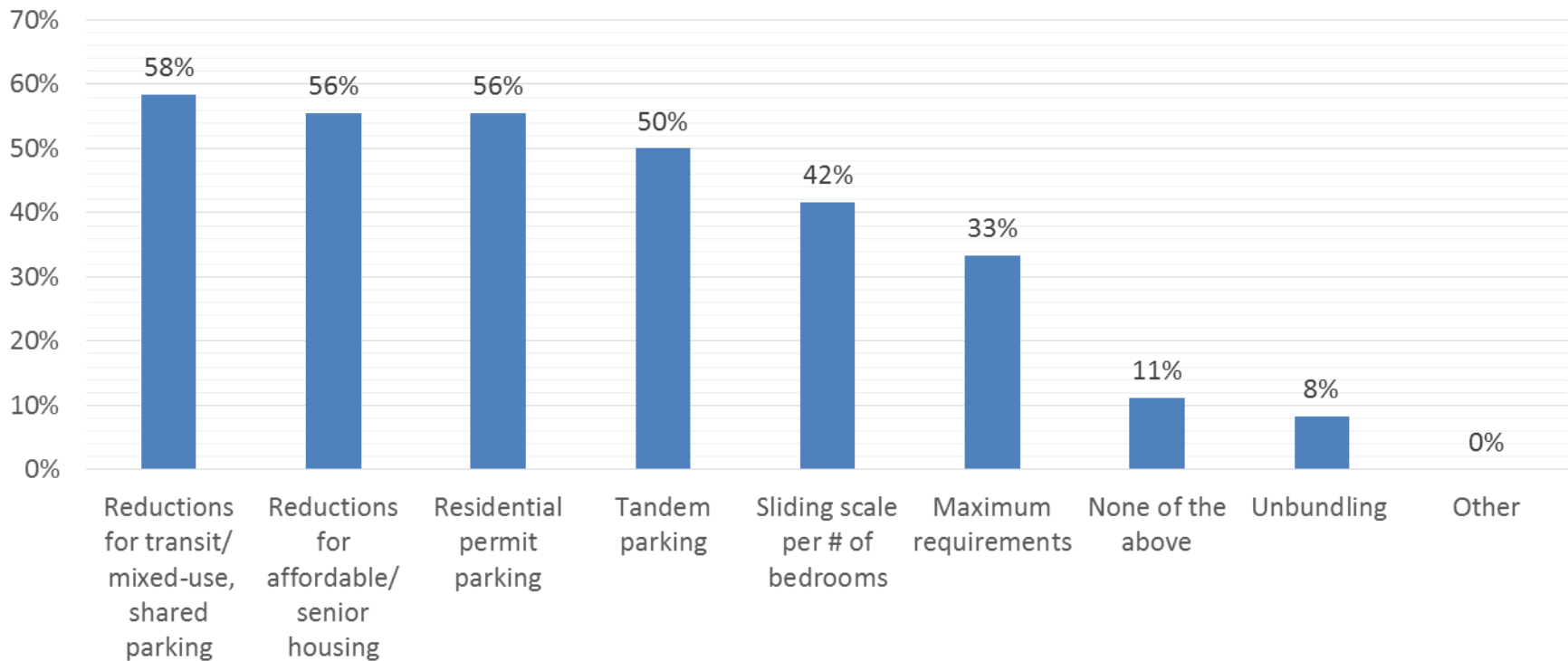
Response Summary

Cities/Agencies Invited	87
Total Cities/Agencies Responses	36
Response Rate	42%
Average Time to Complete	15 minutes



Parking Innovations

Please identify parking innovations or strategies being utilized by your jurisdiction.

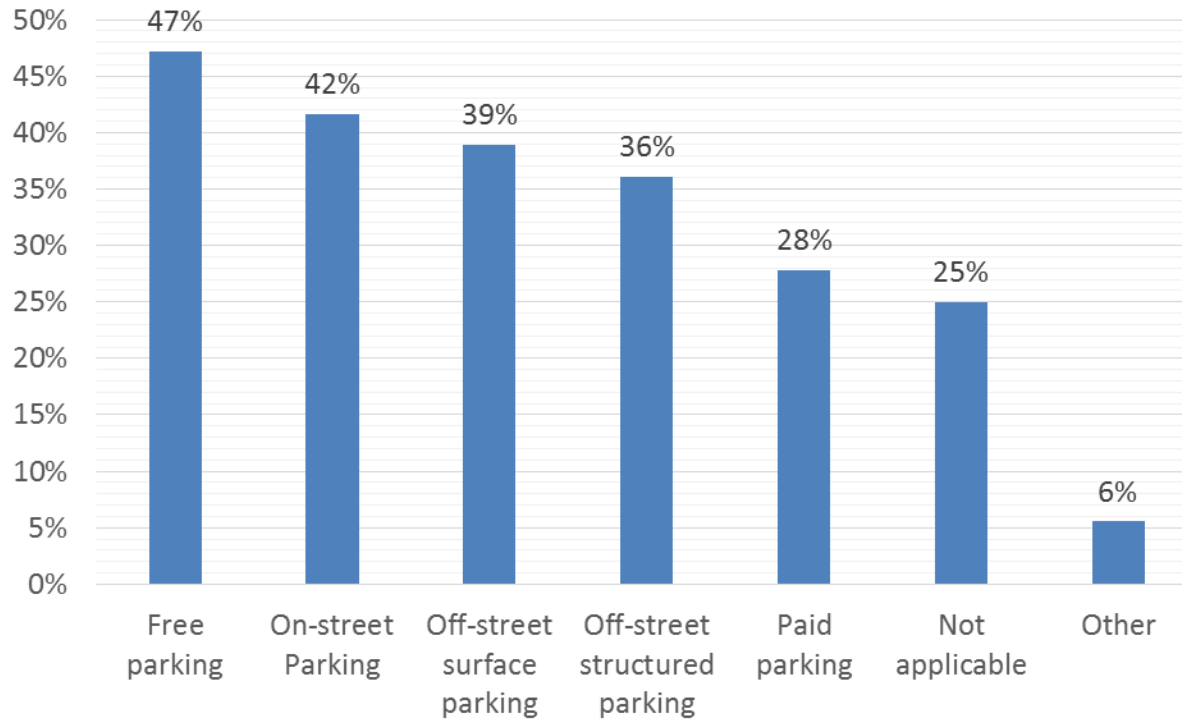


Total Cities/Agencies Responded = 36



Parking Options

If your city has a Metro Rail or Busway Station, how is parking provided at and near it?



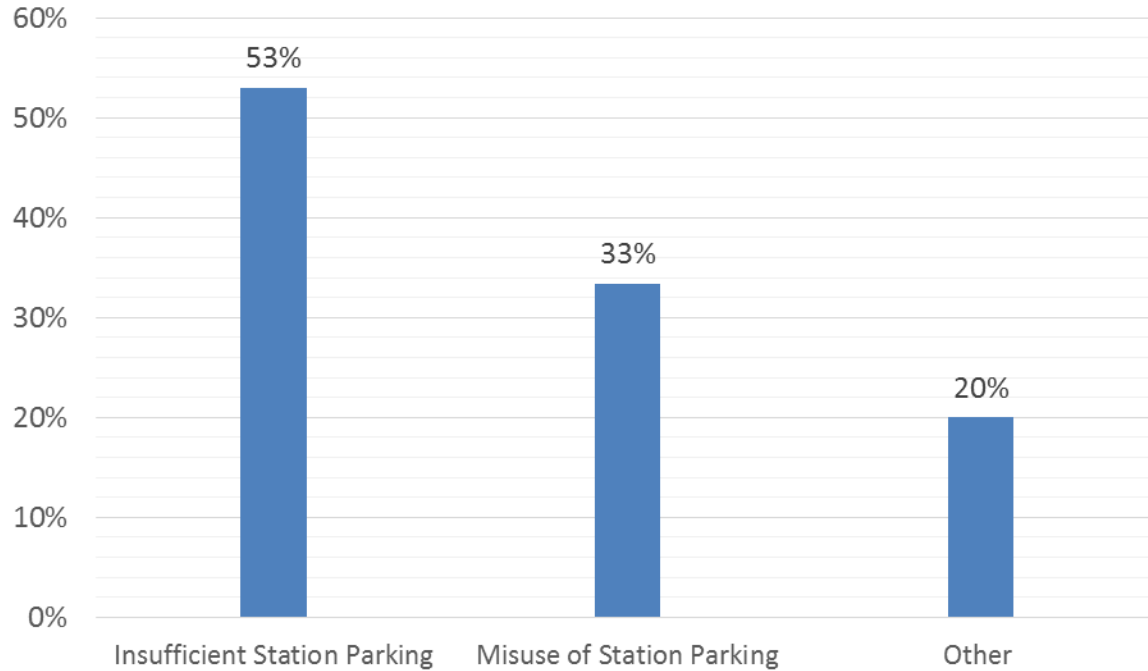
Total Cities/Agencies Responded = 36



Parking Issues

Are there issues with parking at or near your city's Metro Rail or Busway Station(s)?

Yes: 36% No: 25% Don't Know: 14%

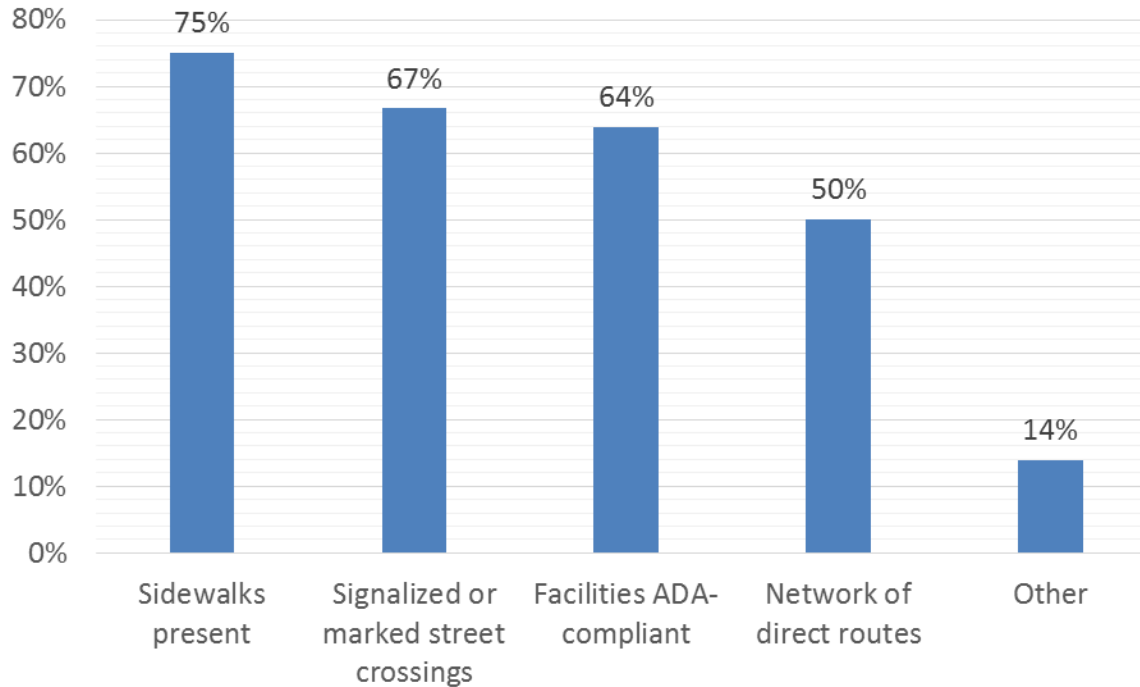


Total Cities/Agencies Responded = 27



Pedestrian Accessibility

Within Metro Rail or Busway Station area(s) in your city (1/2 mile radius), to what extent is/are your station area(s) pedestrian accessible?



Total Cities/Agencies Responded = 33



Public Parking

In your city, are there public parking lots or garages?

Yes: 83% No: 11% Don't Know: 3%

What user fees (parking charges) are currently required, if any, and what fees would be needed to cover the costs of upkeep and maintenance?

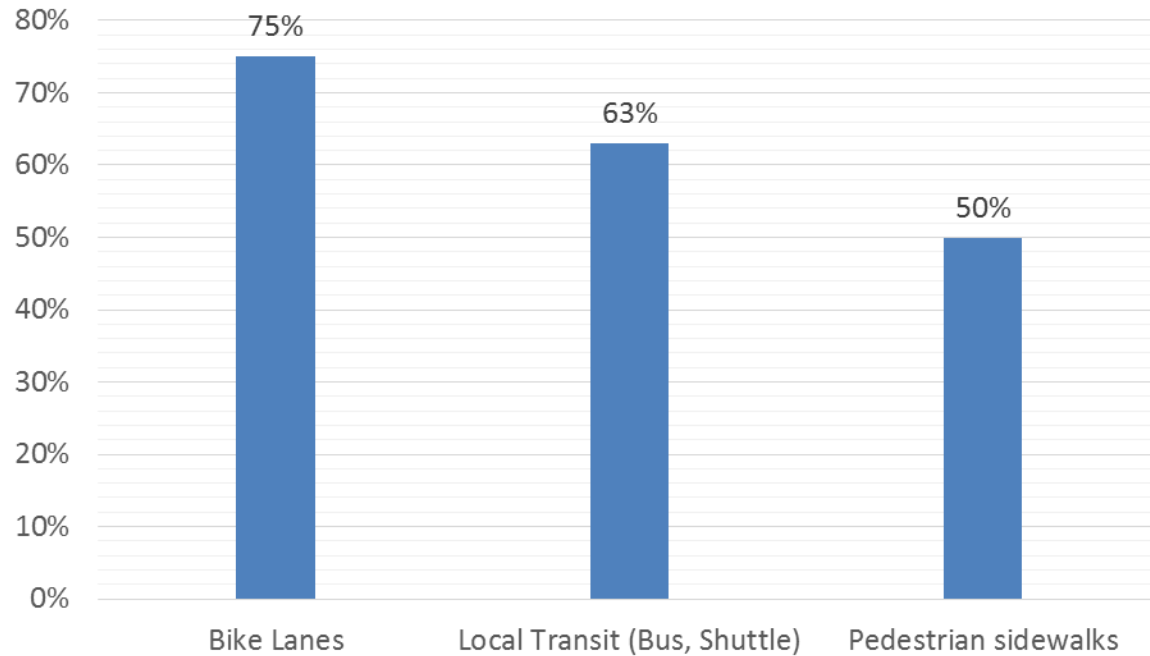
- Parking charges vary, and cities often offer daily or monthly parking permits at or near Metro stations. Some cities offer discount or free parking for Metro riders.
- Most of the respondents indicated that the maintenance costs have not been assessed.
 - *Jesus Gomez (El Monte): No fees are currently charged. Public parking is currently maintained by Public Works staff and absorbed by the City's General Fund. The City would need to perform a cost analysis to determine the proper fee amount to recover costs.*
 - *Samuel Zneimer (South Pasadena): There are free public lots, but the parking structure which is adjacent to our Metro Gold Line Station is a paid lot; we charge \$50 for monthly and \$3 for daily. This helps pay maintenance fees and upkeep fees.*

Total Cities/Agencies Responded = 29



Station Access

In your city, have you made investments in other modes of access (walking, biking, local transit)? Yes: 78% No: 3% Don't Know: 17%



Total Cities/Agencies Responded = 35



Concerns & Issues

Any other concerns or issues that we should address?

- As parking demands are growing throughout LA County, many cities have reiterated their interest in parking studies and analyses.
- Providing electronic ticket purchase service, addressing safety issues at Metro stations, and securing public funding are among the main concerns that need to be addressed.
 - *Charles D. Herbertson (Culver City): Opening of Phase II of Expo and subsequent development of the parking lot that currently provides parking for the Culver City Expo station raises concerns that there will not be sufficient parking for station users. We need to develop alternative means of riders getting to the Expo station in order to help reduce parking demand.*
 - *Daren Grilley (San Gabriel): Our City Council has expressed interest in conducting parking study for various areas, including around our two transit Park & Ride lots. It would be extremely valuable to have Metro assistance/guidance on this.*

Total Cities/Agencies Responded = 10



Evaluating Parking Alternatives

- 72% of respondents expressed interest in a tool to assist in **evaluating parking alternatives and costs**.
- 78% of respondents expressed interest in learning more about addressing **parking issues** at or near the Metro transit stations.
- 89% of respondents expressed their interest in hearing about **analysis of parking options and associated costs**.
- 35 cities/agencies expressed interest in follow-up discussions, and would like to hear more from:
 - local city staff with experiences (67%)
 - city staff from other regions (64%)
 - practitioners with technical analyses (61%)
 - analysts with techniques (67%)
 - developers or financiers (53%) and
 - academics (44%).



Activities To Date

Research and Analysis

Facility assessments (5 min)

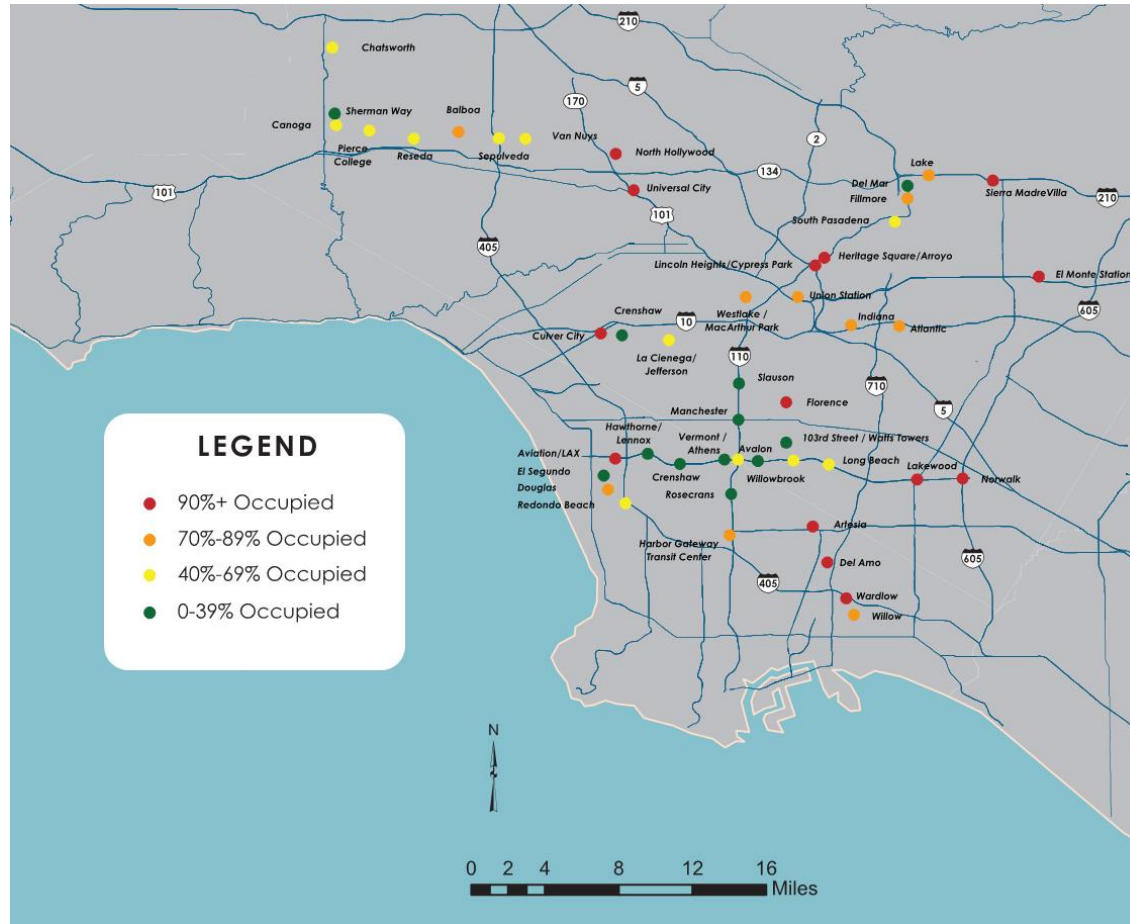
Ridership versus parking demand model (5 min)

Facility Assessments – Approach

- Assessment covered
 - Vehicle occupancy
 - Bicycle occupancy
 - Parking user groups
 - Bicycle and pedestrian infrastructure
 - Parking wayfinding
 - General facility conditions
 - Lighting
- Recommendation Matrix items include
 - Parking and pedestrian wayfinding
 - Parking facility conditions
 - Safety/security
 - Permit parking



Facility Assessments – Occupancy by Location



Facility Assessments – Next Steps

- Draft recommendations with ROM cost estimates and timing to be incorporated into overall Master Plan
- A few items outside of Metro control
 - Safety adjacent to station area
 - Bicycle infrastructure to/from station areas
 - Pedestrian infrastructure to/from station areas



Ridership vs Demand Model – Approach

- Model components
 - Base data
 - Station typology assignment
 - Demand ratios
 - Elasticity curve
- Base data
 - parking occupancy data
 - weekday boardings and
 - TAP card activity
- Six station typologies
 - assigned based on location/type
- Three demand ratios
- Elasticity curve
 - baseline of free parking and increments of \$1.00 per day



Ridership vs Demand Model – Draft Results & Next Steps

- North Hollywood station -
 - 1,145 spaces today (estimated 1,381 riders)
- Using the three demand ratios provided a range of values
 - Low: 1,029 vehicles (1,245 riders)
 - High: 1,751 vehicles (2,119 riders)
 - Average: 1,326 vehicles (1,604 riders)
- Potential to gain ridership with net addition of parking spaces
- Next steps – additional refinement to elasticity curve



Activities To Date

Program Management Alternatives (10 min)

Program Management Alternatives

- Transit parking is not a one size fits all solution countywide
- Proposed strategy to monitor and adjust parking management policies as needed
- Common management measures for all alternatives
 - Parking and pedestrian wayfinding
 - Enforcement
 - Amenities
 - Good lighting
 - High level of cleanliness and maintenance
 - High level of security
 - Access
 - Good bus service to station
 - Good bike and pedestrian access to station
 - Bike parking
 - Bikeshare
 - Carshare
 - Dedicated carpool/vanpool spaces
 - Pick-up/drop-off areas



Program Management Alternatives

- Alternative 1
 - Parking occupancy threshold of 90%+
 - Paid parking with higher rate for transient parkers (those not riding transit)
 - Identify resources to increase parking inventory
- Alternative 2
 - Parking occupancy of 70-89%
 - Paid parking with higher rate for transient parkers (those not riding transit)
- Alternative 3
 - Parking occupancy of 0-69%
 - Free parking
 - Actively market to increase occupancy
 - Some locations may have alternate uses



STPP Alternatives Map



Parking Management Pilot Program

Why Paid Parking?

The Paid Parking Pilot Program is being recommended as part of the Supportive Transit Parking Program (STPP) Master Plan and will:

- Determine parking occupancy (and related demand) before and after pricing implementation.
- Assess the relationship between parking demand and ridership.
- Adjust pricing to mitigate changes in parking occupancy.
- Determine necessary parking enforcement.
- Identify innovative solutions and funding for parking operations and management.



Pilot Locations and Pricing Recommendations

Pilot locations were selected based on their capacity, terminus locations, utilization and recent parking facility assessment findings. Key findings include:

- Transit parking at North Hollywood reaches capacity by 7am or earlier during weekdays.
- Transit parking at Universal and Sierra Madre reaches capacity by 8am during weekdays.
- Utilization at La Cienega/Jefferson continues to increase, as the Culver City Station has reached its capacity.
- Expo II has strong possibility for non-transit rider “poaching” because nearby private parking facilities charge for parking.

Pilot Program - Proposed Pricing

Station	Rail Line	Transit User Daily Rate	Transit User Monthly Rate	Carpool Monthly Rate	Non-Transit Rider Daily Rate	# of Parking Spaces
Expo/Bundy	Expo II	\$2	\$39	\$25	\$20	250
Expo/Sepulveda	Expo II	\$2	\$39	\$25	\$15	260
17th St/SMC	Expo II	\$2	\$39	\$25	\$20	67
La Cienega/Jefferson	Expo I	\$2	\$39	\$25	\$17	485
Culver City	Expo I	\$2	\$39	\$25	\$17	586
Sierra Madre Villa	Gold	\$2	\$29	\$20	\$17	965
Atlantic	Gold	\$2	\$29	\$20	\$15	284
Universal	Red	\$3	\$55	\$45	\$25	546
North Hollywood	Red	\$3	\$59	\$45	\$25	1,310
Total						4,753



Impacts: Arrival and Commuting Cost

Boardings and Arrival methods

	Weekday Boardings	% of Park and Ride at Station	% Arrive by Public Transit	% of Arrive by other Methods
North Hollywood	15,841	9%	62%	29%
Universal City	6,945	13%	60%	27%
Atlantic	2,138	8%	62%	30%
Culver City	4,713	15%	50%	35%

Commuting Cost

Station	Monthly Cost of Metro Commute Including Paid Parking at first location	Total of Gas + Monthly Parking in Downtown LA	Savings % - with Metro Parking Charge	Savings % - Free Metro Parking
North Hollywood	\$130.00	\$274	53%	74%
Universal City	\$130.00	\$258	50%	73%
		Average	51%	74%



Impacts: Public Perception & Benefits

- Parking facilities are maintained through Metro's annual budget without generating any revenue to recover a portion of its costs.
 - Surveys have found that some non-driving transit patrons perceive that their transit fare is subsidizing parking.
- The Pilot Program is estimated to generate approximately \$600,000 in net revenue.
- Pricing can be adjusted, or even eliminated, if there are significant impacts on ridership.
- Best practices in parking demand management and academia suggest that parking should be managed through appropriate, flexible pricing programs.



How does it work?

Return Transit Riders



Step 1
Hand TAP card to parking attendant



Step 2
Parking attendant verifies TAP ridership transaction



Step 3
Transit patron pays the parking attendant



Step 4
Enjoy Metro



How does it work?

New Transit Riders



Step 1
Parking attendant issues exception ticket to transit patron



Step 2
Parking attendant places printed ticket on dashboard



Step 3
Enjoy Metro



Step 4
Transit patron pays by mobile payment with the exception ticket number or pays the parking attendant upon return



Program Implementation

Phase I

- Implement at three transit parking locations along the Expo II extension opening May 2016

Phase II

- Procure a new parking operator contract for the Pilot Program (including the original 3 locations on Phase I)
- Implement 6 additional stations, and all 9 locations will manage by the new contract by Winter 2016
- Phase II will include more sophisticated parking equipment, additional labor, parking tax, credit card and transaction processing etc.



Phase I - Locations



Expo/Sepulveda

- Parking Structure
- 260 parking spaces



Expo/Bundy

- Surface Parking
- 250 parking spaces



Colorado/17th St.

- Surface Parking
- 67 parking spaces



Next Steps

- Public outreach and notification in April 2016.
- Begin phase I operation May 20, 2016 at Expo II locations.
- Procure a new parking operator contract for Phase II
- Install equipment for Phase II in Fall 2016
- Phase II nine locations begin operation in Winter 2016
- Staff will monitor and evaluate the Pilot Program every three months and return to the Board with update, new contract and Phase II operating plan at the September 2016 Board meeting.



Group Discussion

STPP Discussion Questions

- Program Goals
- Management Approaches
- Management Alternatives
- Parking Pricing
- Spillover Impacts



Next Steps

Los Angeles County Metropolitan Transportation Authority

Contacts:

Adela Felix, Metro Transportation Planning Manager
213.922.4333

Bernard Lee, Walker Parking Consultants
213.488.4911 ext. 3708

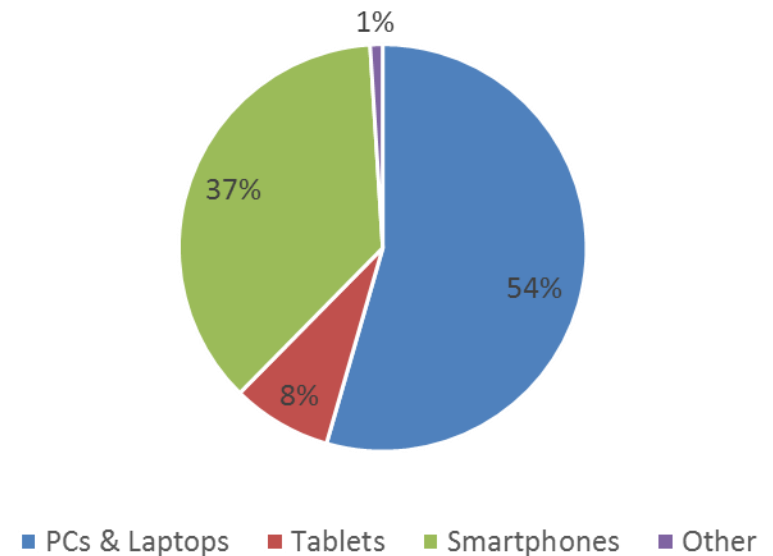
Susan DeSantis, Arellano Associates
714.423.7323



Online Survey Summary

Total Participants/Visitors:	10880
Total Responses:	8073
English Responses:	8061
Spanish Responses:	12
Response Rate:	74%

Devices vs Responses



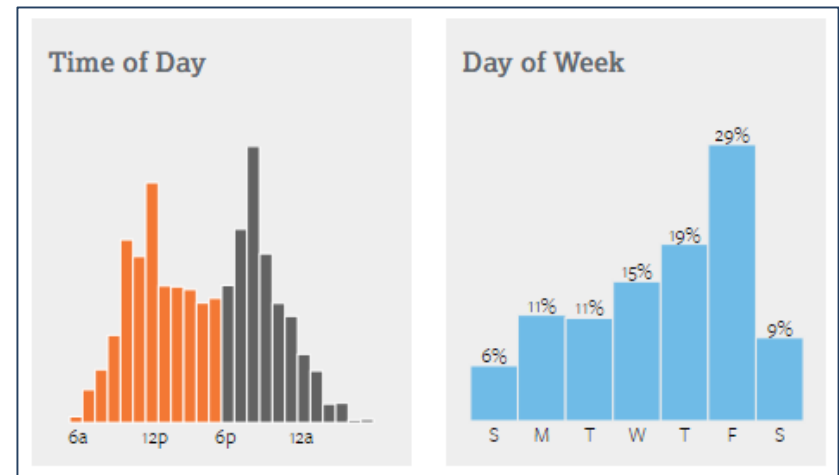
Metro

4/20/2016



Text Survey Summary

Total Participants/Visitors:	1053
Total Responses:	942
English Responses:	872
Spanish Responses:	70
Response Rate:	89%



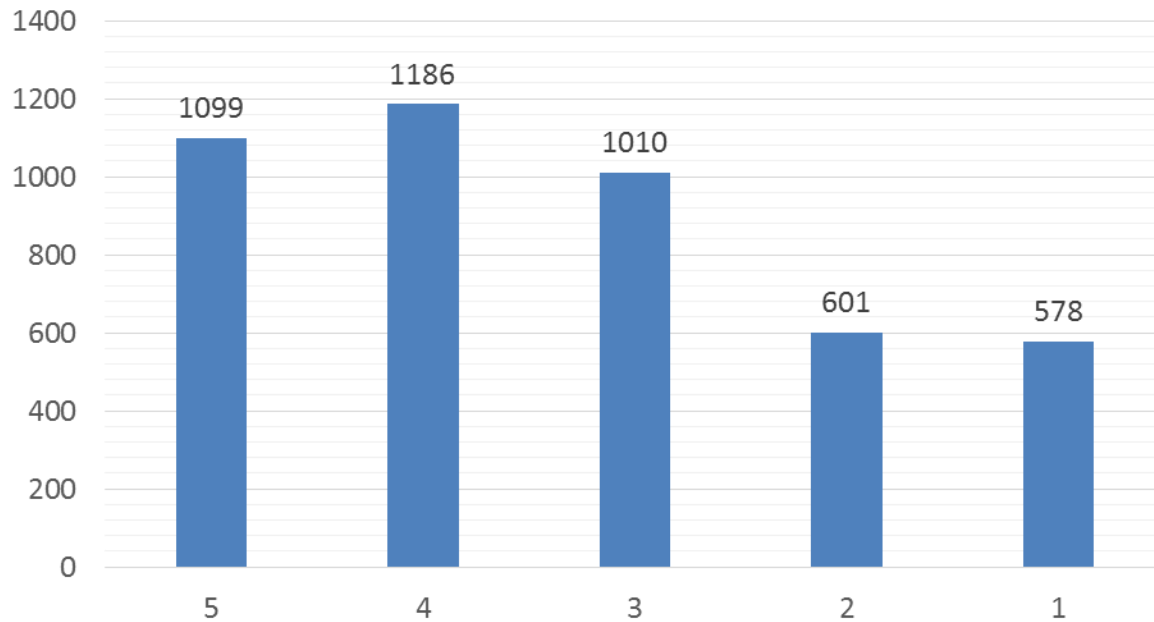
Metro

4/20/2016



Customer Satisfaction

“On a scale of 1 to 5 (5 = extremely satisfied), how satisfied are you with Metro station parking facilities?”



Total Respondents = 4,474



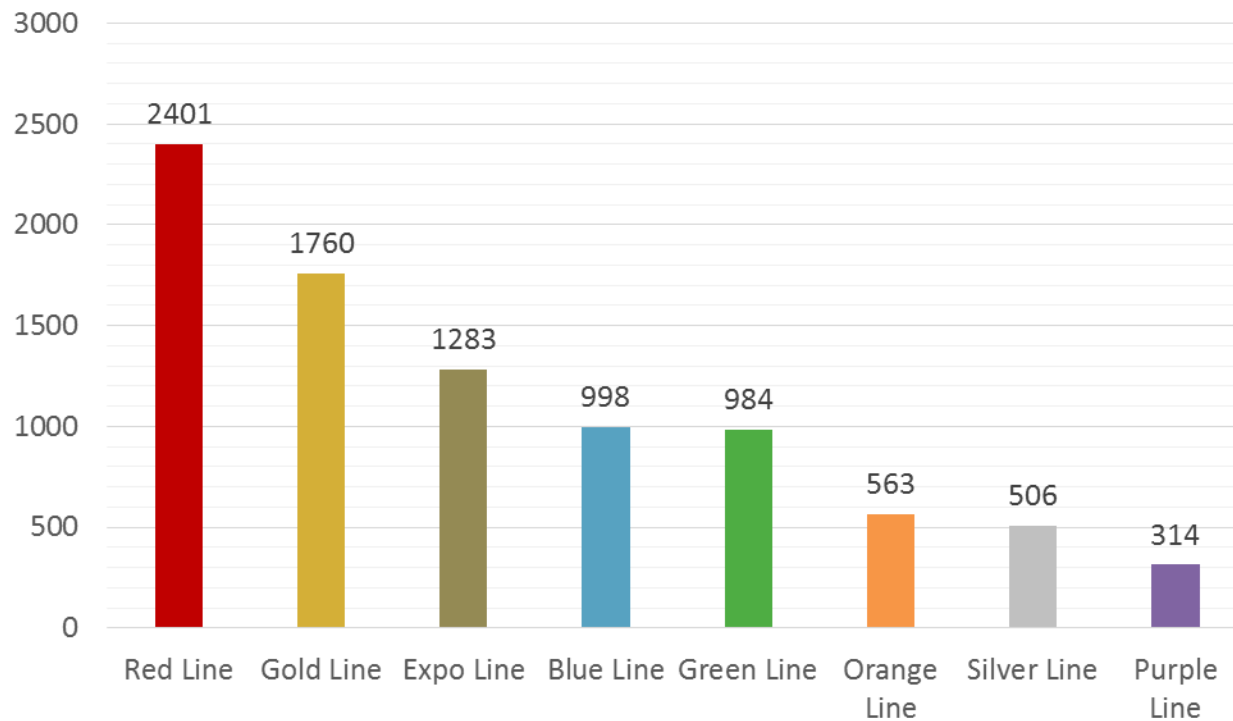
Metro

4/20/2016



Station of Origin

“Which Metro Line do you use most often as your station of origin?”



Total Respondents = 8,809



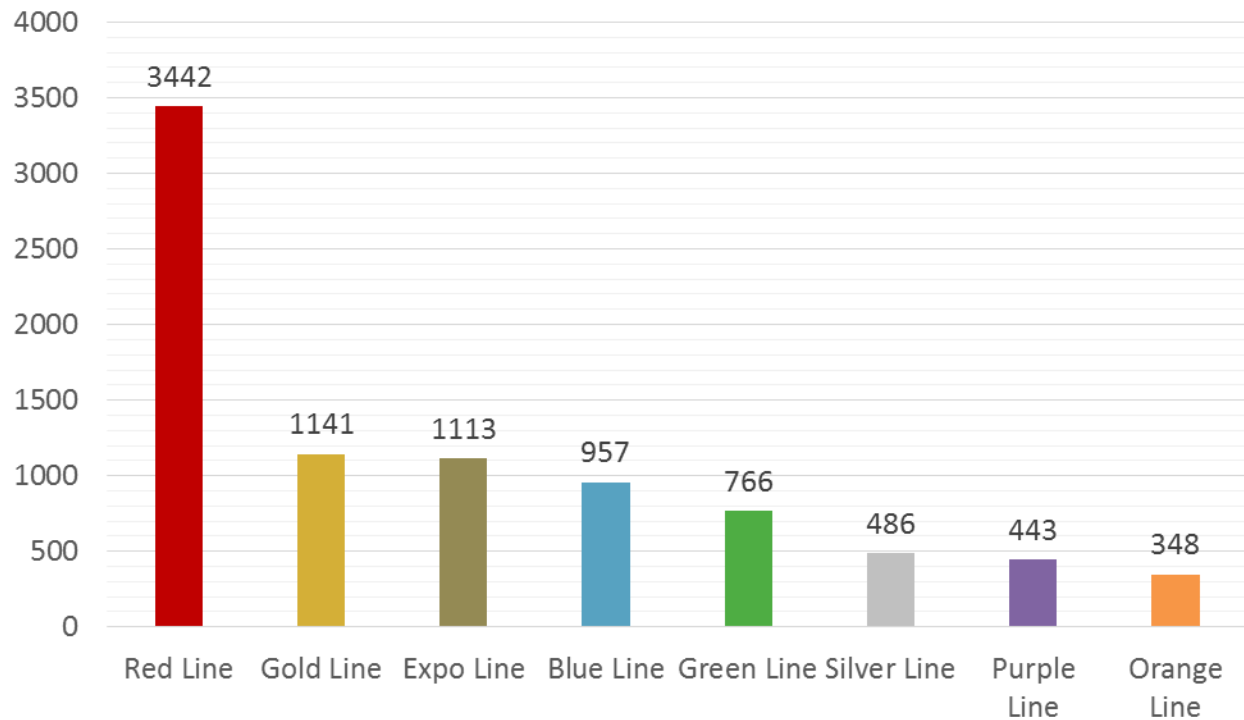
Metro

4/20/2016



Destination Station

“Which Metro Line do you use most often as your final destination station?”



Total Respondents = 8,696



Metro

4/20/2016



Appendix G: Workshop Summary Reports



Metro

Supportive Transit Parking Program

Metro STPP Agency Workshop

Location:	Monrovia Community Center 119 W Palm Ave. Monrovia, CA 91016	
Date:	Tuesday, March 15, 2016	10:00 a.m. - 12:00 p.m.
CITIES	Phillip Wray, Arcadia Brittany Mello, Monrovia Tina Cherry, Monrovia Jon Hamblen, Pasadena Samuel Zneimer, South Pasadena	
AGENCIES	Sharlane Bailey, Foothill Transit Maayan Dembo, UrbanTrans	
PRIVATE SECTOR	Miguel Vasquez, Grapevine Development	
METRO	Adela Felix, Metro Frank Ching, Metro	
Consultant Team	Bernard Lee, Walker Parking Susan De Santis, Arellano Associates Sohrab Mikanik, Arellano Associates	



Metro

Supportive Transit Parking Program

Agenda Items

A. Welcome and Opening Remarks (Frank Ching, Metro)

Frank Ching (Metro) opened the meeting.

B. STPP project overview (Bernard Lee, Walker Parking)

Bernard Lee introduced LA Metro STPP project, and noted that the goal is to develop a strategic implementation master plan. Mr. Lee discussed LA Metro parking system, parking primer, and parking triangle. He noted that parking is a derived demand from demand of something else, and different occupancy levels at different time reflect fluctuation of demand levels.

C. STPP Activities to-date (Susan DeSantis, Arellano Associates, Bernard Lee, Walker Parking)

1. Stakeholder Outreach

Transit rider outreach — Susan DeSantis (Arellano Associates) presented results on transit rider survey. She shared the survey results on transit riders and non-transit riders riding behavior and demographics.

Agency stakeholder outreach — Ms. DeSantis presented results on agency stakeholder survey.

2. Research and Analysis

Facility assessments — Mr. Lee discussed facility assessment approach, findings and next steps.

Ridership versus parking demand model — Mr. Lee discussed approach, results and next steps on ridership versus parking demand model.

3. Program management alternatives

Mr. Lee introduced the proposed five alternatives and common measures for all alternatives. A member asked what determines the change of rates. Mr. Lee responded that occupancy changes determine the rate changes.

D. Parking Management Pilot Program (Frank Ching, Metro)

Mr. Ching presented Pilot Program components. He noted that the stations recommended for the Pilot Program were carefully selected by project team based on their capacity, utilization and recent facility assessment findings. He noted that



Metro

Supportive Transit Parking Program

demand of Sierra Madre and Culver City stations have already changed because of the opening of Expo 2 Extension.

He also pointed out that this Parking Management Pilot Program is not expected to cause significant drops in ridership since a small portion of transit riders at the selected parking facilities drive to the station. This program is not expected to significantly increase the overall commuting costs to Metro transit riders.

Mr. Ching invited comments and questions on Pilot Program.

One workshop participant inquired about whether building more parking was considered as an alternative to solving current parking problems. Mr. Ching responded that building more parking is an option but not until parking management efforts are implemented and examined. He said that Metro is open to the alternative of building additional parking at the point when paid parking at the cap price still has full occupancy.

Another question was asked on what system will be used to implement the differential rates for transit and non-transit riders. Mr. Ching replied that the project team is developing TAP card identifier system. A workshop participant noted that the Del Mar station is currently having TAP cards validated by staff. Mr. Ching responded that the TAP identifier system is similar to this practice, and the difference is that TAP identifier system will integrate different rates, so that when riders are checking out, the specific rate would automatically show up.

A question was asked about whether transit rider was referring to only light rail rider or include also busway rider. Mr. Ching noted that it will apply to any program that accepts TAP card.

A question was asked on the determinants for stations to be included in Phase 2. Mr. Ching responded that the locations would be determined by Expo 2 Line impact as well as utilization data. Another question asked if the nine locations for Phase 2 have been identified, and specifically asked whether El Monte bus station would be included. Mr. Ching explained that El Monte bus station is under a joint use agreement between Metro and Caltrans, and Metro has no jurisdiction over Caltrans' stations. However, he pointed out that Metro is working on developing new agreements and transitioning ownership from Caltrans.



Metro

Supportive Transit Parking Program

A question was asked about the project timeline, specifically when Metro will give recommendations on alternatives for each of the stations along the Gold Line extension. Mr. Ching replied that Metro plans to present alternatives in the Management Plan in September 2016.

Other questions and responses are noted below:

How will the revenues generated from this program be used?

Mr. Ching responded that most of the revenue will be going into an all-purpose account, which serves mostly as saving for future development. Mr. Ching also mentioned that Metro is looking at improving parking enforcement with new technology.

Will daily parking fare be based on percent occupancy?

Mr. Ching explained that it is determined by both occupancy rate and transit fare, with a cap of \$5. A further inquiry asked if the gas price would have any influence on parking rates. Mr. Ching said it is not anticipated that gas prices would influence the rates. A question was asked if the pilot program looks at mainly outside of Downtown Los Angeles. Mr. Ching gave a positive response and noted that Downtown Los Angeles is likely to be turned into a permit parking only area.

Will electric vehicle (EV) charging station be available in the parking locations?

Mr. Ching noted that environmental and energy management team in Metro manages an EV charging program. He mentioned that it is expected that EV charging will be available as a sign-up program and will be associated with a fee. However, other details remain to be determined.

E. Roundtable Discussions and Input on Program Management Alternatives (Susan DeSantis, Arellano Associates)

Ms. DeSantis led the roundtable discussions, which covered STPP Program goals, management approaches, alternatives, pricing and spillover impact.

Ms. DeSantis invited comments or suggestions on STPP program goals. Suggestions received:



Metro

Supportive Transit Parking Program

Would Metro consider sharing some return on investment with the cities?

Cities hope to cover the cost as much as possible as they are responsible for maintenance. One participant noted that in his city, almost all Prop C account is dedicated in parking management, and he hopes that some revenue can go back to Prop C account for use in other projects.

Would Metro share points of contact with Uber/Lyft with cities for future use?

One participant noted that small cities might not have the scale to attract ride-share companies. Mr. Ching asked if he is looking to develop relationship with ride-share companies or if he would like to have Metro as conduit. The member clarified that he would like to have Metro serve as conduit between cities and ride-share companies. Mr. Ching then responded that Metro will work with cities as needed.

STPP management approaches and alternatives.

Ms. DeSantis open the topic of the Alternative Management Approaches up for discussion.

It was suggested that region education be added to alternatives.

A question was asked about the distinction between Alternative 4 and Alternative 5. Mr. Lee responded that Alternative 5 is essentially a case-by-case basis alternative to Alternative 4.

Another question was asked as to the reason of why physical inventory is not included as an option. Mr. Ching responded that parking stations will be monitored and if data indicate insufficient parking even with paid parking implemented, resources would be identified to increase inventory.

Would building new parking facilities building would be open to Public-Private-Partnerships? Mr. Ching said it is a possibility.

Is increasing bus frequency considered in the Access category?

Mr. Lee responded that increasing frequency of bus and other transit services would be considered.



Metro

Supportive Transit Parking Program

It was noted that another possibility could be to look at parking spaces included in original plan but not yet built. He said that, along Gold Line Foothill, 800 parking spaces were designed in Arcadia but only 300 were built and being used. He said to make use of the designed parking spaces could be a realistic parking addition option. Mr. Ching responded that this parking addition option is included in the big picture; however, one problem lies in parking accommodation during construction of new spaces.

Clarification was asked on alternative thresholds; it was noted that some locations are already charging for parking to relieve parking needs, in what way this situation would be accounted for when evaluating the threshold among alternatives. Mr. Lee responded that the team would develop a way to account for this factor. A workshop participant suggested that it might not be realistic to use dynamic pricing on annual permit holders. It was also asked if dynamic pricing is applied to carpooling, and Mr. Ching confirmed that carpool parking is included in paid parking program.

F. Next Steps

Ms. DeSantis discussed next steps, including additional surveys targeted to the high occupancy stations.

G. Adjournment

Ms. DeSantis thanked members for their attendance and adjourned the meeting.



Metro

Supportive Transit Parking Program

Metro STPP Agency Workshop

Location:	Gateway Cities Council of Governments 16401 Paramount Blvd. Paramount, CA 90723
Date:	Thursday, March 17, 2016 10:00 a.m. - 12:00 p.m.
COUNTY	Dominic Osmena, LA County Department of Public Works
CITIES	Joe Hernandez, City of Artesia Dahl Kim, City of Bell Jason Frieman, City of Bellflower Glen Kau, Compton Mohammad Mostahkami, City of Downey Abraham Bandegan, City of Long Beach Bruno Naulls, City of Lynwood James Parker, City of Norwalk
AGENCIES	Adela Felix, Metro Frank Ching, Metro
PRIVATE SECTOR	Michael Kodama, MK Planners
Consultant Team	Bernard Lee, Walker Parking Steven Kuykendall, Steven T. Kuykendall & Associates Susan De Santis, Arellano Associates Sohrab Mikanik, Arellano Associates



Metro

Supportive Transit Parking Program

Agenda Items

A. Welcome and Opening Remarks (Frank Ching, Metro)

Frank Ching (Metro) opened the meeting.

B. STPP project overview (Bernard Lee, Walker Parking)

Bernard Lee (Walker Parking) introduced LA Metro STPP project. Mr. Lee discussed LA Metro parking system, parking primer, and parking triangle.

C. Activities to-date (Susan De Santis, Arellano Associates, Bernard Lee, Walker Parking)

1. Stakeholder Outreach

Transit rider outreach — Susan De Santis (Arellano Associates) presented results on transit rider survey. She shared the survey results on transit riders and non-transit riders riding behavior and demographics.

Agency stakeholder outreach — Ms. De Santis presented results on agency stakeholder survey.

2. Research and Analysis

Facility assessments — Mr. Lee discussed facility assessment approach, findings and next steps.

Ridership versus parking demand model — Mr. Lee discussed approach, results and next steps on ridership versus parking demand model.

3. Program management alternatives

Mr. Lee introduced the proposed five alternatives and common measures for all alternatives. A workshop participant asked what determines the change of paid parking rates. Mr. Lee responded that changes in occupancy change would be a factor in determining rate changes.

D. Parking Management Pilot Program (Frank Ching, Metro)

Mr. Ching presented the Pilot Program components. He noted that the stations recommended for the Pilot Program were carefully selected by the project team based on their capacity, utilization and recent facility assessment findings. He pointed out that the Paid Parking Program is not expected to cause significant drops in ridership since a small portion of transit riders at the selected parking



Metro

Supportive Transit Parking Program

facilities drive to the station. This program is not expected to significantly increase the overall commuting costs to Metro transit riders.

Mr. Ching invited comments and questions on the Pilot Program. One workshop participant said he noticed some stations along the Green Line were not included. Mr. Ching responded that stations under freeways are owned by Caltrans and will not be taken over by Metro. Another workshop participant asked about the arrangements of parking locations partially under a freeway. Mr. Ching replied that it depends on Caltrans' review of each specific case.

A question was asked about parking enforcement at various locations; Mr. Ching responded that Metro is working on improving parking enforcement. Mike Kodama suggested that safety should be major priority. Mr. Ching confirmed that Metro has put the safety issue as the top priority.

Another question was asked if a projection of new bus and other transit demand was considered when collecting occupancy data. Mr. Ching responded that bus, bicycle and other transit connections were considered and accounted for in the model developed. Another question asked if the model takes into account the latest situation, for example, the Gold Line opening caused a shift in parking availability at different locations. Mr. Ching gave a positive answer to this question.

There was a question about accommodations for senior and disabled parking. Mr. Ching responded that seniors are already qualified for low-fare/discounted parking, and that disabled parking will be regulated. Another question focused on motorcycle parking; Mr. Ching replied that motorcycles are treated as automobiles.

E. Roundtable Discussions and Input on Program Management Alternatives (Susan De Santis, Arellano Associates)

Ms. De Santis led the roundtable discussions, which covered STPP Program goals, management approaches, alternatives, pricing and spillover impact.

Ms. De Santis invited comments or suggestions on STPP program goals. One workshop participant suggested that there should be a correlation within the program goals on how the parking program will assist in increasing Metro ridership. A member brought up the possibility of partnership with local transit agencies and also Public-Private Partnerships.



Metro

Supportive Transit Parking Program

Ms. De Santis invited comments on STPP management approaches and alternatives. It was suggested that the stations should be identified by jurisdiction. Another suggestion was to add security as an amenity. Another suggestion was to target outreach efforts for all stations. Ms. De Santis replied that this is included in the next steps.

A question was asked about whether the pedestrian wayfinding also includes identifying the closest available Metro station parking. Ms. Felix (Metro) said that Metro is developing an inter-station information sharing system.

Clarification was asked on the dynamic parking rates. Mr. Lee explained that dynamic rate involves rate changes more than once per year, instead of rate changes for different time of a day. It was asked if there is any consideration for official holidays. Ms. De Santis responded that this will be factored in the pilot project.

Seasonal effects were mentioned, for example, football season, and it was suggested that they should be taken into account in monitoring occupancy levels. Mr. Lee responded that the project team will look into seasonal adjustments. A member suggested that when analyzing monitoring data, the date should cover at least one year period to reflect trends.

A concern was brought up on the ability to change parking rate at a quarterly basis. Mr. Ching responded that it would be based on changes in occupancy rates, which is consistently monitored. A workshop participant asked the reason for not considering a different rates for different time of a day. Mr. Lee explained that it is mostly a customer experience concern as the end-users might be confused. It was suggested to adopt different rates for weekend and weekdays parking.

F. Next Steps

Ms. De Santis discussed next steps, including additional surveys targeted on high occupancy stations.

G. Adjournment

Ms. De Santis thanked members for their attendance and adjourned the workshop.



Metro

Supportive Transit Parking Program

Metro STPP Agency Workshop

LOCATION:	Metro Headquarters One Gateway Plaza Gateway Conference Room, 3 rd Floor Los Angeles, CA 90012
DATE:	Tuesday, March 29, 2016 10:00 a.m. - 12:00 p.m.
SUBREGIONAL	Marisa Creter, San Gabriel Valley COG
CITIES	Ray Lau, City of Los Angeles Peer Ghent, City of Los Angeles Thomas Chang, LADOT Michael Woolson, City of Pasadena Salvador Valles, City of Santa Monica Jason Kligier, City of Santa Monica Elaine Warner, Culver City
TRANSIT AGENCY	Vincent Saucedo, Foothill Transit
PRIVATE SECTOR	Steve Forster, Infrastructure Engineers (representing City of Montebello, Baldwin Park, and Bell Gardens) Arthur Sohikian, AVS Consulting Eric Natwig, New West Partners
METRO	Adela Felix, Metro Frank Ching, Metro
CONSULTANT TEAM	Bernard Lee, Walker Parking Steffen Turoff, Walker Parking Susan De Santis, Arellano Associates Sohrab Mikanik, Arellano Associates



Metro

Supportive Transit Parking Program

Agenda Items

A. Welcome and Opening Remarks (Frank Ching, Metro)

Frank Ching (Metro) opened the meeting. He stated the necessity to manage Metro parking as demand continues to grow, especially with the opening of Gold Line Extension. He noted that the goal of this program is to make transit cost-effective for riders and Metro.

B. STPP Project Overview (Bernard Lee, Walker Parking)

Bernard Lee (Walker Parking) introduced LA Metro STPP project. Mr. Lee discussed LA Metro parking system, parking primer, and parking triangle.

C. Activities To-Date (Susan DeSantis, Arellano Associates; Bernard Lee, Walker Parking)

1. Stakeholder Outreach

Transit rider outreach — Susan DeSantis (Arellano Associates) presented the results of the STPP Transit Rider Survey. She shared the survey results on transit riders' demographics and their riding behavior.

Agency stakeholder outreach — Ms. DeSantis presented the results of the STPP Agency Stakeholder Survey and discussed survey findings.

2. Research and Analysis

Facility assessments — Mr. Lee discussed facility assessment approaches, findings and next steps. A participant asked if the occupancy rate was derived from one-day assessments or from a period of time. Mr. Lee responded that it was based on one-day assessments. The participant followed up and asked if seasonal variations were considered, and Mr. Lee said surveys had been taken both before and after holidays, meaning to represent a typical scenario. Mr. Ching added that Metro staff have been conducting surveys throughout the years, and minimal seasonal variations were found in survey results.

Ridership versus parking demand model — Mr. Lee discussed approaches, results and next steps on ridership versus parking demand model.



Metro

Supportive Transit Parking Program

3. Program Management Alternatives

Mr. Lee introduced the proposed three management alternatives and common measures for all of the alternatives. He noted that there were changes regarding management alternatives, based on inputs from the previous two workshops.

D. Parking Management Pilot Program (Frank Ching, Metro)

Mr. Ching presented the Pilot Program components. He pointed out that Metro is making efforts to take over ownership of 17 stations out of 41 stations in Los Angeles County, by either transferring ownership from Caltrans or developing new ownership agreement to allow Metro to charge for parking. However, for some parking lots, Metro is excluded from ownership since these parking lots are located under freeways and the State of California has air rights over these locations. A participant asked for clarification on ownership conversion process and a timeline for the 17 stations. Mr. Ching responded that it is still in the process, and these 17 stations will be included in the Parking Master Plan, carefully monitored and ready for management alternative implementation contingent upon their level of occupancy.

Mr. Ching said that Caltrans is willing to relinquish complete ownership of some stations, meaning that Metro will be responsible for maintenance of these stations. He also noted that Caltrans is likely to require local agencies to implement high maintenance standards once they take over the parking facilities, such as signage implementation. A participant suggested considering joint ventures possibilities with electric vehicle manufacturers that are looking for sponsorships in parking lots. Mr. Ching responded that electric vehicle charging program is managed by an environment assessment team at Metro, and more information will be available soon.

He also noted that Metro is developing a parking guidance system, which will broadcast real-time parking availability in Metro parking facilities through a mobile phone app and Metro website. A participant asked if the information for this system can be found on Metro website. Mr. Ching responded that it is not available at this moment, but will be made available in the future.

Mr. Ching stated that one of the goals of the Pilot Program is to achieve 85% to 90% occupancy rate in designated parking lots. He added that Metro parking team is also hoping to take over parking enforcement responsibilities from the Sheriff Department. He noted that there have been changes in proposed stations, which



Metro

Supportive Transit Parking Program

is allowed according to the Metro Board action. Culver City and Sierra Madre Villa stations are likely to be replaced by other stations. He added that three locations are identified for Phase 1 Pilot Program: Expo/Bundy, Expo/Sepulveda and 17th St/SMC, along Expo II line. Other locations will be included in Phase 2 as Metro is still in the process of procuring parking operator contracts. He noted that these locations were identified due to their high occupancy rate and misuse by non-transit riders, such as Universal City station. He also noted that instead of charging higher rates, the program will reject non-transit riders in Phase 1 locations, and the data collected in Phase 1 will be used to analyze this measure's feasibility and impacts. He added that a carpool monthly parking rate has been developed, which will require three TAP Card users to register for three cars. In addition, at least 10 days of parking in a calendar month has to be met to be eligible for the mentioned carpooling rate.

Mr. Ching pointed out that survey results suggest that about 10% of Metro transit riders drive to and park at Metro stations, and the rest of the riders arrive to Metro stations via buses, drop-offs, and ride-sharing services such as Uber, etc. He said that the impact on Metro ridership will be minimal if the portion of riders who drive to Metro stations reject being charged for parking. He also pointed out that, when calculating commute costs, the amount of time sitting in traffic is often neglected, and on that note, the program expects total commute costs including parking charges would still be lower than driving for commute, and the parking charges will drive away only a small number of riders.

Mr. Ching summarized public perception and benefits of parking charges, and explained the procedures of applying different parking rates for return and new transit riders. He then reviewed the two phases and next steps of the Pilot Program.

E. Roundtable Discussions and Input on Program Management Alternatives (Susan DeSantis, Arellano Associates)

Ms. DeSantis led the roundtable discussions, which covered STPP Program goals, management approaches, alternatives, pricing and spillover impacts.

Ms. DeSantis invited comments and suggestions on STPP program goals. Two participants suggested that the main goal of the program should be increasing access to public transit instead of simply providing more parking. They emphasized



Metro

Supportive Transit Parking Program

that the goal of Pilot Program should be consistent with the holistic goal of Metro, which is to encourage people to ride public transit as a way to ease traffic problems in Los Angeles County.

Ms. DeSantis invited comments on STPP management approaches and alternatives. A participant brought up her concern on safety issue in parking lots if parking enforcement is taken over by Metro from the Sheriff Department. Mr. Ching replied that having Metro responsible for enforcement will help to relocate the resources, so that Sheriff Officers can focus on patrolling, security and other safety issues, which will eventually increase security in parking locations.

A participant suggested that Metro utilizes dynamic messages to redirect people to nearby available parking lots. Mr. Ching said that this is part of the plan. A participant inquired about Metro's policy to restrict bike-sharing stations at Metro stations, and Mr. Ching responded that he will check with the appropriate Metro team on that issue. Another participant brought up his concern on the Santa Monica parking facility; he pointed out that some people may use a TAP Card to park at Metro parking facility, even though they are not riding Metro, since total charges are still lower than parking charges at non-Metro parking facilities in the area. Mr. Ching responded that they will look into this issue.

A participant suggested increasing public communications to encourage public transit ridership. Another participant inquired if Metro has data on the origin of riders to more accurately identify cities to be engaged in this program. For example, if a significant number of riders in Azusa station are from Glendora via buses or shuttles, it will be necessary to engage City of Glendora in this program, even though there is no Metro station in Glendora. Mr. Ching responded that this type of data will be collected and analyzed.

A participant inquired about the reason to choose ride-sharing services instead of taxi services and if there will be regulations. Mr. Ching responded that ride-sharing companies are more likely to comply with Metro's rules, and regulations will be applied to these services. Several participants pointed out that ride-sharing services such as Uber take less space because they are constantly moving instead of queuing at parking lots to wait for customers.

Ms. DeSantis invited comments on the three Management Alternatives. She noted that based on inputs from two previous workshops, identifying more resources to



Metro

Supportive Transit Parking Program

increase parking supply was added to Alternative 1. Mr. Ching added that if the price cap of \$5 is reached, and occupancy rate is still high at about 90% - 95%, Metro will make efforts to increase parking supply.

F. Next Steps

Ms. DeSantis discussed next steps, including additional surveys targeted on high occupancy stations.

G. Adjournment

Ms. DeSantis thanked participants for their attendance and adjourned the meeting.

Metro Parking



SUPPORTIVE TRANSIT PARKING PROGRAM

Round 1 Survey - Analysis of Results

Prepared for

Los Angeles County Metropolitan Transportation
Authority

Prepared by

Walker Parking

Arellano Associates

February 3, 2016





Table of Contents

1. Introduction	2
2. Summary of Survey Results.....	3
2.1 Station of Origin	3
2.2 Station of Destination	3
3. Transit riders who drive and park at station lot/garage	4
4. Transit riders who drive and park outside station lot/garage	4
5. Transit riders who do not drive to Metro stations	5
6. Demographics	5
Appendix A: Promotional Campaign	7
Press Release	7
Postcards.....	8
A-Frames	9
E-blast	10
Appendix B: Survey Campaign	11
Online Survey	11
Text Survey.....	12
Attachments:.....	13
Attachment A: Metro STPP Final First Round Survey Results Overview Slides	13
Attachment B: Metro STPP Final First Round Consolidated Survey Results Spreadsheet.....	13



1. Introduction

Los Angeles County Metropolitan Transportation Authority (Metro) serves as transportation planner, coordinator, designer, builder and operator for Los Angeles County. Metro is initiating a comprehensive study to examine parking at 48 transit stations within LA County, consisting of over 22,000 parking spaces. Parking for Metro transit stations is a valuable resource that facilitates and provides access to transit for many of Metro's riders. It is important that the parking resource be effectively managed to maximize ridership in a way that is cost effective as well as economically and environmentally sustainable. Metro's Supportive Transit Parking Program (STPP) would provide an implementation roadmap for parking policies, operations, enforcement, maintenance, and technologies to support the plan and program management as well as a funding structure for a parking enterprise that would manage these efforts.

Metro is conducting a series of surveys to collect information from Metro transit riders in the Los Angeles County. The primary motivation for the surveys is to understand transit riders' needs and priorities with respect to Metro's parking facilities. By learning riders' parking experience at Metro transit stations, their greatest concerns, and identifying their riding patterns on Metro lines, the surveys were designed to help guide planning efforts. The series of STPP public surveys consist of three rounds delivered in both online and text message platforms. Textizen and TypeForm survey tools were employed to facilitate the text message and online surveys respectively.

Round one of the survey campaign was launched on December 1, 2015, and ran through January 31, 2016. To promote the campaign, Metro designed A-frame signs, postcards, flyers and offered free Metro 30-day passes as an incentive for riders to participate in the campaign¹. In addition, Metro sent a promotional e-blast to over 129,000 Metro Transit Access Pass (TAP) cardholders inviting them to participate in the surveys. Both text message and online surveys featured Spanish versions to cater to Spanish speaking riders. Metro acquired a separate phone number and URL for the Spanish text message and online surveys respectively. By the end of Round 1 of the campaign on January 31, 2016, over 9000 responses were collected². Results indicate that a majority of the targeted survey respondents drive to Metro stations and park at Metro station lot/garage. Riders who drive to Metro stations but park outside of Metro Station lot/garage noted that not being able to find parking in Metro lot/garage is the main reason they park outside of Metro parking facilities. For transit riders who do not drive to Metro stations, infrequent bus service was the biggest challenge for to get to Metro stations.

¹ Please see Appendix A for promotional campaign material.

² Please see Attachment A for survey results overview slides.



2. Summary of Survey Results

From December 1, 2015, to January 31, 2016, 11,933 transit riders visited survey sites and among them 9,015 respondents completed the survey, reaching a 74% response rate. 10,880 transit riders visited the survey through the online site and 1,053 residents participated through text survey. The first round also featured Spanish surveys, which achieved a total of 82 responses³. Results have been summarized based on the respondent's answer to the main question: "How do you arrive at the Metro Station?" The surveys featured a skip logic that would customize the follow up questions based on the respondent's answer to the main question. According to the result, 50% of respondents drive and park at Metro station lot, 6% drive and park outside Metro stations, and 44% do not drive to Metro stations. Result concerning most used Metro lines and stations is shown below.

2.1 Station of Origin – 27% of respondents most often use Red Line as their station of origin, followed by Gold Line (20%), Expo Line (15%), Blue Line (11%), Green Line (11%), Orange Line (6%), Sliver Line (6%) and Purple Line (4%).

- **Red Line Stations** – North Hollywood station (44%) is the most used Red Line station followed by Union Station (8%) and Hollywood/Highland (8%).
- **Gold Line Stations** – Sierra Madre station (33%) is the most used Gold Line station followed by Atlantic (13%) and Fillmore (10%).
- **Expo Line Stations** – Culver City station (62%) is the most used Expo Line station followed by La Cienega/Jefferson (16%) and Expo/Crenshaw (6%).
- **Blue Line** – Willow Street station (20%) is the most used Blue Line station followed by Del Amo (14%) and Wardlow (13%).
- **Green Line** – Norwalk station (44%) is the most used Green Line station followed by Aviation/LAX (17%) and Lakewood Blvd. (9%).
- **Orange Line** – Canoga station (14%) is the most used Orange Line station followed by Reseda (13%) and Balboa (13%).
- **Sliver Line** – El Monte station (48%) is the most used Sliver Line station followed by Harbor Gateway Transit Center (38%) and Harbor Freeway (6%).
- **Purple Line** – Wilshire/Western station (48%) is the most used Purple Line station followed by Wilshire/Normandie (16%) and union Station (10%)

2.2 Station of Destination – 40% of respondents most often use Red Line as their station of destination, followed by Gold Line (13%), Expo Line (13%), Blue Line (11%), Green Line (9%), Sliver Line (6%), Purple Line (5%) and Orange Line (4%).

³ Please see Attachment B for detailed survey result spreadsheet.



3. Transit riders who drive and park at station lot/garage

First set of questions sought input on transit preferences of respondents who drive to Metro stations and park at Metro lot/garage. Result concerning each question is shown below.

- The first question asked respondents about the frequency of using Metro parking facilities. Over 42% of respondents use Metro parking facilities “4-5 times a week” followed by “less than once a month” (17%) and “once a month” (16%).
- The next question asked respondents about their typical time of arriving to Metro parking facilities. 29% of respondents select “7-8 am” followed by “after 10 am” (22%) and “before 6 am” (16%).
- The third question asked respondents “How long do you usually park in a Metro parking facility?” 69% of respondents selected “4-10 hours” followed by “10-24” hours (14%) and “3-4 hours” (13%).
- The next question asked respondents about the average time it takes them to find a place to park in a Metro parking facility. 32% of respondents selected “1-3 minutes” followed by “less than a minute” (27%) and “4-6 minutes” 21%.
- Among respondents, over 27% are “very satisfied” with Metro station parking facilities followed by “extremely satisfied” (25%) and “somewhat satisfied” (23%).

4. Transit riders who drive and park outside station lot/garage

Second set of questions sought input on transit preferences of respondents who drive to Metro stations but park outside of Metro lot/garage. Result concerning each question is shown below.

- The first question asked respondents why they park outside of Metro lot/garage. 47% of respondents selected “can’t find parking in lot/garage” as the main reason, followed by “no Metro lot/garage available” (32%) and “convenience” (13%).
- The next question asked respondents about the frequency of parking outside Metro parking facilities. 42% of respondents selected “4-5 times a week”, followed by “2-3 times a week” (17%) and “once a week” (14%).



- The third question asked respondents “How long do you usually park near a Metro parking facility?” 64% of respondents selected “4-10 hours”, followed by “3-4 hours” (17%) and “10-24” hours (11%)
- The next question asked respondents about the average time it takes them to find a place to park near a Metro parking facility. 26% of respondents selected “4-6 minutes” followed by “1-3 minutes” (23%) and “10+ minutes” (19%).

5. Transit riders who do not drive to Metro stations

Third set of questions sought input on transit preferences of respondents who do not drive to Metro stations. Result concerning each question is shown below.

- The first question asked respondents why they do not drive to Metro stations. 45% of respondents selected “more convenient not to drive” as the main reason, followed by “no access to a vehicle” (32%) and “other” (12%)
- The next question asked respondents “What is your biggest challenge to get to the Metro station?” 66% of respondents chose “infrequent bus service” as the main challenge, followed by “no drop-off area” (16%) and “no bike lanes” (11%).

6. Demographics

Demographic questions sought information regarding respondents’ age, ethnicity, gender and income level. Result concerning each question is shown below.

- Among the 8,736 respondents who identified their age in the surveys, 27% were from “50-64” age group, followed by “35-49” (26%) and “25-34” (22%). The percentages of these three age groups in the overall Los Angeles County were 18%, 22% and 15% respectively.
- Among the 8,698 respondents who chose to identify their ethnicity in the surveys, 44% were “White” followed by 21% “Latino” and 17% “Asian/pacific Islander”. The percentages for these three ethnicities in the overall Los Angeles County were 28%, 49% and 11% respectively.
- Among the 8,725 respondents who identified their gender in the surveys, 53% were “male” and 47% were “female”. The percentages for male and female population in the overall Los Angeles County were 49% and 51% respectively.



- Among the 8,459 respondents who chose to identify their household income level in the surveys, 57% selected “\$50k or more” followed by 17% “30k-49.9k” and 9% “20k-29.9k”. The percentages for these three income levels in the overall Los Angeles County were 53%, 17% and 10% respectively.



Appendix A: Promotional Campaign

Press Release



M Metro Supportive Transit Parking Program

Metro Rider Survey to Launch Dec. 1

Los Angeles -- The Los Angeles Metropolitan Transportation Authority (Metro) is launching a rider survey through text (SMS) and online engagement tools for Transit Riders to provide feedback relating to riders' parking experiences at Metro stations beginning on December 1, 2015, until January 31, 2016.

Riders are encouraged to enter the survey through answering the first question, "Hey, Angelenos! How's Metro treating you?" by texting 213-332-1184, or by taking the survey online at metroriderssurvey.com.

All riders who complete the survey, either online or through text, will automatically be entered for a chance to win a free one-month Metro Transit Pass.

Metro is conducting a comprehensive study to examine parking at 48 stations within Los Angeles County, consisting of over 22,000 parking spaces. Assuming that Caltrans park and ride facilities are acquired by Metro, parking facilities are expected to reach approximately 30,000 parking spaces when additional rail lines enter into operation.

The end result of the text and online survey is adoption of a Supportive Transit Parking Program (STPP) Master Plan. The plan would provide an implementation roadmap for parking policies, operations, enforcement, maintenance, and technologies to support the plan and program management, as well as a funding structure for a parking enterprise that would manage these efforts. The study is expected to run approximately one year.

For more information, visit www.metro.net.



Postcards

Can you find a parking spot?
Please tell us about your experience.

A — YES, ALL THE TIME
B — SOMETIMES
C — ONCE IN AWHILE
D — NEVER



M Metro

Complete the survey for a chance to win a Metro 30-Day Pass!

Text your answer to 213.322.1184.* You can also fill out the survey online at metroparkingsurvey.com.

Your feedback will help shape potential improvements. Learn more at metro.net/parking.

*We respect your privacy and won't share your information.



M Metro



A-Frames





E-blast

Metro Parking



Please tell us what you think of Metro stations and parking facilities by completing our [online survey](#). You could win a free Metro 30-Day Pass!

Alternatively, you can participate in our text survey. To start the text survey, please text your answer to the question below to **(213) 322-1184**:

How's Metro treating you?

- A - Great
- B - Pretty good
- C - Needs improvement
- D - We haven't met yet

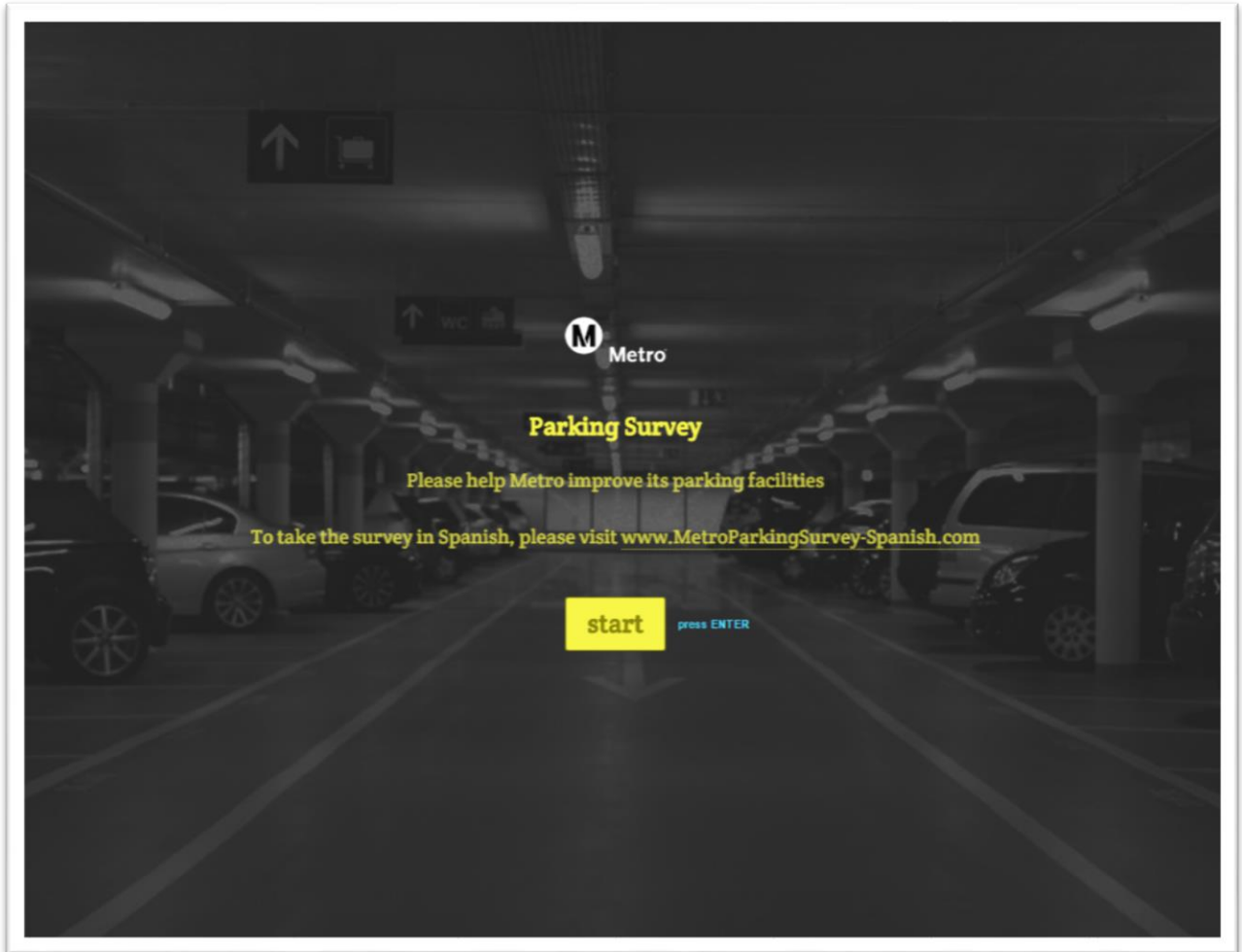
Your input will help shape Metro's Supportive Transit Parking Program (STPP) Master Plan. This plan will outline a vision for proactively managing Metro parking facilities and provide a roadmap for developing future parking policies, operations, enforcement, maintenance and technology. The study is expected to run for one year, with the final Plan going to the Metro Board for adoption in Fall 2016.

Questions? See our [Frequently Asked Questions](#).



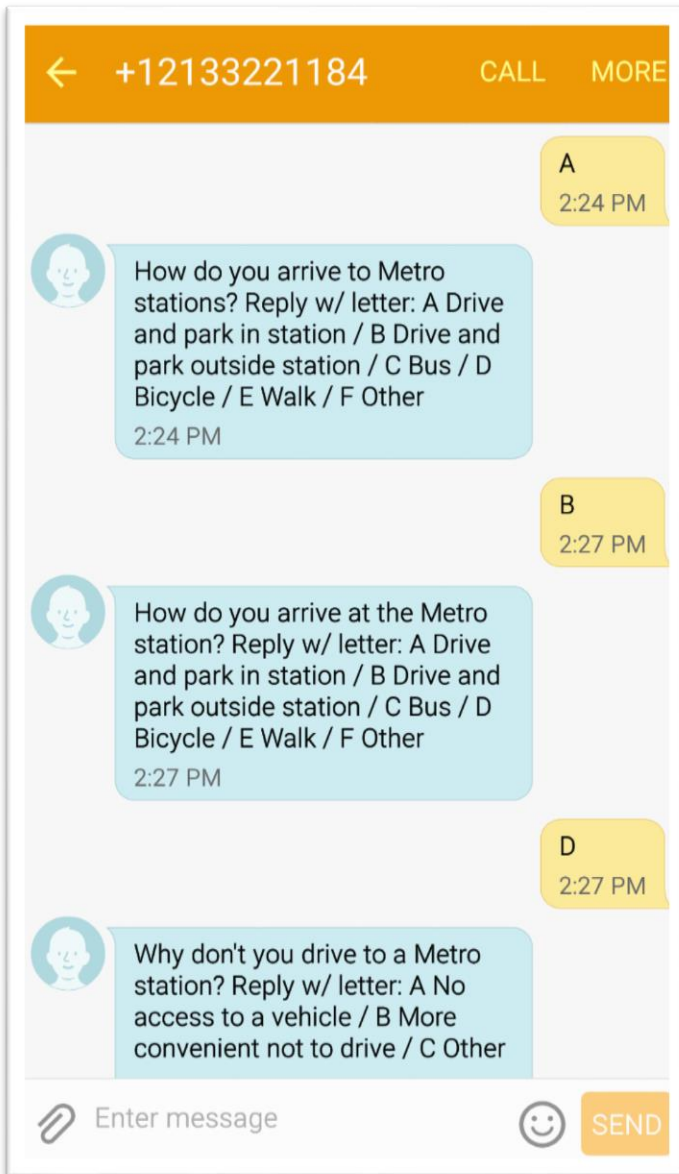
Appendix B: Survey Campaign

Online Survey





Text Survey





Attachments:

Attachment A: [Metro STPP Final First Round Survey Results Overview Slides](#)

Attachment B: [Metro STPP Final First Round Consolidated Survey Results Spreadsheet](#)



Supportive Transit Parking Program

Final Survey Results Overview

February 3, 2016

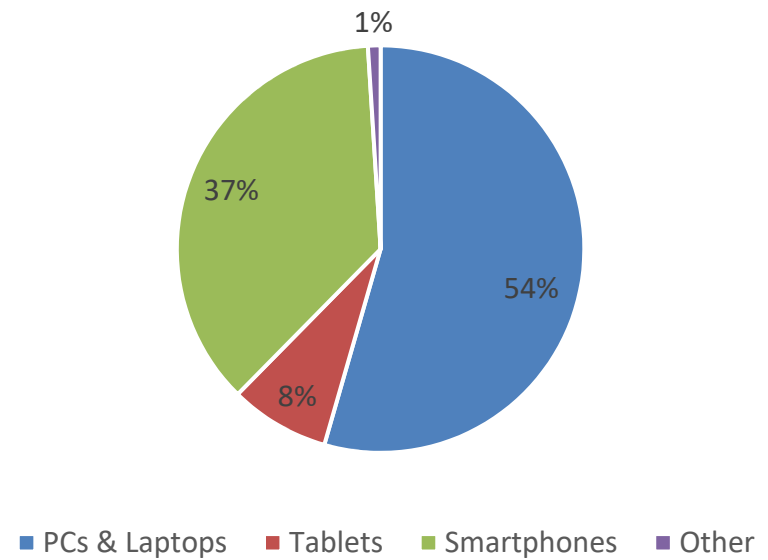
Visitor Summary

Total Participants/Visitors:	11933
Total Responses:	9015
English Responses:	8933
Spanish Responses:	82
Response Rate:	75%

Online Survey Summary

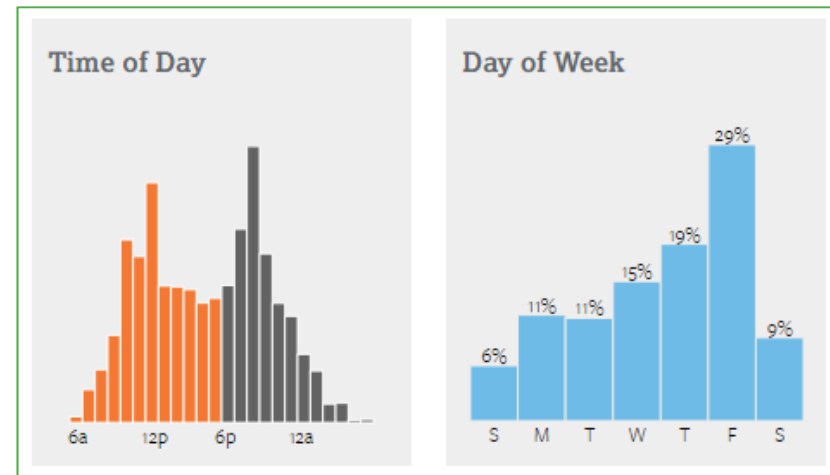
Total Participants/Visitors:	10880
Total Responses:	8073
English Responses:	8061
Spanish Responses:	12
Response Rate:	74%

Devices vs Responses



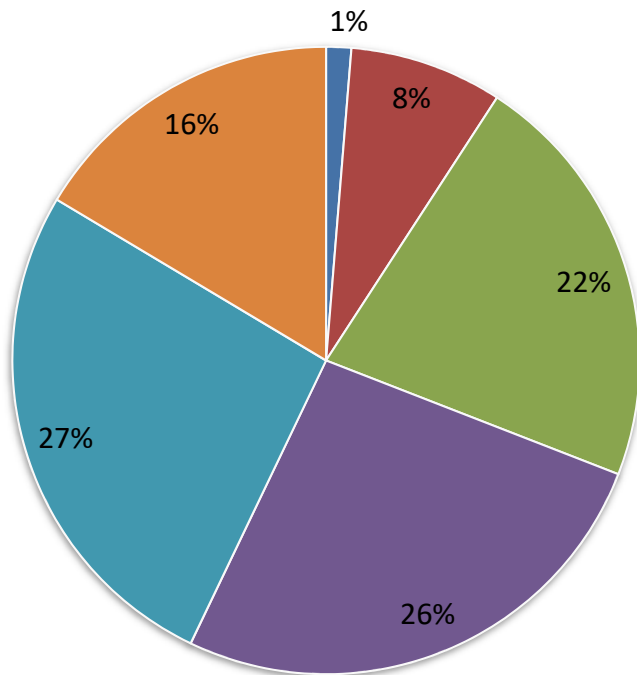
Text Survey Summary

Total Participants/Visitors:	1053
Total Responses:	942
English Responses:	872
Spanish Responses:	70
Response Rate:	89%

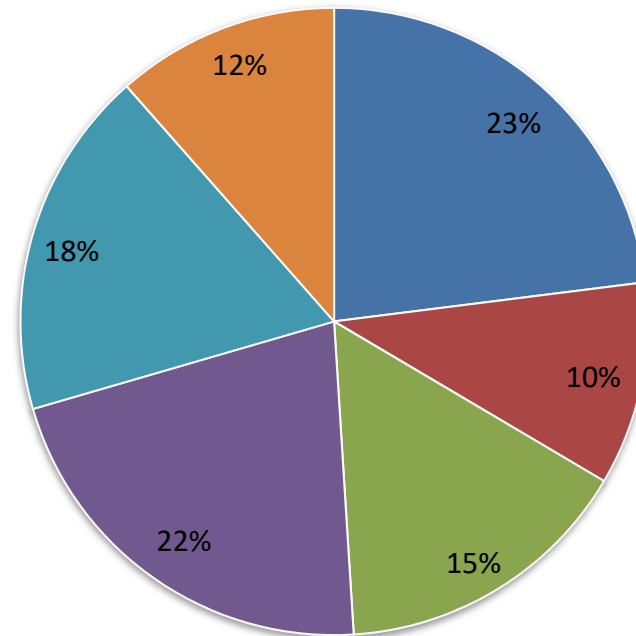


Demographics - Age

Respondents



LA County

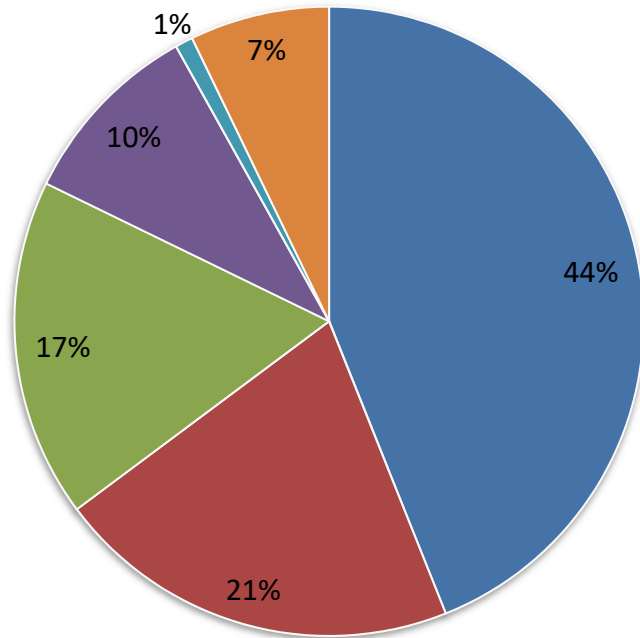


■ Younger than 18 ■ 18-24 ■ 25-34 ■ 35-49 ■ 50-64 ■ 65 or more

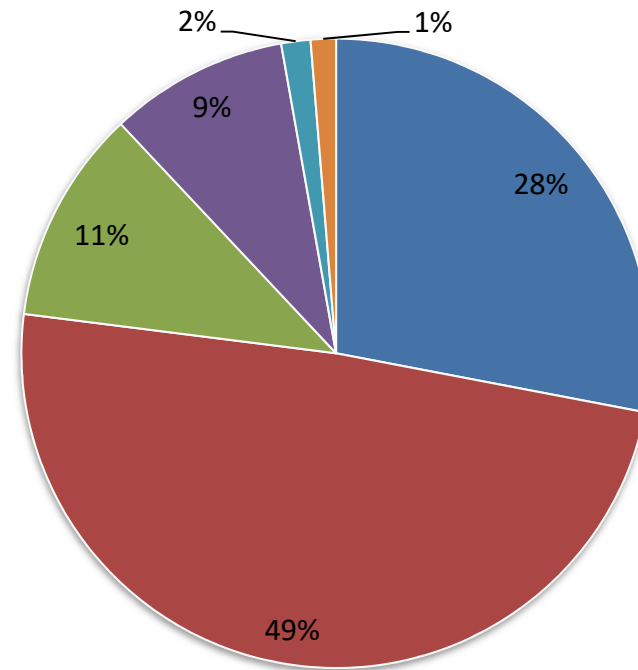
Total Respondents = 8,736

Demographics - Ethnicity

Respondents



LA County

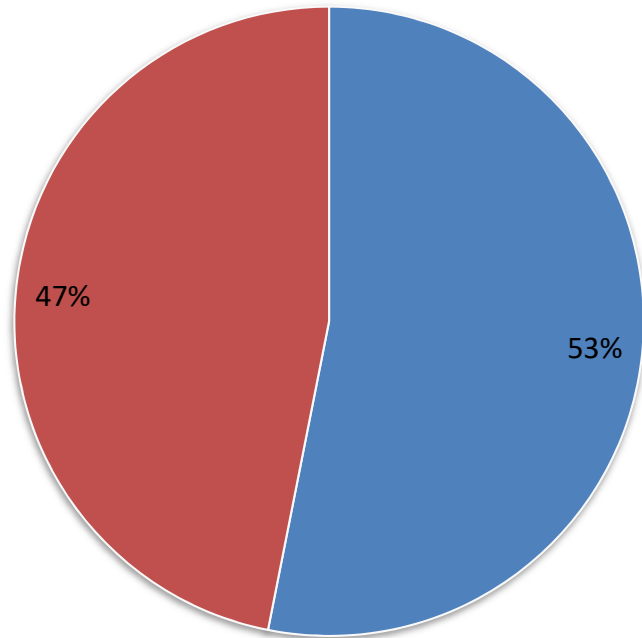


■ White ■ Latino ■ Asian/pacific Islander ■ Black ■ American Indian ■ Other

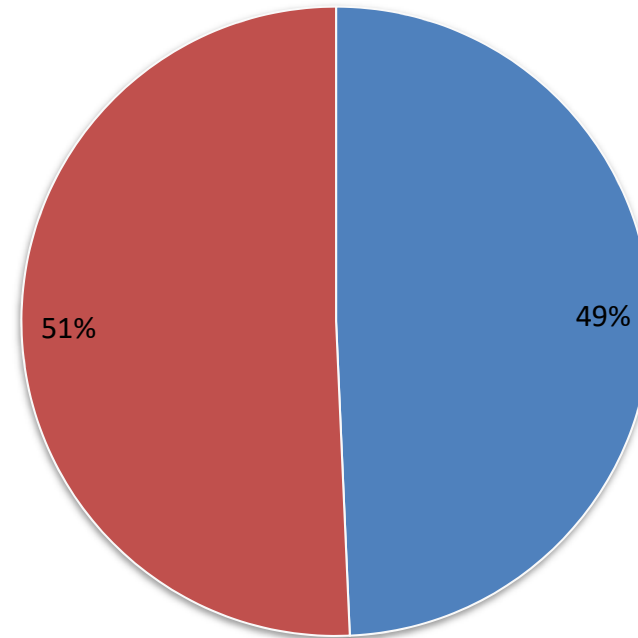
Total Respondents = 8,698

Demographics - Gender

Respondents



LA County

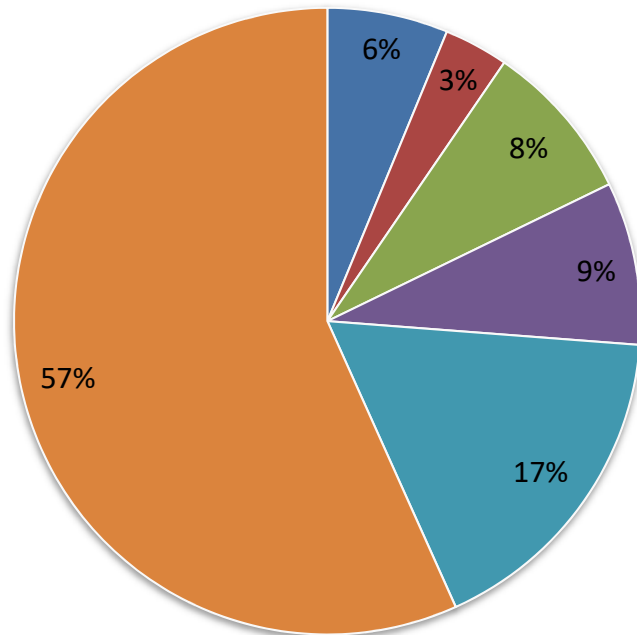


■ Male ■ Female

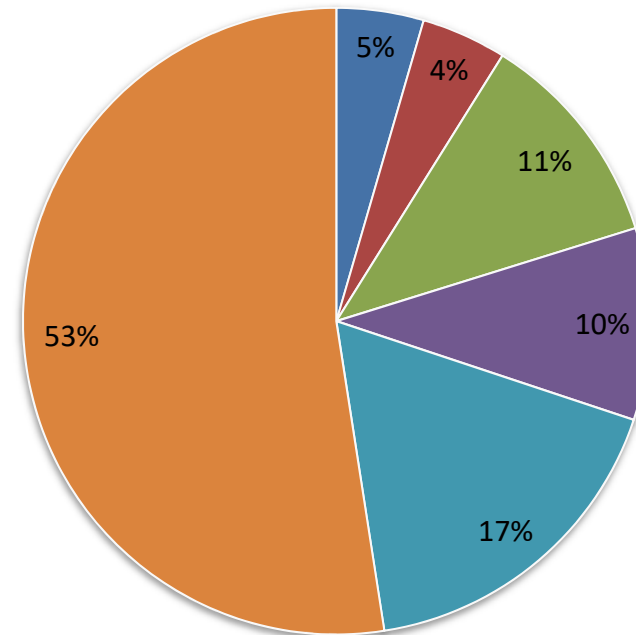
Total Respondents = 8,725

Demographics - Income

Respondents



LA County



■ Under \$5,000 ■ \$5,000-\$9,999 ■ \$10,000-\$19,999 ■ \$20,000-\$29,999 ■ \$30,000-\$49,999 ■ \$50,000 or more

Total Respondents = 8,459

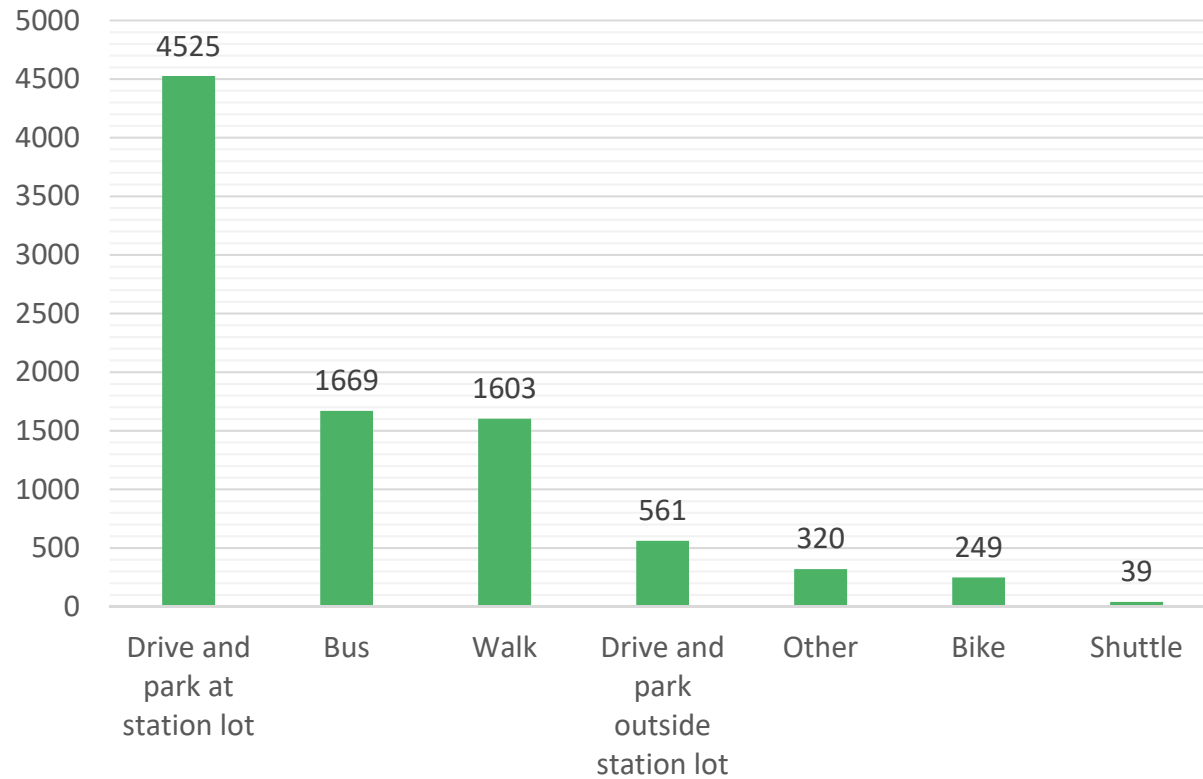


Metro

10/26/2017

Transportation Choices

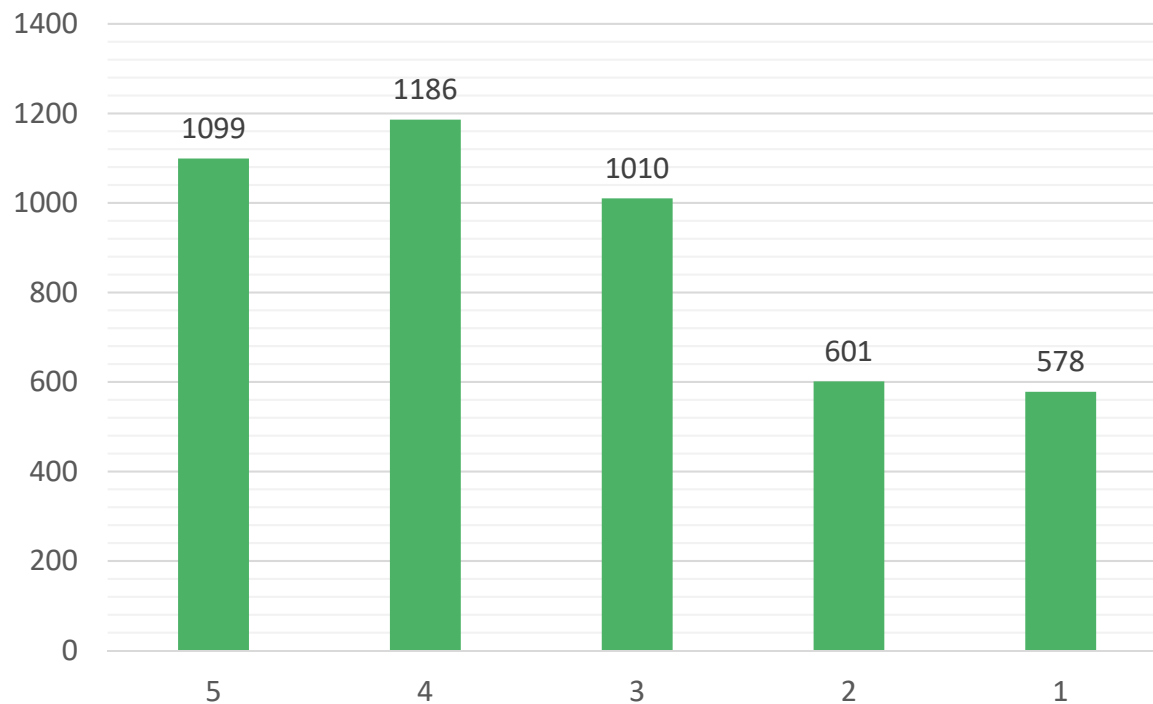
“How do you arrive at the Metro Station?”



Total Respondents = 8,966

Customer Satisfaction

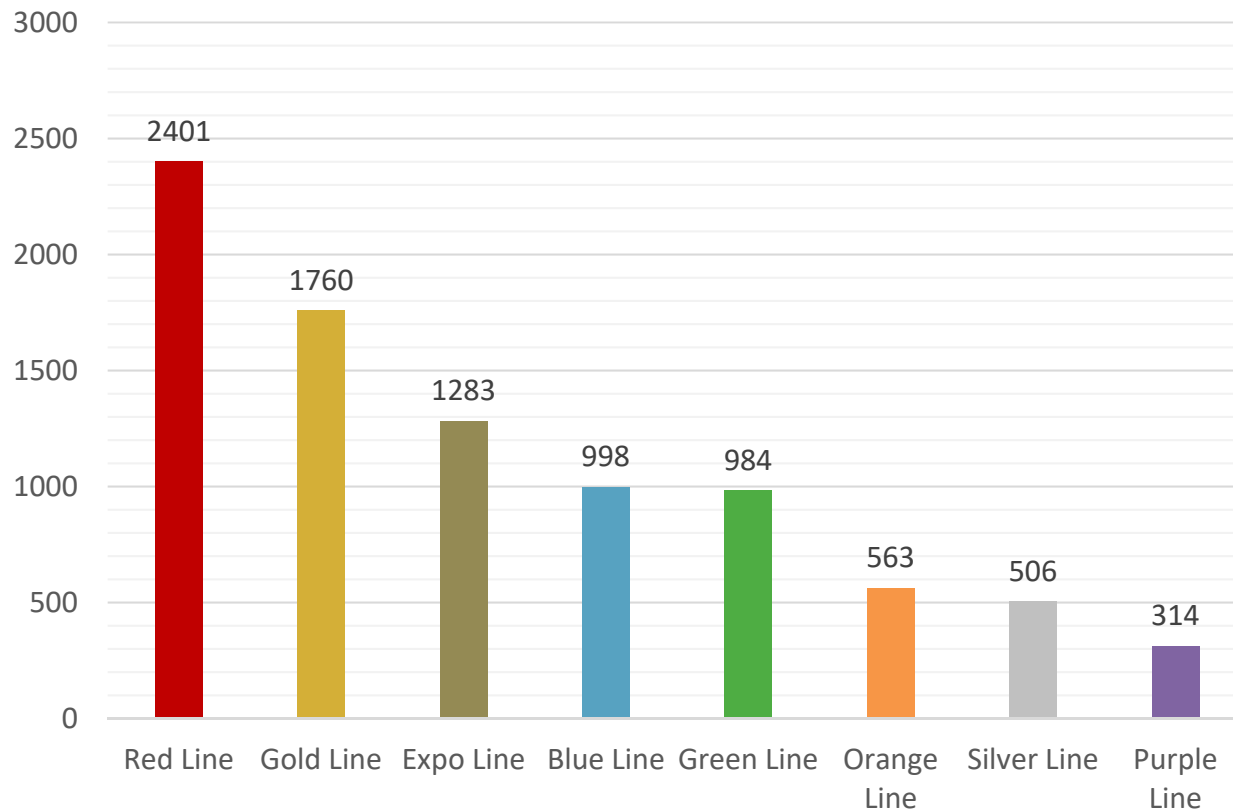
“On a scale of 1 to 5 (5 = extremely satisfied), how satisfied are you with Metro station parking facilities?”



Total Respondents = 4,474

Station of Origin

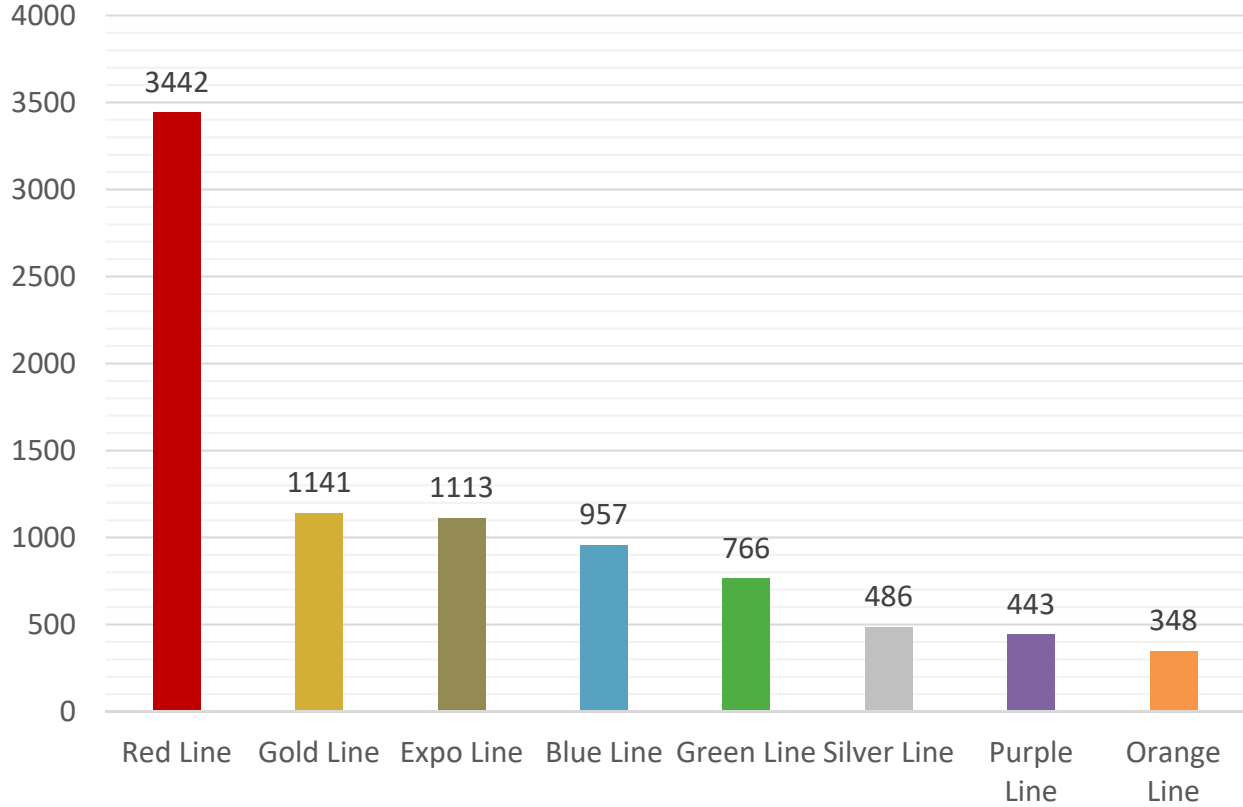
“Which Metro Line do you use most often as your station of origin?”



Total Respondents = 8,809

Destination Station

“Which Metro Line do you use most often as your final destination station?”



Total Respondents = 8,696

Metro Parkers

It takes

less than
a minute



for a **majority** of respondents to find
a parking spot in a **Metro** parking facility.

Most respondents park in a
Metro station parking facility



4-5 times a week.

7-8 a.m.

is the time **most**
respondents arrive at a
Metro parking facility.



A **majority** of respondents park
in a **Metro** parking station for

4-10 hours.



Metro

10/26/2017

Non-Metro Parkers

Top three reasons respondents park outside of a **Metro** parking facility:

47% Can't find parking in lot/garage

31% No **Metro** lot/garage available

13% Convenience

41% of respondents park **near** a **Metro** station parking facility



4-5 times a week.

It takes most respondents who **do not** park in a **Metro** facility

4-6 minutes

to find a parking space **near** a station.



Same as Metro parkers, a **majority** of respondents park **near** a **Metro** parking station for

4-10 hours.

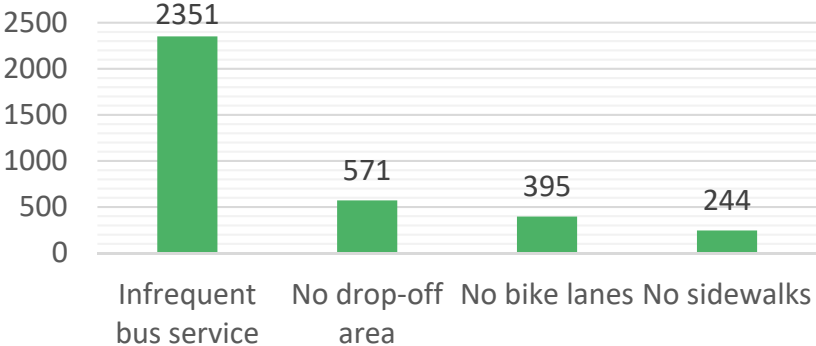
Non-Drivers

“What is your biggest challenge to get to the Metro station?”



Infrequent bus service

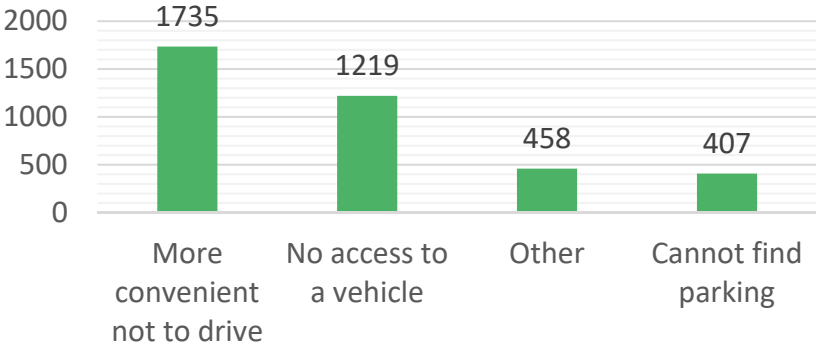
is the biggest challenge to get to the Metro station for most respondents who do not drive to a station.



“Why don't you drive to the Metro station?”



It is more convenient not to drive to a Metro parking facility for a majority of respondents who do not drive to a station.



The Transit Riders Survey was conducted by LA Metro as part of the Supportive Transit Parking Program. The survey was launched on December 1, 2015, and ran through January 31, 2016, using online and text-based survey technologies.

Transportation Choices

How do you arrive at the Metro station?



Visitor Summary

Total Participants/Visitors: 11,933
Online Survey Responses: 8,073
Text Survey Responses: 942
Total Responses: 9,015
Response Rate: 75%

Survey Findings



Most respondents park in a Metro station parking facility **4-5 times a week.**



7-8 a.m. is the time **most** respondents arrive at a Metro parking facility.



Infrequent bus service is the **biggest challenge** to get to the Metro station for most respondents **who do not drive to a station.**

Average time it takes to find parking in or outside of a Metro parking facility:

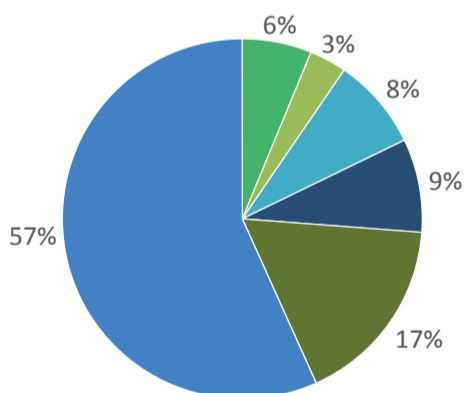
- 4-6 minutes** High demand Metro parking facilities
- <1 minute** Rest of Metro parking facilities
- 4-6 minutes** Outside of Metro stations

Top three reasons respondents park outside of a Metro parking facility:

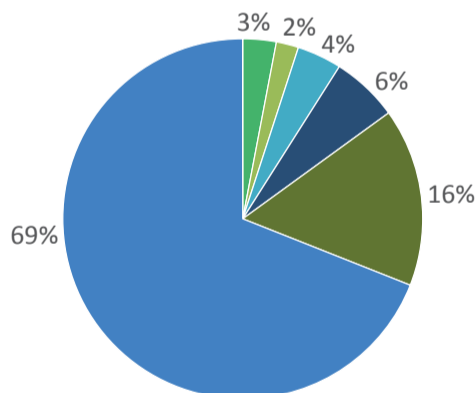
- 47%** Can't find parking in lot/garage
- 31%** No Metro lot/garage available
- 13%** Convenience

Income Distribution

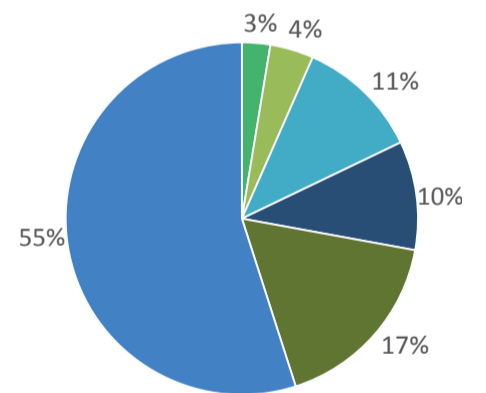
All Respondents



All Parkers

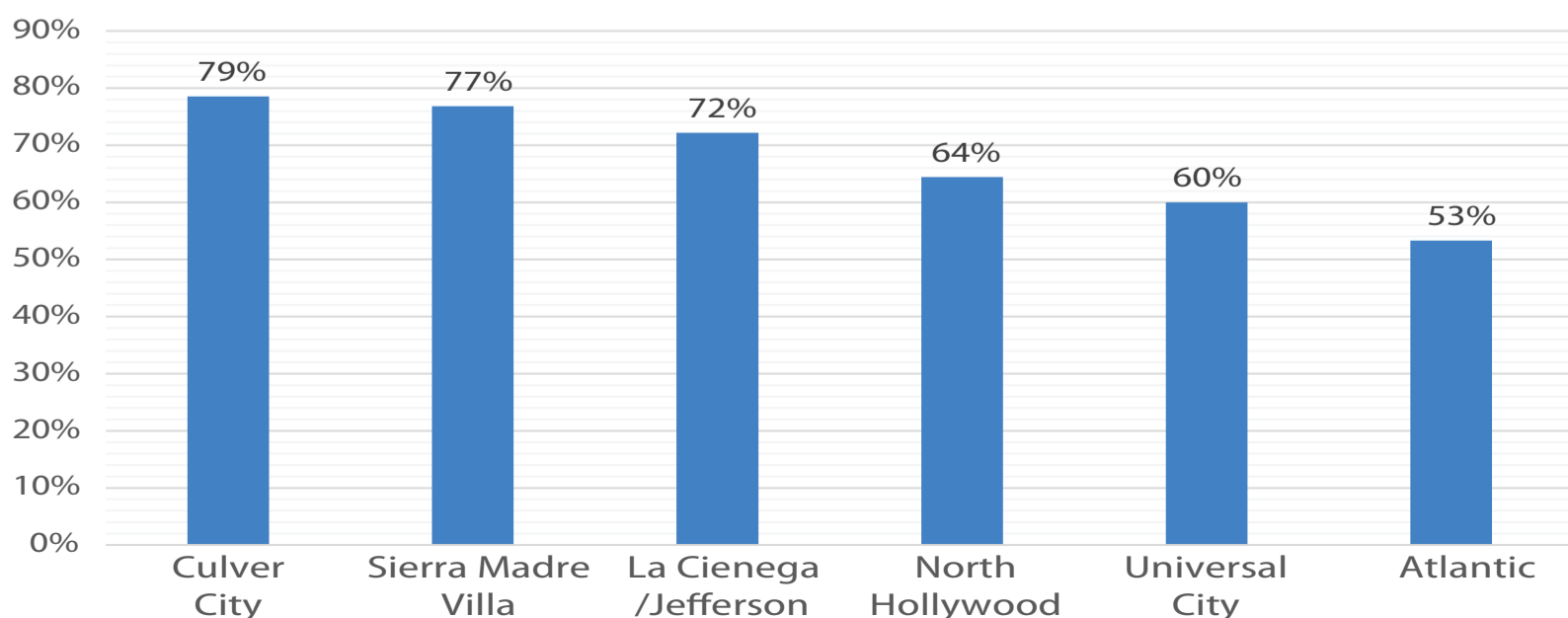


LA County Overall



Legend: Under \$5,000 (light green), \$5,000-\$9,999 (medium green), \$10,000-\$19,999 (teal), \$20,000-\$29,999 (dark blue), \$30,000-\$49,999 (olive green), \$50,000 or more (blue)

Percentage of respondents that report annual income over \$50,000



	Online Total	Textizen Total	Total	%
Q1 How do you arrive at the Metro station?				
Drive and park at station lot	4111	414	4525	50.47%
Bus	1521	148	1669	18.61%
Walk	1432	171	1603	17.88%
Drive and park outside station	483	78	561	6.26%
Other	260	60	320	3.57%
Bike	235	14	249	2.78%
Shuttle	30	9	39	0.43%
Q2 How often do you park in a Metro parking facility?				
4-5 times a week	1694	193	1887	42.33%
Less than once a month	717	41	758	17.00%
Once a month	692	37	729	16.35%
2-3 times a week	533	68	601	13.48%
Once a week	439	44	483	10.83%
Q3 At what time do you typically arrive to the Metro parking facility?				
7-8 am	1163	140	1303	29.00%
After 10 am	907	77	984	21.90%
Before 6 am	669	59	728	16.20%
8-9 am	522	57	579	12.89%
Other	420	30	450	10.02%
9-10 am	407	42	449	9.99%
Q4 How long do you usually park in a Metro parking facility?				
4-10 hours	2792	280	3072	68.63%
10-24 hours	598	46	644	14.39%
3-4 hours	543	48	591	13.20%
Less than 60 minutes	69	14	83	1.85%
1-2 hours	39	6	45	1.01%
24 hours or more	39	2	41	0.92%
Q5 How many minutes on average does it take you to find a place to park in a Metro parking facility?				
1-3 minutes	1305	116	1421	31.76%
Less than a minute	1130	90	1220	27.27%
4-6 minutes	848	96	944	21.10%
10+ minutes	462	42	504	11.27%
7-10 minutes	338	47	385	8.61%
Q6 On a scale of 1 to 5 (5 = extremely satisfied), how satisfied are you with Metro station parking facilities?				
4	1094	92	1186	26.51%
5	1003	96	1099	24.56%
3	916	94	1010	22.57%
2	541	60	601	13.43%
1	529	49	578	12.92%
Q7 Why do you park outside of a Metro station lot/garage?				
Can't find parking in lot/garage	209	51	260	47.27%
No Metro lot/garage available	164	10	174	31.64%
Convenience	62	12	74	13.45%
Other	39	3	42	7.64%

	Online Total	Textizen Total	Total	%
Q8 How often do you park near a Metro station?				
4-5 times a week	181	49	230	41.52%
2-3 times a week	80	15	95	17.15%
Once a week	75	4	79	14.26%
Once a month	75	4	79	14.26%
Less than once a month	69	2	71	12.82%
Q9 How long do you usually park near a Metro station?				
4-10 hours	315	8	323	63.83%
3-4 hours	81	5	86	17.00%
10-24 hours	50	8	58	11.46%
Less than 60 minutes	22	2	24	4.74%
1-2 hours	9	2	11	2.17%
24 hours or more	3	1	4	0.79%
Q10 How many minutes on average does it take you to find a place to park near a Metro station?				
4-6 minutes	134	11	145	26.41%
1-3 minutes	119	9	128	23.32%
10+ minutes	81	24	105	19.13%
7-10 minutes	82	19	101	18.40%
Less than a minute	62	8	70	12.75%
Q11 Why don't you drive to the Metro station?				
More convenient not to drive	1600	135	1735	45.43%
No access to a vehicle	1049	170	1219	31.92%
Other	425	33	458	11.99%
Cannot find parking	378	29	407	10.66%
Q12 What is your biggest challenge to get to the Metro station?				
Infrequent bus service	2105	246	2351	66.02%
No drop-off area	519	52	571	16.03%
No bike lanes	362	33	395	11.09%
No sidewalks	216	28	244	6.85%
Q13 Which Metro Line do you use most often as your station of origin?				
Red Line	2238	163	2401	27.26%
Gold Line	1583	177	1760	19.98%
Expo Line	1143	140	1283	14.56%
Blue Line	888	110	998	11.33%
Green Line	847	137	984	11.17%
Orange Line	493	70	563	6.39%
Silver Line	474	32	506	5.74%
Purple Line	295	19	314	3.56%

	Online Total	Textizen Total	Total	%
Q14 Which Blue Line station do you use most often?				
Willow Street	156	0	156	19.82%
Del Amo	89	20	109	13.85%
Wardlow	85	14	99	12.58%
Artesia	77	18	95	12.07%
7th Street/Metro Center	62	0	62	7.88%
Downtown Long Beach	50	0	50	6.35%
Florence	47	0	47	5.97%
1st Street	35	0	35	4.45%
Willowbrook/Rosa Parks	34	0	34	4.32%
Anaheim Street	30	0	30	3.81%
Other	0	25	25	3.18%
Pacific Coast Highway	17	0	17	2.16%
Pacific Avenue	15	0	15	1.91%
Firestone	13	0	13	1.65%
Compton	0	0	0	0.00%
Q15 Which Expo Line station do you use most often?				
Culver City	703	68	771	62.43%
La Cienega/Jefferson	165	35	200	16.19%
Expo/Crenshaw	60	12	72	5.83%
7th Street/Metro Center	57	0	57	4.62%
Expo/La Brea	31	9	40	3.24%
Expo Park/USC	14	7	21	1.70%
Expo/Western	19	0	19	1.54%
Jefferson/USC	16	0	16	1.30%
Expo/Vermont	15	0	15	1.21%
Pico	10	0	10	0.81%
LATTC/Ortho Institute	8	0	8	0.65%
Farmdale	6	0	6	0.49%
Q16 Which Gold Line station do you use most often?				
Sierra Madre Villa	437	26	463	33.12%
Atlantic	151	35	186	13.30%
Fillmore	118	18	136	9.73%
South Pasadena	119	0	119	8.51%
Highland Park	109	0	109	7.80%
Lincoln/Cypress	69	0	69	4.94%
Union Station	59	0	59	4.22%
Heritage Square	54	0	54	3.86%
Lake	53	0	53	3.79%
Other	0	51	51	3.65%
Allen	48	0	48	3.43%
Southwest Museum	34	0	34	2.43%
Little Tokyo/Arts District	17	0	17	1.22%
Del Amo	0	0	0	0.00%
Mariachi Plaza	0	0	0	0.00%

	Online Total	Textizen Total	Total	%
Q17 Which Green Line station do you use most often?				
Norwalk	373	30	403	44.04%
Aviation/LAX	105	47	152	16.61%
Lakewood Boulevard	85	0	85	9.29%
Redondo Beach	57	0	57	6.23%
Crenshaw	40	9	49	5.36%
Long Beach Boulevard	34	0	34	3.72%
Harbor Freeway	30	4	34	3.72%
El Segundo	24	0	24	2.62%
Hawthorne/Lennox	22	0	22	2.40%
Vermont/Athens	19	0	19	2.08%
Willowbrook/Rosa Parks	12	0	12	1.31%
Avalon	11	0	11	1.20%
Mariposa	7	0	7	0.77%
Douglas	6	0	6	0.66%
Q18 Which Red Line station do you use most often?				
North Hollywood	787	0	787	44.44%
Union Station	143	2	145	8.19%
Hollywood/Highland	136	0	136	7.68%
7th Street/Metro Center	123	0	123	6.95%
Vermont/Sunset	96	0	96	5.42%
Hollywood/Vine	87	0	87	4.91%
Wilshire/Vermont	79	1	80	4.52%
Hollywood/Western	78	0	78	4.40%
Pershing Square	73	0	73	4.12%
Vermont/Santa Monica	53	0	53	2.99%
Vermont/Beverly	47	0	47	2.65%
Civic Center/Grand Park	38	0	38	2.15%
Westlake/MacArthur Park	28	0	28	1.58%
Q19 Which Purple Line station do you use most often?				
Wilshire/Western	154	2	156	48.00%
Wilshire/Normandie	44	8	52	16.00%
Union Station	30	2	32	9.85%
Westlake/MacArthur Park	28	0	28	8.62%
Wilshire/Vermont	20	1	21	6.46%
7th Street/Metro Center	17	0	17	5.23%
Civic Center/Grand Park	10	0	10	3.08%
Pershing Square	9	0	9	2.77%

	Online Total	Textizen Total	Total	%
Q20 Which Orange Line station do you use most often?				
Canoga	58	9	67	14.14%
Reseda	59	5	64	13.50%
Balboa	51	10	61	12.87%
Van Nuys	51	6	57	12.03%
Chatsworth	42	9	51	10.76%
Sepulveda	43	0	43	9.07%
North Hollywood	43	0	43	9.07%
Pierce College	37	4	41	8.65%
Other	0	26	26	5.49%
Warner Center	11	0	11	2.32%
Laurel Canyon	10	0	10	2.11%
Woodley	0	0	0	0.00%
De Soto	0	0	0	0.00%
Nordhoff	0	0	0	0.00%
Roscoe	0	0	0	0.00%
Q21 Which Silver Line station do you use most often?				
El Monte Station	194	11	205	47.90%
Harbor Gateway Transit Center	163	2	165	38.55%
Harbor Freeway	23	2	25	5.84%
Union Station	22	0	22	5.14%
Manchester	10	1	11	2.57%
37th St/USC	0	0	0	0.00%
Cal State LA	0	0	0	0.00%
LA County + USC Medical Ctr	0	0	0	0.00%
Rosecrans	0	0	0	0.00%
Slauson	0	0	0	0.00%
Q22 Which Metro Line do you use most often as your final destination station?				
Red Line	3181	261	3442	39.58%
Gold Line	1028	113	1141	13.12%
Expo Line	1000	113	1113	12.80%
Blue Line	842	115	957	11.01%
Green Line	655	111	766	8.81%
Silver Line	453	33	486	5.59%
Purple Line	412	31	443	5.09%
Orange Line	295	53	348	4.00%
Q23 What's your age?				
50-64	2184	128	2312	26.47%
35-49	2040	249	2289	26.20%
25-34	1633	265	1898	21.73%
65 or more	1405	30	1435	16.43%
18-24	542	147	689	7.89%
Younger than 18	100	13	113	1.29%
			8736	100.00%
Q24 What is your gender?				
Male	4188	446	4634	53.11%
Female	3702	389	4091	46.89%

	Online Total	Textizen Total	Total	%
Q25 What is your ethnicity?				
White	3566	257	3823	43.95%
Latino	1552	262	1814	20.86%
Asian/Pacific Islander	1392	122	1514	17.41%
Black	746	98	844	9.70%
Other	549	75	624	7.17%
American Indian	66	13	79	0.91%

Q26 What is your household's total annual earnings?				
\$50,000 or more	4519	279	4798	56.72%
\$30,000-\$49,999	1302	142	1444	17.07%
\$20,000-\$29,999	600	111	711	8.41%
\$10,000-\$19,999	597	101	698	8.25%
Under \$5,000	416	111	527	6.23%
\$5,000-\$9,999	220	61	281	3.32%



Supportive Transit Parking Program

Final Round 2 Survey Results Overview

May 25, 2016



Metro

6/9/2016

Visitor Summary

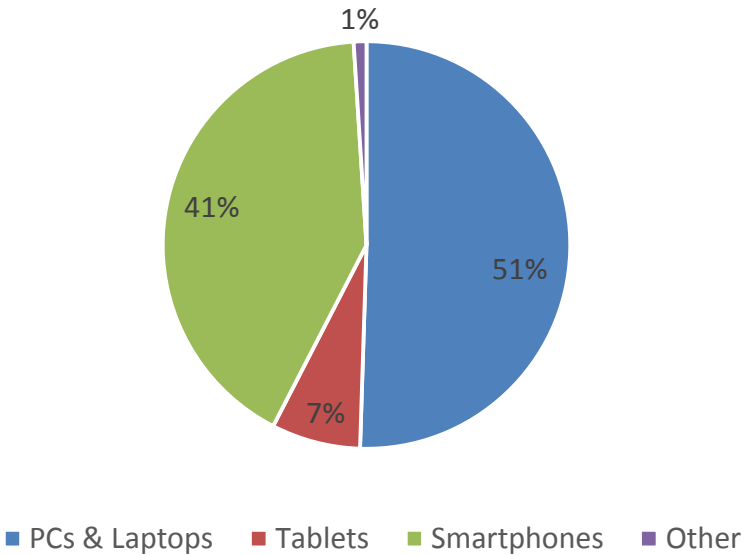
Total Participants/Visitors:	11284
Total Responses:	8800
English Responses:	8755
Spanish Responses:	45
Response Rate:	78%



Online Survey Summary

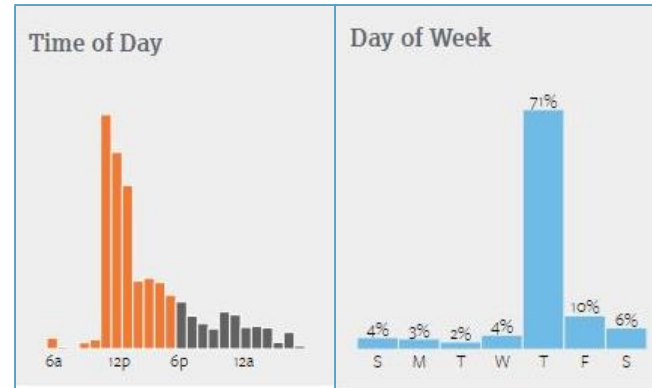
Total Participants/Visitors:	10961
Total Responses:	8523
English Responses:	8514
Spanish Responses:	9
Response Rate:	78%

Devices vs Responses



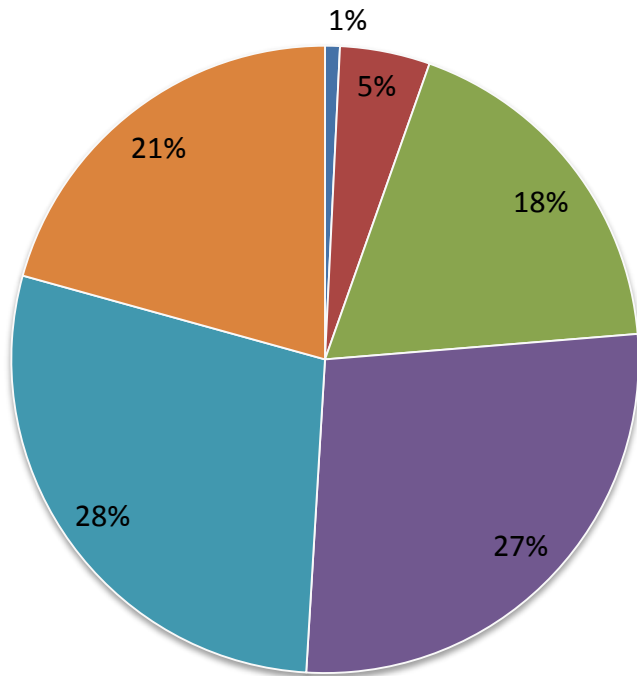
Text Survey Summary

Total Participants/Visitors:	323
Total Responses:	277
English Responses:	241
Spanish Responses:	36
Response Rate:	86%

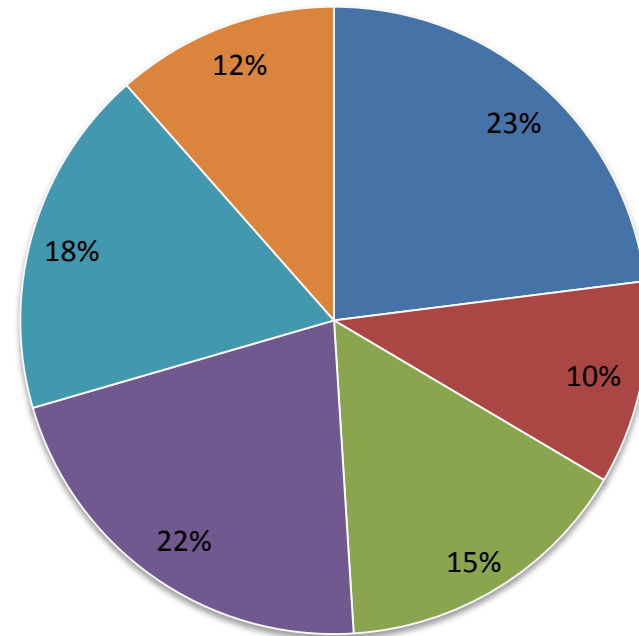


Demographics - Age

Respondents



LA County

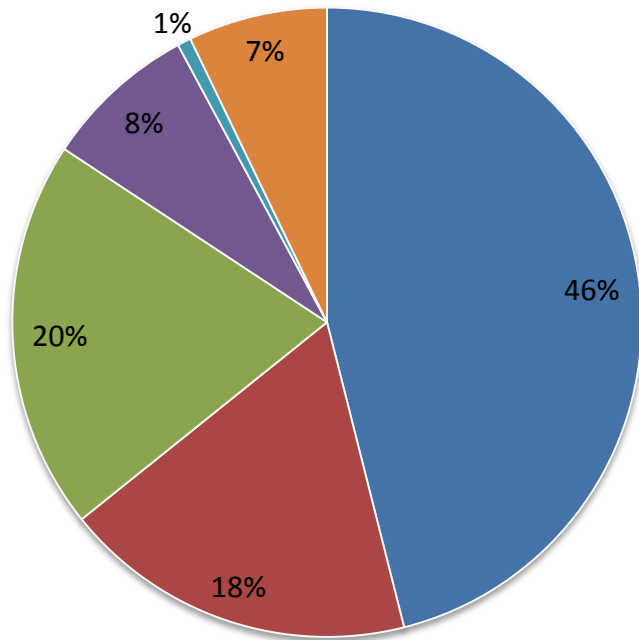


■ Younger than 18 ■ 18-24 ■ 25-34 ■ 35-49 ■ 50-64 ■ 65 or more

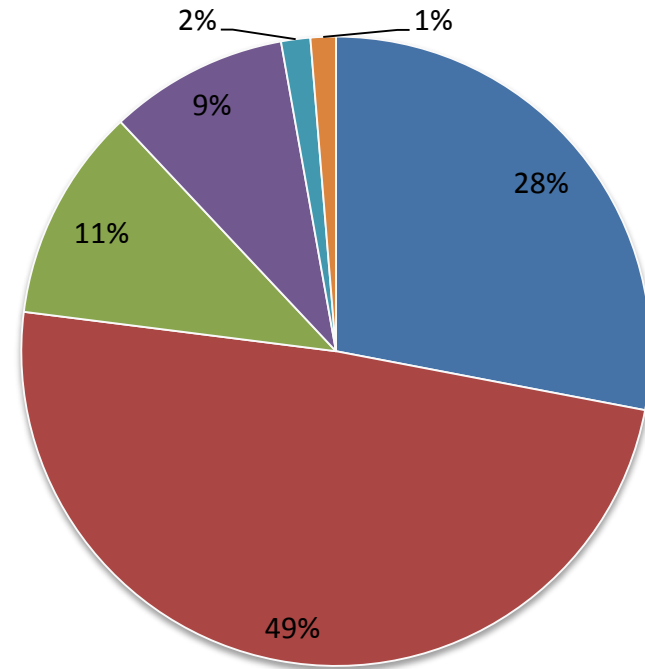
Total Respondents = 8,378

Demographics - Ethnicity

Respondents



LA County



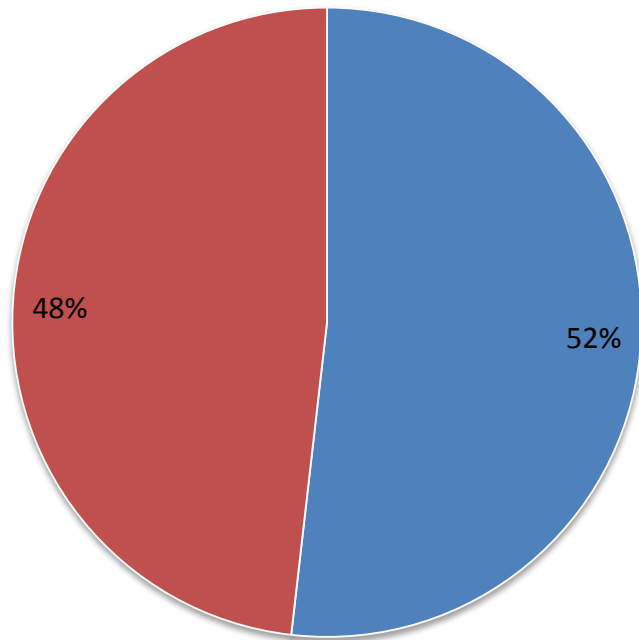
■ White ■ Latino ■ Asian/pacific Islander ■ Black ■ American Indian ■ Other

Total Respondents = 8,320

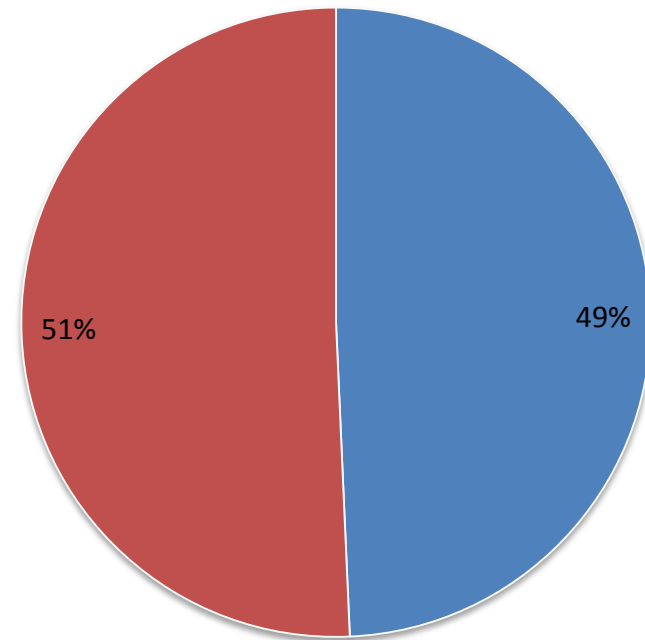


Demographics - Gender

Respondents



LA County

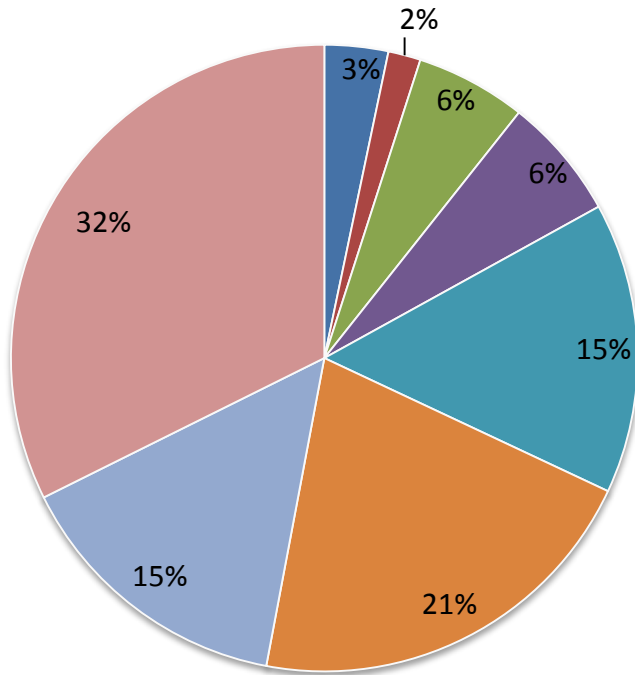


■ Male ■ Female

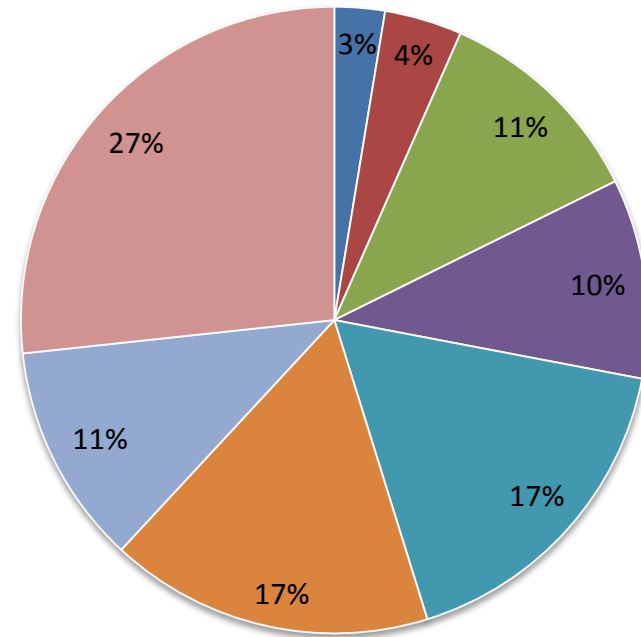
Total Respondents = 8,347

Demographics - Income

Respondents



LA County



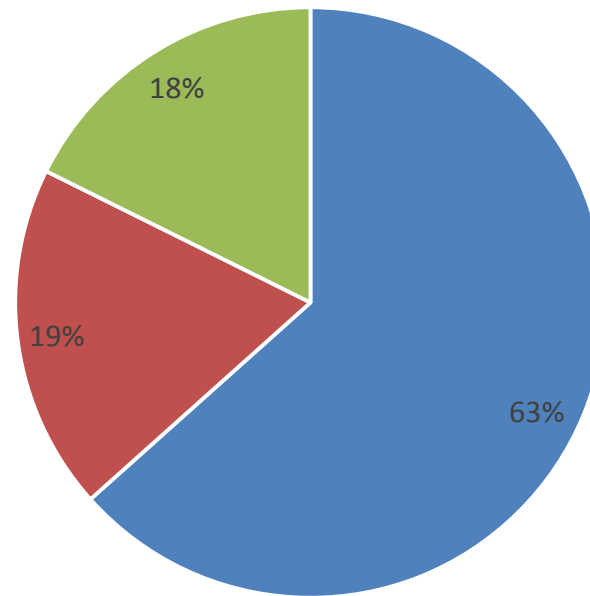
■ Under \$5,000 ■ \$5,000-\$9,999 ■ \$10,000-\$19,999 ■ \$20,000-\$29,999 ■ \$30,000-\$49,999 ■ \$50,000-\$74,999 ■ \$75,000-\$99,999 ■ \$100,000 or more

Total Respondents = 7,882



Parking Choices

“Do you usually park at Metro parking facilities?”



■ Yes ■ No ■ I don't drive to Metro stations

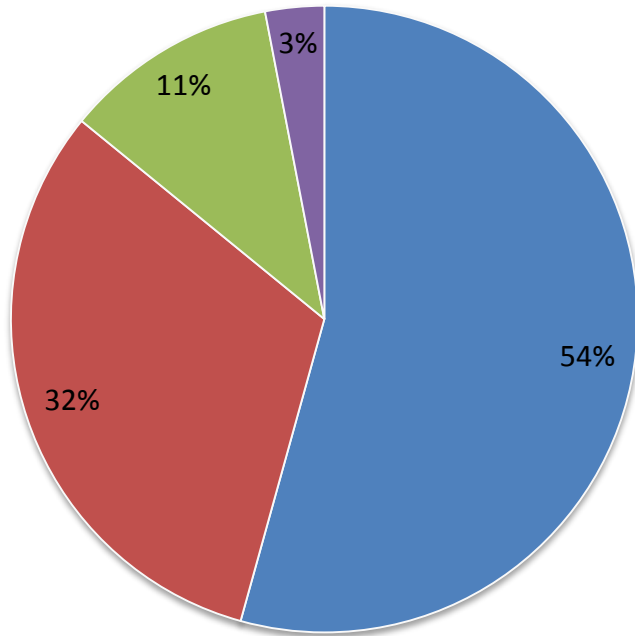
Total Respondents = 8,800



Occupant Summary

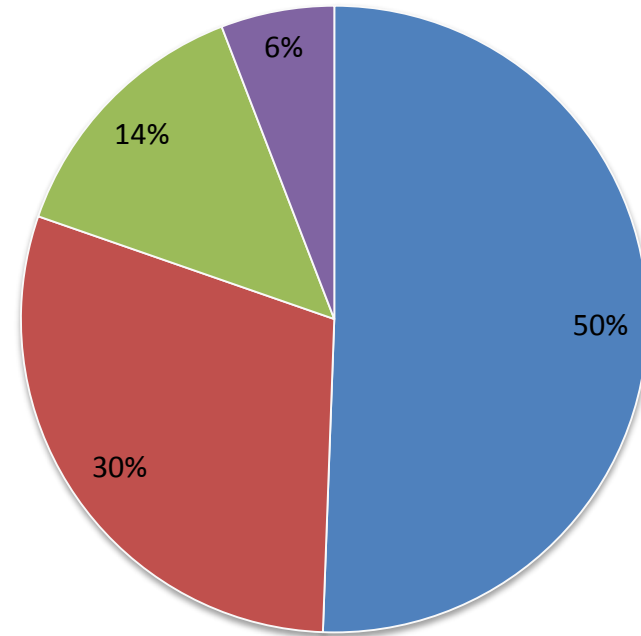
“How many other occupants are typically in your vehicle?”

Metro Parkers



Total Respondents = 5,537

Non-Metro Parkers



Total Respondents = 1,641

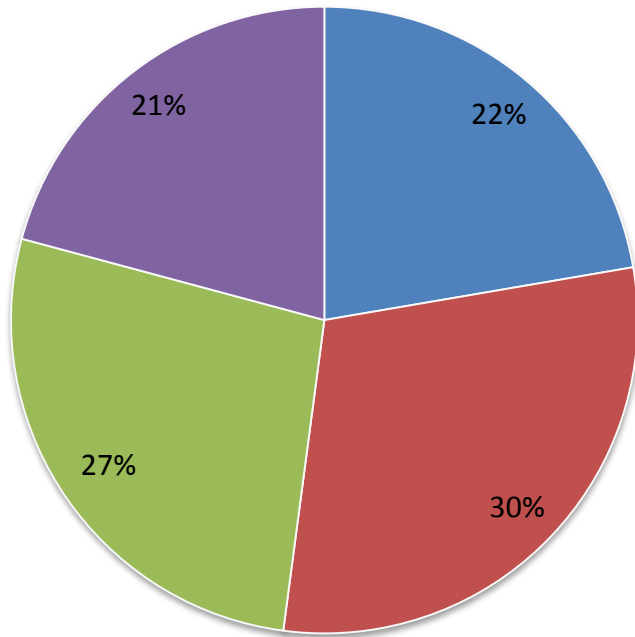
■ 0 ■ 1 ■ 2 ■ 3 or more



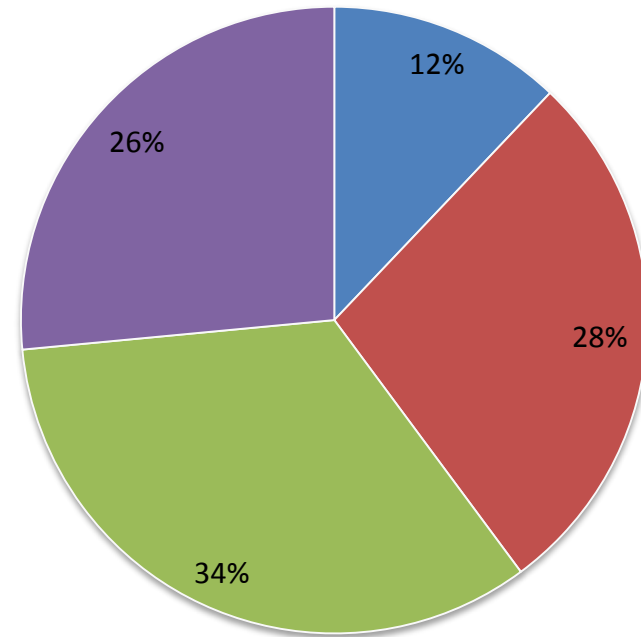
Parking Availability

“How would you rate your ability to find parking?”

Metro Parkers



Non-Metro Parkers



■ Excellent ■ Good ■ Fair ■ Poor

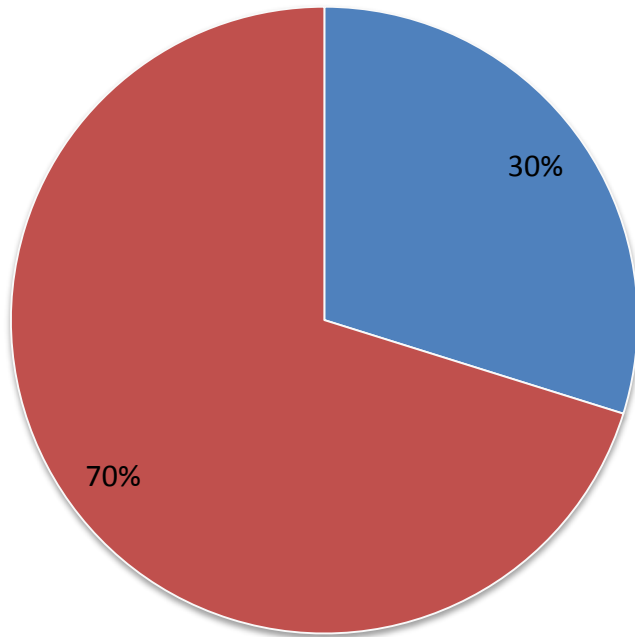
Total Respondents = 5,542

Total Respondents = 1,596

Parking Fee

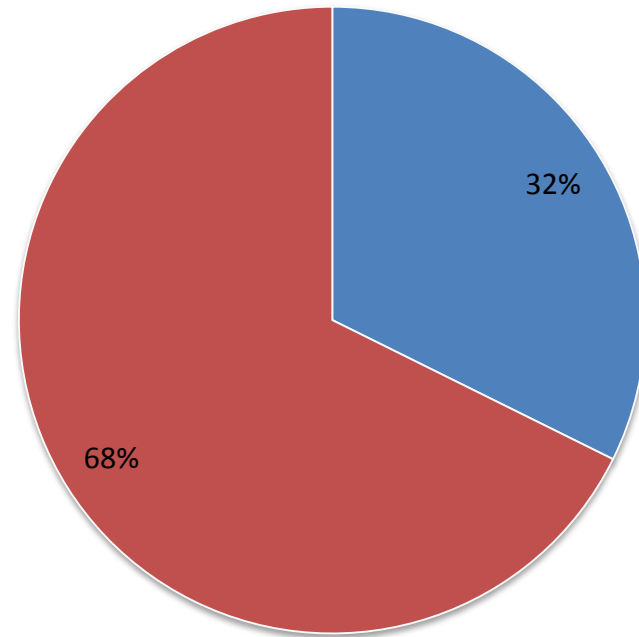
“Would you pay to secure a parking space?”

Metro Parkers



Total Respondents = 5,401

Non-Metro Parkers



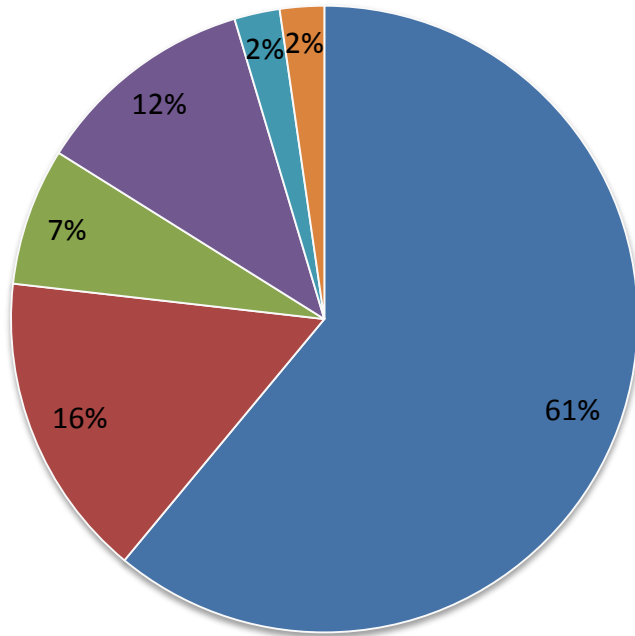
Total Respondents = 1,615

■ Yes ■ No

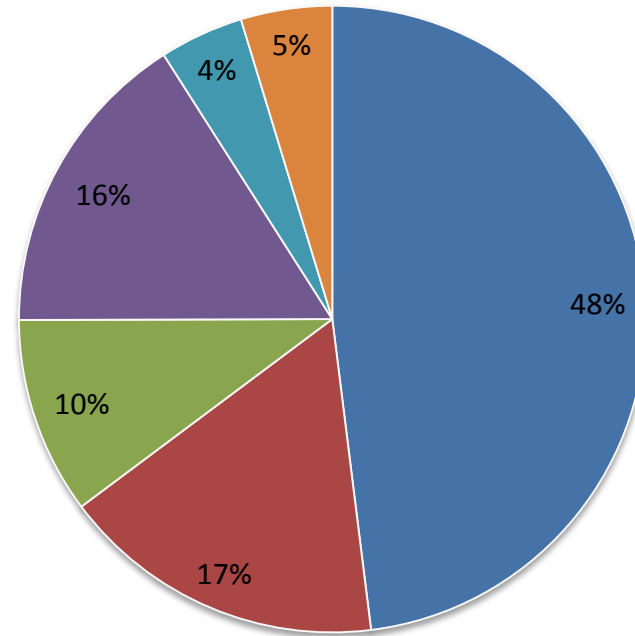
Parking Rate

“Up to what price per day would you be willing to pay [for parking]?”

Metro Parkers



Non-Metro Parkers



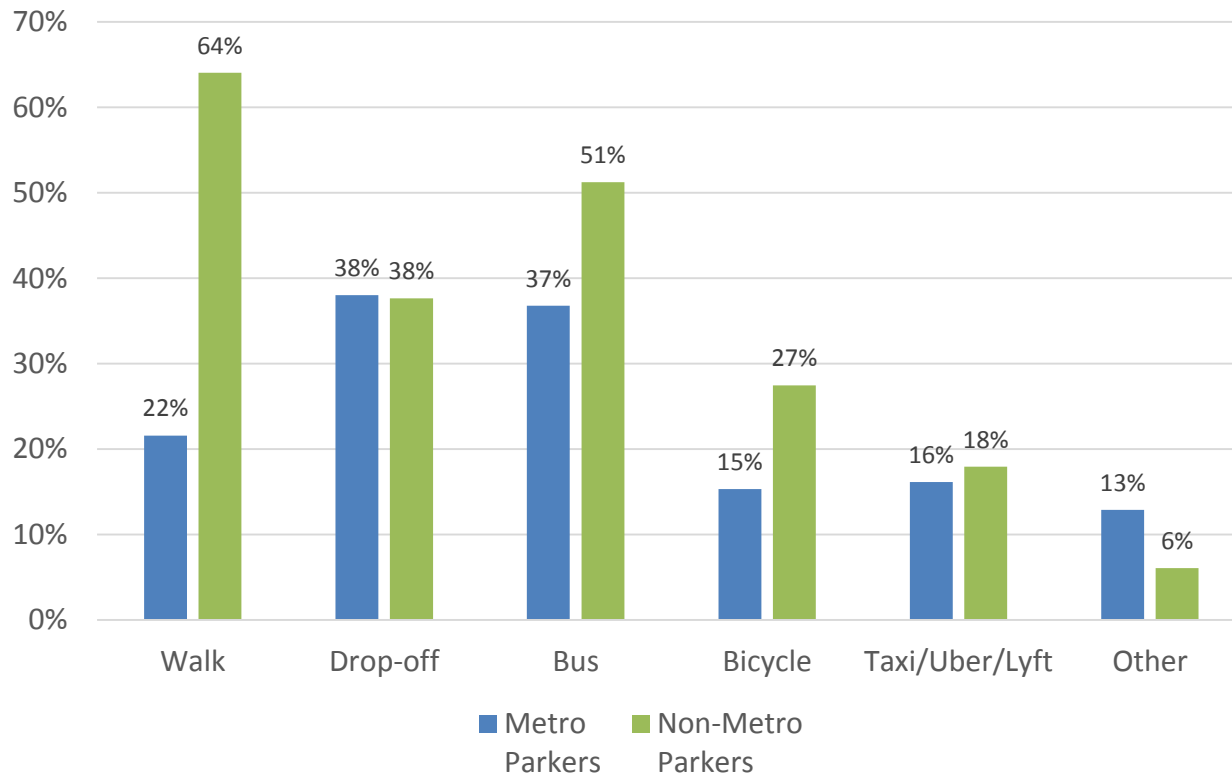
■ \$2 ■ \$3 ■ \$4 ■ \$5 ■ \$6 ■ More than \$6

Total Respondents = 1,621

Total Respondents = 531

Transit Modes

“What other mode(s) would you consider to access your preferred stop/station?”



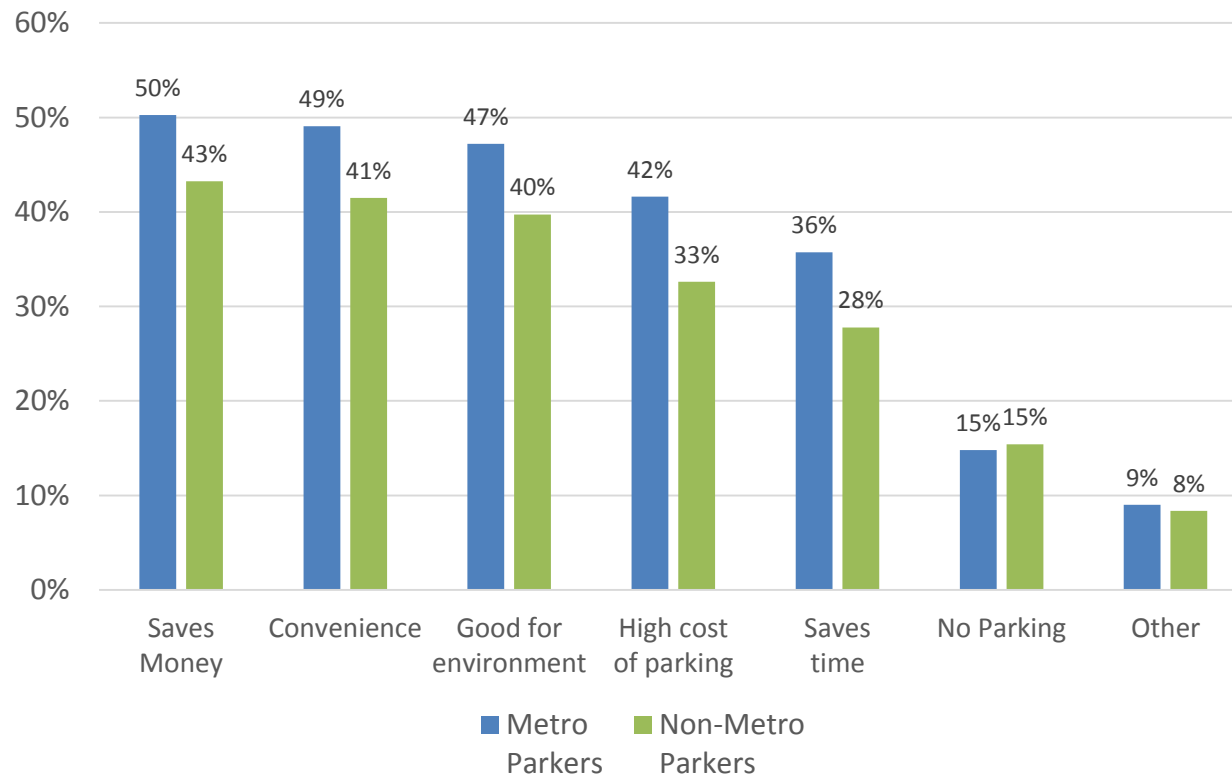
* Multiple-choice question. Percentages indicating number of each option chosen out of total respondents to this question.

Total Respondents = 5,528

Total Respondents = 1,649

Transit Choices

“Why do you choose to park and ride transit?”



* Multiple-choice question. Percentages indicating number of each option chosen out of total respondents to this question.

Total Respondents = 5,528

Total Respondents = 1,649



By the Numbers



Out of 7,246 respondents
37% live within **2 miles**
of Metro stations.



Out of 7,246 respondents
44% earn an annual household
income of **\$75,000** or more.



Out of 5,364 respondents
68% would drive to a different
station with **lower** parking cost.

Top three requested facility
improvements by Metro parkers:

63% More parking spaces

21% More security

7% Better lighting

Top three requested improvements
to better access Metro stations:

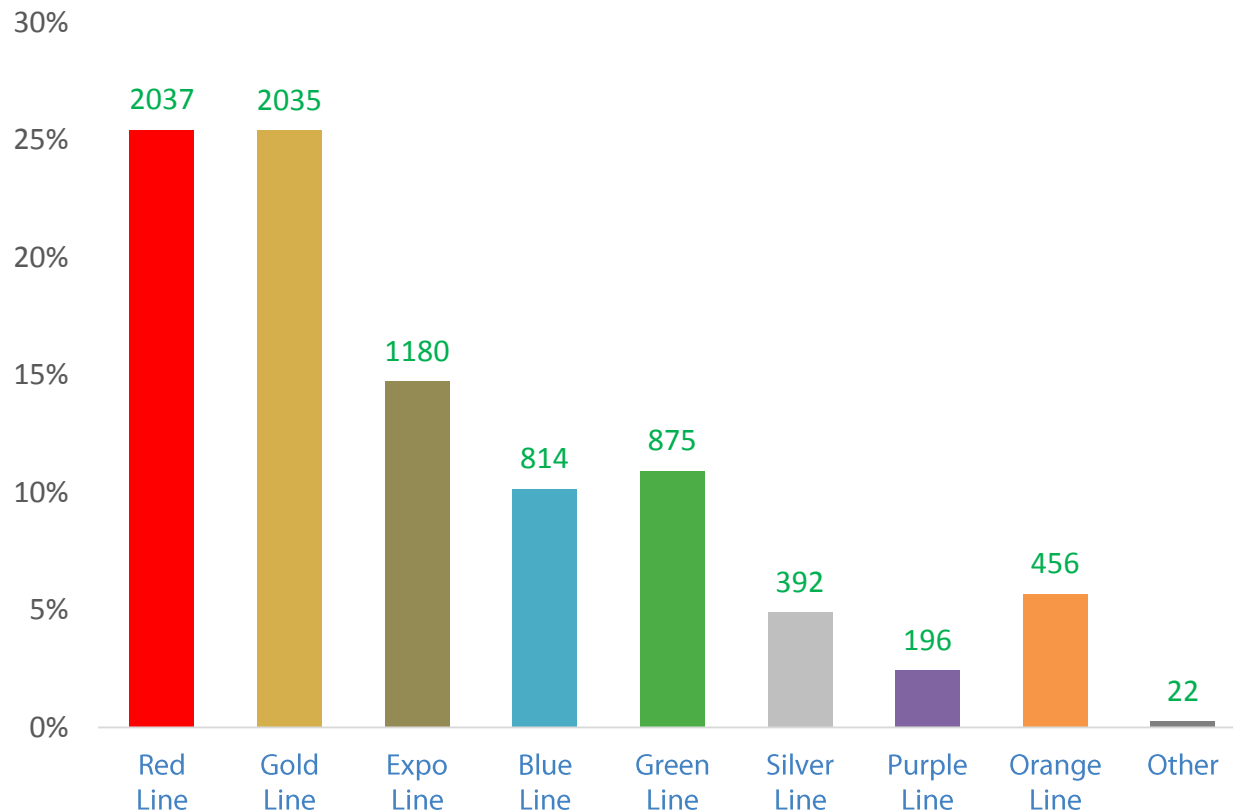
59% More bus service

20% More drop-off areas

12% More bike racks

Station of Origin

“Which Metro line has your preferred stop/station of origin?”

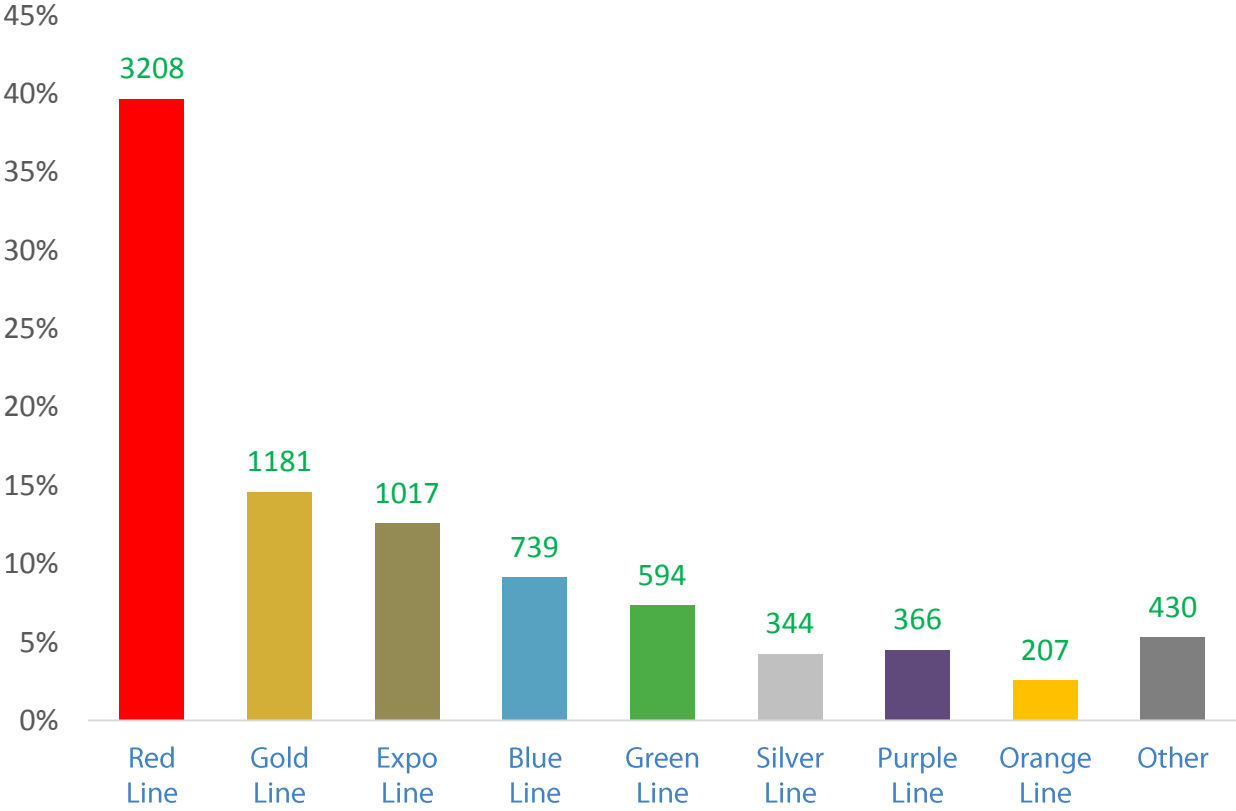


Total Respondents = 6,575



Destination Station

“On which Metro line is your final destination stop/station typically located?”

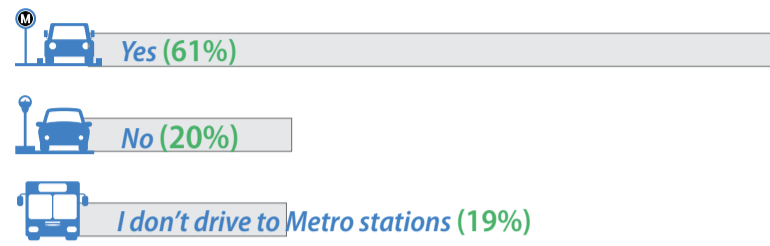


Total Respondents = 6,653

The Transit Riders Survey (Round 2) was conducted by LA Metro as part of the Supportive Transit Parking Program. The survey was launched on April 11, 2016, and ran through May 25, 2016, using online and text-based survey technologies.

Transportation Choices

Do you usually park at Metro parking facilities?



Visitor Summary

Total Participants/Visitors: 11,284
Online Survey Responses: 8,523
Text Survey Responses: 277
Total Responses: 8,800
Response Rate: 78%

Survey Findings



69% of respondents would **not** be willing to pay to secure a parking space.



68% of respondents would drive to a different station with **lower** parking cost.



37% of parkers live within **2 miles** of Metro stations.

Top three requested facility improvements by Metro parkers:

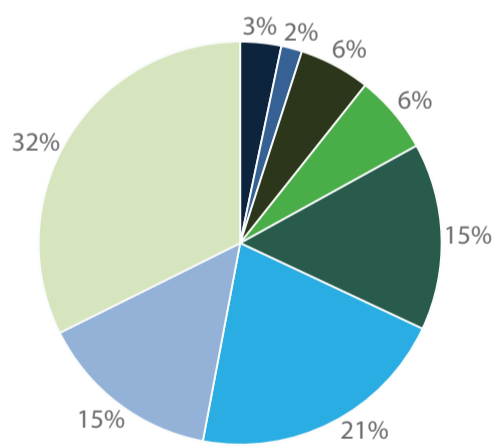
- 63%** More parking spaces
- 21%** More security
- 7%** Better lighting

Top three requested improvements to better access Metro stations:

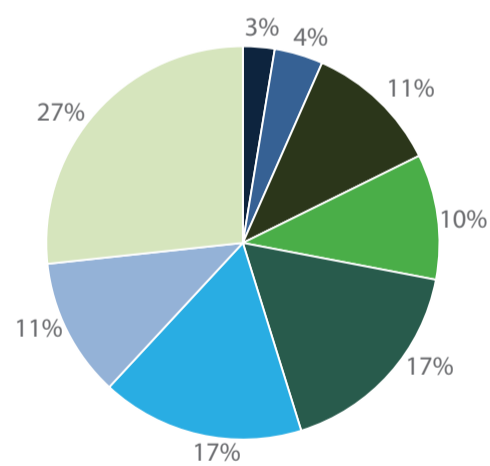
- 59%** More bus service
- 20%** More drop-off areas
- 12%** More bike racks

Income Distribution

Respondents

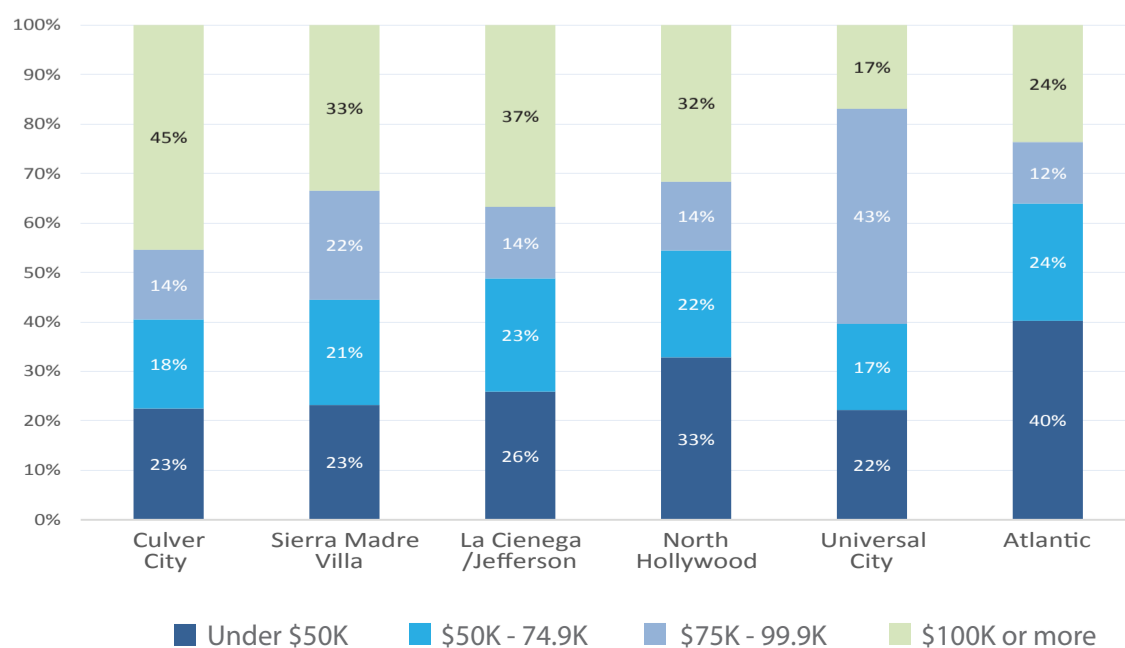


LA County



Legend for income distribution: Under \$5K, \$5K - \$9.9K, \$10K - \$19.9K, \$20K - \$29.9K, \$30K - \$49.9K, \$50K - 74.9K, \$75K - 99.9K, \$100K or more

Income Distribution in High Demand Stations



	Total	%
Do you usually park at Metro parking facilities?		
Yes	5578	63%
No	1668	19%
I don't drive to Metro stations	1554	18%
Metro Parkers		
How far from home is your preferred stop/station?		
2-5 miles	2189	40%
1-2 miles	1199	22%
5-10 miles	1074	19%
More than 10 miles	599	11%
0-1 mile	473	9%
How many other occupants are typically in your vehicle?		
0	3007	54%
1	1749	32%
2	613	11%
3 or more	168	3%
Are you a permit holder?		
No	4621	84%
Yes	909	16%
How would you rate your ability to find parking?		
Good	1651	30%
Fair	1501	27%
Excellent	1236	22%
Poor	1154	21%
What would most improve your experience at the Metro station parking facility?		
More parking spaces	3104	63%
More security	1059	21%
Better lighting	338	7%
Better signage	219	4%
Increased maintenance	207	4%
Other	10	0%
How best to provide parking?		
Build more parking near the station	2747	71%
Build more parking but further away	594	15%
Charge for all parking	182	5%
Charge/charge more for closest parking	174	4%
Other	173	4%
Would you pay to secure a parking space?		
No	3752	69%
Yes	1647	31%

Up to what price per day would you be willing to pay for parking?

\$2.00	989	61%
\$3.00	256	16%
\$5.00	186	11%
\$4.00	115	7%
\$6.00	38	2%
More than \$6.00	37	2%

Would an increase in parking cost deter you from riding transit?

Yes	3750	70%
No	1631	30%

What price for parking would discourage you from using transit?

\$2.00	2010	54%
\$3.00	526	14%
\$4.00	521	14%
\$5.00	297	8%
More than \$6.00	213	6%
\$6.00	137	4%

Would an increase in parking cost encourage you to drive to a different stop/station with free/lower parking cost?

Yes	3755	70%
No	1609	30%

How far away is that stop/station?

2-5 miles	1548	42%
5-10 miles	888	24%
1-2 miles	534	14%
More than 10 miles	419	11%
0-1 mile	337	9%

What other mode(s) would you consider to access your preferred station?

Drop-off by friend/family	2102	27%
Bus	2037	26%
Walk	1194	15%
Taxi/Uber/Lyft	892	11%
Bicycle	847	11%
Other	713	9%

What improvement would benefit you most to access your preferred stop/station?

More bus service	2284	58%
More drop-off areas	794	20%
More bike racks/lockers	475	12%
Better sidewalks	327	8%
Other	38	1%

Why do you choose to park and ride transit?

Saves money	2779	20%
Convenience	2683	20%
Good for environment	2609	19%
High cost of parking at destination	2300	17%
Saves time	1975	15%
No parking at destination	818	6%
Other	402	3%

Non-Metro Parkers

How far from home is your preferred stop/station?

0-1 mile	574	35%
2-5 miles	405	25%
1-2 miles	393	24%
5-10 miles	160	10%
More than 10 miles	116	7%

How many other occupants are typically in your vehicle?

0	830	51%
1	488	30%
2	227	14%
3 or more	96	6%

Where do you typically park?

Street parking	676	53%
Parking lot	356	28%
Parking structure	234	18%

How would you rate your ability to find parking?

Fair	537	34%
Good	443	28%
Poor	423	27%
Excellent	193	12%

Do you pay to park?

No	1366	84%
Yes	260	16%

Would you prefer to park in a Metro parking facility that offers availability, but requires a fee?

No	1080	67%
Yes	534	33%

Up to what price per day would you be willing to pay?

\$2.00	255	48%
\$3.00	89	17%
\$5.00	85	16%
\$4.00	54	10%
\$6.00	24	5%
More than \$6.00	24	5%

Would an increase in parking cost deter you from riding transit?

Yes	943	59%
No	665	41%

What price for parking would discourage you from using transit?

\$2.00	387	41%
\$4.00	146	16%
\$3.00	142	15%
More than \$6.00	116	12%
\$5.00	89	10%
\$6.00	56	6%

Would an increase in parking cost encourage you to drive to a different stop/station with free/lower parking cost?

Yes	1080	67%
No	524	33%

How far away is that stop/station?

2-5 miles	430	40%
0-1 mile	206	19%
1-2 miles	203	19%
5-10 miles	158	15%
More than 10 miles	74	7%

What other mode(s) would you consider to access your preferred stop/station?

Walk	785	27%
Bus	695	24%
Drop-off by friend/family	675	23%
Bicycle	377	13%
Taxi/Uber/Lyft	309	11%
Other	69	2%

What improvement would benefit you most to access your preferred stop/station?

More bus service	755	57%
More drop-off areas	232	17%
More bike racks/lockers	182	14%
Better sidewalks	159	12%
Other	7	1%

Why do you choose to park and ride transit?

Saves money	713	26%
Good for environment	655	24%
High cost of parking at destination	530	19%
Saves time	458	17%
No parking at destination	254	9%
Other	138	5%

Do Not Drive to Metro Stations

How far from home is your preferred stop/station?

0-1 mile	822	54%
----------	-----	-----

1-2 miles	303	20%
2-5 miles	233	15%
5-10 miles	97	6%
More than 10 miles	80	5%

What other mode(s) would you consider to access your preferred stop/station?

Walk	1056	32%
Bus	847	26%
Drop-off by friend/family	622	19%
Bicycle	454	14%
Taxi/Uber/Lyft	295	9%
Other	30	1%

What improvement would benefit you most to access your preferred stop/station?

More bus service	743	55%
Better sidewalks	265	20%
More bike racks/lockers	185	14%
More drop-off areas	150	11%

All Respondents**Which Metro line has your preferred stop/station of origin?**

Red Line	2037	25%
Gold Line	2035	25%
Expo Line	1180	15%
Green Line	875	11%
Blue Line	814	10%
Orange Line	456	6%
Silver Line	392	5%
Purple Line	196	2%
Other	21	0%

Which Blue Line station do you use most often?

Willow Street	187	25%
Wardlow	90	12%
Del Amo	89	12%
Artesia	58	8%
Downtown Long Beach	49	6%
7th Street/Metro Center	42	6%
Florence	41	5%
1st Street	31	4%
Willowbrook/Rosa Parks	30	4%
Anaheim Street	23	3%
Compton	17	2%
Pacific Avenue	16	2%
Pacific Coast Highway	15	2%
Firestone	15	2%
Pico	11	1%
103rd Street/Watts Towers	10	1%
Grand/LATTC	9	1%
Washington	8	1%
Vernon	6	1%
Slauson	6	1%
5th Street	5	1%
San Pedro Street	5	1%

Which Expo Line station do you use most often?

Culver City	768	67%
La Cienega/Jefferson	178	16%
Expo/Crenshaw	48	4%
7th Street/Metro Center	31	3%
Expo/La Brea	20	2%
Expo Park/USC	19	2%
Pico	17	1%
Expo/Western	15	1%
Expo/Vermont	14	1%
LATTC/Ortho Institute	12	1%
Jefferson/USC	9	1%
Farmdale	8	1%

Which Gold Line station do you use most often?

Sierra Madre Villa	291	15%
Atlantic	179	9%
Azusa/Downtown	166	9%
South Pasadena	154	8%
APU/Citrus College	146	8%
Fillmore	125	6%
Del Mar	111	6%
Highland Park	92	5%
Arcadia	88	5%
Heritage Square	68	4%
Lincoln/Cypress	66	3%
Monrovia	58	3%
Allen	53	3%
Lake	51	3%
Irwindale	50	3%
Union Station	45	2%
Memorial Park	38	2%
Southwest Museum	38	2%
Duarte/City of Hope	29	2%
East LA Civic Center	23	1%
Little Tokyo/Arts District	21	1%
Indiana	18	1%
Chinatown	17	1%
Soto	11	1%

Which Green Line station do you use most often?

Norwalk	403	48%
Aviation/LAX	123	15%
Lakewood Boulevard	90	11%
Redondo Beach	76	9%
Crenshaw	41	5%
Harbor Freeway	24	3%
Long Beach Boulevard	21	3%
El Segundo	16	2%
Hawthorne/Lennox	12	1%
Avalon	10	1%
Willowbrook/Rosa Parks	8	1%
Douglas	5	1%
Mariposa	4	0%
Mariposa	4	0%

Which Orange Line station do you use most often?

Balboa	69	15%
Canoga	66	14%
Reseda	52	11%
Sepulveda	49	10%
Chatsworth	37	8%
North Hollywood	34	7%
Pierce College	32	7%
Pierce College	32	7%
Van Nuys	27	6%
Warner Center	10	2%
Woodman	9	2%
Tampa	9	2%
Roscoe	8	2%
Valley College	8	2%
Sherman Way	8	2%
Laurel Canyon	6	1%
Nordhoff	5	1%
Woodley	4	1%
De Soto	3	1%

Which Purple Line station do you use most often?

Wilshire/Western	68	38%
Wilshire/Vermont	39	22%
Wilshire/Normandie	24	13%
Union Station	17	9%
7th Street/Metro Center	13	7%
Pershing Square	5	3%
Civic Center/Grand Park	5	3%
Hollywood/Western	4	2%
Westlake/MacArthur Park	3	2%
Universal/Studio City	1	1%
North Hollywood	0	0%

Which Red Line station do you use most often?

North Hollywood	813	41%
Universal/Studio City	444	23%
Hollywood/Highland	111	6%
7th Street/Metro Center	92	5%
Union Station	89	5%
Vermont/Sunset	71	4%
Wilshire/Vermont	66	3%
Vermont/Santa Monica	47	2%
Pershing Square	46	2%
Hollywood/Vine	45	2%
Hollywood/Western	45	2%
Civic Center/Grand Park	36	2%
Vermont/Beverly	36	2%
Westlake/MacArthur Park	19	1%

Which Silver Line station do you use most often?

Harbor Gateway Transit Center	162	43%
El Monte Station	130	35%
Harbor Freeway	24	6%
Union Station	13	3%
Manchester	9	2%
Rosecrans	8	2%
Cal State LA	7	2%
Cal State LA	7	2%
Pacific Coast Highway	4	1%
37th St/USC	3	1%
LA County + USC Medical Ctr	3	1%
Slauson	3	1%
Carson	2	1%

On which Metro line is your final destination stop/station typically located?

Red Line	3208	40%
Gold Line	1181	15%
Expo Line	1017	13%
Blue Line	739	9%
Green Line	594	7%
Other	431	5%
Purple Line	365	5%
Silver Line	344	4%
Orange Line	207	3%

Which Blue Line station do you use most often?

Willow Street	289	42%
Wardlow	85	12%
Del Amo	49	7%
Artesia	38	5%
Downtown Long Beach	38	5%
7th Street/Metro Center	28	4%
Florence	26	4%
1st Street	18	3%
Willowbrook/Rosa Parks	18	3%
Anaheim Street	18	3%
Compton	14	2%
Pacific Avenue	13	2%
Pacific Coast Highway	13	2%
Firestone	9	1%
Pico	8	1%
103rd Street/Watts Towers	6	1%
Grand/LATTC	5	1%
Washington	4	1%
Vernon	4	1%
Slauson	4	1%
5th Street	4	1%
San Pedro Street	4	0%

Which Expo Line station do you use most often?

Culver City	285	29%
La Cienega/Jefferson	230	23%
Expo/Crenshaw	218	22%
7th Street/Metro Center	63	6%
Expo/La Brea	62	6%
Expo Park/USC	56	6%
Pico	23	2%
Expo/Western	17	2%
Expo/Vermont	17	2%
LATTC/Ortho Institute	14	1%
Jefferson/USC	6	1%
Farmdale	2	0%

Which Gold Line station do you use most often?

Sierra Madre Villa	231	21%
Atlantic	135	12%
Azusa/Downtown	78	7%
South Pasadena	78	7%
APU/Citrus College	65	6%
Fillmore	60	5%
Del Mar	52	5%
Highland Park	50	4%
Arcadia	47	4%
Heritage Square	46	4%
Lincoln/Cypress	42	4%
Monrovia	41	4%
Allen	31	3%
Lake	26	2%
Irwindale	26	2%
Union Station	22	2%
Memorial Park	14	1%
Southwest Museum	14	1%
Duarte/City of Hope	12	1%
East LA Civic Center	12	1%
Little Tokyo/Arts District	11	1%
Indiana	11	1%
Chinatown	9	1%
Soto	7	1%

Which Green Line station do you use most often?

Norwalk	177	28%
Aviation/LAX	98	15%
Lakewood Boulevard	76	12%
Redondo Beach	67	10%
Crenshaw	67	10%
Harbor Freeway	34	5%
Long Beach Boulevard	30	5%
El Segundo	21	3%
Hawthorne/Lennox	19	3%
Avalon	13	2%
Willowbrook/Rosa Parks	13	2%
Douglas	11	2%
Mariposa	11	2%
Mariposa	6	1%

Which Orange Line station do you use most often?

Balboa	34	17%
Canoga	19	9%
Reseda	18	9%
Sepulveda	18	9%
Chatsworth	16	8%
North Hollywood	15	7%
Pierce College	15	7%
Pierce College	12	6%
Van Nuys	12	6%
Warner Center	11	5%
Woodman	7	3%
Tampa	7	3%
Roscoe	5	2%
Valley College	5	2%
Sherman Way	4	2%
Laurel Canyon	2	1%
Nordhoff	2	1%
Woodley	1	0%
De Soto	1	0%

Which Purple Line station do you use most often?

Wilshire/Western	74	21%
Wilshire/Vermont	68	19%
Wilshire/Normandie	67	19%
Union Station	51	15%
7th Street/Metro Center	33	9%
Pershing Square	23	7%
Civic Center/Grand Park	19	5%
Hollywood/Western	7	2%
Westlake/MacArthur Park	5	1%
Universal/Studio City	2	1%
North Hollywood	1	0%

Which Red Line station do you use most often?

North Hollywood	722	23%
Universal/Studio City	407	13%
Hollywood/Highland	405	13%
7th Street/Metro Center	356	11%
Union Station	311	10%
Vermont/Sunset	196	6%
Wilshire/Vermont	167	5%
Vermont/Santa Monica	163	5%
Pershing Square	154	5%
Hollywood/Vine	111	4%
Hollywood/Western	44	1%
Civic Center/Grand Park	37	1%
Vermont/Beverly	29	1%
Westlake/MacArthur Park	19	1%

Which Silver Line station do you use most often?

Harbor Gateway Transit Center	92	28%
El Monte Station	75	23%
Harbor Freeway	40	12%
Union Station	40	12%
Cal State LA	23	7%
37th St/USC	23	7%
LA County + USC Medical Ctr	8	2%
Manchester	8	2%
Rosecrans	6	2%
Pacific Coast Highway	5	2%
Carson	2	1%
Slauson	2	1%

Demographics**What is your age?**

50-64	2375	28%
35-49	2283	27%
65 or more	1733	21%
25-34	1533	18%
18-24	389	5%
Younger than 18	64	1%

What is your gender?

Male	4314	52%
Female	4048	48%

What is your ethnicity?

White	3832	46%
Asian/pacific Islander	1668	20%
Latino	1512	18%
Black	655	8%
Other	595	7%
American Indian	58	1%

What is your household total annual earnings?

\$100,000 or more	2567	32%
\$50,000-\$74,999	1664	21%
\$30,000-\$49,999	1190	15%
\$75,000-\$99,999	1169	15%
\$20,000-\$29,999	502	6%
\$10,000-\$19,999	454	6%
Under \$5,000	261	3%
\$5,000-\$9,999	133	2%

Responses Summary

Total Responses	8800	100%
Total Online Responses	8523	97%
Total Text Responses	277	3%

Metro Parking



SUPPORTIVE TRANSIT PARKING PLAN

Analysis of Surveys Results

Prepared for

Los Angeles County Metropolitan Transportation
Authority

Prepared by

Walker Parking Consultants

Arellano Associates

June 9, 2016





Table of Contents

1	Introduction	3
2	Key Highlights.....	4
3	Summary of Survey Results – Round One.....	5
3.1	Station of Origin	5
3.2	Station of Destination	6
3.3	Transit riders who drive and park at station lot/garage	6
3.4	Transit riders who drive and park outside station lot/garage	6
3.5	Transit riders who do not drive to Metro stations	7
3.6	Demographics	7
4	Summary of Survey Results – Round Two	8
4.1	Station of Origin	8
4.2	Station of Destination	9
4.3	Transit riders who drive and park at station lot/garage	9
4.4	Transit riders who drive and park outside station lot/garage	11
4.5	Transit riders who do not drive to Metro stations	12
4.6	Demographics	12
	Appendix A: Promotional Campaign	14
	Press Release	14
	Postcards.....	15
	A-Frames	16
	E-blast – Round One.....	17
	E-blast – Round Two	18



Appendix B: Survey Campaign	19
Online Survey - Round One.....	19
Online Survey - Round Two.....	20
Text Survey – Round One.....	21
Text Survey – Round Two.....	22
Attachments:.....	23
Attachment A: Metro STPP Final First Round Survey Results Overview Slides	23
Attachment B: Metro STPP Final First Round Consolidated Survey Results Spreadsheet.....	23
Attachment C: Round One Infographic.....	23
Attachment D: Metro STPP Final Second Round Consolidated Survey Results Overview Slides	23
Attachment E: Metro STPP Final Second Round Consolidated Survey Results Spreadsheet	23
Attachment F: Round Two Infographic	23



1 Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro) serves as transportation planner, coordinator, designer, builder and operator for Los Angeles County. Metro is initiating a comprehensive study to examine parking at 48 transit stations within LA County, consisting of over 22,000 parking spaces. Parking for Metro transit stations is a valuable resource that facilitates and provides access to transit for many of Metro's riders. It is important that the parking resource be effectively managed to maximize ridership in a way that is cost effective as well as economically and environmentally sustainable. Metro's Supportive Transit Parking Program (STPP) would provide an implementation roadmap for parking policies, operations, enforcement, maintenance, and technologies to support the plan and program management as well as a funding structure for a parking enterprise that would manage these efforts.

In order to engage transit riders in the design of the plan, Metro conducted a series of surveys to collect information from Metro riders in the Los Angeles County region. The primary motivation for the surveys was to understand riders' needs and priorities with respect to Metro's parking facilities. By learning about riders' parking experiences and concerns at Metro transit stations, and identifying their ridership patterns on Metro lines, the surveys were designed to help guide the planning efforts. The STPP surveys consisted of two rounds delivered in both online and text message platforms. Textizen and TypeForm survey tools were employed to facilitate the text message and online surveys respectively.

Round One of the survey campaign was launched on December 1, 2015, and ran through January 31, 2016. Round Two was launched on April 13, 2016 and ran through May 25, 2016. To promote the campaign, Metro designed A-frame posters, postcards, flyers and offered free Metro 30-day passes as an incentive for riders to participate in the campaign¹. In addition, Metro sent a promotional e-blast to over 129,000 Metro TAP cardholders and 1,200 transit parking permit holders inviting participation in the surveys. In addition, Metro promoted the survey on The Source blog and provided a link to it from the Metro Parking webpage. Both text message and online surveys featured Spanish versions to cater to Spanish speaking riders. Metro acquired a separate phone number and a URL for the Spanish text message and online surveys respectively.

Round One of the survey campaign was promoted to all transit riders across Los Angeles County and asked participants to provide feedback on their experiences at Metro stations. Round One closed on January 31, 2016, with over 9,000 surveys collected. Round Two sought in-depth input on riders' preferences and

¹ Please see Appendix A for promotional campaign material.



recommendations for parking either at or outside Metro parking facilities. Round Two closed on May 25, 2016, with approximately 8,800 responses collected².

2 Key Highlights

Over the course of the STPP survey campaign, approximately 17,900 responses were collected from transit riders throughout the Los Angeles County. Please see below for a list of key highlights.

- According to the results of the survey campaign, although over half of the respondents drive to Metro stations and park at Metro parking facilities, only 16% own Metro parking permits.
- Most respondents park at Metro parking facilities 4-5 times a week. 7-8 a.m. is the time that most respondents arrive at those facilities.
- A majority of respondents (70%) would not pay to secure a parking space and would be willing to drive to a different station with lower parking cost.
- On average, it takes 4-6 minutes to find parking at high demand Metro parking facilities, while for the rest of the parking facilities the average time is less than a minute. Respondents who park outside Metro stations have noted that on average it takes them 4-6 minutes to find a parking spot.
- Not being able to find parking at Metro parking facilities is the main reason that respondents park outside Metro stations. Providing more parking spaces is the top requested improvement at the Metro parking facilities, followed by enhancing security.
- For respondents who do not drive to Metro stations, “Infrequent bus service” is the biggest challenge to get to the Metro stations. Providing more bus service is the top requested improvement to better access Metro stations.
- For respondents who park at Metro stations, the non-auto mode that is most highly considered to access the preferred station is Taxi/Uber/Lyft. It was also highly considered by non-Metro parkers where it finished behind walking and bus.

² Please see Attachment A for survey results overview slides.



- 68% of the respondents earn an annual income of \$50,000 or more, while LA County is 55%. It should be noted that for respondents who use high-demand Metro stations that number is over 74%.
- A number of non-Metro parkers (35%) live within one mile of their preferred Metro station.

3 Summary of Survey Results – Round One

From December 1, 2015, to January 31, 2016, 11,933 transit riders visited survey sites and among them 9,015 respondents completed the survey, achieving a 74% response rate. 10,880 transit riders visited the survey through the online site and 1,053 residents participated through text survey. The first round also featured Spanish surveys, which achieved a total of 82 responses³. Round One of the survey campaign was marketed to all transit riders and sought general information on how they access Metro stations and their experiences at the stations. Results have been summarized based on the respondent’s answer to the main question: “How do you arrive at the Metro Station?” The surveys featured a skip logic that would customize the follow up questions based on the respondent’s answer to the main question. The results indicate that, 50% of respondents drive and park at a Metro transit parking facility, 6% drive and park outside Metro transit parking facilities, and 44% do not drive to Metro stations. The most used Metro lines and stations as reported by respondents are shown below.

3.1 Station of Origin

27% of respondents most often use Red Line as their station of origin, followed by Gold Line (20%), Expo Line (15%), Blue Line (11%), Green Line (11%), Orange Line (6%), Silver Line (6%) and Purple Line (4%).

- **Red Line Stations** – North Hollywood station (44%) is the most used Red Line station followed by Union Station (8%) and Hollywood/Highland (8%).
- **Gold Line Stations** – Sierra Madre Villa station (33%) is the most used Gold Line station followed by Atlantic (13%) and Fillmore (10%).
- **Expo Line Stations** – Culver City station (62%) is the most used Expo Line station followed by La Cienega/Jefferson (16%) and Expo/Crenshaw (6%).
- **Blue Line** – Willow Street station (20%) is the most used Blue Line station followed by Del Amo (14%) and Wardlow (13%).
- **Green Line** – Norwalk station (44%) is the most used Green Line station followed by Aviation/LAX (17%) and Lakewood Blvd. (9%).

³ Please see Attachment B for detailed survey result spreadsheet.



- **Orange Line** – Canoga station (14%) is the most used Orange Line station followed by Reseda (13%) and Balboa (13%).
- **Silver Line** – El Monte station (48%) is the most used Silver Line station followed by Harbor Gateway Transit Center (38%) and Harbor Freeway (6%).
- **Purple Line** – Wilshire/Western station (48%) is the most used Purple Line station followed by Wilshire/Normandie (16%) and Union Station (10%)

3.2 Station of Destination

40% of respondents most often use Red Line as their station of destination, followed by Gold Line (13%), Expo Line (13%), Blue Line (11%), Green Line (9%), Silver Line (6%), Purple Line (5%) and Orange Line (4%).

3.3 Transit riders who drive and park at station lot/garage

The first set of questions sought input on transit preferences of respondents who drive to Metro stations and park at Metro lot/garage. The results are summarized below.

- The first question asked respondents about the frequency of using Metro parking facilities. Over 42% of respondents use Metro parking facilities “4-5 times a week” followed by “less than once a month” (17%) and “once a month” (16%).
- The next question asked respondents about their typical time of arriving to Metro parking facilities. 29% of respondents select “7-8 am” followed by “after 10 am” (22%) and “before 6 am” (16%).
- The third question asked respondents “How long do you usually park in a Metro parking facility?” 69% of respondents selected “4-10 hours” followed by “10-24” hours (14%) and “3-4 hours” (13%).
- The next question asked respondents about the average time it takes them to find a place to park in a Metro parking facility. 32% of respondents selected “1-3 minutes” followed by “less than a minute” (27%) and “4-6 minutes” 21%.
- Among respondents, over 27% are “very satisfied” with Metro station parking facilities followed by “extremely satisfied” (25%) and “somewhat satisfied” (23%).

3.4 Transit riders who drive and park outside station lot/garage

The second set of questions sought input on transit preferences of respondents who drive to Metro stations but park outside of Metro lot/garage. The results are summarized below.



- The first question asked respondents why they park outside of Metro lot/garage. 47% of respondents selected “can’t find parking in lot/garage” as the main reason, followed by “no Metro lot/garage available” (32%) and “convenience” (13%).
- Respondents were asked about the frequency of parking outside Metro parking facilities. 42% of respondents selected “4-5 times a week”, followed by “2-3 times a week” (17%) and “once a week” (14%).
- Respondents were also asked “How long do you usually park near a Metro parking facility?” 64% of respondents selected “4-10 hours”, followed by “3-4 hours” (17%) and “10-24” hours (11%)
- Finally, respondents were queried about the average time it takes them to find a place to park near a Metro parking facility. 26% of respondents selected “4-6 minutes” followed by “1-3 minutes” (23%) and “10+ minutes” (19%).

3.5 Transit riders who do not drive to Metro stations

The third set of questions sought input on transit preferences of respondents who do not drive to Metro stations. The results are summarized below.

- The first question asked respondents why they do not drive to Metro stations. 45% of respondents selected “more convenient not to drive” as the main reason, followed by “no access to a vehicle” (32%) and “other” (12%)
- Respondents were then asked “What is your biggest challenge to get to the Metro station?” 66% of respondents chose “infrequent bus service” as the main challenge, followed by “no drop-off area” (16%) and “no bike lanes” (11%).

3.6 Demographics

Demographic questions sought information regarding respondents’ age, ethnicity, gender and income level. Result concerning each question is shown below.

- Among the 8,736 respondents who identified their age in the surveys, 27% were from “50-64” age group, followed by “35-49” (26%) and “25-34” (22%). The percentages of these three age groups in the overall Los Angeles County were 18%, 22% and 15% respectively.



- Among the 8,698 respondents who chose to identify their ethnicity in the surveys, 44% were “White” followed by 21% “Latino” and 17% “Asian/pacific Islander”. The percentages for these three ethnicities in the overall Los Angeles County were 28%, 49% and 11% respectively.
- Among the 8,725 respondents who identified their gender in the surveys, 53% were “male” and 47% were “female”. The percentages for male and female population in the overall Los Angeles County were 49% and 51% respectively.
- Among the 8,459 respondents who chose to identify their household income level in the surveys, 57% selected “\$50k or more” followed by 17% “30k-49.9k” and 9% “20k-29.9k”. The percentages for these three income levels in the overall Los Angeles County were 55%, 17% and 10% respectively.

4 Summary of Survey Results – Round Two

From April 13 to May 25, 2016, 11,284 transit riders visited the survey sites; 8,800 completed the survey, which resulted in a 78% response rate. The online site was used by 10,961 while the text survey was utilized by 323 transit riders. Spanish surveys totaled 45 responses⁴.

Round Two of the survey campaign sought in-depth input on parking preferences and experiences from transit riders who drive to the station and park either at or outside Metro’s parking facilities. Results have been summarized based on the respondent’s answer to the main question: “How do you arrive at the Metro Station?” The surveys featured a skip logic that would customize the follow-up questions based on the respondent’s answer to the main question. According to the result, 63% of respondents drive and park at Metro parking facilities, 19% drive and park outside Metro stations, and 18% do not drive to Metro stations. Results are shown below.

4.1 Station of Origin

Red Line (25%) is the most often used station of origin, followed by Gold Line (25%), Expo Line (15%), Green Line (11%), Blue Line (10%), Orange Line (6%), Silver Line (5%) and Purple Line (2%).

- **Red Line Stations** - North Hollywood station (41%) is the most used Red Line station followed by Universal/Studio City (23%) and Hollywood/Highland (6%).
- **Gold Line Stations** – Sierra Madre Villa station (15%) is the most used Gold Line station followed by Atlantic (9%) and Azusa/Downtown (9%).

⁴ Please see Attachment D for detailed survey result spreadsheet.



- **Expo Line Stations** – Culver City station (67%) is the most used Expo Line station followed by La Cienega/Jefferson (16%) and Expo/Crenshaw (4%).
- **Blue Line** – Willow Street station (25%) is the most used Blue Line station followed by Wardlow (12%) and Del Amo (12%).
- **Green Line** – Norwalk station (48%) is the most used Green Line station followed by Aviation/LAX (15%) and Lakewood Boulevard (11%).
- **Orange Line** – Balboa station (15%) is the most used Orange Line station followed by Canoga (14%) and Reseda (11%).
- **Silver Line** - Harbor Gateway Transit Center (43%) is the most used Silver Line station followed by El Monte station (35%) and Harbor Freeway (6%).
- **Purple Line** – Wilshire/Western station (38%) is the most used Purple Line station followed by Wilshire/Vermont (22%) and Wilshire/Normandie (13%).

4.2 Station of Destination

40% of respondents most often use the Red Line as their station of destination, followed by Gold Line (15%), Expo Line (13%), Blue Line (9%), Green Line (7%), Other (5%), Purple Line (5%), Silver Line (4%) and Orange Line (3%).

4.3 Transit riders who drive and park at station lot/garage

The first set of questions sought input on transit preferences of respondents who drive to Metro stations and park at Metro parking facilities. The result for each question follows.

- The first question asked “Metro parkers”⁵ about the distance between their home and their preferred station. 40% of respondents reported living live within “2 to 5 miles” from their preferred station, followed by “1 to 2 miles” (22%) and “5 to 10 miles” (19%).
- Metro parkers were then asked: “How many other occupants are typically in your vehicle? 54% of respondents reported “0”, followed by “1” (32%) and “2” (11%).
- Among Metro parkers, 16% indicated that they own a Metro parking permit, while 84% responded that they did not.
- Respondents were asked to rate their ability to find parking at Metro parking facilities. 30% of respondents selected “Good”, followed by “Fair” (27%) and “Excellent” (22%).

⁵ “Metro parkers” refers to transit riders who drive to and park at Metro parking facilities.



- Among Metro parkers, 63% responded that having “More parking spaces” would best improve their experience at Metro station parking facilities, followed by “More security” (21%) and “Better lighting” (7%).
- When respondents were asked about the best ways for Metro to provide parking to transit riders, 71% of respondents selected “Build more parking near the station”, followed by “Build more parking but further away” (15%) and “Charge for all parking” (5%).
- Among Metro parkers, 31% would pay to secure a parking space while 69% would not.
- The majority of Metro parkers (61%) responded that they would be willing to pay up to “\$2.00” for parking, followed by “\$3.00” (16%) and “\$5.00” (11%).
- Among Metro parkers, 70% responded that they would be deterred from riding transit if parking cost increased, while 30% reported that they would not be deterred.
- When respondents were asked: “What price for parking would discourage you from using transit?” 54% selected “\$2.00”, followed by “\$3.00” (14%) and “\$4.00” (14%).
- The majority of respondents (70%) responded that an increase in parking cost would encourage them to drive to a different station with free or lower parking cost, while 30% indicated that they would not drive to a different station.
- When respondents were asked how far they would be willing to drive for free or lower-cost parking, 42% of respondents selected “2 to 5 miles”, followed by “5 to 10 miles” (24%) and “1 to 2 miles” (14%).
- When respondents were asked about the other mode(s) of transportation that they would consider to access their preferred stop/station, 27% of respondents selected “Taxi/Uber/Lyft”, followed by “Bus” (26%) and “Walk” (15%).
- Among Metro parkers, 58% responded that having “More bus service” would best benefit them to access their preferred station, followed by “More drop-off areas” (20%) and “More bike racks/lockers” (12%).
- When respondents were asked: “why do you choose to park and ride transit?” 20% of respondents selected “Saves money”, followed by “Convenience” (20%) and “Good for environment” (19%).



4.4 Transit riders who drive and park outside station lot/garage

The second set of questions sought input on transit preferences of respondents who drive to Metro stations but park outside of Metro parking facilities. The result for each question is shown below.

- The first question asked “non-Metro parkers”⁶ about the distance between their home and preferred station. 35% of respondents live within “0 to 1 miles” from their preferred station, followed by “2 to 5 miles” (25%) and “1 to 2 miles” (24%).
- Non-Metro parkers were then asked: “How many other occupants are typically in your vehicle?” 51% of respondents selected “0”, followed by “1” (30%) and “2” (14%).
- When non-Metro parkers were asked where they typically park, 53% of respondents indicated “Street parking”, followed by “Parking lot” (28%) and “Parking structure” (18%).
- Respondents were asked to rate their ability to find parking. 34% of respondents selected “Fair”, followed by “Good” (28%) and “Poor” (27%).
- Among non-Metro parkers, 84% pay to park while 16% use free parking.
- “Would you prefer to park in a Metro parking facility that offers availability but requires a fee?” was the next question for non-Metro parkers. 67% selected “No”, while 33% select “Yes”.
- Almost half (48%) of respondents reported that they would be willing to pay up to “\$2.00” for parking, followed by “\$3.00” (17%) and “\$5.00” (16%).
- Among non-Metro parkers, 59% indicated that they would be deterred from riding transit if parking cost increases, while 41% would not.
- When respondents were asked: “What price for parking would discourage you from using transit?” 41% selected “\$2.00”, followed by “\$4.00” (16%) and “\$3.00” (15%).
- 67% of non-Metro parkers indicated that an increase in parking cost would encourage them to drive to a different station with free or lower parking cost, while 33% would not be willing to drive to a different station.

⁶ “non-Metro parkers” refers to transit riders who drive to Metro stations but park outside of the stations.



- When non-Metro parker respondents were asked how far they would be willing to drive for free or lower-cost parking, 40% of respondents selected “2-5 miles”, followed by “0-1 miles” (19%) and “1-2 miles” (19%).
- When non-Metro parker respondents were asked about the other mode(s) of transportation that they would consider to access their preferred station. 27% of respondents selected “Walk”, followed by “Bus” (24%) and “Taxi/Uber/Lyft” (23%).
- Among non-Metro parkers, 57% indicated that having “More bus service” would best benefit them to access their preferred station, followed by “More drop-off areas” (17%) and “More bike racks/lockers” (14%).
- Finally, respondents were asked: “Why do you choose to park and ride transit?” 26% of respondents selected “Saves money”, followed by “Good for environment” (24%) and “High cost of parking at destination” (19%).

4.5 Transit riders who do not drive to Metro stations

Third set of questions sought input on transit preferences of respondents who do not drive to Metro stations.

The first question asked respondents about the distance between their home and preferred station. 54% of respondents live within “0 to 1 miles” from their preferred station, followed by “1 to 2 miles” (20%) and “2 to 5 miles” (15%).

- Respondents were then asked about the other mode(s) of transportation that they would consider to access their preferred station. 32% of respondents selected “Walk”, followed by “Bus” (26%) and “Drop-off by friend/family” (19%).
- Among respondents who do not drive, 55% indicated that having “More bus service” would best benefit the to access their preferred station, followed by “Better sidewalks” (20%) and “More bike racks/lockers” (14%).

4.6 Demographics

Demographic questions sought information regarding respondents’ age, ethnicity, gender and income level. Among 8,378 respondents who identified their age in Round Two Surveys, 28% were from “50 to 64” age group, followed by “35 to 49” (27%) and “65 or more” (21%). The percentages of these three age groups in the overall Los Angeles County were 18%, 22% and 12% respectively.



- Among the 8,320 respondents who chose to identify their ethnicity in Round Two surveys, 46% were “White”, followed by 20% “Asian/pacific Islander” and 18% “Latino”. The percentages for these three ethnicities in the overall Los Angeles County are 28%, 11% and 49% respectively.
- Among the 8,347 respondents who identified their gender in Round Two Surveys, 52% were “male” and 48% were “female”. The percentages for male and female population in the overall Los Angeles County were 49% and 51% respectively.
- Among the 7,940 respondents who chose to identify their household income level in round two surveys, 32% of respondents earn an annual household income of “\$100k or more”, followed by “\$50k-\$75k” (21%) and “\$30k - \$50k” (15%). The percentages for these three income levels in the overall Los Angeles County were 27%, 17% and 17% respectively.



Appendix A: Promotional Campaign

Press Release



M Metro Supportive Transit Parking Program

Metro Rider Survey to Launch Dec. 1

Los Angeles -- The Los Angeles Metropolitan Transportation Authority (Metro) is launching a rider survey through text (SMS) and online engagement tools for Transit Riders to provide feedback relating to riders' parking experiences at Metro stations beginning on December 1, 2015, until January 31, 2016.

Riders are encouraged to enter the survey through answering the first question, "Hey, Angelenos! How's Metro treating you?" by texting 213-332-1184, or by taking the survey online at metroriderssurvey.com.

All riders who complete the survey, either online or through text, will automatically be entered for a chance to win a free one-month Metro Transit Pass.

Metro is conducting a comprehensive study to examine parking at 48 stations within Los Angeles County, consisting of over 22,000 parking spaces. Assuming that Caltrans park and ride facilities are acquired by Metro, parking facilities are expected to reach approximately 30,000 parking spaces when additional rail lines enter into operation.

The end result of the text and online survey is adoption of a Supportive Transit Parking Program (STPP) Master Plan. The plan would provide an implementation roadmap for parking policies, operations, enforcement, maintenance, and technologies to support the plan and program management, as well as a funding structure for a parking enterprise that would manage these efforts. The study is expected to run approximately one year.

For more information, visit www.metro.net.



Postcards

Can you find a parking spot?

Please tell us about your experience.

- A — YES, ALL THE TIME
- B — SOMETIMES
- C — ONCE IN AWHILE
- D — NEVER



Metro



Complete the survey for a chance to win a Metro 30-Day Pass!

Text your answer to 213.322.1184.* You can also fill out the survey online at metroparkingsurvey.com.

Your feedback will help shape potential improvements. Learn more at metro.net/parking.

**We respect your privacy and won't share your information.*

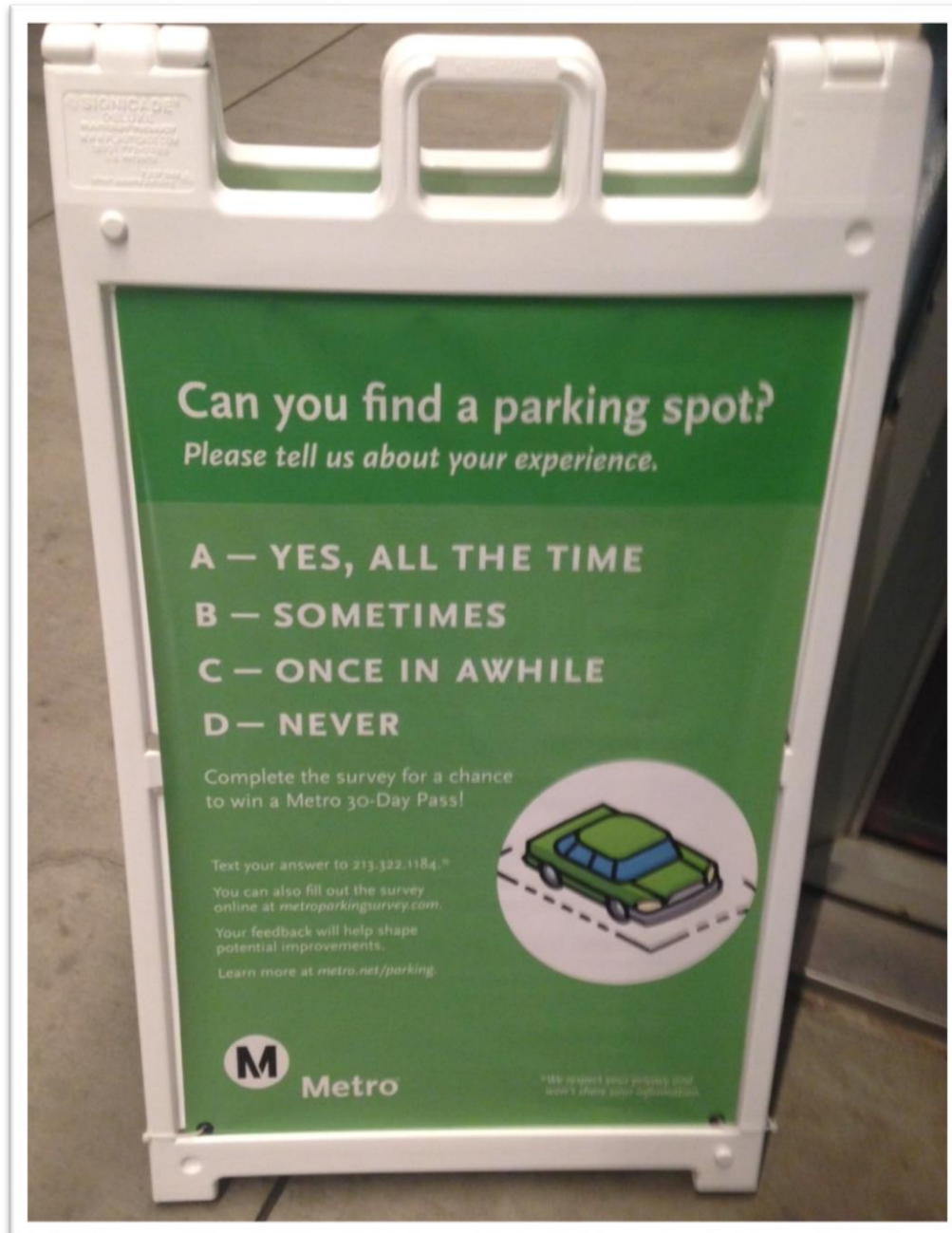


Metro





A-Frames





E-blast – Round One

Metro Parking



Please tell us what you think of Metro stations and parking facilities by completing our [online survey](#). You could win a free Metro 30-Day Pass!

Alternatively, you can participate in our text survey. To start the text survey, please text your answer to the question below to **(213) 322-1184**:

How's Metro treating you?

- A** - Great
- B** - Pretty good
- C** - Needs improvement
- D** - We haven't met yet

Your input will help shape Metro's Supportive Transit Parking Program (STPP) Master Plan. This plan will outline a vision for proactively managing Metro parking facilities and provide a roadmap for developing future parking policies, operations, enforcement, maintenance and technology. The study is expected to run for one year, with the final Plan going to the Metro Board for adoption in Fall 2016.

Questions? See our [Frequently Asked Questions](#).



E-blast – Round Two

Can't find a place to park?

Metro continues to collect input on parking improvements.



Dear Metro Transit Rider,

Thank you for taking the time to participate in our Metro Parking Survey. We appreciate the input you have already provided.

With some stations experiencing parking occupancy levels of over 90%, it may become more difficult to find parking in the future. We invite you to take a couple minutes to tell us what you think with a few additional questions that address parking challenges and potential solutions.

Round 2 Survey

Alternatively, you can participate in our text survey. To start the text survey, please text your answer to the question below to **(323) 673-2086**:

Do you usually park at Metro parking facilities?

A: Yes

B: No

C: I don't drive to Metro stations

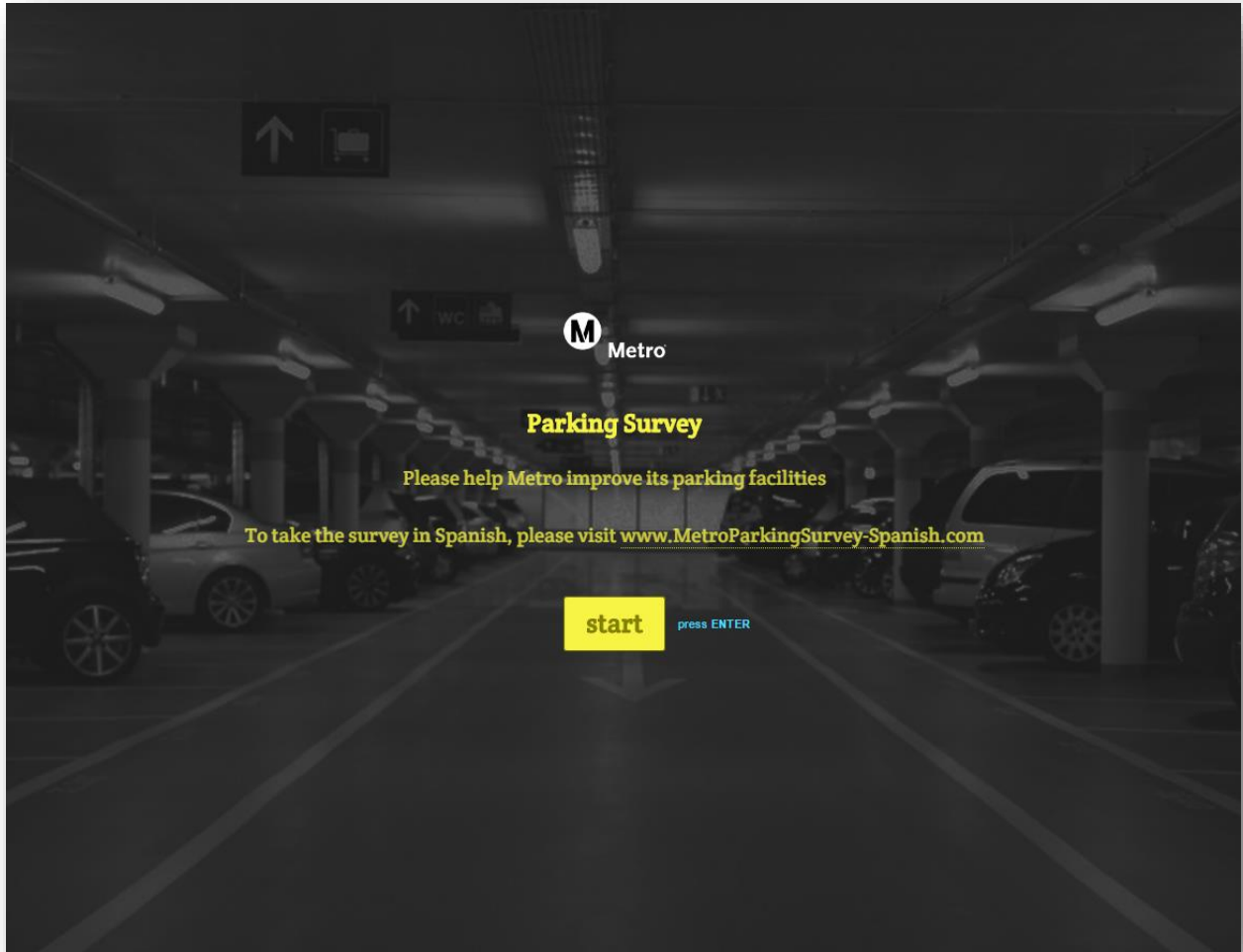
You could win a free 30-Day Metro Pass!

With ongoing input from transit riders, we can continue to strive for our goal of 100 percent rider satisfaction. Questions? See our [Frequently Asked Questions](#).



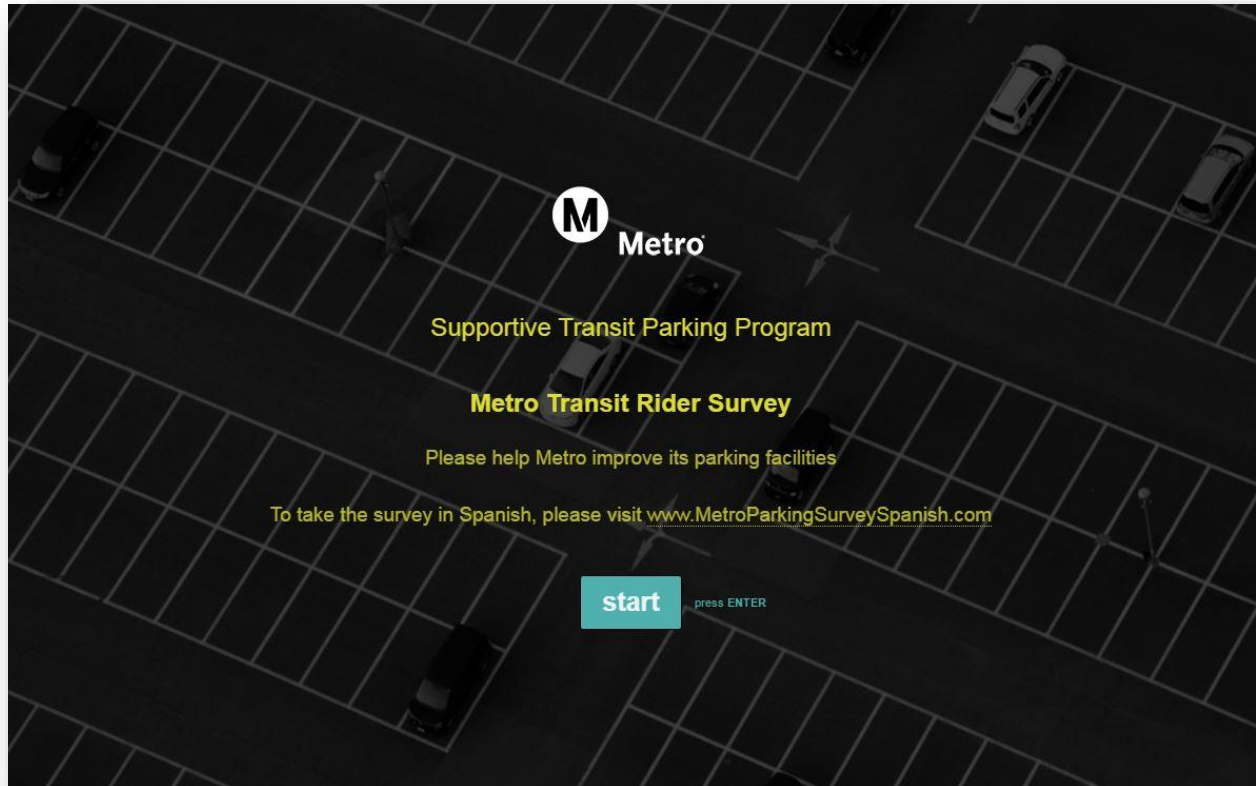
Appendix B: Survey Campaign

Online Survey - Round One



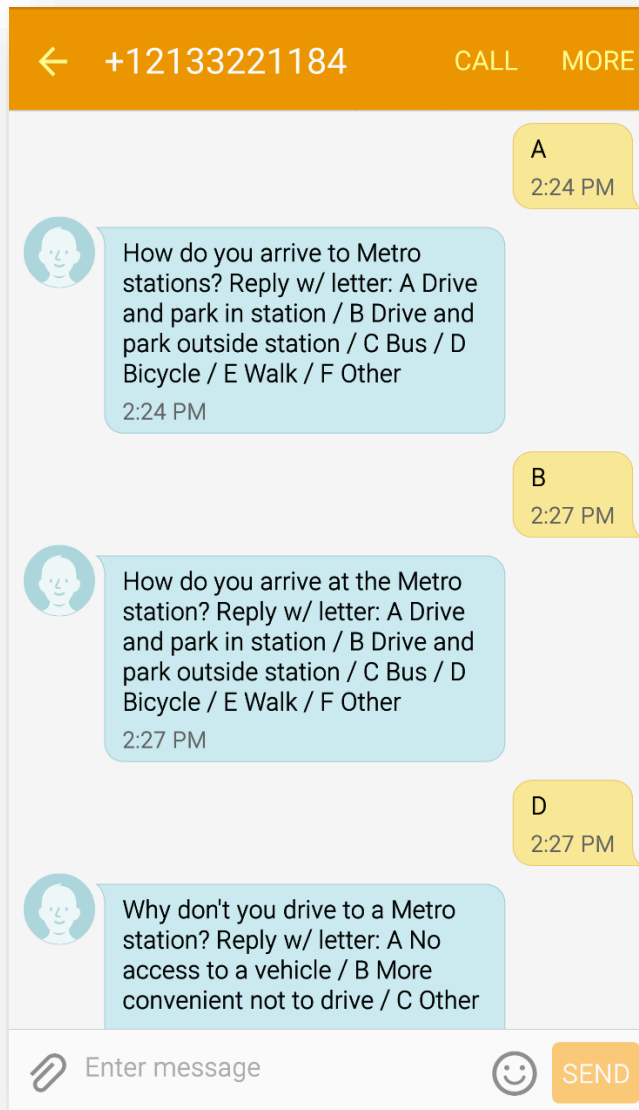


Online Survey - Round Two



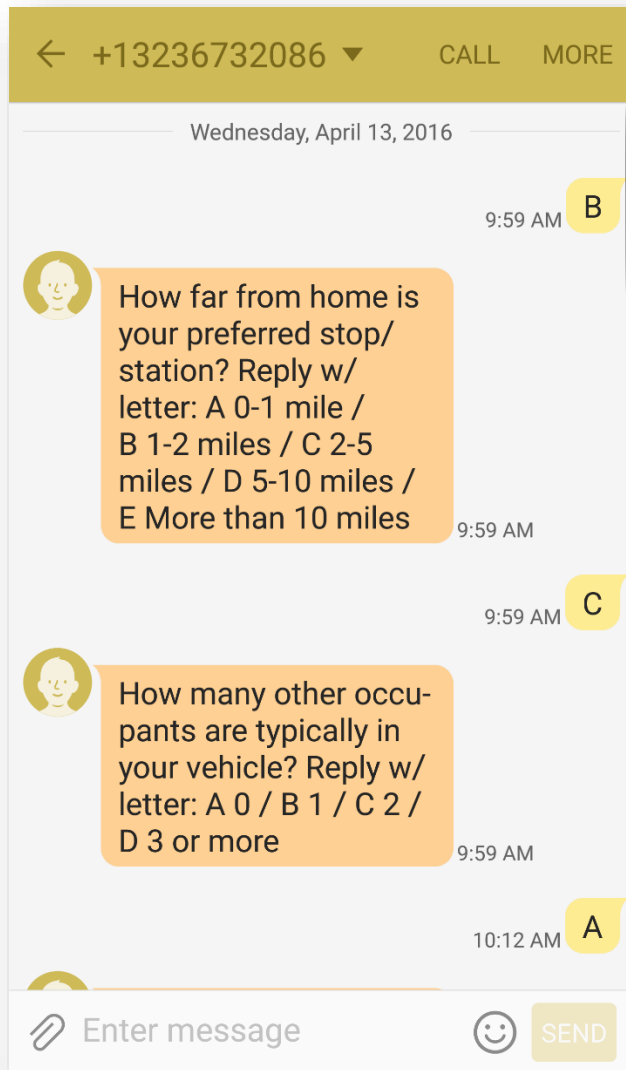


Text Survey – Round One





Text Survey – Round Two





Attachments:

- Attachment A: [Metro STPP Final First Round Survey Results Overview Slides](#)
- Attachment B: [Metro STPP Final First Round Consolidated Survey Results Spreadsheet](#)
- Attachment C: [Round One Infographic](#)
- Attachment D: [Metro STPP Final Second Round Consolidated Survey Results Overview Slides](#)
- Attachment E: [Metro STPP Final Second Round Consolidated Survey Results Spreadsheet](#)
- Attachment F: [Round Two Infographic](#)



Facility Assessment
B Appendix

APPENDIX B – FACILITY ASSESSMENT REPORT

A key first step of the STPP Master Plan effort was the collection of quantitative data regarding how Metro’s parking spaces and qualitative information related to their condition and access. The purpose of the Facility Assessment effort was to understand current system operation and performance, which served as baseline information required to recommend future policy and operational changes, and to recommend and quantify the cost of improving the parking facilities.

An assessment of Metro parking facilities was conducted from December 2015 through February 2016 for stations providing parking. Parking facilities at the new Gold Line Foothill extension and Expo II stations were assessed in June 2016. Appendix B provides the detailed information collected during the assessments by line and by station.



Metro[®]

FACILITY ASSESSMENT

SUPPORTIVE TRANSIT PARKING PROGRAM

Prepared for:

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION
AUTHORITY (METRO)

May 2017



[This page intentionally left blank]

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

TABLE OF CONTENTS

EXECUTIVE SUMMARY	IV
OVERVIEW	1
METHODOLOGY	4
Vehicle Occupancy Data	4
Parking Access	4
Parking User Groups	4
Parking Signage and Wayfinding	5
Potential Carshare Locations	5
Potential Vanpool Locations	5
Facility Upkeep, Maintenance and Pavement Conditions	5
Lighting	5
Safety	7
Security	7
Parking Reconfiguration	8
Bicycle Occupancy Data	8
Bicycle Infrastructure Rating	8
Pedestrian Infrastructure Rating	8
KEY FINDINGS	10
Occupancy Levels	10
Parking Signage and Wayfinding	12
Lighting	12
Upkeep	12
Safety and Security	12
Parking Reconfiguration	12
Bicycle Infrastructure and Parking	12
Pedestrian Infrastructure	13
GENERAL RECOMMENDATIONS	14
Focus on Customer Experience	14
Implement Consistency System-Wide	14
Enhance First/Last Mile Options.....	14
Focus on Managing Demand	15
Explore other Uses During Non-Peak Periods	15
Consider Rationalization of Some Parking Facilities	16
Where Availability Exists, Consider Selling Parking to Non-Transit Users.....	16
Adopt a Consistent Parking Facility Naming Convention	16
Improve Consistency of Experience at Parking Facilities under Lease Agreement	16
Restripe Spaces to Add Supply where Possible.....	17
Other Recommendations	17
STATION FINDINGS AND RECOMMENDATIONS	19
Vehicle Occupancy	19
Bicycle Occupancy	21
Station Scores	23
Intelligent Transportation Systems Infrastructure	25

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

Station-Specific Recommendations.....	26
Cost Estimates and Timing.....	30
Rough Order-of-Magnitude Costs and Timing	34

APPENDIX A – BLUE LINE STATIONS

Florence.....	A-2
103rd St./Watts Towers	A-6
Willowbrook/Rosa Parks	A-10
Artesia	A-15
Del Amo.....	A-20
Wardlow	A-25
Willow.....	A-29

APPENDIX B – EXPO LINE STATIONS

Expo/Crenshaw.....	B-2
La Cienega/Jefferson	B-6
Culver City.....	B-11
Expo/Sepulveda	B-15
Expo/Bundy.....	B-20
17 th St./SMC.....	B-25

APPENDIX C – GOLD LINE STATIONS

Atlantic	C-2
Indiana.....	C-8
Lincoln/Cypress	C-13
Heritage Square	C-18
South Pasadena.....	C-23
Fillmore.....	C-28
Del Mar	C-33
Lake.....	C-39
Sierra Madre Villa	C-43
Arcadia.....	C-48
Monrovia	C-53
Duarte/City of Hope.....	C-58
Irwindale.....	C-62
Azusa Downtown.....	C-67
APU/Citrus	C-72

APPENDIX D – GREEN LINE STATIONS

Norwalk.....	D-2
Lakewood	D-7
Long Beach.....	D-13
Avalon.....	D-18
Harbor Freeway.....	D-24
Vermont/Athens.....	D-29
Crenshaw	D-33
Hawthorne/Lennox.....	D-38
Aviation/LAX	D-42
El Segundo	D-47
Douglas.....	D-52

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

Redondo Beach.....	D-57
--------------------	------

APPENDIX E – ORANGE LINE STATIONS

Van Nuys	E-3
Sepulveda	E-9
Balboa	E-13
Reseda.....	E-18
Pierce College.....	E-23
Canoga	E-27
Sherman Way	E-32
Chatsworth.....	E-37

APPENDIX F – RED LINE STATIONS

Union Station.....	F-2
Universal City/Studio City.....	F-7
North Hollywood	F-12
Westlake/MacArthur Park	F-17

APPENDIX G – SILVER LINE STATIONS

Slauson.....	G-2
Manchester.....	G-7
Rosecrans	G-12
Harbor Gateway Transit Center	G-17
El Monte.....	G-21
Carson.....	G-26
Pacific Coast Highway.....	G-31

APPENDIX H – ADDITIONAL DATA

Detailed Inventory with Occupancy	H-2
Parking Facility Ownership Details	H-4
Lighting Measurement Details	H-6
Details of Walker Level of Service for Lighting Table	H-10

LIST OF TABLES AND FIGURES

Table 1: Metro Parking System (Blue, Expo and Gold Lines)	2
Table 2: Metro Parking System (Green, Orange, Red and Silver Lines)	3
Table 3: Walker Level of Service for Minimum Lighting (in foot-candles [fc])	6
Table 4: Vehicle Occupancy Summary (Blue, Expo and Gold Lines)	19
Table 5: Vehicle Occupancy Summary (Green, Orange, Red and Silver Lines)	20
Table 6: Stations with Highest Vehicle Occupancy	21
Table 7: Bicycle Occupancy Summary (Blue, Expo and Gold Lines)	22
Table 8: Bicycle Occupancy Summary (Green, Orange, Red and Silver Lines)	23
Table 9: Scores for Bicycle/Pedestrian Infrastructure and Parking Wayfinding (Blue, Expo and Gold Lines)	24
Table 10: Scores for Bicycle/Pedestrian Infrastructure and Parking Wayfinding (Green, Orange, Red and Silver Lines)	25
Table 11: Measures – Cost Metrics and Priority	30
Table 12: Assumptions Utilized to Develop ROM Cost Estimates (2016 Dollars)	31
Table 13: ROM Cost Estimates for Blue, Expo and Gold Lines (2016 Dollars)	33
Table 14: ROM Cost Estimates for Green, Orange, Red and Silver Lines (2016 Dollars)	34
Figure 1: Examples of Minimum Lighting with Level of Service A	6
Figure 2: Metro Parking System Weekday Morning Occupancy Map	11
Figure 3: Matrix of Measures (Blue, Expo and Gold Lines)	27
Figure 4: Matrix of Measures (Green, Orange, Red and Silver Lines)	29

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

EXECUTIVE SUMMARY

The Supportive Transit Parking Program ("STPP") Master Plan is a comprehensive assessment and evaluation of the Los Angeles County Metropolitan Transportation Authority's ("Metro's") current parking program for Metro's Parking Management unit. The end product of the effort is the STPP Master Plan. The primary goals of the effort are to:

- Create an implementable Master Plan;
- Create a self-sustaining parking system; and
- Prioritize parking for transit riders.

As part of the effort, an assessment of Metro parking facilities was conducted from December 2015 through February 2016 for stations with parking facilities. Additional parking facilities at newly opened Gold Line Foothill extension and Expo 2 stations were assessed in June 2016.

The purpose of the facility assessment effort is to understand current system operation and performance, which serves as baseline information required to recommend future policy and operational changes, and to recommend and quantify the cost of improving the parking facilities. The following evaluations were included in the facility assessment effort.

- Vehicle occupancy counts weekday late morning, weekday evening and weekends
- Assessment of parking wayfinding leading to each station and parking signage
- Parking access details
- Observed and potential parking user groups
- Potential carshare and vanpool parking locations
- Observations regarding facility upkeep and facility maintenance
- Evening lighting level measurements
- Observations regarding safety and security
- Parking reconfiguration opportunities at highly utilized stations
- Bicycle rack occupancy counts weekday late morning and bicycle locker rental utilization data
- Assessment of bicycle and pedestrian infrastructure surrounding each station

The facility assessment covered parking at 59 Metro stations with a total of 87 parking facilities (lots, garages and on-street). There are 70 surface lots totaling approximately 15,700 patron-accessible spaces, 16 garages totaling approximately 7,300 patron-accessible spaces and one on-street parking area with approximately 200 patron-accessible spaces. There are approximately 23,200 patron-accessible spaces total in the entire Metro system. Of these, approximately 18,800 are free, 4,200 require a daily or monthly fee and approximately 200 are reserved, mostly for short-term pick-up/drop-off, EV charging and Zipcar carshare. Two future Crenshaw Line parking lots were also assessed, based on information currently available. These two lots comprise approximately 200 spaces.

Key findings of the facility assessment effort are as follows:

- **Parking occupancy** – Over 30% of stations have peak weekday parking occupancy of over 90%.
- **Parking signage and wayfinding** – Majority of locations have limited or no parking wayfinding.
- **Lighting** – Levels are substandard in over 70% of the facilities.
- **Upkeep** – Over 25% of stations have issues with litter and debris.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

- **Safety and security** – Over one-fifth of stations were observed to have activities that increase security risk levels.
- **Bicycle infrastructure and parking** – Over 60% of stations do not have Class I or Class II bicycle facilities within one block of the station. Eight stations do not currently have any bicycle parking.
- **Pedestrian infrastructure** – Over 15% of stations would benefit from improvements to pedestrian infrastructure (presence of crosswalks and adequate sidewalk widths) near station.
- **Parking reconfiguration** – A few lots with long rows of standard dimension parking spaces may be restriped to increase capacity by less than 3%. Larger gains of 5% to 15% may be realized by reorienting some lots, but at a much higher cost.

Based on the findings of the facility assessment effort, we developed a set of general recommendations as well as station-specific recommendations. The set of general recommendations are as follows:

- **Focus on customer experience** – Metro riders who drive and park must be able to easily find station parking, find a space within a parking facility, be comfortable walking between the car and station platform/portal and vice versa and should be able to exit in a convenient manner.
- **Implement consistency system-wide** – Signage, facility conditions and operation must be consistent system-wide.
- **Enhance first/last mile options** – Park and ride is just one form of station access and based on Metro surveys, it is estimated to make up 10% to 15% of station access. Other modes such as bicycle and pedestrian access need to be viable options. In particular improving bicycle infrastructure around stations and adding bicycle parking at stations that currently have none.
- **Focus on managing demand** – Due to the high cost to build new parking, focus on managing existing demand. This includes introduction and expansion of permit programs, instituting daily fees for all parking at stations that experience high parking demand and development of permit parking zones to spread demand across multiple stations.
- **Explore other uses during non-peak periods** – Consider making Metro parking available for other uses, such as farmers markets and cultural events, during low demand periods.
- **Consider rationalization of some parking facilities** – Locations that experience very low occupancy (less than 10%) should be reviewed to determine whether there is a higher and better use.
- **Where availability exists, consider selling parking to non-transit users** – At locations where non-transit riders are parking and there is availability, consider selling parking to the non-transit riders.
- **Adopt a consistent parking facility naming convention** – Doing so system-wide would avoid requiring that a rider know where he/she is parked relative to the station platform/portal.
- **Improve consistency of experience at parking facilities under lease agreement** – User experience should be consistent to Metro-owned facilities, including signage, lighting, security, upkeep and payment.
- **Restripe spaces to add supply where possible** – At high occupancy locations with long rows of standard dimension parking, restripe to compact stalls such that the total percentage of compact stalls does not exceed 20%.
- **Other recommendations**
 - **Increased enforcement** – This is necessary to improve operation of permit and any other paid parking program.
 - **Pick-up/drop-off areas** – Due to the popularity of ride-hailing services such as Uber and Lyft, provide pick-up/drop-off areas in parking facilities if no curb locations near the platform/portal are suitable.
 - **Lighting** – To improve lighting levels at parking facilities with deficient lighting, we recommend replacing existing fixtures with LED fixtures. For parking garages, we also recommend painting walls and ceilings white to improve illumination.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT

- **ADA updates** – Deficiencies were observed and a more comprehensive review should be undertaken.
- **Carshare** – Metro should continue to make spaces available to carshare providers for a monthly fee.
- **Vanpool** – Offer free dedicated vanpool spaces but vanpool participants should be treated as transit riders and will need to adhere to the parking programs in place at the parking facility that their vanpool is based at.

Station-specific recommendations were provided and cover the following categories:

- Parking Signage and Wayfinding
- Bicycle Parking
- Pedestrian Wayfinding
- Lighting
- Parking Surface
- Traffic Calming
- Appearance
- Enforcement
- Security
- Permit Parking
- Surrounding Area – Security
- Surrounding Area – Bicycle Infrastructure
- Surrounding Area – Pedestrian Infrastructure

Each station was assessed under 23 measures which fall under the aforementioned categories. Each measure was assigned a metric with associated cost assumptions as well as a priority (high, medium or low). Some measures are on-going in nature and are indicated as annual. High priority items are focused on safety and security, while medium and low priority items address other categories.

Cost estimates based on Walker experience and industry standards were provided. We estimate that \$6.10 million over three years (including \$5.24 million in one-time costs) would be required to address the recommended improvements. And approximately \$286,000 per year thereafter for on-going maintenance and services. For Metro-owned facilities, the figures are \$1.38 million over three years (including approximately \$943,000 in one-time costs) and approximately \$144,000 per year on an annual basis.

Based on the need to improve and maintain Metro-owned parking facilities, we recommend identifying revenue streams to offset these costs. These may include introduction or expansion of permit programs and charging daily fees to parkers at high occupancy locations. In addition, rationalization of low occupancy facilities would reduce expenses associated with those facilities.

REPORT

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – OVERVIEW

OVERVIEW

As part of the overall Supportive Transit Parking Program (“STPP”) effort, Walker Parking Consultants (“Walker”) and its team performed an assessment of all parking facilities in the Los Angeles County Metropolitan Transportation Authority (“Metro”) system. System-wide, there are 59 stations with parking and 87 total facilities (lots, garages and on-street). There are 70 surface lots totaling approximately 15,700 patron-accessible spaces, 16 garages totaling approximately 7,300 patron-accessible spaces and one on-street parking area with approximately 200 spaces. There are approximately 23,200 patron-accessible spaces total in the entire system. Of these, approximately 18,800 are free, 4,200 require a daily or monthly fee and approximately 200 are reserved, mostly for short-term pick-up/drop-off, EV charging and Zipcar carshare. The team also assessed two future Crenshaw Line parking lots, based on information currently available. These two lots comprise approximately 200 spaces (120 in Florence/West and 100 in Florence/La Brea).

The purpose of the facility assessment effort is to understand current system operation and performance, which serves as baseline information required to recommend future policy and operational changes, and to recommend and quantify the cost of improving the parking facilities. The following evaluations were included in the facility assessment effort.

- Vehicle occupancy counts weekday late morning, weekday evening and weekends
- Assessment of parking wayfinding leading to each station and parking signage
- Parking access details
- Observed and potential parking user groups
- Potential carshare and vanpool parking locations
- Observations regarding facility upkeep, facility maintenance and pavement conditions
- Evening lighting level measurements
- Observations regarding safety and security
- Bicycle rack occupancy counts weekday late morning and bicycle locker rental utilization data
- Assessment of bicycle and pedestrian infrastructure surrounding each station

Parking reconfiguration opportunities were assessed at high occupancy stations with detailed options developed at priority stations (North Hollywood, Universal City/Studio City and Willowbrook/Rosa Parks). The assessment did not assess any structural conditions or measure pavement conditions.

Note that these figures include only facilities and spaces that are for Metro patron use. There are additional spaces that are leased to or reserved for specific users and are not available to patrons. Table 1 summarizes the number of free, paid and total spaces in the Metro system by station. Free spaces include those that may be reserved for special uses such as short-term parking or EV charging. Paid space figures may include ADA spaces, when these spaces are located inside parking garages.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – OVERVIEW

Table 1: Metro Parking System (Blue, Expo and Gold Lines)

Line	Station	Spaces			Total
		Free	Paid	Reserved	
Blue	Florence	95	20	0	115
Blue	103rd Street/Watts Towers	69	0	0	69
Blue/Green	Willowbrook/Rosa Parks	224	0	10	234
Blue	Artesia	266	32	0	298
Blue	Del Amo	338	61	0	399
Blue	Wardlow	72	17	0	89
Blue	Willow	811	36	6	853
Crenshaw	Florence/West	TBD	TBD	TBD	0
Crenshaw	Florence/La Brea	TBD	TBD	TBD	0
Expo	Expo/Crenshaw	225	0	0	225
Expo	La Cienega/Jefferson	492	0	2	494
Expo	Culver City	568	0	0	568
Expo	Expo/Sepulveda	7	241	12	260
Expo	Expo/Bundy	8	206	3	217
Expo	17th Street/SMC	3	54	8	65
Gold	Atlantic	258	24	2	284
Gold	Indiana	35	5	2	42
Gold	Lincoln/Cypress	77	15	2	94
Gold	Heritage Square	118	11	0	129
Gold	South Pasadena	0	142	0	142
Gold	Fillmore	125	30	0	155
Gold	Del Mar	0	610	0	610
Gold	Lake	0	22	0	22
Gold	Sierra Madre Villa	837	124	4	965
Gold	Arcadia	298	0	2	300
Gold	Monrovia	348	0	2	350
Gold	Duarte/City of Hope	122	0	3	125
Gold	Irwindale	272	76	2	350
Gold	Azusa Downtown	155	73	9	237
Gold	APU/Citrus College	198	0	2	200

Source: Los Angeles Metro, 2016; Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – OVERVIEW

Table 2: Metro Parking System (Green, Orange, Red and Silver Lines)

Line	Station	Spaces			Total
		Free	Paid	Reserved	
Green	Norwalk	1,720	0	0	1,720
Green	Lakewood	299	0	0	299
Green	Long Beach	646	0	0	646
Green	Avalon	160	0	0	160
Green/Silver	Harbor Freeway	252	0	0	252
Green	Vermont/Athens	155	0	0	155
Green	Crenshaw	516	0	0	516
Green	Hawthorne/Lennox	362	0	0	362
Green	Aviation/LAX	390	0	0	390
Green	El Segundo	74	0	19	93
Green	Douglas	30	0	0	30
Green	Redondo Beach	323	0	17	340
Orange	Van Nuys	305	0	2	307
Orange	Sepulveda	439	0	0	439
Orange	Balboa	264	9	0	273
Orange	Reseda	522	0	0	522
Orange	Pierce College	390	0	2	392
Orange	Canoga	241	0	8	249
Orange	Sherman Way	199	0	6	205
Orange	Chatsworth	595	0	14	609
Red/Purple/Gold	Union Station	0	1,848	12	1,860
Red	Universal City/Studio City	627	195	6	828
Red/Orange	North Hollywood	756	375	14	1,145
Red	Westlake/MacArthur Park	16	0	2	18
Silver	Slauson	150	0	0	150
Silver	Manchester	239	0	0	239
Silver	Rosecrans	338	0	0	338
Silver	Harbor Gateway Transit Center	960	0	20	980
Silver	El Monte	1,432	0	3	1,435
Silver	Carson	143	0	0	143
Silver	Pacific Coast Highway	236	0	0	236
Total		18,800	4,226	196	23,222

Source: Los Angeles Metro, 2016; Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY

METHODOLOGY

A large portion of the work for this assessment consisted of on-site data collection and observations. The methodology for each component of the facility assessment is described in the sections that follow.

VEHICLE OCCUPANCY DATA

For the majority of stations, vehicle occupancy counts were conducted from the first week of December 2015 through the first week of February 2016. Due to the holidays, no occupancy counts were conducted the last two weeks of December 2015 and the first week of January 2016. For Gold Line Foothill and Expo 2 stations, vehicle occupancy counts were conducted in June 2016.

Vehicle occupancy data were collected during three different periods. Below are periods during which data were collected.

- Weekday mornings (9:00 AM to 12:00 PM)
- Weekday evenings (7:00 PM to 12:00 AM)
- Saturday afternoons (1:00 PM to 5:00 PM)

During weekday morning periods, we performed a count of free, permit, ADA and reserved (e.g. Zipcar, short-term kiss and ride, sheriff, etc.) parking. During weekday evenings and Saturday afternoons, we performed a count of all vehicles, regardless of where parked.

In cases where a facility was mostly full (over 90%), inventory data provided by Metro was used as a baseline. Empty spaces were counted and subtracted from the inventory figure while any vehicles parked in unmarked spaces were added in order to calculate an occupancy percentage.

In facilities with motorcycle parking spaces, motorcycles were also counted during weekday morning periods.

PARKING ACCESS

We identified potential challenges with entering and exiting each parking facility and included the number of parking entry and exit lanes at each facility.

PARKING USER GROUPS

By default, we assumed that parkers at Metro parking facilities were there to ride transit or another non-SOV mode such as carpooling. During the site visits, we observed individuals who parked and walked away from the station area, indicating parking for a use other than Metro transit. Non-transit parker user groups included employees of nearby uses (businesses, schools, churches and hospitals), residents who live nearby and visitors of adjacent uses. We observed vehicles that appeared to cluster near adjacent uses and vehicles with obvious identifiers (such as stickers or hangtags) or uses (such as box trucks).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY

PARKING SIGNAGE AND WAYFINDING

We made observations about signage and wayfinding to parking facilities from primary roadway access points. Specifically, we observed whether signage is present and if present, its adequacy in directing motorists to Metro parking. We assigned a low, medium or high rating based on our observations. Stations with no or very minimal parking wayfinding signage earned a low score. Those with abundant and visible signage earned a high score, while those with some readily visible signage earned a medium score.

POTENTIAL CARSHARE LOCATIONS

Potential locations for new or additional designated spaces for carshare (Zipcar or other provider) or new designated spaces for vanpool were noted. Carshare spaces are ideally located closest to the platform/portal as they are intended to serve a first/last mile function.

POTENTIAL VANPOOL LOCATIONS

Vanpool spaces are to be designated for the actual vans and do not require proximity to the platform/portal. They should be located on the periphery of parking facilities in order to provide more convenient parking for the vanpool participants who drive and park in order to access the vanpool.

FACILITY UPKEEP, MAINTENANCE AND PAVEMENT CONDITIONS

Facility upkeep in terms of general cleanliness in and around parking facilities was observed. Any visible facility maintenance issues were identified. We also qualitatively assessed pavement conditions and the visibility of parking space striping.

LIGHTING

A basic assessment of lighting levels was conducted as poor lighting levels may deter riders from using Metro's parking facilities due to personal security concerns. Lighting measurements were taken in each parking facility when evening occupancy counts were conducted. In garages, lighting levels were taken on a covered level and on the roof. Minimum and maximum lighting levels at each measurement location were recorded and an average was calculated.

Walker developed a Level of Service for Minimum Lighting table (Table 3), which incorporates recommendations of different industry standards for minimum lighting levels assigned to a level of service. It is to be used as a tool for assessing lighting levels in parking facilities. While there are other lighting metrics, the focus is on minimum lighting levels as these have the greatest impact on real and perceived personal safety/security.

The table lists separate minimum lighting levels in foot-candles for covered levels in a parking structure and open parking areas (top level of a parking structure or surface parking lots).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY

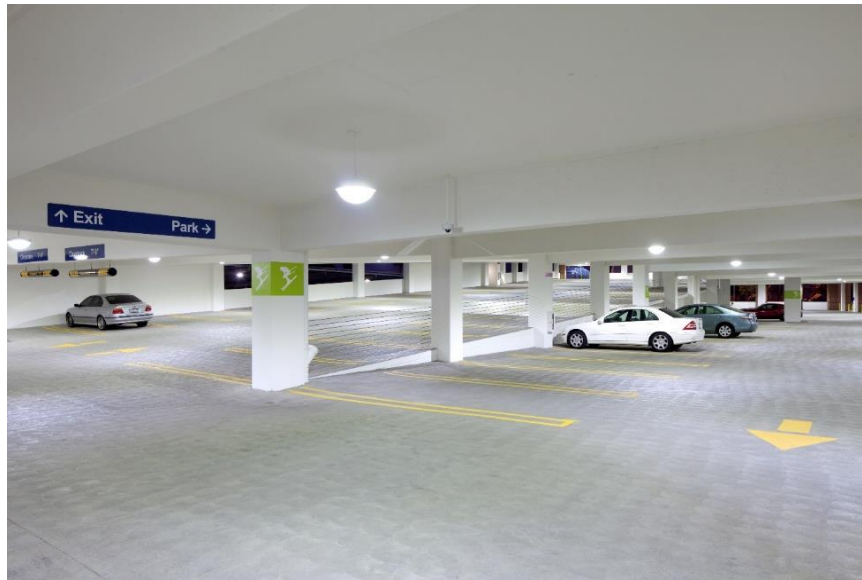
Table 3: Walker Level of Service for Minimum Lighting (in foot-candles [fc])

	Level of Service			
	A	B	C	D
Covered Levels	4.0	3.0	2.0	1.0
Top Level and Parking Lots	2.0	1.5	0.5	0.2

Source: Walker Parking Consultants, 2016

Level of service C is the recommended minimum threshold of acceptable lighting. For example, under level of service C, covered levels would have foot-candle levels between 2.0 and 3.0 while top levels and surface parking lots would have foot-candle levels between 0.5 and 1.5. Minimum foot-candle values that fall below level of service D (less than 1.0 for covered levels and less than 0.2 for top levels and surface parking lots) would be considered level of service E. Lighting levels continue to degrade over time. Therefore, lighting at levels D or E will only continue to decline in light output. Figure 1 illustrates examples of minimum lighting with level of service A.

Figure 1: Examples of Minimum Lighting with Level of Service A



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY



Source: Walker Parking Consultants, 2016

More details about this table and other lighting measurements (average and maximum-to-minimum) may be found in the Appendix.

SAFETY

Safety features minimize accidents, especially personal injuries. The typical concerns in parking are trips, slips and falls and preventing vehicular/vehicular or vehicular/pedestrian accidents. Regarding trips/slips and falls, a primary problem is curbs and wheel stops, as well as surfaces that are slippery when wet. Sometimes, traffic calming devices can help to create a safer environment for riders walking between their vehicle and the station portal/platform. We observed whether there were any potential safety issues in parking facilities.

SECURITY

Security features are intended to discourage and react to crime.

- Crime Prevention Through Environmental Design ("CPTED") – features which discourage crime; these used to be called passive security. Generally these fundamentally rely on visibility and to some extent perimeter controls to funnel pedestrian and vehicular access through the appropriate paths, and prevent secret entry/exit.
- Active Security – cameras, emergency call systems, patrols

We generally recommend that as many CPTED provisions be in place as possible in all parking facilities, because they not only discourage crime, but enhance the perception of being safe in the facility. Also risk levels change over time, so CPTED provisions are already in place if needed more in the future. For retrofit situations however security provisions need to be based and site-specific security audit. Some facilities may be deficient in CPTED features, which tends to make them feel insecure and intimidating to park in. To determine the need for improvements in security, we recommend that a security audit be performed, to assess the CPTED provisions, and the risk of crimes.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY

We observed potential security issues in the parking facilities. These included signs of individuals living in parking facilities and potentially vulnerable areas (e.g. dimly lit or not readily visible due to walls) from a security standpoint. We also observed if there were obvious abandoned vehicles or signs of individuals living in a parking facility.

PARKING RECONFIGURATION

Since the majority of Metro parking facilities are parking lots, there may be select opportunities to increase parking supply. We examined as-built plans, cross-referenced against aerial imagery, at the highest occupancy stations along with a sample of other stations to identify potential low-cost opportunities to add parking capacity. Detailed layouts were developed for North Hollywood, Universal City/Studio City and Willowbrook/Rosa Parks.

BICYCLE OCCUPANCY DATA

We counted bicycles parked at bicycle racks during weekday morning periods (9:00 AM to 12:00 PM). At some stations, bicycles were parked illegally (such as locked to fences or posts) and were recorded but not included in our occupancy data.

Metro provided bicycle locker data from late January 2016 for all stations except Expo 2 and Gold Line Foothill Extension stations, the data from which were provided in June 2016. We deducted “lockers removed from service” to arrive at current lockers in service and assume those designated as “in use” are utilized, whether they are actually used or not by the locker renters.

BICYCLE INFRASTRUCTURE RATING

We assigned a bicycle infrastructure rating (low, medium or high) based on the presence of Class I or Class II bicycle facilities within one block of a given station. Stations without a Class I or Class II facility received a low rating. Stations with at least a Class I or Class II facility received a medium rating, while those with both received a high rating.

Per the California Department of Transportation, a Class I bikeway *provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized* while a Class II bikeway *provides a striped lane for one-way bike travel on a St. or highway.*¹ We also made qualitative observations regarding bicycle facilities during the site visits.

PEDESTRIAN INFRASTRUCTURE RATING

We assigned a pedestrian infrastructure rating (low, medium or high) based on the presence of north/south crosswalks, east/west crosswalks and the width of area sidewalks. One point was assigned if north/south crosswalks were present on both sides of the St. Same if east/west crosswalks were present on both sides of the St. A half point was assigned if only one side had a crosswalk and no points were assigned if no north/south or no east/west crosswalks were present. If a station has sidewalks leading to a station greater than 10 feet in width, then three

¹ <http://www.dot.ca.gov/hq/oppd/hdm/pdf/chp1000.pdf>

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – METHODOLOGY

points were assigned. Two points were assigned if the width was seven to 10 feet, one point assigned if less than seven feet and no points if there were no sidewalks. With a maximum of five points, stations that earned at least four points were scored high, two to four points earned a medium rating while less than two earned a low rating.

We also made qualitative observations about the pedestrian infrastructure near each station including pedestrian wayfinding to the station from both parking areas and the St.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – KEY FINDINGS

KEY FINDINGS

The key findings of the facility assessment effort are summarized in the following sections:

- Occupancy Levels
- Parking Signage and Wayfinding
- Lighting
- Upkeep
- Safety and Security
- Parking Reconfiguration
- Bicycle Infrastructure and Parking
- Pedestrian Infrastructure

The key findings are general findings. Facility-specific findings are located in the Appendix.

OCCUPANCY LEVELS

Over 30% of stations have weekday morning occupancy levels that are very high, which we define as 90% and higher. We view stations with 90% occupancy as effectively full as there needs to be a buffer to account for misparking, debris in spaces, spaces out of service for maintenance, and to allow motorists searching for parking the ability to find available parking spaces within a reasonable amount of time. The stations with weekday morning occupancy levels observed to be at least 90% are the following:

- APU / Citrus College
- Artesia
- Aviation / LAX
- Azusa Downtown
- Culver City
- Del Amo
- Duarte/City of Hope
- El Monte Station
- Florence
- Heritage Square
- Irwindale
- Lakewood
- Lincoln/Cypress
- Monrovia
- North Hollywood
- Norwalk
- Universal City/Studio City
- Wardlow

Figure 2 illustrates weekday morning occupancy throughout the Metro parking system. Occupancy levels are highest at terminus locations (and former ones in the case of Culver City) and stations that are the next closest to Downtown Los Angeles as demand at terminus locations will spill over to these. Gold Line stations along the Foothill extension experience high occupancy as do southern stations along the Blue Line.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – KEY FINDINGS

Figure 2: Metro Parking System Weekday Morning Occupancy Map



Source: Walker Parking Consultants, 2016

Weekday evening and weekend (Saturday afternoon) occupancy levels were almost always lower than weekday morning occupancy levels. Aviation/LAX station had consistently high occupancy levels, likely due to LAX employees using the lot. APU/Citrus College also experienced high occupancy during the weekday morning and weekend.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – KEY FINDINGS

Expo line stations Culver City and La Cienega/Jefferson were full during the UCLA-USC football game on November 28, 2015. Culver City was over 50% occupied at 7:00 PM on February 18, 2016 perhaps due in part to a Los Angeles Clippers game at Staples Center.

PARKING SIGNAGE AND WAYFINDING

Metro parking is challenging to find at a majority of locations as signage directing drivers to facilities is not present or is not readily visible. In addition, signage at facility entrances, which may assist riders in finding parking is either not present or difficult to see while approaching. Wayfinding and entrance signage is also inconsistent throughout the system with different logos and verbiage in use. Stations with multiple facilities do not generally offer signage directing drivers between the facilities.

LIGHTING

Lighting levels are substandard (level of service D or E) in over 70% of the facilities. Lighting at those levels will continue to degrade in quality and may lead riders to at least perceive a lower level of security.

UPKEEP

Over one quarter of stations were observed to have issues with litter and debris in their facilities. This included litter and debris on parking surfaces, landscaped areas in parking lots, near station entrances and in parkway areas adjacent to roadways.

SAFETY AND SECURITY

We identified a few facilities would benefit from traffic calming measures to create a safer environment for riders walking between their vehicle and the station portal/platform. Over 20% of stations were observed to have activities that tend to raise the security risk level, including the presence of individuals living in vehicles or individuals at the parking facilities engaging in potentially illegal activities.

PARKING RECONFIGURATION

There are opportunities for minimal capacity gains (less than 3%) by restriping to include code allowed compact stalls. In particular, lots with long rows of standard dimension parking spaces (nine feet in width) are candidates for restriping to spaces that are compact. We recommend eight feet, six inches in width.

Larger gains of 5-15% may be realized through reorienting some lots to gain better efficiencies. However the cost per net new space created may be high, approximating the cost of a structured parking space (\$20,000 to \$25,000).

BICYCLE INFRASTRUCTURE AND PARKING

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – KEY FINDINGS

Over 60% of stations do not have Class I or Class II bicycle facilities within one block of station areas. Coordination with local jurisdictions is required to improve these conditions. Eight stations do not currently have any bicycle racks or bicycle lockers. Several stations experience high demand for bicycle lockers. In general, demand for bicycle lockers is much higher than demand for bicycle racks.

PEDESTRIAN INFRASTRUCTURE

Pedestrian infrastructure, measured based on the presence of crosswalks and sidewalk widths, is generally good. Over 15% of stations would benefit from pedestrian improvements and coordination with local jurisdictions would be required.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GENERAL RECOMMENDATIONS

GENERAL RECOMMENDATIONS

We have developed a set of general recommendations that apply system-wide. These are based on detailed station recommendations which were developed through data collection and observation, as described later in the report.

FOCUS ON CUSTOMER EXPERIENCE

- Providing a strong customer experience is of paramount importance. We recommend ensuring that parking facilities can be easily located by riders who use park-and-ride for station access.
- Within each facility, riders should be directed to open parking spaces. If a parking facility is full, a rider should be directed to the next available facility, whether at the current station or at another nearby station.
- Once parked, riders should be directed to the station platform/portal and should feel comfortable walking from their vehicle to it and vice versa in a clean and well-lit parking facility.
- Exiting the facility should be a simple process.

IMPLEMENT CONSISTENCY SYSTEM-WIDE

- The current program does not provide consistency from the transit park-and-ride user perspective.
- There is either inconsistent signage or no signage directing riders to the parking facilities. Facility entrance signage is highly variable. The easiest to find parking facilities are the ones within view when drivers see the station monument signage. But in many instances, the parking facility locations are not obvious and easily missed. There needs to be signage directing parkers to the platform/portal at locations where it is not visible from the entire parking facility (or facilities). In addition, there needs to be consistent signage directing parkers on how to pay, where applicable. Signage should be vibrant and lively as it will be a parker's first experience with Metro parking.
- Facility conditions vary, where some are well-kept and clean while others are debris-filled, run-down and unsafe. Part of the variability is due to differences between Caltrans-owned and Metro-owned facilities.
- Permit parking spaces should be available to patrons at the same time across all facilities. Currently, permit parking is available to patrons after 9:00 AM, 10:00 AM or 11:00 AM, depending on the station. We recommend setting the general patron availability time to 9:00 AM across the entire system.
- Transitioning Caltrans-owned facilities to Metro operation or ownership would allow for implementation of a consistent parking system. And the Parking Management initiative that is underway to implement consistent signage system-wide should address signage deficiencies.

ENHANCE FIRST/LAST MILE OPTIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GENERAL RECOMMENDATIONS

- Since providing station access for Metro riders is the goal, transit riders need multiple options for accessing stations. Bicycle and pedestrian infrastructure in station areas must be robust, in order to provide equivalent options for station access.
- As our findings illustrate, better bicycle infrastructure is needed at many stations. Improvements in this area would provide some riders with additional options for accessing stations.
- All stations should have at least bicycle racks for parking bicycles.

FOCUS ON MANAGING DEMAND

- Due to the high cost to add parking capacity when construction is involved, as well as the short-term loss of spaces, we recommend focusing on managing existing parking demand.
- This includes introduction and expansion of permit parking programs. Some high occupancy stations, such as Aviation/LAX, El Monte, Lakewood and Norwalk, would benefit from introduction of a permit program for transit riders to ensure availability in peak morning commute periods. Some stations with fully-occupied permit spaces may benefit from an expansion of the program. Conversely, in case there are stations where permit spaces are not fully utilized, consideration should be given to removing some permit spaces.
- Consideration should be given to instituting daily fees across all parking spaces at stations that experience high parking demand. This concept is currently being tested through the Pilot Program.
- Develop permit parking zones that cover multiple stations to spread parking demand across those stations. Permit holders of a zone may park in permit spaces at any station within the zone. Development of the zones considers parking occupancy at stations within the zone and distance between stations. Proposed zones for current permit parking locations are the following:
 - 103rd/Watts Towers, Florence
 - Atlantic, Indiana
 - Del Amo, Artesia
 - El Segundo, Aviation/LAX, Hawthorne/Lennox
 - Heritage Square, Lincoln/Cypress
 - Lakewood, Long Beach
 - North Hollywood, Universal City/Studio City
 - Reseda, Balboa
 - Willow, Wardlow

EXPLORE OTHER USES DURING NON-PEAK PERIODS

- Since weekday evening and weekend parking demand is lower than weekday demand, consider making at least portions of parking lots available for other uses during low demand periods. These uses may include events such as farmers markets, fairs and cultural events.
- Providing Metro parking for these events may increase awareness of Metro parking leading to increased utilization of parking and ridership.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GENERAL RECOMMENDATIONS

CONSIDER RATIONALIZATION OF SOME PARKING FACILITIES

- Facilities that experience very low occupancy on weekdays (below 10%) should be reviewed to determine whether they have a higher and better use as something other than transit parking. Slauson, Avalon, Vermont/Athens and 103rd St./Watts Towers were all less than 10% occupied when surveyed.
- These facilities suffer from poor upkeep and disrepair. In some cases, individuals living in vehicles have been spotted.
- Some riders may be dissuaded from parking there due to the poor conditions, which only exacerbates the situation as fewer eyes are available to provide some level of security and to report issues.

WHERE AVAILABILITY EXISTS, CONSIDER SELLING PARKING TO NON-TRANSIT USERS

- At some stations, it was apparent that some vehicles were parked for a use other than transit. During some of our observations, we noticed decals on rental cars and individuals walking to or from a nearby use.
- At stations where there is parking availability, consider selling available spaces on a month-to-month basis to non-transit riders who are willing to pay for the ability to park in a Metro parking facility. This permit would not guarantee a space but would allow a non-transit rider to park in a Metro facility without incurring citations.
- A formalized program would allow Metro to generate revenue without impacting transit riders. The program should be reassessed if occupancy in those facilities increases, creating challenges for transit riders to find parking.

ADOPT A CONSISTENT PARKING FACILITY NAMING CONVENTION

- Currently, stations with multiple parking facilities use cardinal (north, south, west and east) and intercardinal (northwest, northeast, southwest and southeast) directions relative to the portal or platform to establish the specific parking facility at a given station.
- Due to inconsistent and missing signage, it is often not clear to a rider which parking facility he or she is parked in. Metro employees may also not be able to readily differentiate one facility from another at a given station.
- The current naming convention requires one to know where the portal or platform is located and where other parking facilities are located. In addition, there is a separate lot numbering scheme in the permit processing system which may further confuse the situation.
- We recommend a consistent naming convention be adopted and propose a system with the station name followed by a number. For example, the North Hollywood lots would be *North Hollywood-1* to *North Hollywood-4*. If a new facility is added to a station, the last parking facility at the station may be incremented by one. If a facility is removed at a station, the name may be removed from service. Recommended facility names are located in the Appendix.

IMPROVE CONSISTENCY OF EXPERIENCE AT PARKING FACILITIES UNDER LEASE AGREEMENT

- Metro currently has lease agreements with parking garages at Fillmore and Del Mar stations to provide its riders with parking at a discounted rate of \$2.00 per day.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GENERAL RECOMMENDATIONS

- Metro riders should be presented with an experience consistent with that found at Metro-operated parking facilities for these and any future parking facilities where Metro has a lease agreement to provide its riders with parking. Signage consistent with other Metro parking facilities should direct riders to these facilities and to any Metro-designated parking areas within the facilities. Once parked, riders should experience signage consistent with other Metro parking facilities to direct them to the portal/platform area. Lighting, upkeep and security must be at least comparable to that experienced at other Metro parking facilities. The payment process should be similar to as well. The Pilot Program has outlined a payment process with TAP card verification that may be replicated at the facilities with lease agreements.
- For parking facilities that will accommodate Metro riders and have not yet been built, Metro Parking Management will need to participate in the planning process to ensure that the parking will be consistent with its other facilities. A basis of design document may be provided to ensure that design standards, including signage, lighting and elevators, are met. Transit rider verification and payment process requirements must also be presented as they may impact operational requirements and the supporting technology selected.

RESTRIPE SPACES TO ADD SUPPLY WHERE POSSIBLE

- In facilities that experience high occupancy (over 90%), we recommend adding supply through restriping to include more compact spaces (eight feet, six inches in width), if the percentage of compact stalls does not exceed 20%. When compact space supply exceeds 20%, we expect increased misparking (i.e. cars occupying more than one space) which may minimize the benefit of restriping. In the process, locations may be brought to current ADA standards.
- Candidate stations for restriping include Del Amo, El Monte and Florence.
- Refurbishment efforts currently underway at Artesia, North Hollywood and Wardlow are expected to add some supply through restriping and update these facilities to current ADA standards.

OTHER RECOMMENDATIONS

Some additional recommendations based on our observations are as follows:

- Increased enforcement, particularly at stations with permit parking spaces, is essential to ensure permit holders are able to utilize the spaces they pay for. Individuals who park and are observed walking to adjacent uses from Metro parking should be cited. Citations may be dismissed if a registered TAP card is provided that shows the TAP card holder rode transit during the parking grace period.
- Due to the increasing use of ridesharing services (such as Uber and Lyft), we recommend planning for increased pick-up/drop-off activity at stations with the highest parking occupancy rates. Ideally pick-up/drop-off areas should be located curbside, whether on-street or in kiss-and-ride areas, adjacent to platform/portal entries/exits. If not feasible, non-ADA spaces in parking facilities which are closest to the platform/portal entries/exits may be converted to short-term parking for the purpose of pick-up/drop-off.
- At parking facilities with deficient lighting levels, we recommend replacing existing light fixtures with LED fixtures. An example ceiling mounted fixture is 17 inches in diameter

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GENERAL RECOMMENDATIONS

housed in marine-grade diecast aluminum and has a type V-square distribution with integral control module and occupancy/light level sensor. An example pole-mounted fixture is 23 inches in diameter housed in marine-grade diecast aluminum and has a type III distribution with integral control module and occupancy/light level sensor.

- In order to improve lighting levels inside garages, we recommend that garages be painted white on interior walls and ceilings. This will improve light illumination and overall lighting levels, creating a safer environment for parkers. At a minimum, walls need to be painted halfway, from the ceiling down to the floor-to-ceiling vehicle height clearance level to improve lighting conditions. For example, if floor-to-ceiling height is ten feet and vehicle height clearance is seven feet, then the walls only need to be painted three feet from the ceiling downward. The wall would be unpainted from floor level up to seven feet.
- Americans with Disabilities Act ("ADA") parking deficiencies were observed at some station parking facilities. These were mostly missing fine amount signage but in some facilities, more serious issues, such as access path grades that are steeper than ADA parking guidelines were noticed. Further review of ADA parking conditions should be undertaken in the future to ensure that equal access is being provided.
- Metro should continue to make spaces available to carshare providers for a monthly fee. The designated spaces are prime parking spaces located closest to the platform/portal, to provide convenience to riders who are utilizing the service. Monthly fees charged should vary based on parking occupancy at Metro facilities, with highly utilized facilities charging a higher rate than lower utilized facilities.
- Dedicated vanpool spaces for vans may be provided for free in order to incentive use of the program. However, participants should be treated as transit riders and will need to adhere to the parking programs in place at the parking facility that their vanpool is based at.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

STATION FINDINGS AND RECOMMENDATIONS

VEHICLE OCCUPANCY

Vehicle occupancy at each station, for each period in which occupancy data were collected, is detailed on Table 4 and Table 5. Weekday daytime peak occupancy across the entire system is approximately 73% while it is 16% on weekday evenings and 28% on weekends.

Table 4: Vehicle Occupancy Summary (Blue, Expo and Gold Lines)

Line	Station	Occupancy Percentage		
		Weekday - Day	Weekday - Evening	Weekend
Blue	Florence	95%	32%	39%
Blue	103rd Street/Watts Towers	0%	0%	20%
Blue/Green	Willowbrook/Rosa Parks	68%	7%	12%
Blue	Artesia	99%	13%	12%
Blue	Del Amo	96%	8%	29%
Blue	Wardlow	100%	20%	45%
Blue	Willow	88%	6%	13%
Crenshaw	Florence/West	N/A	N/A	N/A
Crenshaw	Florence/La Brea	N/A	N/A	N/A
Expo	Expo/Crenshaw	52%	0%	0%
Expo	La Cienega/Jefferson	68%	23%	100%
Expo	Culver City	99%	53%	100%
Expo	Expo/Sepulveda	7%	8%	10%
Expo	Expo/Bundy	11%	6%	11%
Expo	17th Street/SMC	25%	17%	28%
Gold	Atlantic	75%	4%	20%
Gold	Indiana	71%	10%	19%
Gold	Lincoln/Cypress	95%	26%	36%
Gold	Heritage Square	98%	19%	16%
Gold	South Pasadena	41%	11%	19%
Gold	Fillmore	86%	5%	15%
Gold	Del Mar	38%	25%	0%
Gold	Lake	73%	18%	0%
Gold	Sierra Madre Villa	93%	7%	30%
Gold	Arcadia	88%	15%	33%
Gold	Monrovia	93%	10%	21%
Gold	Duarte/City of Hope	94%	8%	25%
Gold	Irwindale	99%	2%	14%
Gold	Azusa Downtown	99%	8%	21%
Gold	APU/Citrus College	98%	6%	84%

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 5: Vehicle Occupancy Summary (Green, Orange, Red and Silver Lines)

Line	Station	Occupancy Percentage		
		Weekday - Day	Weekday - Evening	Weekend
Green	Norwalk	100%	5%	13%
Green	Lakewood	104%	5%	25%
Green	Long Beach	53%	2%	10%
Green	Avalon	4%	1%	1%
Green/Silver	Harbor Freeway	58%	3%	18%
Green	Vermont/Athens	3%	4%	3%
Green	Crenshaw	38%	16%	47%
Green	Hawthorne/Lennox	33%	12%	6%
Green	Aviation/LAX	102%	82%	95%
Green	El Segundo	26%	16%	14%
Green	Douglas	87%	30%	30%
Green	Redondo Beach	51%	13%	15%
Orange	Van Nuys	63%	9%	15%
Orange	Sepulveda	40%	9%	7%
Orange	Balboa	83%	30%	13%
Orange	Reseda	50%	8%	11%
Orange	Pierce College	62%	11%	7%
Orange	Canoga	61%	8%	9%
Orange	Sherman Way	24%	12%	17%
Orange	Chatsworth	52%	9%	11%
Red/Purple/Gold	Union Station	73%	35%	58%
Red	Universal City/Studio City	94%	34%	50%
Red/Orange	North Hollywood	100%	36%	53%
Red	Westlake/MacArthur Park	72%	28%	94%
Silver	Slauson	7%	8%	5%
Silver	Manchester	17%	0%	6%
Silver	Rosecrans	21%	1%	7%
Silver	Harbor Gateway Transit Center	80%	7%	17%
Silver	El Monte	100%	18%	12%
Silver	Carson	16%	2%	8%
Silver	Pacific Coast Highway	34%	2%	2%
Total		73%	16%	28%

Source: Walker Parking Consultants, 2016

The stations with highest occupancy (occupancy levels over 90%) are detailed on Table 6.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 6: Stations with Highest Vehicle Occupancy

Line	Station	Weekday - Day Occupancy %
Green	Lakewood	104%
Green	Aviation / LAX	102%
Blue	Wardlow	100%
Green	Norwalk	100%
Silver	El Monte Station	100%
Red/Orange	North Hollywood	100%
Blue	Artesia	99%
Gold	Irwindale	99%
Expo	Culver City	99%
Gold	Azusa Downtown	99%
Gold	Heritage Square / Arroyo	98%
Gold	APU / Citrus College	98%
Blue	Del Amo	96%
Blue	Florence	95%
Gold	Lincoln Heights / Cypress Park	95%
Gold	Duarte	94%
Red	Universal City	94%
Gold	Monrovia	93%

Source: Walker Parking Consultants, 2016

BICYCLE OCCUPANCY

Bicycle occupancy at each station is detailed on Table 7 and Table 8. It is broken down by type of bicycle parking – rack or locker.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 7: Bicycle Occupancy Summary (Blue, Expo and Gold Lines)

Line	Station	Inventory		Occupied/Rented		Occupancy Percentage		
		Rack	Locker	Rack	Locker	Rack	Locker	Overall
Blue	Florence	12	N/A	1	N/A	8%	N/A	8%
Blue	103rd Street/Watts Towers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Blue/Green	Willowbrook/Rosa Parks	20	6	0	2	0%	33%	8%
Blue	Artesia	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Blue	Del Amo	10	11	0	8	0%	73%	38%
Blue	Wardlow	8	14	0	12	0%	86%	55%
Blue	Willow	16	6	1	4	6%	67%	23%
Crenshaw	Florence/West	TBD	TBD	N/A	N/A	N/A	N/A	N/A
Crenshaw	Florence/La Brea	TBD	TBD	N/A	N/A	N/A	N/A	N/A
Expo	Expo/Crenshaw	20	N/A	0	N/A	0%	N/A	0%
Expo	La Cienega/Jefferson	24	8	1	8	4%	100%	28%
Expo	Culver City	44	23	17	20	39%	87%	55%
Expo	Expo/Sepulveda	20	16	6	16	30%	100%	61%
Expo	Expo/Bundy	20	16	6	16	30%	100%	61%
Expo	17th Street/SMC	40	32	7	32	18%	100%	54%
Gold	Atlantic	12	6	1	5	8%	83%	33%
Gold	Indiana	10	N/A	0	N/A	0%	N/A	0%
Gold	Lincoln/Cypress	10	N/A	0	N/A	0%	N/A	0%
Gold	Heritage Square	4	N/A	1	N/A	25%	N/A	25%
Gold	South Pasadena	24	N/A	6	N/A	25%	N/A	25%
Gold	Fillmore	20	N/A	2	N/A	10%	N/A	10%
Gold	Del Mar	24	N/A	5	N/A	21%	N/A	21%
Gold	Lake	12	N/A	3	N/A	25%	N/A	25%
Gold	Sierra Madre Villa	10	15	2	14	20%	93%	64%
Gold	Arcadia	40	24	4	24	10%	100%	44%
Gold	Monrovia	40	24	4	21	10%	88%	39%
Gold	Duarte/City of Hope	38	24	2	7	5%	29%	15%
Gold	Irwindale	28	24	0	6	0%	25%	12%
Gold	Azusa Downtown	40	24	2	21	5%	88%	36%
Gold	APU/Citrus College	36	24	2	24	6%	100%	43%

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 8: Bicycle Occupancy Summary (Green, Orange, Red and Silver Lines)

Line	Station	Inventory		Occupied/Rented		Occupancy Percentage		
		Rack	Locker	Rack	Locker	Rack	Locker	Overall
Green	Norwalk	36	40	5	37	14%	93%	55%
Green	Lakewood	22	11	7	6	32%	55%	39%
Green	Long Beach	12	N/A	0	N/A	0%	N/A	0%
Green	Avalon	8	N/A	0	N/A	0%	N/A	0%
Green/Silver	Harbor Freeway	10	N/A	1	N/A	10%	N/A	10%
Green	Vermont/Athens	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Green	Crenshaw	12	4	0	4	0%	100%	25%
Green	Hawthorne/Lennox	8	N/A	0	N/A	0%	N/A	0%
Green	Aviation/LAX	38	20	3	19	8%	95%	38%
Green	El Segundo	14	7	0	7	0%	100%	33%
Green	Douglas	6	11	0	9	0%	82%	53%
Green	Redondo Beach	12	5	0	5	0%	100%	29%
Orange	Van Nuys	12	8	0	2	0%	25%	10%
Orange	Sepulveda	12	11	0	5	0%	45%	22%
Orange	Balboa	6	18	0	12	0%	67%	50%
Orange	Reseda	6	14	0	5	0%	36%	25%
Orange	Pierce College	12	7	2	4	17%	57%	32%
Orange	Canoga	24	22	0	12	0%	55%	26%
Orange	Sherman Way	24	14	2	0	8%	0%	5%
Orange	Chatsworth	32	15	0	6	0%	40%	13%
Red/Purple/Gold	Union Station	74	37	36	29	49%	78%	59%
Red	Universal City/Studio City	16	31	2	23	13%	74%	53%
Red/Orange	North Hollywood	101	41	68	36	67%	88%	73%
Red	Westlake/MacArthur Park	12	0	2	N/A	17%	N/A	17%
Silver	Slauson	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	Manchester	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	Rosecrans	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	Harbor Gateway Transit Center	6	14	3	13	50%	93%	80%
Silver	El Monte	110	8	41	2	37%	25%	36%
Silver	Carson	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silver	Pacific Coast Highway	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		1,207	635	245	476	20%	75%	39%

Source: Walker Parking Consultants, 2016

Harbor Gateway Transit Center is the only station where bicycle parking achieves at least 80% occupancy overall. However, at several stations, bicycle lockers are highly utilized. In general, bicycle lockers are much more highly utilized, based on locker rental data, than bicycle racks at stations where both options are present.

STATION SCORES

Table 9 and Table 10 detail scores for bicycle infrastructure, pedestrian infrastructure and parking wayfinding based on the scoring methodology outlined in the Work Approach.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 9: Scores for Bicycle/Pedestrian Infrastructure and Parking Wayfinding (Blue, Expo and Gold Lines)

Line	Station	Infrastructure		Parking Signage and Wayfinding
		Bicycle	Pedestrian	
Blue	Florence	Low	Medium	Low
Blue	103rd Street/Watts Towers	Low	High	Low
Blue/Green	Willowbrook/Rosa Parks	Low	High	Low
Blue	Artesia	Low	Low	Low
Blue	Del Amo	Low	Medium	Medium
Blue	Wardlow	Low	High	Low
Blue	Willow	Low	High	Low
Crenshaw	Florence/West	Low	High	N/A
Crenshaw	Florence/La Brea	Low	Medium	N/A
Expo	Expo/Crenshaw	Medium	High	Low
Expo	La Cienega/Jefferson	Medium	High	Medium
Expo	Culver City	High	High	Low
Expo	Expo/Sepulveda	Medium	High	Low
Expo	Expo/Bundy	Medium	High	Low
Expo	17th Street/SMC	High	Medium	Low
Gold	Atlantic	Low	High	Low
Gold	Indiana	Low	High	Medium
Gold	Lincoln/Cypress	Low	Medium	Medium
Gold	Heritage Square	Low	Medium	Medium
Gold	South Pasadena	Low	High	Low
Gold	Fillmore	Low	High	Low
Gold	Del Mar	Low	High	Medium
Gold	Lake	Medium	Medium	Low
Gold	Sierra Madre Villa	Low	Low	Medium
Gold	Arcadia	Medium	High	Medium
Gold	Monrovia	Low	High	Low
Gold	Duarte/City of Hope	Low	High	Low
Gold	Irwindale	Low	Low	Medium
Gold	Azusa Downtown	Low	High	Medium
Gold	APU/Citrus College	Low	High	Medium

Source: Iteris Inc., 2016; Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 10: Scores for Bicycle/Pedestrian Infrastructure and Parking Wayfinding (Green, Orange, Red and Silver Lines)

Line	Station	Infrastructure		Parking Signage and Wayfinding
		Bicycle	Pedestrian	
Green	Norwalk	Low	Medium	Low
Green	Lakewood	Low	Medium	Low
Green	Long Beach	Low	Low	Low
Green	Avalon	Low	Low	Low
Green/Silver	Harbor Freeway	Low	Low	Low
Green	Vermont/Athens	Medium	Low	Low
Green	Crenshaw	Low	Low	Low
Green	Hawthorne/Lennox	Low	Low	Low
Green	Aviation/LAX	Low	Medium	Low
Green	El Segundo	Low	High	Low
Green	Douglas	Low	High	Low
Green	Redondo Beach	Medium	Medium	Medium
Orange	Van Nuys	Medium	High	Low
Orange	Sepulveda	Medium	Medium	Low
Orange	Balboa	Medium	High	Low
Orange	Reseda	Medium	High	Low
Orange	Pierce College	Medium	High	Low
Orange	Canoga	Medium	Medium	Low
Orange	Sherman Way	Medium	High	Low
Orange	Chatsworth	Medium	High	Medium
Red/Purple/Gold	Union Station	Low	High	Low
Red	Universal City/Studio City	Low	High	Low
Red/Orange	North Hollywood	Medium	High	Low
Red	Westlake/MacArthur Park	Medium	High	Low
Silver	Slauson	Low	Medium	Low
Silver	Manchester	Low	Medium	Low
Silver	Rosecrans	Low	Medium	Low
Silver	Harbor Gateway Transit Center	Low	High	Medium
Silver	El Monte	Medium	Medium	Low
Silver	Carson	Medium	High	Low
Silver	Pacific Coast Highway	Low	Medium	Low

Source: Iteris Inc., 2016; Walker Parking Consultants, 2016

Due to not having Class I and Class II bicycle facilities within one block of stations, many (almost 65%) earned a low score for bicycle infrastructure. The majority of stations (85%) earned medium or high scores for pedestrian infrastructure. Culver City was the only station to score high for both bicycle and pedestrian infrastructure.

As the two Crenshaw Line stations with parking (Florence/West and Florence/La Brea) are still under development, we were only able to survey the bicycle and pedestrian infrastructure at the proposed parking facility locations. Both scored low on bicycle infrastructure. For pedestrian infrastructure, Florence/West scored high while Florence/La Brea scored medium.

Over 75% of stations earned a low score for parking wayfinding while the rest earned a medium score.

INTELLIGENT TRANSPORTATION SYSTEMS INFRASTRUCTURE

As part of the assessment, our team identified the availability of intelligent transportation systems ("ITS") infrastructure, as its presence may assist with parking management through the

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

implementation of technology. The following stations have ITS infrastructure within one block of the station.

- 17th St./SMC
- 103rd St./Watts Towers station
- Arcadia
- Aviation/LAX
- Azusa Downtown
- Carson
- Culver City
- Hawthorne/Lennox
- Heritage Square
- Irwindale
- Lake
- Lincoln/Cypress
- Sierra Madre Villa
- Wardlow

In addition, the future Florence/La Brea station has ITS infrastructure within one block of the station.

STATION-SPECIFIC RECOMMENDATIONS

A set of recommended measures was developed for each station based on the outcome of the facility assessment. The measures were grouped into the following categories:

- Parking Signage and Wayfinding
- Bicycle Parking
- Pedestrian Wayfinding
- Lighting
- Parking Surface
- Traffic Calming
- Appearance
- Enforcement
- Security
- Permit Parking
- Surrounding Area – Security
- Surrounding Area – Bicycle Infrastructure
- Surrounding Area – Pedestrian Infrastructure

The individual measures and a description of each follows:

- **Improve Wayfinding Signage to Station Parking** – improving signage directing drivers to station parking
- **Improve Parking Wayfinding Signage among Facilities at Station** – at stations with multiple facilities, improving signage to direct drivers from one facility to another
- **Improve Parking Signage at Facility Entrance(s)** – improving signage at parking facility entrances

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

- **Increase Bicycle Racks** – add bicycle racks at a station, some of which may not currently have any
- **Increase Bicycle Lockers** – add bicycle lockers at a station, some of which may not currently have any
- **Improve Bicycle Parking Signage** – improve signage directing bicyclists to station bicycle parking
- **Improve Pedestrian Wayfinding to Station** – improve signage directing pedestrians to a station
- **Improve Pedestrian Wayfinding within Parking Facility/Facilities** – improve signage within parking facilities that direct pedestrians to station platform
- **Upgrade Lighting** – retrofit existing lighting system where minimum lighting is at level of service D or below
- **Resurface Pavement** – for parking lots, resurface with a new slurry coat
- **Restripe Spaces** – restripe existing spaces to make them more visible
- **Implement Traffic Calming within Facility/Facilities** – provide speed humps to slow traffic and improve pedestrian safety
- **Improve Landscaping** – install new or upgrade existing landscaping
- **Improve Upkeep** – provide additional janitorial services on an on-going basis
- **Power wash Facility/Facilities** – for garages, power wash on an on-going basis
- **Increase Parking Enforcement** – increase on an on-going basis, especially when adjustments to permit parking programs are proposed
- **Increase Security Patrols within Facility/Facilities** – increase on an on-going basis
- **Initiate Permit Parking at Station for Transit Riders** – restripe, add signage and update permit system; high parking occupancy stations where transit riders would benefit from availability
- **Initiate Permit Parking Spaces for Adjacent Uses** – restripe, add signage and update permit system; only stations with ample parking availability considered
- **Increase Number of Permit Parking Spaces** – restripe, add signage and update permit system; where permit spaces experience high occupancy
- **Improve Security on Sidewalks near Station** – work with local agency to improve safety on sidewalks near station
- **Improve Bicycle Infrastructure near Station** – where rating is low, work with local agency to improve bicycle infrastructure connecting to station
- **Improve Pedestrian Infrastructure near Station** – where rating is low, work with local agency to improve pedestrian infrastructure connecting to station

Figure 3 and Figure 4 show recommended measures by station. Stations marked with an asterisk have parking facilities that are not owned by Metro. Universal City and El Monte have a mix of Metro and non-Metro owned parking facilities.

Note that the Expo 2 stations (Expo/Sepulveda, Expo/Bundy and 17th St./SMC) had a pilot program in place at the time of our assessment. Parkers had to be Metro patrons, with a TAP Card verification system in place, and paid \$2.00 per day to park.

Figure 3: Matrix of Measures (Blue, Expo and Gold Lines)

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Line	Station	Recommendations																									
		Improve Wayfinding Signage to Station Parking	Improve Parking Wayfinding Signage among Facilities at Station	Improve Parking Signage at Facility Entrance(s)	Increase Bicycle Racks	Increase Bicycle Lockers	Improve Bicycle Parking Signage	Improve Pedestrian Wayfinding to Station	Improve Pedestrian Wayfinding within Parking Facility/Facilities	Upgrade Lighting	Resurface Pavement	Restripe Spaces	Implement Traffic Calming within Facility/Facilities	Improve Landscaping	Improve Upkeep	Powerwash Facility/Facilities	Increase Parking Enforcement	Increase Security Patrols within Facility/Facilities	Initiate Permit Parking at Station for Transit Riders	Initiate Permit Parking Spaces for Adjacent Uses	Increase Number of Permit Parking Spaces	Improve Security on Sidewalks near Station	Improve Bicycle Infrastructure Near Station	Improve Pedestrian Infrastructure Near Station			
Blue	Florence	x		x						x	x				x										x		
Blue	103rd Street/Watts Towers*	x		x	x					x	x	x			x		x								x		
Blue/Green	Willowbrook/Rosa Parks*	x	x	x						x	x	x		x	x		x	x							x		
Blue	Artesia	x			x					x							x								x	x	
Blue	Del Amo																								x		
Blue	Wardlow	x	x	x		x				x															x		
Blue	Willow	x	x	x						x															x		
Expo	Expo/Crenshaw*	x				x				x								x									
Expo	La Cienega/Jefferson	x				x				x															x		
Expo	Culver City*	x		x		x											x		x								
Expo	Expo/Sepulveda	x								x																	
Expo	Expo/Bundy	x																									
Expo	17th Street/SMC	x																									
Gold	Atlantic	x	x	x		x				x															x		
Gold	Indiana			x																					x		
Gold	Lincoln/Cypress*									x		x												x	x		
Gold	Heritage Square			x		x									x									x	x		
Gold	South Pasadena*	x		x						x						x									x		
Gold	Fillmore*	x		x						x															x		
Gold	Del Mar*					x				x						x									x		
Gold	Lake*	x	x			x				x															x		
Gold	Sierra Madre Villa					x	x	x		x			x				x	x							x	x	
Gold	Arcadia					x		x		x																	
Gold	Monrovia	x				x				x																x	
Gold	Duarte/City of Hope	x								x																x	
Gold	Irwindale									x																x	x
Gold	Azusa Downtown	x		x		x	x																			x	
Gold	APU/Citrus College					x				x																x	

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Figure 4: Matrix of Measures (Green, Orange, Red and Silver Lines)

Line	Station	Measures																								
		Improve Wayfinding Signage to Station Parking	Improve Parking Wayfinding Signage among Facilities at Station	Improve Parking Signage at Facility Entrance(s)	Increase Bicycle Racks	Increase Bicycle Lockers	Improve Bicycle Parking Signage	Improve Pedestrian Wayfinding to Station	Improve Pedestrian Wayfinding within Parking Facility/Facilities	Upgrade Lighting	Resurface Pavement	Restripe Spaces	Implement Traffic Calming within Facility/Facilities	Improve Landscaping	Improve Upkeep	Powerwash Facility/Facilities	Increase Parking Enforcement	Increase Security Patrols within Facility/Facilities	Initiate Permit Parking at Station for Transit Riders	Initiate Permit Parking Spaces for Adjacent Uses	Increase Number of Permit Parking Spaces	Improve Security on Sidewalks near Station	Improve Bicycle Infrastructure Near Station	Improve Pedestrian Infrastructure Near Station		
Green	Norwalk*	x	x	x		x				x	x			x		x		x						x	x	
Green	Lakewood*	x	x	x						x	x	x		x	x		x		x						x	x
Green	Long Beach*	x	x	x						x	x			x											x	x
Green	Avalon*	x								x	x	x		x	x										x	x
Green/Silver	Harbor Freeway*	x		x							x			x											x	x
Green	Vermont/Athens*	x			x									x	x			x					x		x	x
Green	Crenshaw*	x		x		x								x	x			x							x	x
Green	Hawthorne/Lennox*	x	x	x						x	x	x		x	x		x			x					x	x
Green	Aviation/LAX*	x		x		x				x		x		x			x		x						x	
Green	El Segundo	x		x		x					x	x													x	
Green	Douglas*	x				x		x		x															x	
Green	Redondo Beach*	x	x	x		x				x																
Orange	Van Nuys	x	x	x							x				x			x						x		
Orange	Sepulveda	x		x				x		x			x													
Orange	Balboa	x		x						x								x					x			
Orange	Reseda	x	x	x					x	x		x					x				x					
Orange	Pierce College*	x		x						x			x													
Orange	Canoga	x		x						x																
Orange	Sherman Way	x	x	x						x								x			x					
Orange	Chatsworth*									x																
Red/Purple/Gold	Union Station	x		x						x																
Red	Universal City/Studio City*	x	x	x					x	x		x	x				x								x	
Red/Orange	North Hollywood	x	x	x	x	x				x		x						x	x			x				
Red	Westlake/MacArthur Park	x		x							x				x			x	x							
Silver	Slauson*	x	x	x	x					x	x	x		x	x			x							x	
Silver	Manchester*	x		x	x					x	x	x		x	x				x						x	
Silver	Rosecrans*	x		x	x					x	x			x				x							x	
Silver	Harbor Gateway Transit Center			x		x				x				x											x	
Silver	El Monte*	x	x	x						x		x		x	x		x		x							
Silver	Carson*	x		x	x									x	x											
Silver	Pacific Coast Highway*	x		x										x	x			x							x	

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

COST ESTIMATES AND TIMING

To estimate one-time and on-going rough order-of-magnitude (ROM) costs for the measures, each measure was assigned a metric with associated assumptions as well as a priority (high, medium or low). Some measures are on-going and are indicated as annual. High priority items are focused on safety and security, while medium and low priority items address other measures.

Note we have not included lighting as lighting retrofit costs are driven by light fixture selection and power requirements, and are difficult to generalize. Accurate cost estimates may be developed after developing a photometric layout. The financial benefits of lighting retrofits are derived from energy cost savings. While we do not have baseline energy consumption figures, we note that typical lighting retrofits can provide payback in under four years along with the benefit of improved lighting level of service.

Table 11 details the metric used as well as the priority for each measure.

Table 11: Measures – Cost Metrics and Priority

Category	Measure	Metric	Priority
Parking Signage and Wayfinding	Improve Wayfinding Signage to Station Parking	Number of entry lanes	Medium
Parking Signage and Wayfinding	Improve Parking Wayfinding Signage among Facilities at Station	Number of facilities	Low
Parking Signage and Wayfinding	Improve Parking Signage at Facility Entrance(s)	Number of entry lanes	Medium
Bicycle Parking	Increase Bicycle Racks	Percent of total spaces	Medium
Bicycle Parking	Increase Bicycle Lockers	Percent of total spaces	Low
Bicycle Parking	Improve Bicycle Parking Signage	Number of entry lanes	Low
Pedestrian Wayfinding	Improve Pedestrian Wayfinding to Station	Fixed cost per station	Low
Pedestrian Wayfinding	Improve Pedestrian Wayfinding within Parking Facility/Facilities	Number of facilities	Low
Lighting	Upgrade Lighting	Total spaces	High
Parking Surface	Resurface Pavement	Total spaces	Medium
Parking Surface	Restripe Spaces	Total spaces	Medium
Traffic Calming	Implement Traffic Calming within Facility/Facilities	Total spaces	High
Appearance	Improve Landscaping	Total spaces	Low
Appearance	Improve Upkeep	Total spaces	Annual
Appearance	Powerwash Facility/Facilities	Total spaces	Annual
Enforcement	Increase Parking Enforcement	Total spaces	Annual
Security	Increase Security Patrols within Facility/Facilities	Total spaces	Annual
Permit Parking	Initiate Permit Parking at Station for Transit Riders	Fixed cost	Medium
Permit Parking	Initiate Permit Parking Spaces for Adjacent Uses	Fixed cost	Medium
Permit Parking	Increase Number of Permit Parking Spaces	Additional spaces	Medium
Surrounding Area - Security	Improve Security on Sidewalks near Station	Local agency assistance required	N/A
Surrounding Area - Infrastructure	Improve Bicycle Infrastructure near Station	Local agency assistance required	N/A
Surrounding Area - Infrastructure	Improve Pedestrian Infrastructure near Station	Local agency assistance required	N/A

Source: Walker Parking Consultants, 2016

Priorities correspond to timing with a three-year timeframe assumed. We have assumed that high priority items would be addressed in the first year, medium priority items in the second year and low priority items in the third year.

Table 12 details the assumptions we used to develop the ROM cost estimates. These cost assumptions are based on Walker experience and industry standard figures.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 12: Assumptions Utilized to Develop ROM Cost Estimates (2016 Dollars)

Parking Wayfinding	
Basic sign 2'x4 & pole	\$750.00 per sign
Entry lane multiplier	2.0 signs per entry lane
Facility multiplier	3.0 signs per facility where there are multiple facilities
Parking Signage	
Larger sign at facility entrances	\$2,000.00 per sign
Bike Parking	
Bike rack	\$200.00 per bike
New racks as % of total spaces	2.5%
Bike locker	\$2,000.00 per bike
New lockers % of total spaces	2.0%
Bike Parking Signage	
Basic sign	\$500.00 per sign
Entry lane multiplier	2.0 signs per entry lane
Pedestrian Signage	
Sign package to station	\$2,500.00 per station
Sign package within facility	\$2,000.00 per facility
Pavement Improvement (Lot)	
Patching, asphalt slurry and restripe	\$2.00 per SF
SF per space in a lot	350 SF
SF per space in a garage	375 SF
Restriping	
Restripe existing striping	\$12.00 per space
Traffic Calming	
Speed hump	\$3,000.00 per hump
Speed humps per facility	4 humps
Landscaping	
Cost per SF of landscaped area	\$3.00
% of parking lot landscaped	10.0%
SF per space in a lot	350 SF
Cleanliness	
Janitorial	\$20.00 per hour (fully loaded)
Coverage per hour (janitorial)	500 spaces
Janitorial frequency	104 times per year
Powerwashing	\$6.00 per space
Powerwashing frequency	2 times per year
Enforcement	
Parking enforcement officer	\$35.00 per hour (fully loaded with vehicle)
Coverage per hour	500 spaces
Enforcement frequency	260 times per year
Security	
Security patrol	\$20.00 per hour (fully loaded)
Coverage per hour	1,000 spaces
Security frequency	260 times per year
Permit Parking	
Program for transit riders	\$1,000.00 per location
Program for non-transit parkers	\$1,000.00 per location
Add new or increase existing	\$50.00 per space (restripe and signage)
% of total spaces all-day reserved	2.0%

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Note that our assumptions do not include parking wayfinding signage indicating availability as Metro is currently implementing a Parking Guidance System to provide this functionality.

Specific adjustments were made to assumptions related to restriping and traffic calming. The restriping specifics are detailed in the individual facility assessment reports. Other specific adjustments are as follows.

- Traffic Calming
 - Applied a multiplier of two at Pierce College
 - Applied a multiplier of three at Sepulveda
 - Added an additional \$5,000 for signage at Sierra Madre Villa

- Permit Parking
 - Add 10 spaces to permit program at Balboa
 - Add 10 spaces to permit program at Heritage Square

- Conversion of short-term spaces in South Lot at North Hollywood to curb pick-up/drop-off at a cost of \$15,000, to be done in year one.

The resulting ROM cost estimates are detailed on Table 13 and Table 14. Note that stations with an asterisk have parking facilities that are not owned by Metro.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 13: ROM Cost Estimates for Blue, Expo and Gold Lines (2016 Dollars)

Line	Station	Year 1	Year 2	Year 3	On-Going Annual
Blue	Florence	\$2,100	\$86,100	\$2,100	\$2,100
Blue	103rd Street/Watts Towers*	\$3,300	\$8,000	\$5,300	\$3,300
Blue/Green	Willowbrook/Rosa Parks*	\$11,500	\$185,100	\$40,600	\$11,500
Blue	Artesia	\$5,400	\$8,300	\$5,400	\$5,400
Blue	Del Amo	\$0	\$0	\$0	\$0
Blue	Wardlow	\$0	\$10,500	\$8,500	\$0
Blue	Willow	\$0	\$21,000	\$6,800	\$0
Expo	Expo/Crenshaw*	\$5,200	\$6,700	\$15,200	\$5,200
Expo	La Cienega/Jefferson	\$0	\$3,000	\$20,000	\$0
Expo	Culver City*	\$10,300	\$21,800	\$32,300	\$10,300
Expo	Expo/Sepulveda	\$0	\$1,500	\$0	\$0
Expo	Expo/Bundy	\$0	\$3,000	\$0	\$0
Expo	17th Street/SMC	\$0	\$1,500	\$0	\$0
Gold	Atlantic	\$0	\$7,000	\$16,500	\$0
Gold	Indiana	\$0	\$2,000	\$0	\$0
Gold	Lincoln/Cypress*	\$0	\$1,100	\$0	\$0
Gold	Heritage Square	\$2,100	\$4,600	\$8,100	\$2,100
Gold	South Pasadena*	\$1,700	\$5,200	\$1,700	\$1,700
Gold	Fillmore*	\$0	\$3,500	\$0	\$0
Gold	Del Mar*	\$19,300	\$7,300	\$31,300	\$7,300
Gold	Lake*	\$0	\$6,000	\$2,300	\$0
Gold	Sierra Madre Villa	\$39,800	\$22,800	\$65,300	\$22,800
Gold	Arcadia	\$5,000	\$0	\$14,500	\$0
Gold	Monrovia	\$5,000	\$1,500	\$14,000	\$0
Gold	Duarte/City of Hope	\$5,000	\$1,500	\$2,500	\$0
Gold	Irwindale	\$5,000	\$0	\$2,500	\$0
Gold	Azusa Downtown	\$5,000	\$3,500	\$11,000	\$0
Gold	APU/Citrus College	\$5,000	\$0	\$8,000	\$0

Source: Walker Parking Consultants, 2016

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

Table 14: ROM Cost Estimates for Green, Orange, Red and Silver Lines (2016 Dollars)

Line	Station	Year 1	Year 2	Year 3	On-Going Annual
Green	Norwalk*	\$31,300	\$1,250,300	\$284,400	\$31,300
Green	Lakewood*	\$7,500	\$228,400	\$43,400	\$7,500
Green	Long Beach*	\$0	\$466,200	\$72,300	\$0
Green	Avalon*	\$2,100	\$119,000	\$18,900	\$2,100
Green/Silver	Harbor Freeway*	\$0	\$183,400	\$26,500	\$0
Green	Vermont/Athens*	\$7,300	\$11,100	\$23,600	\$7,300
Green	Crenshaw*	\$9,400	\$19,900	\$83,600	\$9,400
Green	Hawthorne/Lennox*	\$8,700	\$277,900	\$51,200	\$8,700
Green	Aviation/LAX*	\$7,100	\$19,800	\$64,100	\$7,100
Green	El Segundo	\$0	\$69,700	\$4,000	\$0
Green	Douglas*	\$0	\$3,000	\$4,500	\$0
Green	Redondo Beach*	\$0	\$17,500	\$18,500	\$0
Orange	Van Nuys	\$7,300	\$24,800	\$11,800	\$7,300
Orange	Sepulveda	\$36,000	\$10,500	\$2,500	\$0
Orange	Balboa	\$5,200	\$12,700	\$5,200	\$5,200
Orange	Reseda	\$9,500	\$35,800	\$18,300	\$9,500
Orange	Pierce College*	\$24,000	\$10,500	\$0	\$0
Orange	Canoga	\$0	\$10,500	\$0	\$0
Orange	Sherman Way	\$3,700	\$18,700	\$8,200	\$3,700
Orange	Chatsworth*	\$0	\$0	\$0	\$0
Red/Purple/Gold	Union Station	\$0	\$17,500	\$0	\$0
Red	Universal City/Studio City*	\$51,100	\$38,200	\$23,900	\$15,100
Red/Orange	North Hollywood	\$46,200	\$63,600	\$86,200	\$31,200
Red	Westlake/MacArthur Park	\$7,600	\$23,700	\$7,600	\$7,600
Silver	Slauson*	\$7,300	\$121,900	\$27,600	\$7,300
Silver	Manchester*	\$7,300	\$185,700	\$32,400	\$7,300
Silver	Rosecrans*	\$5,200	\$246,900	\$40,700	\$5,200
Silver	Harbor Gateway Transit Center	\$0	\$6,000	\$142,900	\$0
Silver	El Monte*	\$32,400	\$69,900	\$171,100	\$32,400
Silver	Carson*	\$2,100	\$6,400	\$17,100	\$2,100
Silver	Pacific Coast Highway*	\$7,300	\$14,300	\$32,100	\$7,300
Total (One-Time and Annual Costs)		\$456,300	\$4,006,300	\$1,636,500	\$286,300

Source: Walker Parking Consultants, 2016

ROUGH ORDER-OF-MAGNITUDE COSTS AND TIMING

To develop rough order-of-magnitude ("ROM") cost estimates, we assigned cost assumptions to facility-level recommendations. Timing was based on recommended importance of each item with high priority items in year 1, medium priority items in year 2 and low priority items in year 3.

Based on results of the facility recommendations, we estimate that \$6.10 million is required over a three-year period and approximately \$286,000 per year going forward thereafter for all parking facilities. For Metro-owned facilities, we estimate that \$1.38 million is required over a three-year period and approximately \$144,000 per year thereafter. For Metro-owned facilities, the estimated costs per year are as follows:

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – STATION FINDINGS AND RECOMMENDATIONS

- Year 1: \$278,400
- Year 2: \$573,400
- Year 3: \$524,000

In terms of only one-time costs for Metro-owned facilities, the total is \$942,600 over three years with the schedule as follows:

- Year 1: \$134,000
- Year 2: \$429,000
- Year 3: \$379,600

The annual costs are assumed to be incremental to operating and maintenance costs being paid currently. All cost figures are in 2016 dollars.

Due to the costs required to implement the recommended facility improvements, we recommend identifying additional revenue streams to offset these costs, such as introduction or expansion of permit programs and introducing daily fees at high occupancy locations. We assume that permit program enhancements would result in additional revenue generated. In addition, rationalizing low occupancy locations would reduce costs associated with those facilities.

APPENDIX A – BLUE LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

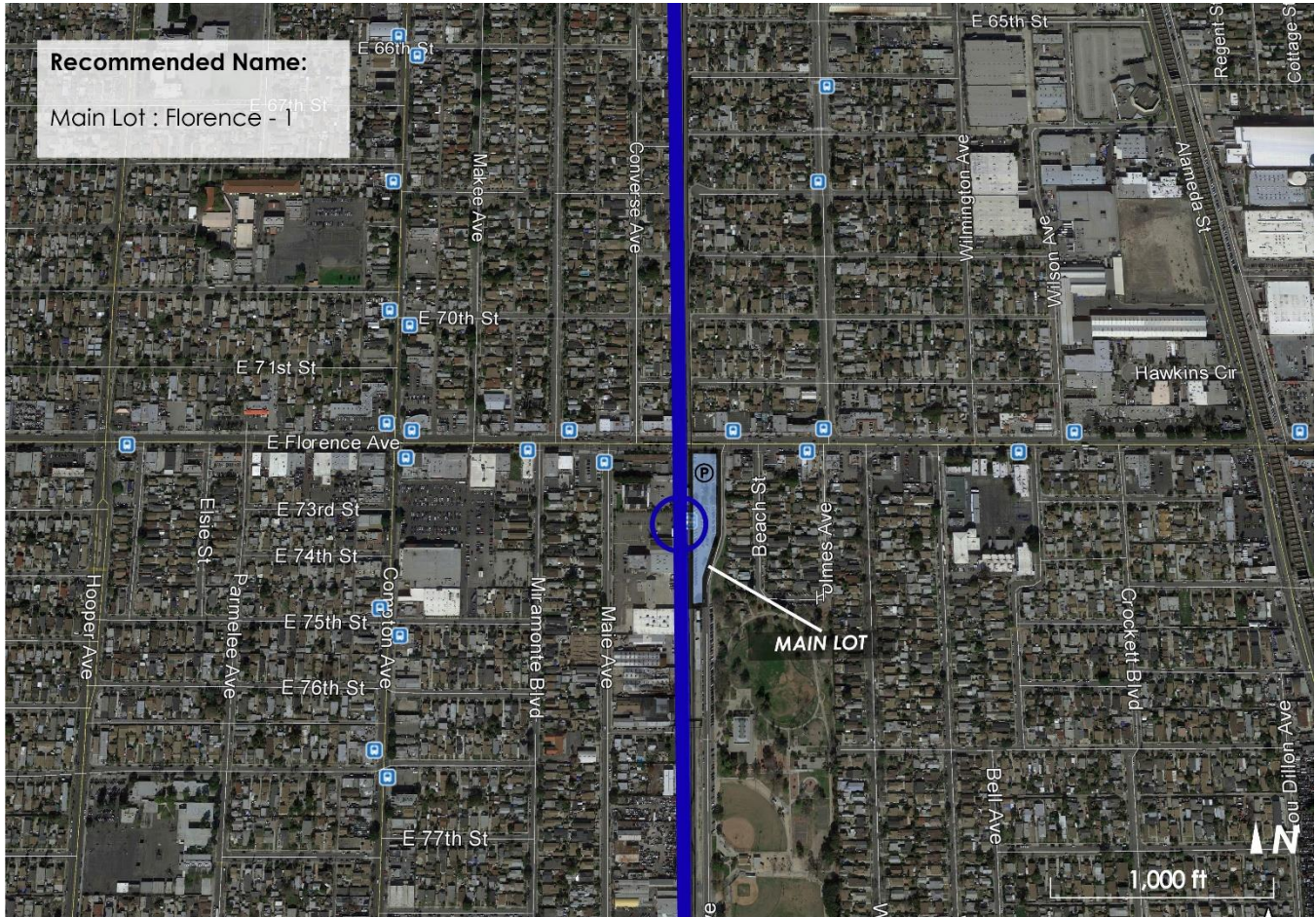
FLORENCE

Address: 7225 Graham Ave., Los Angeles, CA 90001

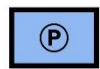
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 115 in one surface lot (20 permit spaces)



LEGEND



Parking Facility

Blue Line



Florence Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	115	90	20	5	N/A
Time Period	Occupancy				
Weekday Daytime	95%	101%	65%	100%	N/A
Weekday Evening	33%				
Weekend	39%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Access

The Florence station has one surface lot. There is one full access driveway and one out only driveway on Graham Ave. Graham Ave. is a low volume two-lane undivided roadway. Turns into and out of the parking lot are not difficult.


Total Lanes in: 1

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Possibly businesses on Florence based on observation of an individual parking and walking across the St.

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	12	1	8%

Bicycle Infrastructure Rating: Low

There are no bicycle facilities on or off-street in the vicinity of the station. The station itself provides a few bicycle racks but no bike lockers.



Photo 1: Bicycle Racks Adjacent to Station Platform

Pedestrian Infrastructure Rating: Medium

Sidewalks are present and in acceptable conditions in the vicinity of the station, with the exception of the west side of Graham Ave. south of the station where there is no sidewalk.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 2: No Sidewalks on the West Side of Graham Ave. South of the Station

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs on Florence Ave. The standard Metro monument sign is not present at this station. There is no parking signage at station entrances to denote Metro parking.

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Spaces on the southern end of the lot closest to Graham Ave. would be the best location for vanpool parkers. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

There was bagged trash next to the trash cans, as if someone had taken the bags out and put new bags in but neglected to remove the full bags. The dumpster at the end of the lot was also overflowing with garbage.

Facility Maintenance

The parking lot appears adequately maintained.

Pavement Conditions

The pavement is slightly cracked and striping is faded.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 3: Bagged Trash Adjacent to Trash Can

Lighting

Minimum lighting level of service is E.

Safety

No safety issues were observed.

Security

No security issues were observed.

Recommendations

- Reconfigure parking to add capacity
- Improve wayfinding to station parking
- Improve parking signage at facility entrance
- Upgrade lighting
- Resurface pavement
- Improve upkeep
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

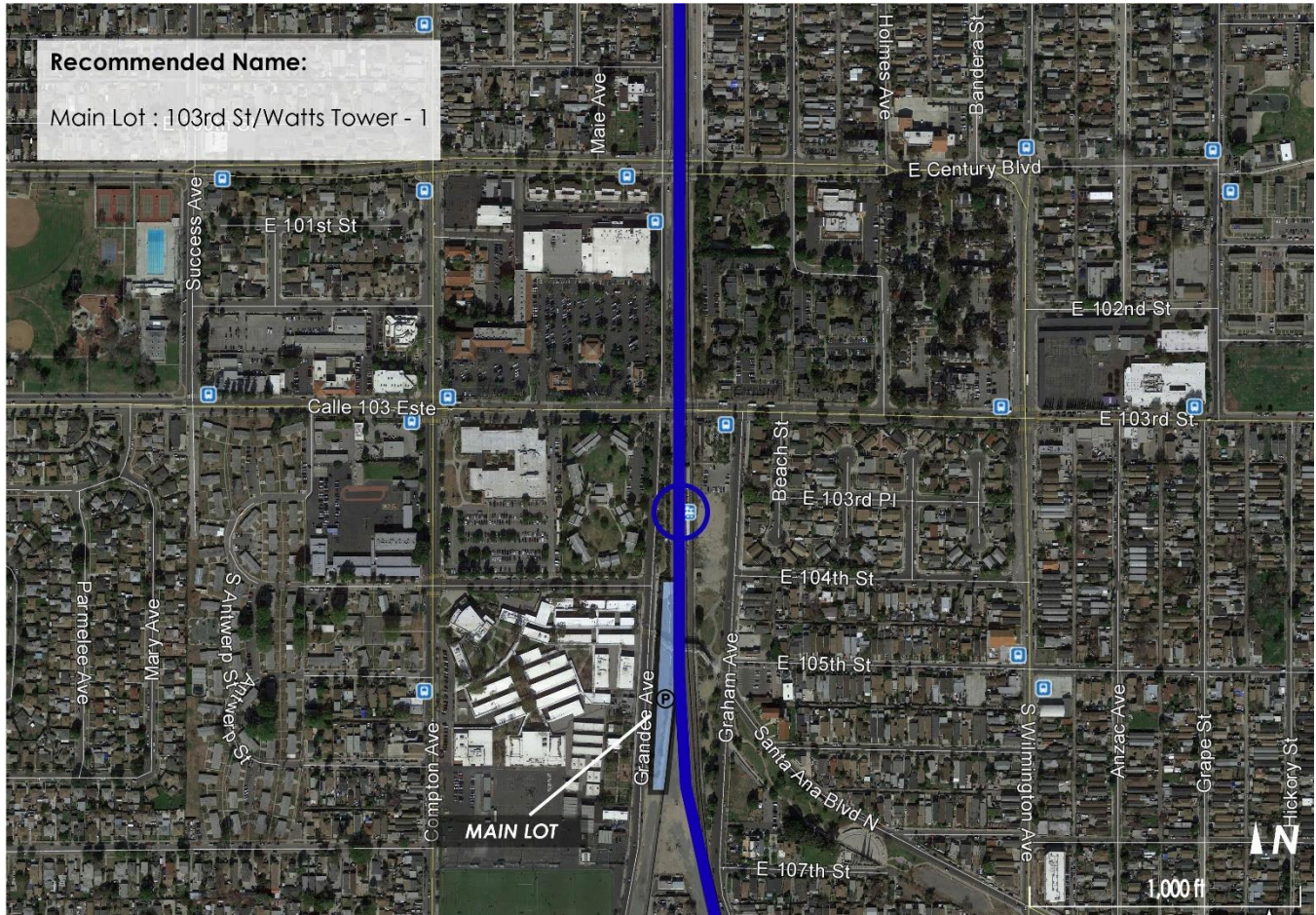
103RD ST./WATTS TOWERS

Address: 10400 Grandee Ave., Los Angeles, CA 90002

Owner: City of Los Angeles

Operator: City of Los Angeles

Total Number of Parking Spaces: 69 in one surface lot (no permit spaces)



Recommended Name:
Main Lot : 103rd St/Watts Tower - 1

LEGEND



Parking Facility

Blue Line



103rd Watts Tower Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	69	66	N/A	3	N/A
Time Period	Occupancy				
Weekday Daytime	0%	0%	N/A	0%	N/A
Weekday Evening	0%				
Weekend	22%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Access

The lot is located along Grandee Ave. It is one-way with an entry lane on the northern end and an exit lane on the southern end.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- Possible adjacent uses on the weekend (school, nearby residents) due to parked vehicles observed in lot on the weekend

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	N/A	N/A	N/A

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. No bicycle parking is present at the station either.

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity between the station and surrounding areas. Once parked, it is not apparent where the station platform is located.



Photo 4: No Signage in Lot to Direct Riders to the Platform

Parking Signage and Wayfinding Rating: Low

There is no signage directing drivers to the parking lot. There are also no signs at the parking lot entrance.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 5: No Wayfinding Signage on Grandee Ave.

Potential Carshare Locations

Spaces on the northern end of the lot, closest to the platform, are the most suitable for carshare when demand exists for them.

Potential Vanpool Locations

Spaces on the southern end of the lot would be the best spaces for vanpool.

Facility Upkeep

Trash was visible in portions of the lot.

Facility Maintenance

The lot does not appear to be well-maintained as the foliage is overgrown.

Pavement Conditions

Pavement conditions are good. Lot striping and one-way arrows are a bit faded.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 6: Faded Parking Space Striping

Lighting

Minimum lighting level of service is E.

Safety

No issues were observed.

Security

The lot feels desolate especially given the low number of parked vehicles. Overgrown foliage and poor visibility to the St. may discourage riders from parking at this location.

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at lot entrance
- Introduce bicycle racks
- Improve pedestrian wayfinding within lot to direct riders to station platform
- Upgrade lighting
- Restripe spaces
- Improve upkeep
- Increase parking enforcement
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

WILLOWBROOK/ROSA PARKS

Address:

North Lot – 11644 Willowbrook Ave., Los Angeles, CA 90059

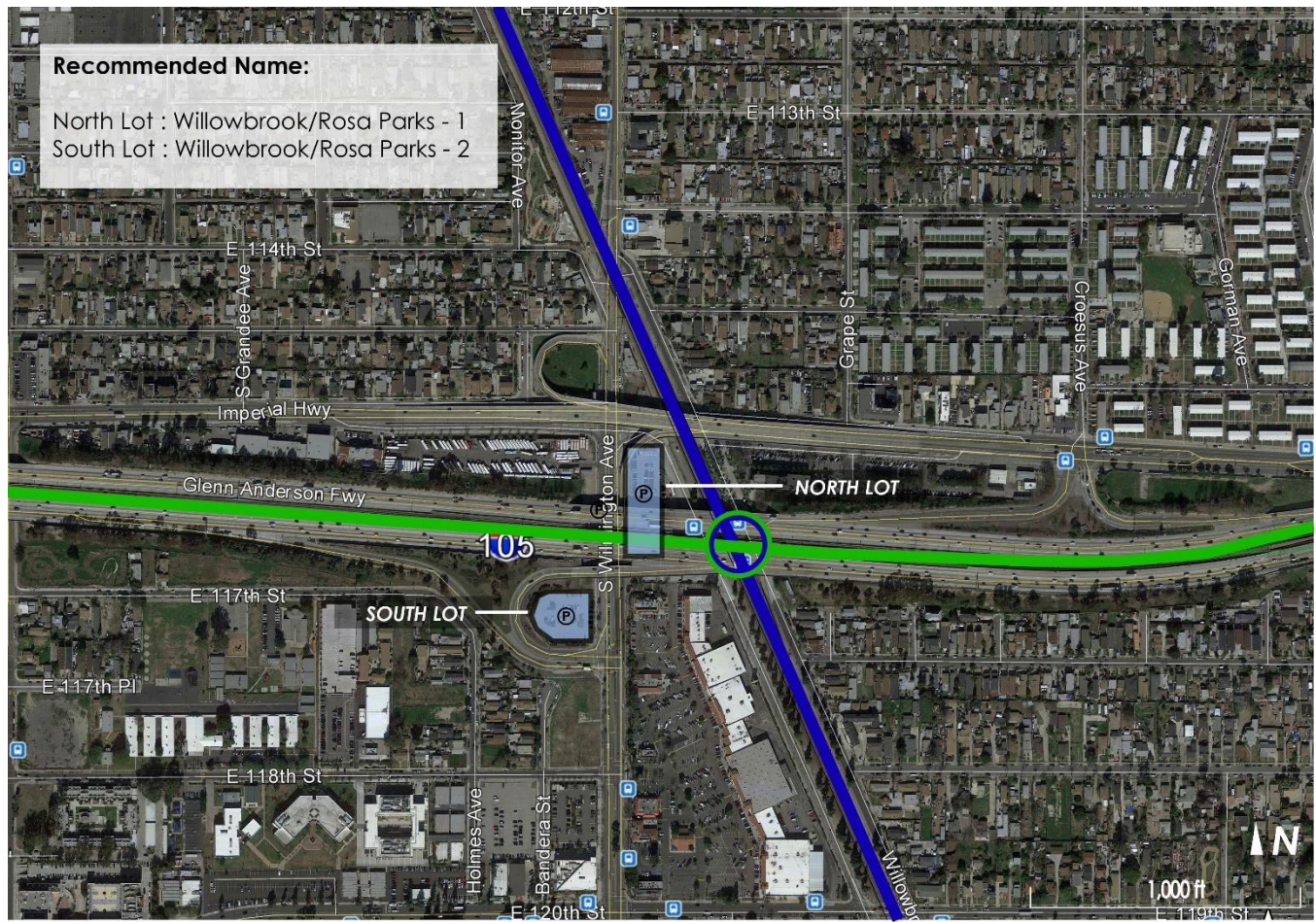
South Lot – 11711 South Wilmington Ave., Los Angeles, CA 90059

Owner: Caltrans

Operator: Metro

Total Number of Parking Spaces: 234 in two surface lots (no permit spaces)

- North Lot: 141 spaces
- South Lot: 93 spaces



LEGEND



Parking Facility

Blue Line



Willowbrook/
Rosa Park Station

Green Line

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	234	216	N/A	8	10
Time Period	Occupancy				
Weekday Daytime	69%	67%	N/A	50%	100%
Weekday Evening	7%				
Weekend	12%				

*The 10 reserved spaces are for short-term parking.

Parking Access

The Willowbrook/Rosa Parks station has two surface lots. The North Lot has one full access driveway off of Willowbrook Ave., and one exit-only driveway onto Wilmington Ave. Left-turns out onto Wilmington Ave. are not prohibited, however they are difficult to make. The South Lot has one full access driveway on Wilmington Ave. Left-turns onto Wilmington Ave. are not prohibited, but are extremely difficult. Even right-turns out of this driveway can be a challenge due to queuing at the Wilmington Ave./I-105 Ramps intersection right next to the parking lot.


Total Lanes in: 2

Total Lanes out: 3

Parking User Groups

- Metro transit riders
- It appears that individuals parking for a longer duration may be parking in short-term spaces based on observations

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	6	2	33%
Bike Rack Spaces	20	0	0%

Bicycle Infrastructure Rating: Low

There are no bicycle facilities in the vicinity of Willowbrook/Rosa Parks station aside from the bike racks and lockers provided at the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 7: Bike Racks at Willowbrook/Rosa Parks Station

Pedestrian Infrastructure Rating: High

Sidewalks are in good shape. It is a long walk from the South Lot to the bus area, since the only option is to cross Wilmington at Imperial highway. The other option would be to walk up the platform to the Blue Line, across the freeway, and back down to access the buses.



Photo 8: Sidewalks along Wilmington Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Signage and Wayfinding Rating: Low

No visible monument signs on Wilmington or Imperial and no signage at parking entrances. No parking wayfinding signs, aside from Caltrans Park-and-Ride signs outside the parking lots. Due to heavy traffic on Wilmington, it is difficult to get from the North Lot to the South Lot when the North Lot is full. No signs directing motorists to the South Lot from the North Lot, which would be especially beneficial when the North Lot is full.



Photo 9: Signage at Entrance to South Lot (L); Signage at Entrance to North Lot (R)

Potential Carshare Locations

The short-term spaces in the North Lot would be the ideal location for carshare spaces.

Potential Vanpool Locations

Spaces in the South Lot would work best for vanpool parking.

Facility Upkeep

Some trash was present on the pavement and in medians.

Facility Maintenance

The parking lots have a feel of slight disrepair, especially the lesser used South Lot. Medians in the lots lack landscaping and are barren.

Pavement Conditions

Striping could be refreshed in both lots.

Lighting

North Lot minimum lighting level of service is B. South Lot minimum lighting level of service is D.

Safety

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Security

Some vehicles in the parking lot may have been transacting other business and not there to ride Metro. There were some individuals on bicycles who appeared to be cruising around the lot.

Recommendations

- Improve wayfinding to station parking
- Improve parking wayfinding among facilities at station
- Improve parking signage at facility entrances
- Upgrade lighting (South Lot)
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Increase parking enforcement
- Increase safety patrols
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

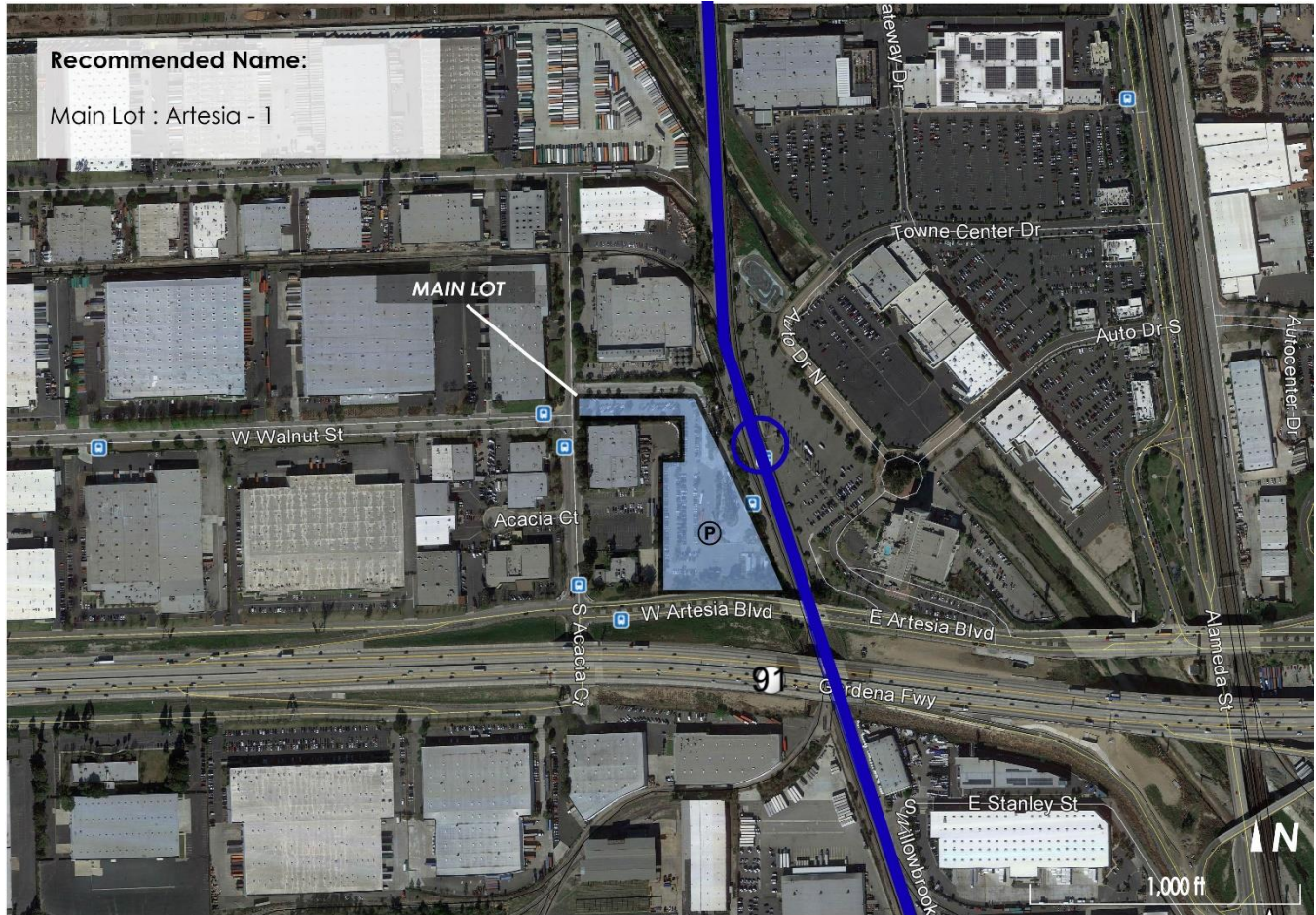
ARTESIA

Address: 1920 ½ Acacia Ave., Compton, CA 90220

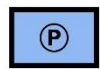
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 298 in one surface lot (32 permit spaces)



LEGEND



Parking Facility

Blue Line



Artesia Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	298	251	32	15	N/A
Time Period	Occupancy				
Weekday Daytime	99%	100%	94%	100%	N/A
Weekday Evening	13%				
Weekend	12%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Access

The Artesia station has one surface lot. Access is via Acacia Court.


Total Lanes in: 1

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	N/A	N/A	N/A

Bicycle Infrastructure Rating: Low

There are no bike lanes, routes or paths in the vicinity of Artesia station. There are no bicycle parking facilities at the station.

Pedestrian Infrastructure Rating: Low

Sidewalks are in good shape on Acacia Court and Artesia Blvd. However pedestrians have no direct access to Artesia Blvd. and there is no pedestrian connection to the casino next door. Pedestrians must walk out to Acacia Court, south to Artesia Blvd. and then to the casino. There is a gated pedestrian access present between the station and the casino, but it is currently locked.



Photo 10: Entrance Lane and Sidewalk off of Acacia Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 11: Pedestrian Path to Station Platform

Parking Signage and Wayfinding Rating: Low

The station monument sign is on Acacia Court, but there is no signage on the main arterial, Artesia Blvd., when passing the station. There is no parking signage at the Acacia Court/Artesia Blvd. intersection that would indicate a train station with parking facilities is nearby.



Photo 12: Station Monument Sign

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 13: Signage at Entrance to Parking Lot

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Spaces closest to the entrance on Acacia Court would be the most ideal for vanpool parkers. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lot was clean and free trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot has some cracks but appears to be generally good.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 14: Cracks in the Pavement

Lighting

Minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Add bicycle racks
- Upgrade lighting
- Increase enforcement
- Create all-day permit spaces
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

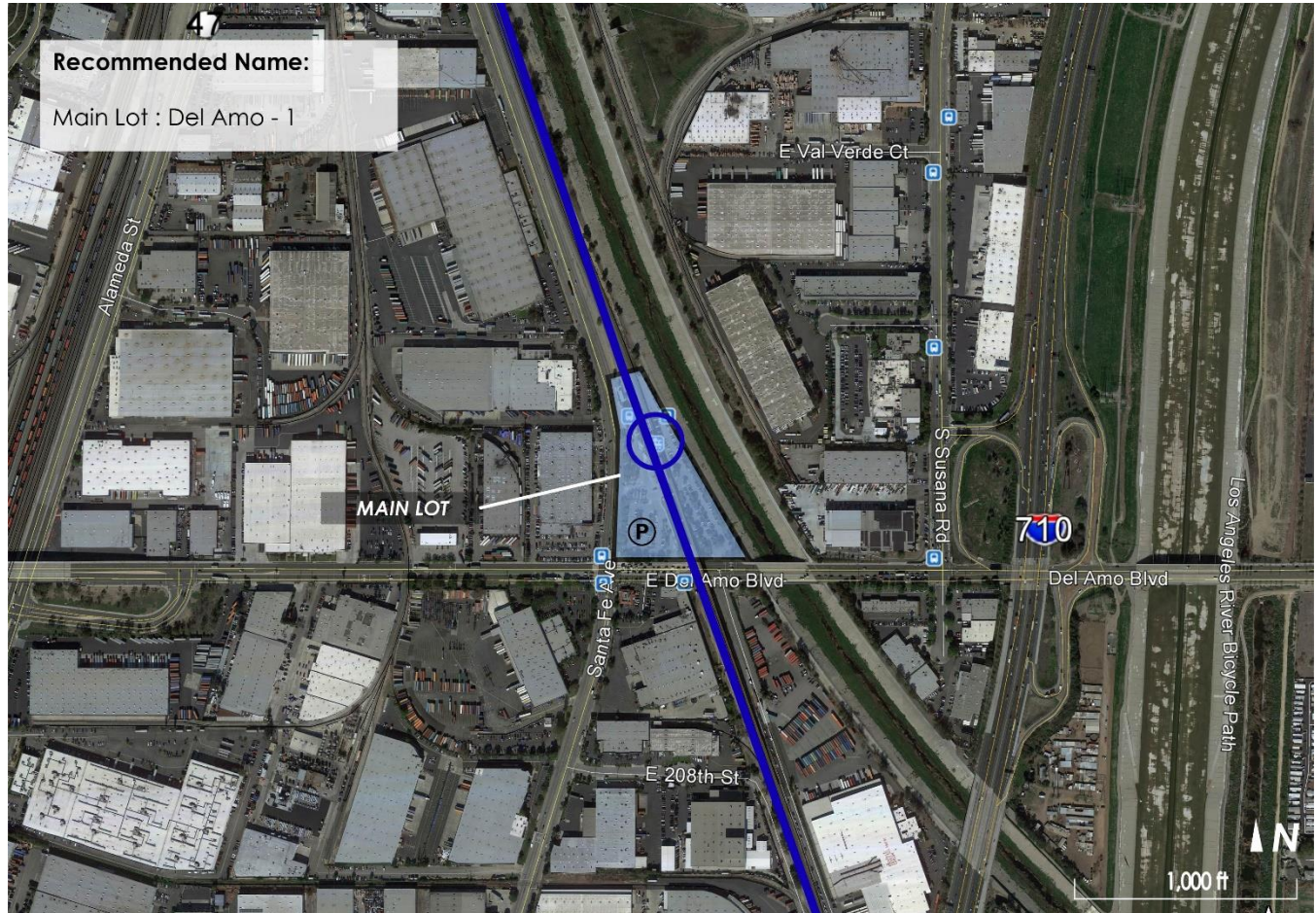
DEL AMO

Address: 20485 Santa Fe Ave., Compton, CA 90221

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 399 in one surface lot (61 permit spaces)



Recommended Name:

Main Lot : Del Amo - 1

LEGEND



Parking Facility

Blue Line



Del Amo Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	399	330	61	8	N/A
Time Period	Occupancy				
Weekday Daytime	96%	100%	74%	100%	N/A
Weekday Evening	8%				
Weekend	29%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Access

The Del Amo station has one surface lot. There is one right-in/right-out only driveway and one full access driveway on Del Amo Blvd. along with one full access driveway on Santa Fe Ave.


Total Lanes in: 3

Total Lanes out: 3

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	11	8	73%
Bike Rack Spaces	10	0	0%

Bicycle Infrastructure Rating: Low

There are no bike lanes, routes or paths in the vicinity of Del Amo station. Bicycle racks and lockers are provided at the station.



Photo 15: Bicycle Parking Underneath the Station Platform Area

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 16: Bicycle Racks

Pedestrian Infrastructure Rating: Medium

Sidewalks are in good condition on Del Amo Blvd. and Santa Fe Ave. ADA walkways are present throughout the station and in the parking area.

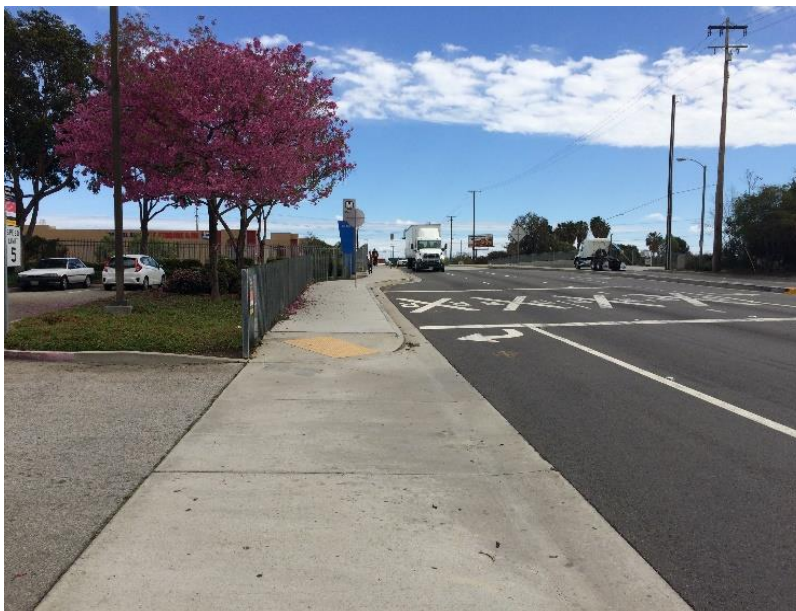


Photo 17: Sidewalk Looking East along Del Amo Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 18: Sidewalk Looking West along Del Amo Blvd.

Parking Signage and Wayfinding Rating: Medium

There is a station monument sign on Del Amo Blvd. at the parking lot entrance, which has excellent visibility from the St. prior to entering. The monument sign on Santa Fe Ave. is similarly well placed. There are no other parking wayfinding signs.



Photo 19: Station Monument Sign along Del Amo Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 20: Station Monument Sign along Santa Fe Ave.

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces.

Potential Vanpool Locations

The spaces closest to either entrance/exit on Del Amo Blvd. would be the best location for vanpool parkers. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lot was clean and free of trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Reconfigure parking to add capacity
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

WARDLOW

Address:

North Lot – 3440 Pacific Place, Long Beach, CA 90806

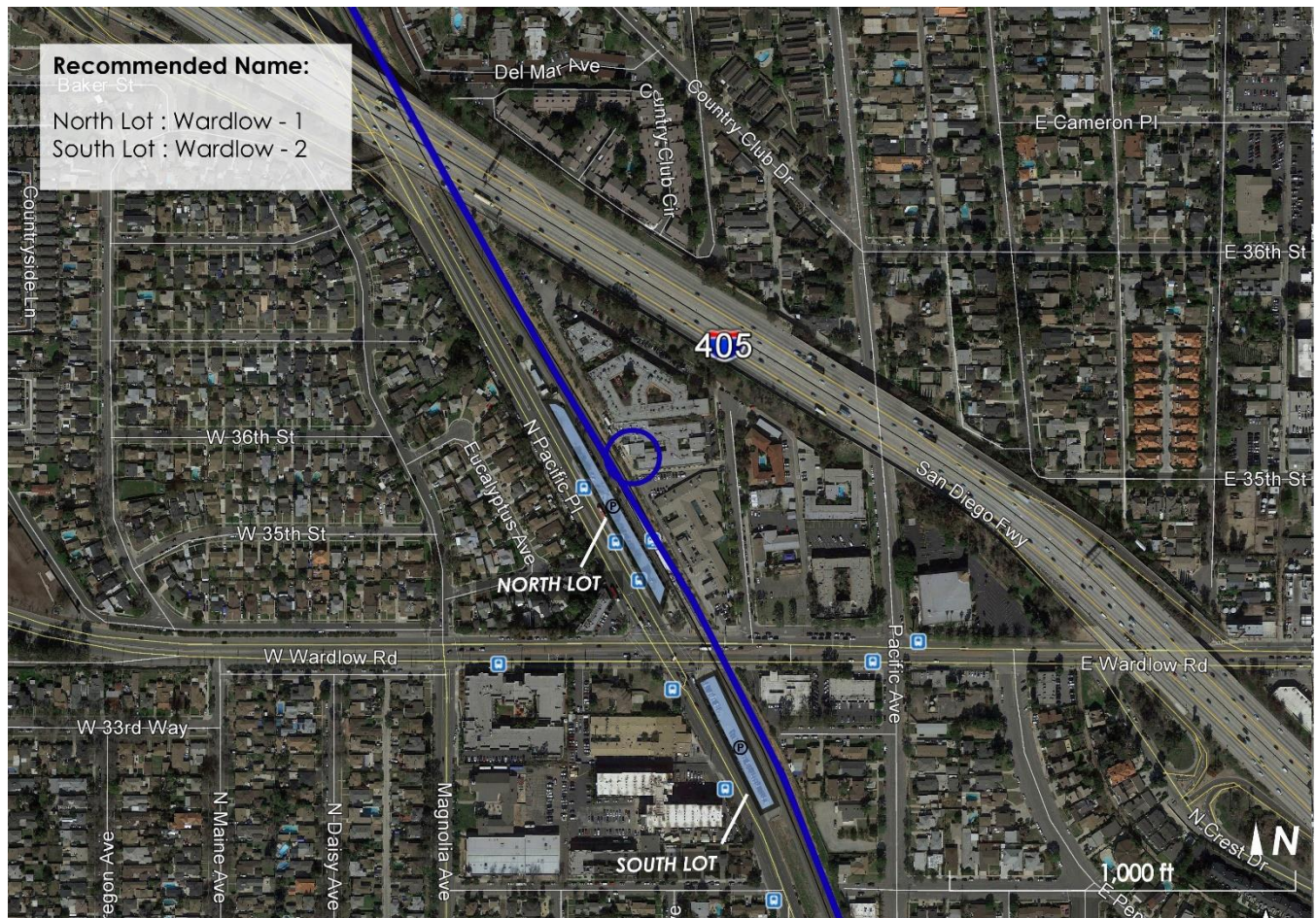
South Lot – 3380 Pacific Place, Long Beach, CA 90806

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 89 in two surface lots (17 permit spaces)

- North Lot: 49 spaces
- South Lot: 40 spaces



Recommended Name:
 Baker St
 North Lot : Wardlow - 1
 South Lot : Wardlow - 2

LEGEND



Parking Facility

Blue Line



Wardlow Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	89	70	17	2	N/A
Time Period	Occupancy				
Weekday Daytime	100%	100%	100%	100%	N/A
Weekday Evening	20%				
Weekend	45%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Access

The Wardlow station has two surface lots. The North Lot has one ingress only driveway and one ingress/egress driveway on Pacific Place. The South Lot has two full driveways on Pacific Place.


Total Lanes in: 3

Total Lanes out: 4

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	14	12	86%
Bike Rack Spaces	8	0	0%

*Two Scooters were parked at the bike racks

Bicycle Infrastructure Rating: Low

There are no bicycle lanes, paths, or routes in the vicinity of Wardlow station. Bicycle parking is near the intersection of Pacific Place and Wardlow Road.

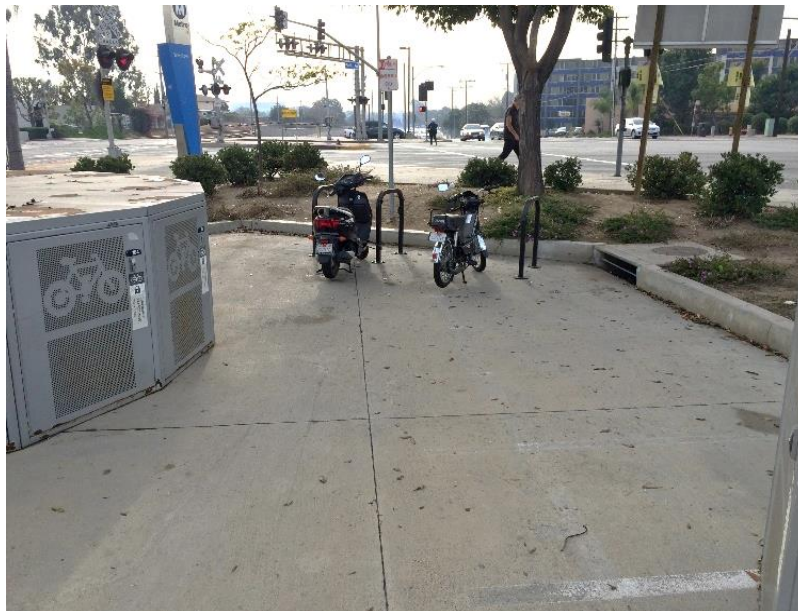


Photo 21: Bicycle Parking at Wardlow Station

Pedestrian Infrastructure Rating: High

The sidewalks on Pacific Place and Wardlow Road and are in good condition and wide where they exist. There is little sidewalk on the west side of Pacific Place north of Wardlow Road. This is an issue as the station parking lots are overcapacity and Metro riders park on-street on Pacific Place, with about 30 vehicles observed on the west side of the St. north of Wardlow. These patrons either cross the St. illegally, or head south on the dirt/grass to the Pacific Place/Wardlow St. intersection to cross Pacific Place.

The ADA parking is not currently in the most optimal location, however the facility will be reconfigured soon and will move the ADA parking to nearest location adjacent to station platform.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS



Photo 22: Non-Optimal Placement of ADA Parking

Parking Signage and Wayfinding Rating: Low

The monument sign for this station is on Wardlow Road and is difficult to see from Pacific Place. There is no signage on Pacific Place indicating parking for a Metro facility, and while the entrance to the North Lot has a worn monument sign, there is no signage at the South Lot entrance.



Photo 23: Sign at Entrance to Parking Lot

Potential Carshare Locations

Parking at Wardlow is already overcapacity with patrons taking up on-street parking on both sides of Pacific Place. The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Potential Vanpool Locations

If vanpool parking is to be assigned at this location, the southernmost spaces in the South Lot would be the most appropriate as they are the least desirable to Blue Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lot was clean and free of trash/debris.

Facility Maintenance

The parking lots appear to be adequately maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lots is acceptable.

Lighting

North Lot minimum lighting level of service is E. South Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve parking wayfinding among the facilities
- Improve parking signage at entrances
- Increase bicycle lockers
- Upgrade lighting
- Convert permit spaces to free spaces (5)
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

WILLOW

Address:

North Lot – 2750 West American Ave., Long Beach, CA 90806

South Lot – 2750 West American Ave., Long Beach, CA 90806

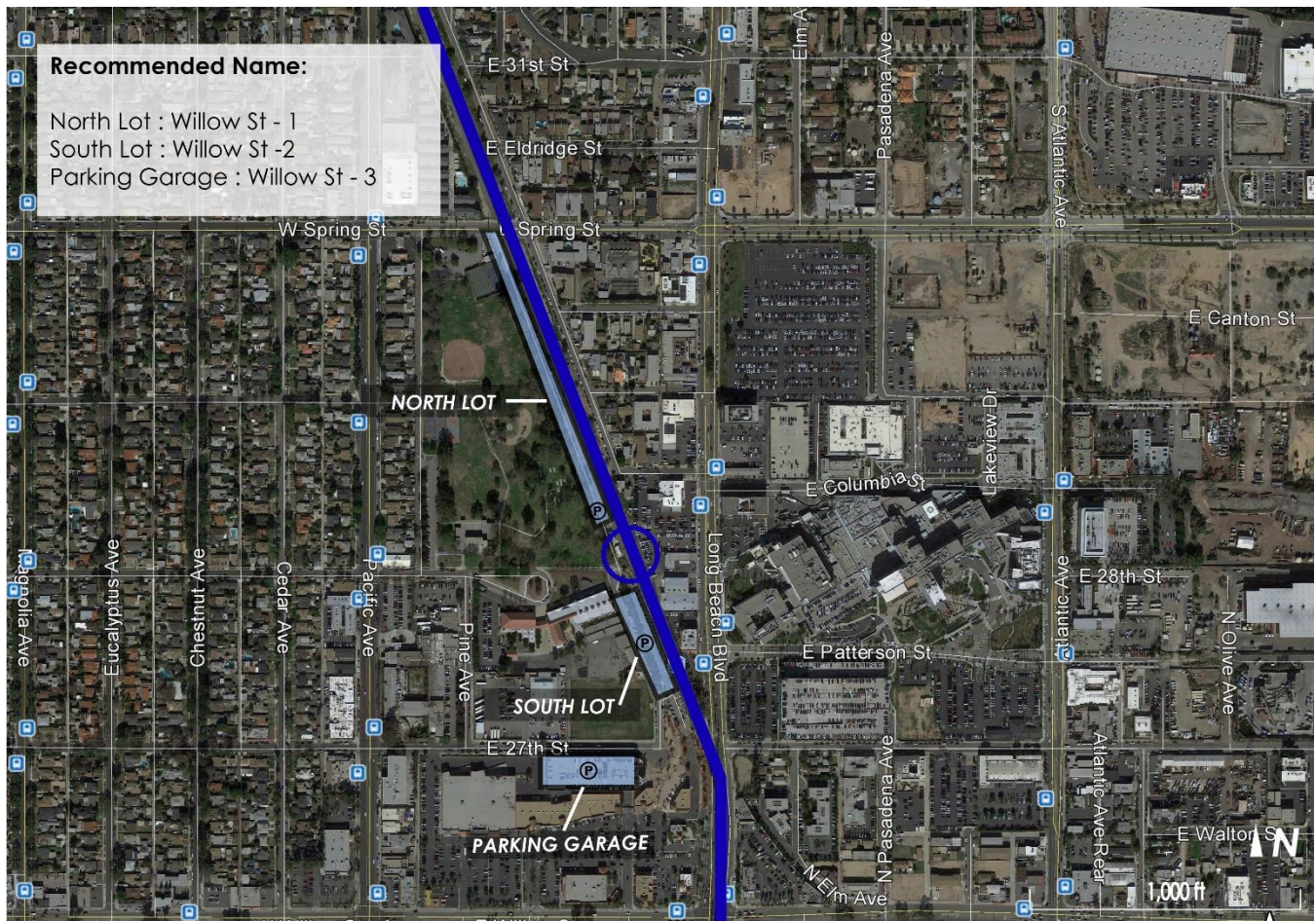
Southwest Structure – 200 East 27th St., Long Beach, CA 90806

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 853 in two surface lots and one parking structure (36 permit spaces)

- North Lot: 67 spaces
- South Lot: 92 spaces
- Southwest Structure: 694 spaces



LEGEND



Parking Facility

Blue Line



Willow Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	853	792	36	19	6
Time Period	Occupancy				
Weekday Daytime	88%	89%	78%	95%	50%
Weekday Evening	6%				
Weekend	13%				

*The reserved spaces consist of four for electric vehicle charging and two for Zipcar (carshare) service.

Parking Access

The Willow station has two surface parking lots and one parking structure. The north lot is one-way only and has one inbound lane and one outbound lane; this lot was not in use at the time of the facility survey. The south lot has two inbound and two outbound lanes. The parking structure has three access points, each with one inbound and one outbound lane. Two of the access points are located on 27th St., with the third entrance location within the adjacent shopping center's parking area


Total Lanes in: 6

Total Lanes out: 6

Parking User Groups

- Metro transit riders
- Teachers at Jackie Robinson Academy (west of South lot) based on observation
- Due to proximity to the following uses:
 - Long Beach Memorial patients/visitors/employees (across Long Beach Blvd. from the station) which has paid parking
 - Employees/customers of the adjacent shopping center

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	6	4	67%
Bike Rack Spaces	16	1	6%

Bicycle Infrastructure Rating: Low

There are no bicycle lanes on Willow St. or Long Beach Blvd. The cul-de-sac of 27th St. at the station is the start of Bike Route 42 which leads to the LA River trail. This is a signed bike route, and is classified as a 'low comfort' route by the City.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

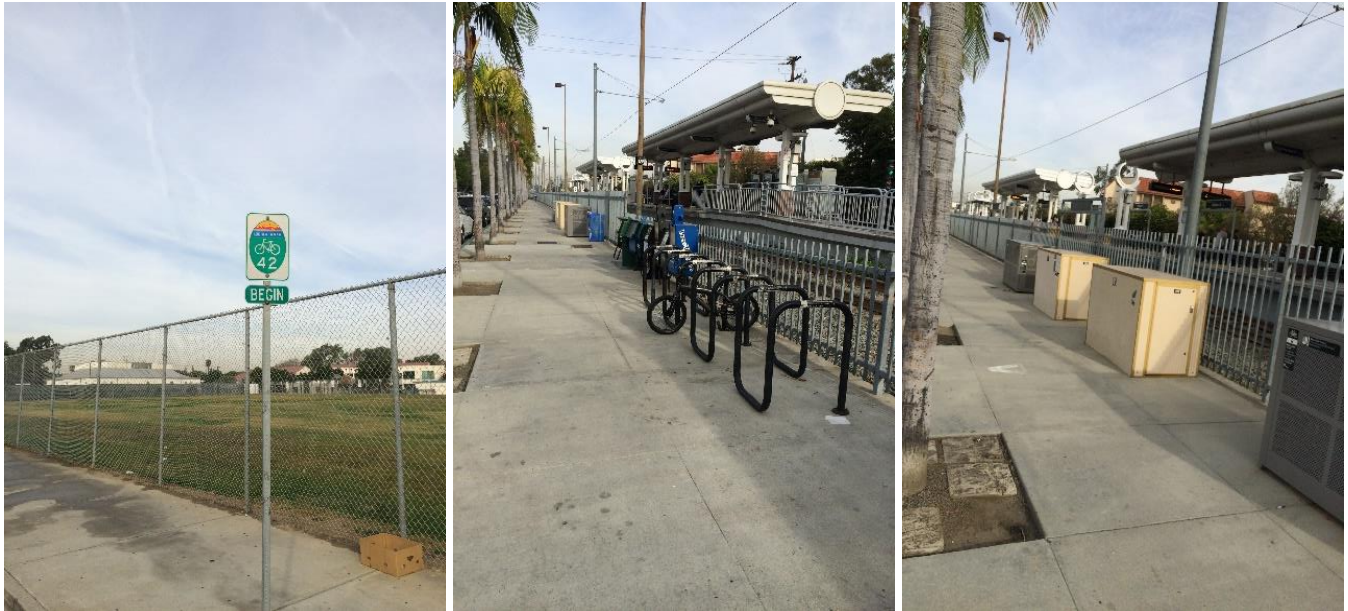


Photo 24: Beginning of Bike Path (L); Bike Racks Adjacent to Station Platform (C); Bike Lockers Adjacent to Station Platform (R)

Pedestrian Infrastructure Rating: High

Sidewalks are in good condition and provide very good access to the station area. ADA walkways are present and well striped.



Photo 25: ADA Walkway Leading to Station Platform

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs on adjacent streets and the typically-found Metro monument signs are absent, or well-hidden making identifying parking entrances more challenging. There is a Metro sign attached to the shopping center's monument at the entrance on Long Beach Blvd., but none at the Willow St. entrance. This is a large monument entrance to the structure within the shopping center, but this is not visible to passing motorists on Willow St. The North Lot was empty but motorists are not made aware of this.



Photo 26: Large Monument Sign at Entry to Parking Structure (L); Small Metro Sign on Shopping Center Monument Sign (R)



Photo 27: Parking Structure Signage at Willow St. Entrance

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – BLUE LINE STATIONS

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the South Lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Spaces in the North Lot or on the roof of the Parking Structure would be the best locations for vanpool parkers since these are the least desirable spaces for Blue Line riders.

Facility Upkeep

The lot was clean and free of trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lots is good.

Lighting

North Lot minimum lighting level of service is E. South Lot minimum lighting level of service is E. Southwest Structure third floor minimum lighting level of service is E. Southwest Structure roof minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve parking wayfinding among facilities, in particular directing motorists to North Lot
- Improve parking signage at facility entrances
- Upgrade lighting
- Improve bicycle infrastructure near station

APPENDIX B – EXPO LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

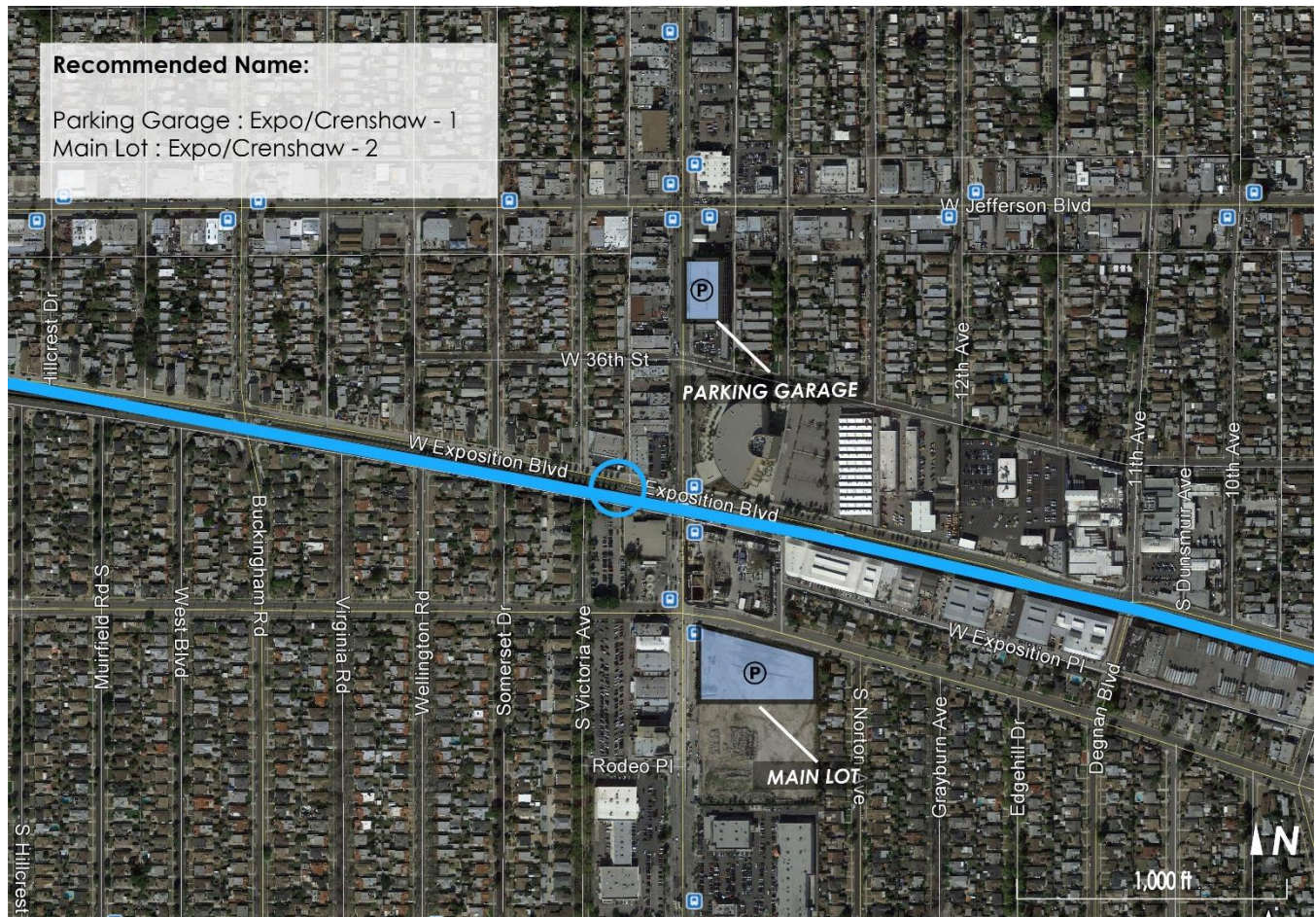
EXPO/CRENSHAW

Address: 3485 Crenshaw Blvd., Los Angeles, CA 90018

Owner: West Los Angeles Church of God

Operator: West Los Angeles Church of God

Total Number of Parking Spaces: 225 in one parking structure (no permit spaces) available to Metro patrons from 2:00 AM Monday until 2:00 AM Sunday; surface lot may serve the Crenshaw line in the future



Recommended Name:
 Parking Garage : Expo/Crenshaw - 1
 Main Lot : Expo/Crenshaw - 2

LEGEND



Parking Facility

Expo Line



Expo/Crenshaw Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	225	215	N/A	10	N/A
Time Period	Occupancy				
Weekday Daytime	52%	55%	N/A	0%	N/A
Weekday Evening	N/A				
Weekend	N/A				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Parking Access

Metro has an agreement to provide transit parking at the West Los Angeles Church of God parking structure from 2:00 AM Monday until 2:00 AM Sunday. The parking structure is served by one full access location of Crenshaw Blvd., and one exit-only driveway at the alley east of the garage. There is a second ingress only driveway on Jefferson that is not in use at this time. Exiting the garage onto Crenshaw and turning left onto Jefferson Blvd. can be challenging.


Total Lanes in: 1

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- West Los Angeles Church of God staff and visitors
- Several work trucks belonging to the same electrical contractor were observed

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	20	0	0%

Bicycle Infrastructure Rating: Medium

There is a bike lane on Exposition Blvd. adjacent to the Expo Line tracks. There are no other bicycle facilities in the vicinity of the station. Bicycle racks are adjacent to the station platform.



Photo 28: Bicycle Racks Adjacent to Station Platform

Pedestrian Infrastructure Rating: High

The sidewalks on Crenshaw Blvd. are wide and in good condition. Sidewalks are present on all roadways in the immediate vicinity of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 29: Sidewalk along Crenshaw Blvd. Crossing Exposition Blvd. (L); Sign at Pedestrian Exit of Parking Garage (R)

Parking Signage and Wayfinding Rating: Low

There is a banner on the side of the parking structure that says “Metro Parking Available.” The station monument signs are on Crenshaw Blvd. at the station and are large and visible from the roadway. There are no parking wayfinding signs on the local St. system, including Crenshaw Blvd., directing patrons to the parking structure.

Potential Carshare Locations

Spaces closest to the structure entrance/exit may be the best candidates for any carshare spaces.

Potential Vanpool Locations

Spaces on the roof of the parking structure are the best candidates for vanpool parkers as these are the least convenient for Expo Line riders.

Facility Upkeep

There was some trash on the floor in the parking structure.

Facility Maintenance

The lighting in the parking structure is visibly poor, even during the daytime. But it does appear to be adequately maintained.

Pavement Conditions

The roof of the parking structure appears to have never been used, as does most of P5.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 30: Roof of Parking Garage

Lighting

No evening lighting measurements were taken at this location, however low lighting levels inside the parking structure were observed during the daytime.

Safety

No issues were observed.

Security

The lighting in the parking structure gives it a cavernous, constricting feel, even during the daytime. The stairwells also feel restricted, and the need to open and close a gate to enter/exit as a pedestrian also lends itself to a claustrophobic feeling.

Recommendations

For the existing leased parking structure:

- Improve wayfinding to station parking
- Introduce bicycle lockers
- Upgrade lighting
- Increase safety patrols

When the Crenshaw line opens, a surface lot may be added or parking for patrons may remain in the parking structure. Approximately 300 spaces are expected to be available at this station once the Crenshaw line opens.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

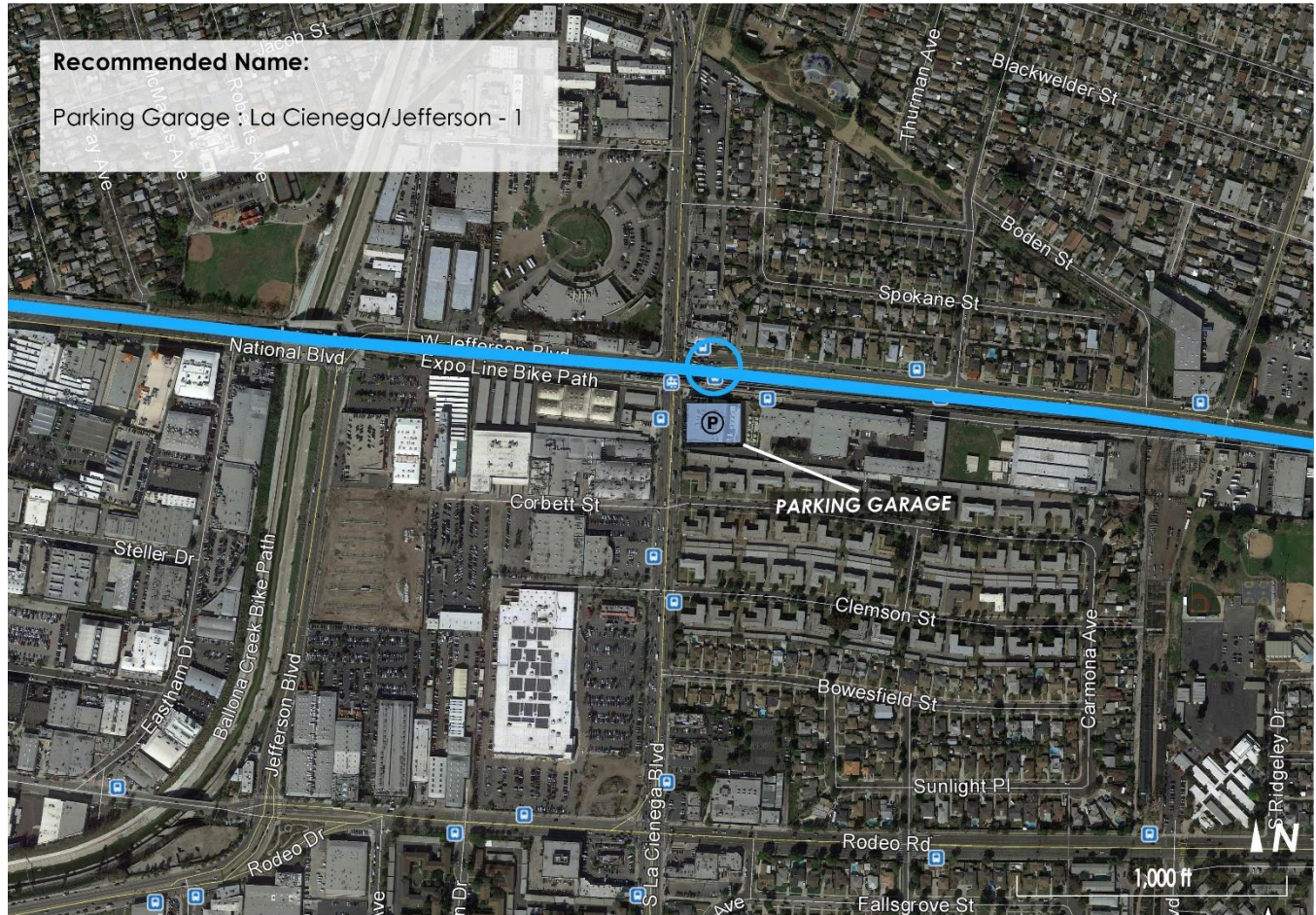
LA CIENEGA/JEFFERSON

Address: 3420 South La Cienega Blvd., Los Angeles, CA 90016

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 494 in one parking structure (no permit spaces)



Recommended Name:
 Parking Garage : La Cienega/Jefferson - 1

LEGEND

-  Parking Facility
-  Expo Line
-  La Cienega/ Jefferson Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	494	483	N/A	9	2
Time Period	Occupancy				
Weekday Daytime	68%	67%	N/A	89%	100%
Weekday Evening	23%				
Weekend	100%				

*The two reserved spaces are for Zipcar (carshare).

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

The La Cienega/Jefferson station is served by one parking structure. There is one three-quarters access driveway on Jefferson Blvd. (left-turns out are prohibited) and one right-in/right-out only driveway on La Cienega Blvd. It is challenging at times to turn right out of the driveway on La Cienega Blvd., and generally impossible to exit on La Cienega and get into the left-turn pocket to travel westbound on Jefferson Blvd. In general with the turning restrictions at the site access points, it is not possible to exit the parking structure and travel westbound on Jefferson Blvd. or southbound on La Cienega Blvd.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Nearby businesses

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	8	8	100%
Bike Rack Spaces	21	1	4%

Bicycle Infrastructure Rating: Medium

The Expo Line bicycle path terminates at this station. It runs from the Culver City station to the La Cienega/Jefferson station. There are sharrows on Jefferson Blvd. west of La Cienega Blvd., and bicycle lanes on Jefferson Blvd. east of La Cienega Blvd. Bicycle lockers are inside the garage while bicycle racks are under the platform on the west side of La Cienega Blvd.



Photo 31: Bicycle Racks underneath Station Platform

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 32: Bicycle Lockers inside the Garage

Pedestrian Infrastructure Rating: High

Sidewalks are present on all roadways. Sidewalks on La Cienega are wide, but unbuffered from a very busy roadway. The sidewalk on the north side of Jefferson west of La Cienega is narrow and substandard, with light poles obstructing the sidewalk in several locations. The sidewalk on the south side of Jefferson west of La Cienega has been replaced by the Expo Line bike path. While the pedestrian infrastructure is good, crossing La Cienega at its intersection with Jefferson can be challenging given the congestion at the intersection, and frequent occurrence of vehicle queues blocking the crosswalks.



Photo 33: Sidewalk along La Cienega Blvd. Looking North (L); Sidewalk along La Cienega Blvd. Looking South (R)

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Parking Signage and Wayfinding Rating: Medium

There are some parking wayfinding signs on the adjacent roadways such as a sign on westbound Jefferson Blvd. at the entrance to the parking structure, and signs pointing to the parking structure on northbound La Cienega. There are no wayfinding signs on eastbound Jefferson Blvd. or southbound La Cienega Blvd. No signage on southbound La Cienega Blvd. is a critical gap because drivers from the north must turn left onto Jefferson to be able to enter the parking structure.



Photo 34: Parking Entrance Signage



Photo 35: Parking Wayfinding Signage along Jefferson Blvd.

Potential Carshare Locations

The non-ADA spaces, non-permit spaces next to the car share spaces in the parking structure would be the most likely location for future carpool spaces when demand exists for them.

Potential Vanpool Locations

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Spaces on the top of the parking structure would be the best vanpool parking locations as these spaces are the least convenient for Expo Line riders.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking structure is good.

Lighting

Basement minimum lighting level of service is E. Roof minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed in the parking structure. However, a homeless person was observed sleeping by one of the elevators to the platform on the west side of La Cienega Blvd.

Recommendations

- Improve wayfinding to station parking
- Increase bike lockers
- Upgrade lighting
- Improve safety on sidewalks near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

CULVER CITY

Address: 8817 Washington Blvd., Culver City, CA 90232

Owner: City of Culver City

Operator: Metro

Total Number of Parking Spaces: 568 in one surface lot (no permit spaces) which will close in February 2017 for development of the lot



LEGEND



Parking Facility

Expo Line



Culver City Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	568	556	N/A	12	N/A
Time Period	Occupancy				
Weekday Daytime	99%	100%	N/A	58%	N/A
Weekday Evening	53%				
Weekend	100%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Parking Access

The Culver City station has one surface lot. There is one full access driveway on Washington Blvd. and one full access driveway on National Blvd. Technically, the driveway at National Blvd. is for ingress only as there is a "Do Not Enter" sign when leaving the parking lot from this driveway. This sign is routinely ignored. It is challenging at times to turn left out of either driveway. There is also a right-in/right-out only driveway on Venice Blvd. that has been closed for some time due to construction.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Businesses across the St. from the parking lot on National due to a cluster of vehicles observed in the back of the lot along National well before the parking lot had filled up

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	23	20	87%
Bike Rack Spaces	44	17	39%

Bicycle Infrastructure Rating: High

The Expo Line bicycle path starts at the Culver City station and continues to the east. There are bicycle lanes on Venice Blvd. to the north of the station. Bicycle racks and lockers are located near the escalators leading to the platform.



Photo 36: Bicycle Racks and Lockers

Pedestrian Infrastructure Rating: High

Sidewalks are present on Venice Blvd., Washington Blvd. and National Blvd., and are generally in good condition. The sidewalk on National Blvd. adjacent to the parking lot has some obstructions and uneven pavement. There is a lot of pedestrian activity within the lot, as students from Alexander Hamilton High School take the train to the Culver City station and walk through the parking lot on their path to school.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 37: Students from Hamilton High School Crossing Through the Lot (L); Sidewalk along National Blvd. (R)

Parking Signage and Wayfinding Rating: Low

There is no wayfinding signage on Venice Blvd. directing patrons to the station, whether on foot or driving. There are only small signs at the entrances to the parking lot, which are easy to miss for motorists passing by. The directional signage within the parking is confusing and appears to be ignored; entering the lot at the Washington Blvd. driveway, motorists are immediately greeted with a no right-turn sign.

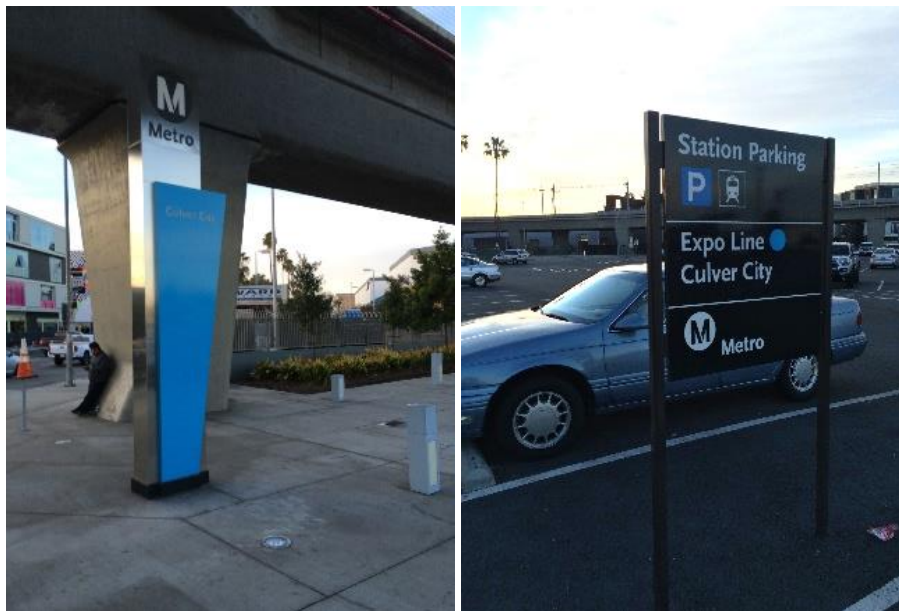


Photo 38: Station Monument Sign (L); Signage at Entry to Parking Lot (R)

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Potential Vanpool Locations

Spaces closest to National Blvd. would be most ideal for vanpool parkers as these are the least convenient for Expo Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lot was clean and free of trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is excellent.

Lighting

Minimum lighting level of service is C.

Safety

There is a striped pedestrian walkway through the parking lot between the platform and National Blvd., which may create conflict points between pedestrians and motorists. However, pedestrians make their way through the lot as they see fit.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at facility entrances
- Increase bike lockers
- Increase enforcement
- Initiate permit parking at station for transit riders

This lot will be closing in February 2017, due to commencement of construction for the Ivy Station development. Until the development is complete, transit parking will temporarily be relocated to the City of Culver City Ince garage which is approximately 0.5 miles away. Transit parking at Ivy Station should follow the aforementioned recommendations. We recommend that interim transit parking at the Ince garage be priced as the number of transit parking spaces available is less than half of the current supply. And it will discourage potential poaching by those who use Metro but are attempting to park at Ince to go somewhere in Downtown Culver City.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

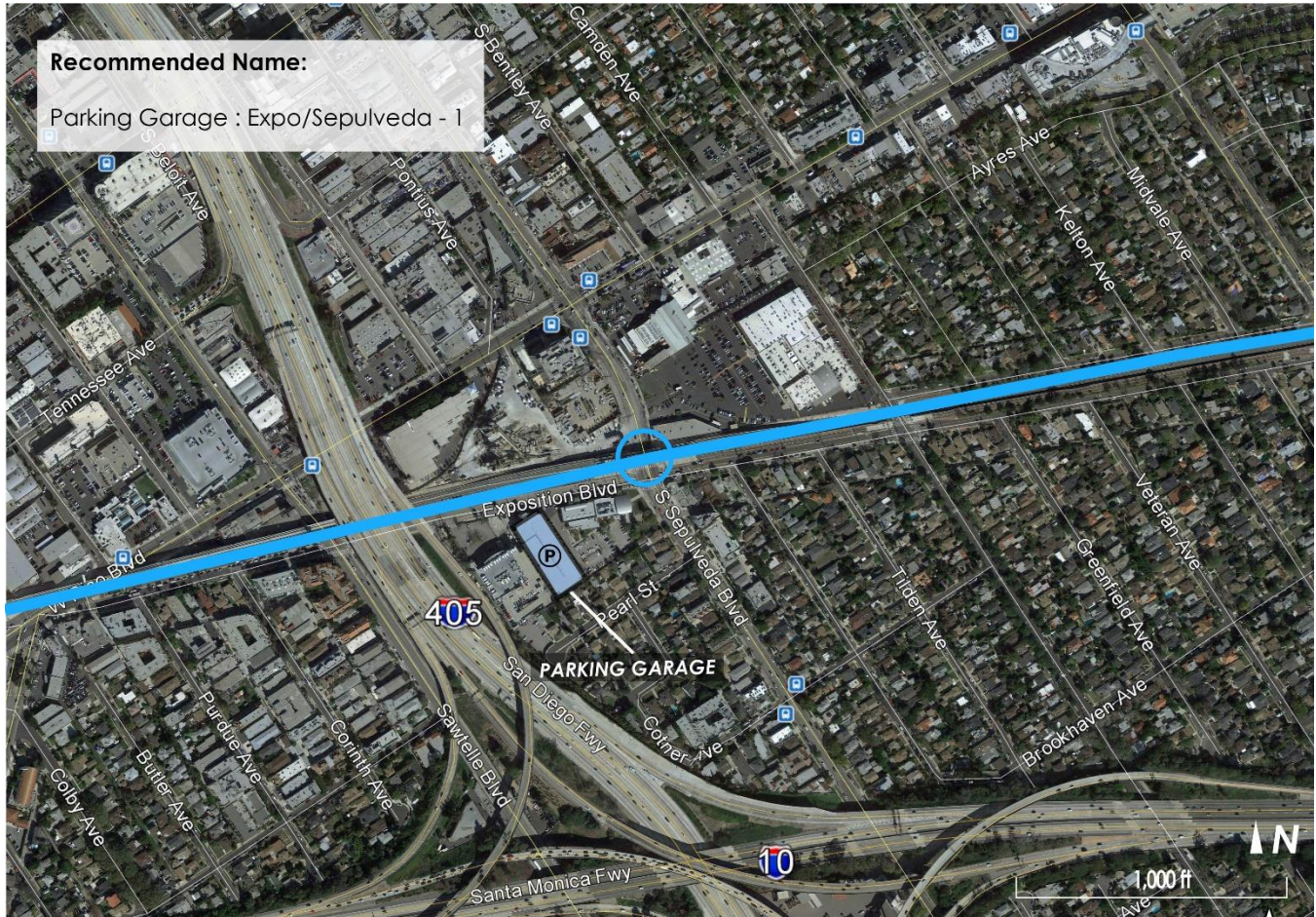
EXPO/SEPULVEDA

Address: 11214 Exposition Blvd., Los Angeles, CA 90064

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 260 structured spaces (all paid spaces)



Recommended Name:
 Parking Garage : Expo/Sepulveda - 1

LEGEND



Parking Facility

Expo Line



Expo/Sepulveda Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	260	N/A	241	7	12
Time Period	Occupancy				
Weekday Daytime	7%	N/A	6%	14%	8%
Weekday Evening	8%				
Weekend	10%				

*Permit spaces are a mixture of monthly permits and daily permits.

*Reserved spaces are three carshare and nine carpool spaces.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Parking Access

The parking structure for the station is accessible on Exposition Blvd.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	16	16	100%
Bike Rack Spaces	20	6	30%

Bicycle Infrastructure Rating: Medium

The Expo Line Bike Path runs parallel to the Expo Line. There are no other Class I or Class II bicycle facilities providing direct access to the station. There is no signage indicating where bicycle parking is located, however the facilities are easy to locate being near to the escalators to the platform.



Photo 39: Expo Line Bike Path

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 40: Bicycle Parking Located Near Platform Escalators

Pedestrian Infrastructure Rating: High

The station is well-connected by sidewalks along Sepulveda Blvd. and the Expo Line Bike Path.

There is a small sign for an Uber waiting area; however, it is unclear where exactly this area is located.



Photo 41: Sidewalk underneath Station Platform Area

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 42: Pedestrian Crosswalks Providing Access to Station

Parking Signage and Wayfinding Rating: Low

There are parking wayfinding signs on Exposition Blvd., attached to the support pillars of the train tracks. These signs are not highly visible to motorists traveling along Sepulveda Blvd.



Photo 43: Small Sign Directing Motorists to Parking

Potential Carshare Locations

If spaces for carshare are desired, non-ADA spaces in the parking structure that are closest to the pedestrian entrance/exit from the structure would be ideal.

Potential Vanpool Locations

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Spaces on the southern end of the roof of the structure are the most ideal for vanpool parking as these spaces are the least desirable for Expo Line riders.

Facility Upkeep

The parking structure is clean and free of trash/debris.

Facility Maintenance

The parking facility is brand new and appears to be well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Third floor minimum lighting level of service is D. Roof minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed. At the time of our visit, there was a parking attendant at the parking structure, which provides some level of security.

Recommendations

- Improve wayfinding signage to station parking
- Upgrade lighting

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

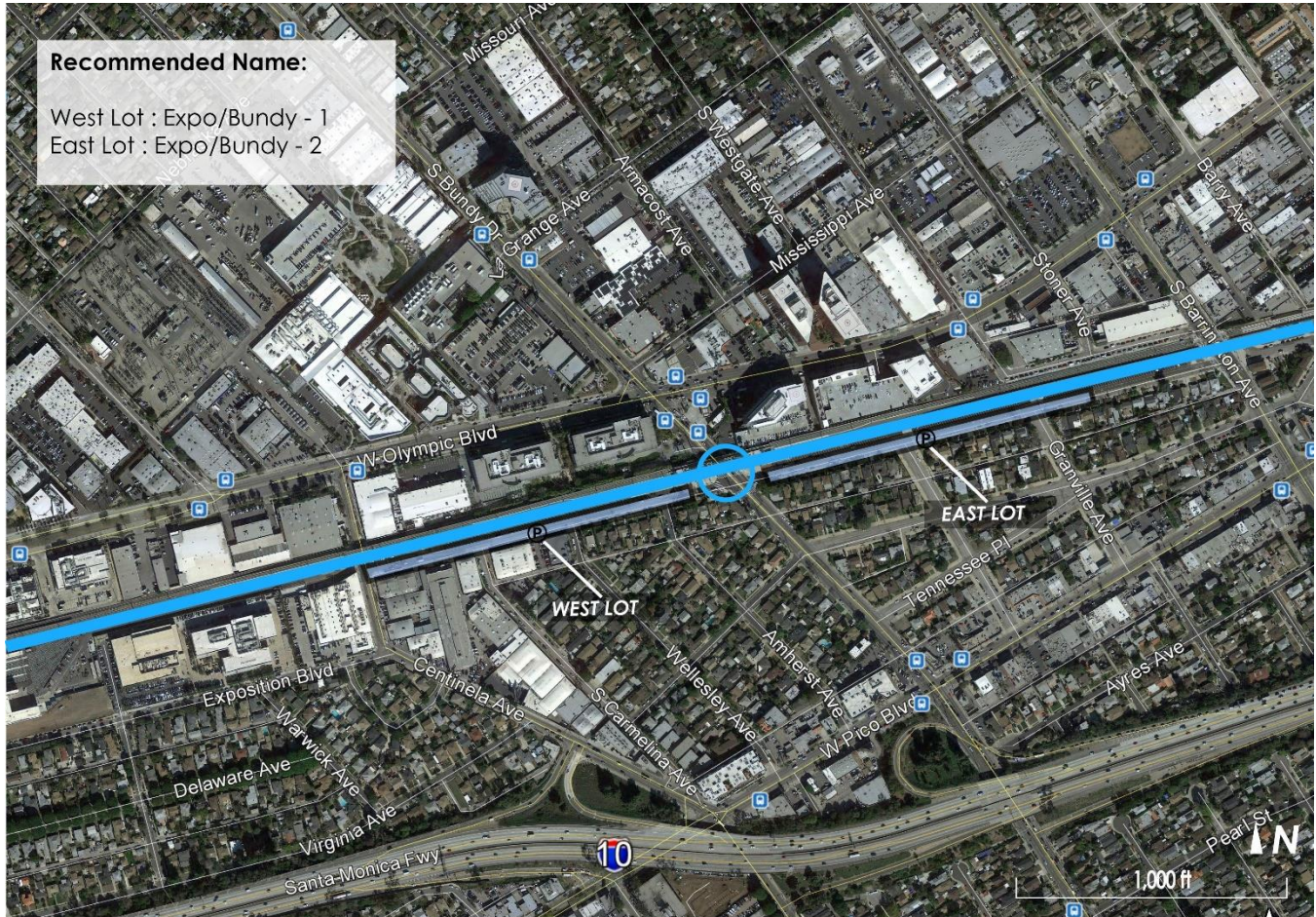
EXPO/BUNDY

Address: 2101 S. Bundy Drive, Los Angeles, CA 90064

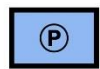
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 217 on-street (all paid spaces)



LEGEND



Parking Facility

Expo Line



Expo/Bundy Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	217	N/A	206	8	3
Time Period	Occupancy				
Weekday Daytime	11%	N/A	11%	0%	33%
Weekday Evening	6%				
Weekend	11%				

*Permit spaces are a mixture of monthly permits and daily permits. Some spaces appear unfinished and have no signage.

*Reserved spaces are for Zipcar (carshare).

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM


FACILITY ASSESSMENT – EXPO LINE STATIONS

The parking for the station is accessible on Exposition Blvd., and is angled on-street parking.

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	16	16	100%
Bike Rack Spaces	20	6	30%

Bicycle Infrastructure Rating: Medium

The Expo Line Bike Path runs parallel to the Expo Line. There are no other Class I or Class II bicycle facilities providing direct access to the station. There is no signage indicating where bicycle parking is located, however the facilities are easy to locate being near to the escalators to the platform.

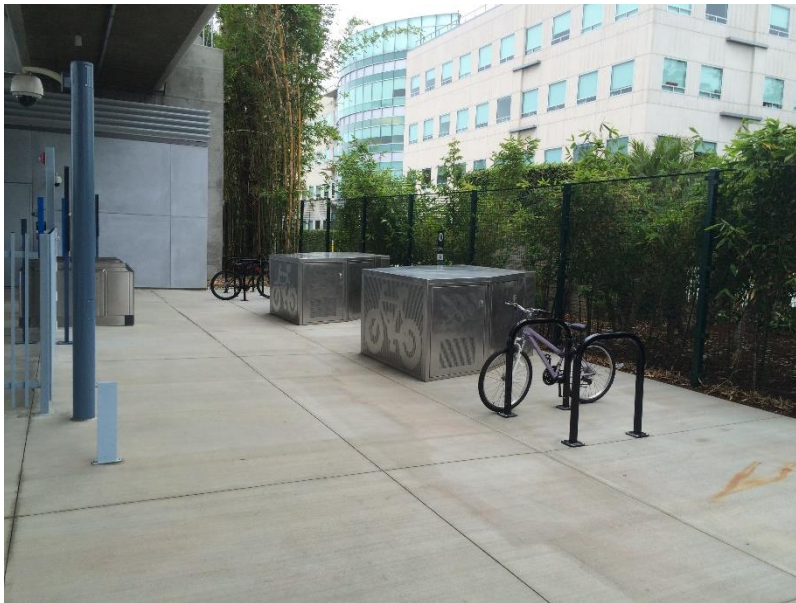


Photo 44: Bicycle Parking Located Near Platform Escalators

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 45: Expo Line Bike Path

Pedestrian Infrastructure Rating: High

The station is well-connected by sidewalks along Bundy Drive and the Expo Line Bike Path.

There is a small sign for an Uber waiting area; however, it is unclear where exactly this area is located.



Photo 46: Sidewalks near Station Platform

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 47: Small Sign Directing to Unclear Uber Waiting Area

Parking Signage and Wayfinding Rating: Low

There are no wayfinding signs on Exposition Blvd. or Bundy Drive that direct drivers heading to the parking. However, the location of the parking is fairly obvious since it is on-street parking and directly adjacent to the station.



Photo 48: Monthly Parking Permit Signage

Potential Carshare Locations

If spaces for carshare or vanpool are desired, spaces closest to Bundy Drive and the platform are the most ideal.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Potential Vanpool Locations

For vanpool parking, spaces furthest from Bundy Drive are recommended as these are the least desirable for Expo Line riders.

Facility Upkeep

The parking spaces are clean and free of trash/debris.

Facility Maintenance

The parking spaces are brand new and appear to be well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding signage to station parking

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

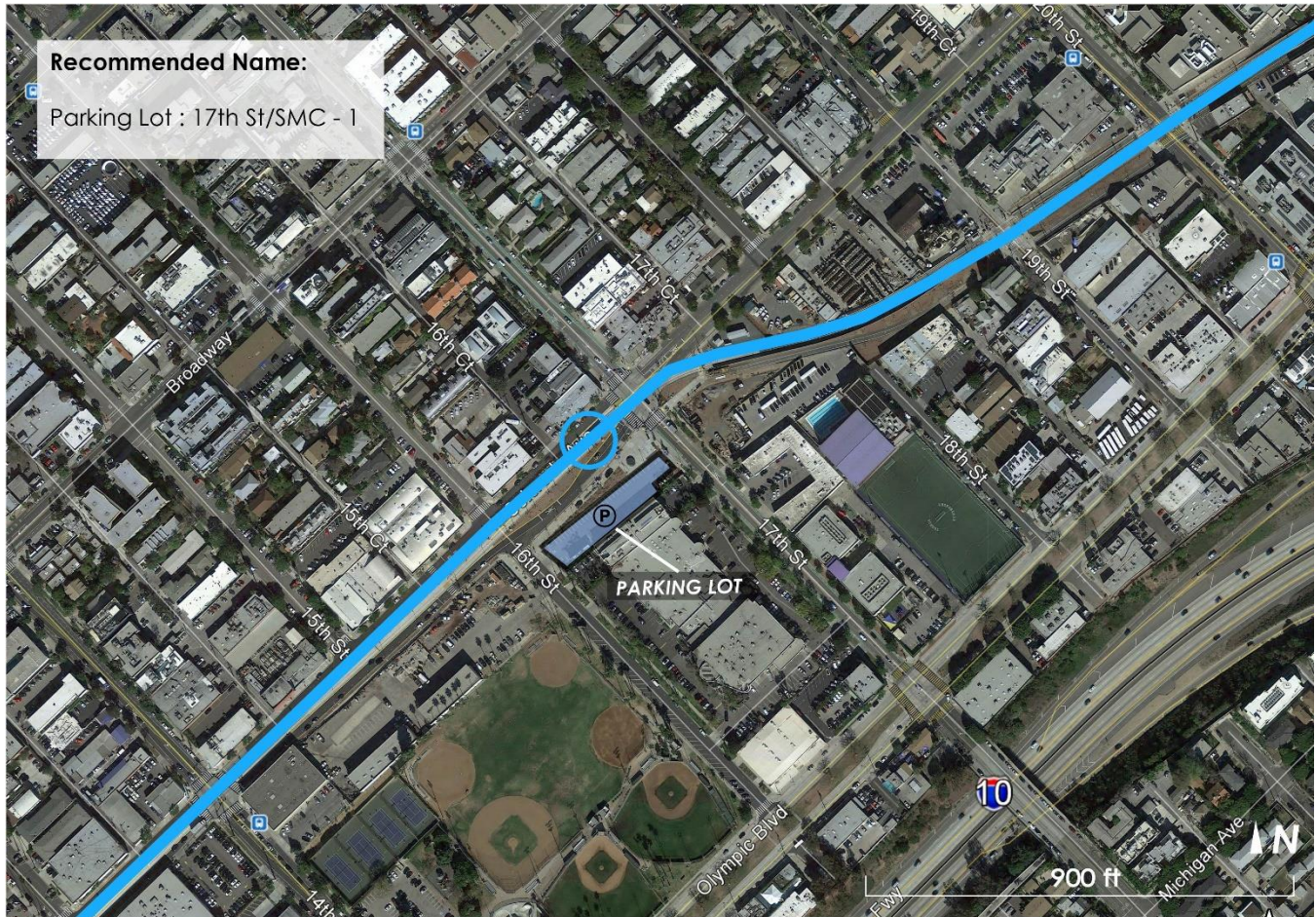
17TH ST./SMC

Address: 1610 Colorado Ave., Santa Monica CA 90404

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 65 in one surface parking lot (all paid spaces)



LEGEND



Parking Facility

Expo Line



17th St. / SMC Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	65	N/A	54	3	8
Time Period	Occupancy				
Weekday Daytime	25%	N/A	24%	0%	38%
Weekday Evening	17%				
Weekend	28%				

*Six reserved spaces are for clean air vehicles, and two are for car share vehicles.

*Permit spaces are a mixture of monthly permits (13 spaces) and daily permits (41 spaces).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Parking Access

The parking lot is accessible on 16th St., which is a one-way St. in the northbound direction. There is no access from eastbound Colorado Ave.; motorists must turn right onto 17th St., right onto Olympic Blvd., and then right onto 16th St. to legally access the parking lot.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	32	32	100%
Bike Rack Spaces	40	7	18%

Bicycle Infrastructure Rating: High

The Expo Line Bike Path originates/terminates at 17th St. adjacent to the 17th/SMC station. There is a Class II bicycle lane on 17th St., as well as on 14th St. Bike lockers and racks are located north of the tracks adjacent to the parking lot. Additionally, there is a Breeze Bike Share station adjacent to the station with 25 bicycle racks. There is no signage indicating where bicycle parking is located, however the bike racks and lockers have good visibility, from both Colorado Ave. and 17th St., and are fairly easy to locate.



Photo 49: Bike Lockers and Racks Adjacent to Parking Lot

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 50: Breeze Bike Share Station

Pedestrian Infrastructure Rating: Medium

The station is well-connected by sidewalks along Colorado St. and 17th St.

There is a pick-up/drop-off area located on 16th St. adjacent to the parking lot, as well as a pick-up/drop-off area located on Colorado Ave. north of the tracks. There is a small sign for an Uber waiting area; however, it is unclear where exactly this area is located.



Photo 51: Station Monument Sign

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS



Photo 52: Sidewalk along Colorado Ave.

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs on 17th St. or Olympic Blvd. that direct drivers heading to the parking lot. Drivers coming to the station for the first time, may have difficulty finding the parking lot's only ingress point, which is located on 16th St., a one-way St.

Potential Carshare Locations

If spaces for carshare are desired, spaces in the parking lot closest to Colorado Ave. and 17th St. are a good location as these are closest to the platform.

Potential Vanpool Locations

Spaces closest to 16th St. would be the best for vanpool parking as these are the least convenient for Expo Line riders.

Facility Upkeep

The parking lot was clean and free of trash/debris.

Facility Maintenance

The parking lot is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – EXPO LINE STATIONS

Recommendations

- Improve wayfinding signage to station parking

APPENDIX C – GOLD LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

ATLANTIC

Address:

Parking Structure – 255 South Atlantic Blvd., Los Angeles, CA 90022

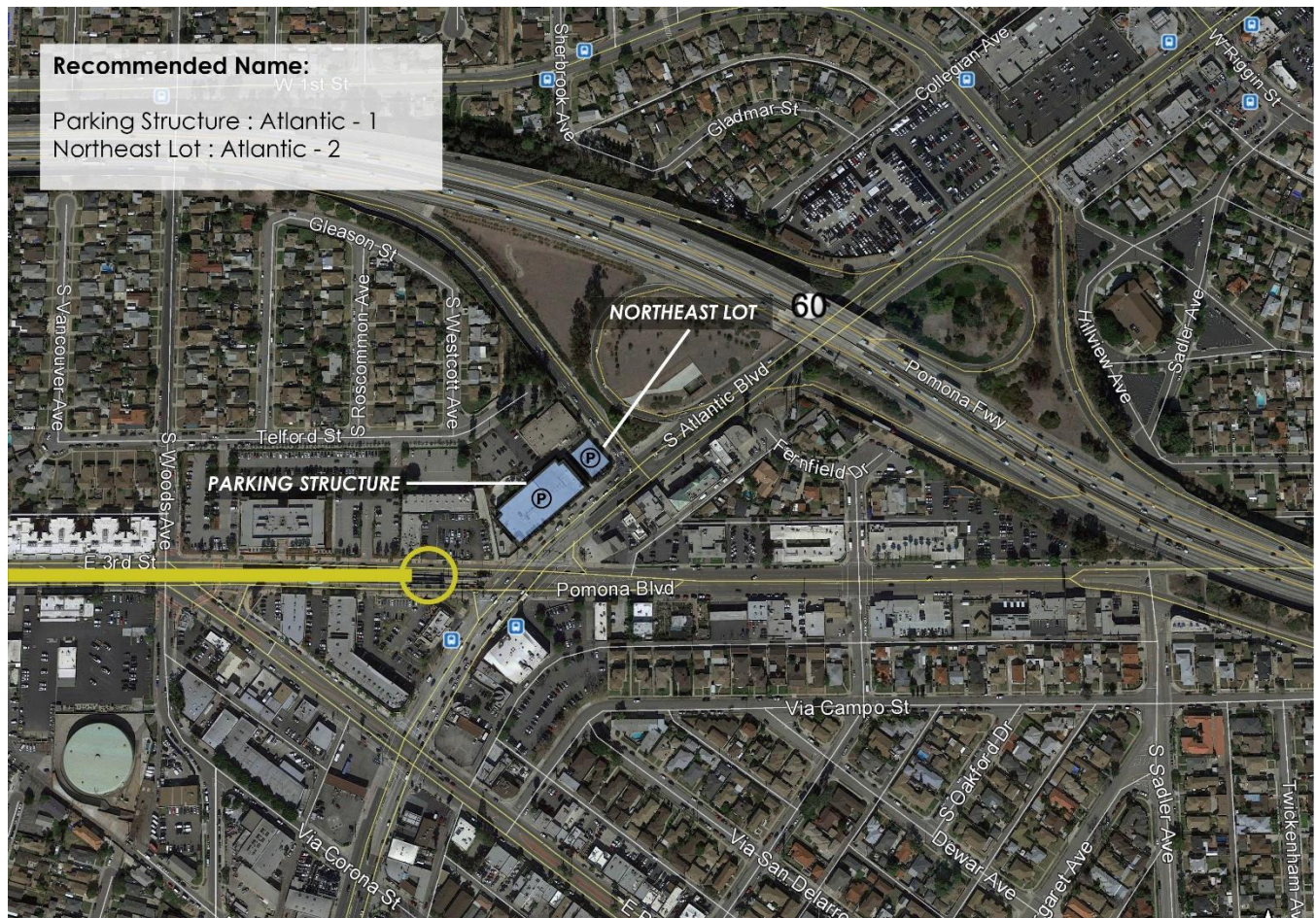
Northeast Lot – 255 South Atlantic Blvd., Los Angeles, CA 90022

Owner: Metro

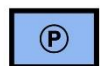
Operator: Metro

Total Number of Parking Spaces: 284 in one structure and one surface lot (24 permit spaces)

- Parking Structure: 262 spaces
- Northeast Lot: 22 spaces



LEGEND



Parking Facility

Gold Line



Atlantic Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	284	251	24	7	2
Time Period	Occupancy				
Weekday Daytime	75%	78%	46%	100%	0%
Weekday Evening	4%				
Weekend	20%				

*The two reserved spaces are for sheriff vehicles.

Parking Access

The Atlantic station has a parking structure and a surface lot. Each facility has one entry lane and one exit lane located off of southbound Atlantic Blvd.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Nearby businesses with more limited parking based on observations

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	6	5	83%
Bike Rack Spaces	12	1	8%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle lanes in the vicinity of the station. The bike racks and lockers are located near the intersection of Atlantic Blvd. and Pomona Blvd.



Photo 53: Intersection of Atlantic Blvd. and Pomona Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 54: Bicycle Lockers at Intersection of Atlantic Blvd. and Pomona Blvd.

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity to the station from the surrounding area including from the parking facilities. However, there is one portion along Atlantic Blvd. in front of the parking structure that is slightly narrow.



Photo 55: Sidewalk along Pomona Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 56: Sidewalk along Atlantic Blvd.

Parking Signage and Wayfinding Rating: Low

There is no parking wayfinding signage directing drivers to either the parking structure or surface lot. A driver not familiar with the parking must pay attention for signage mounted on the parking structure and surface lot fence which can be difficult to see when approaching. Since access to the parking is only along southbound Atlantic Blvd., a driver may easily miss the surface lot. Also, the entrance to the parking structure is south of the exit lane along Atlantic Blvd., which may result in drivers entering the exit lane.



Photo 57: No Visible Signage While Driving on Atlantic Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 58: Signage at Entrance to Parking Structure

Potential Carshare Locations

Non-ADA spaces, currently designated for permit holders, closest to the platform on the southern end of the parking structure are the best candidates for addition of carshare spaces.

Potential Vanpool Locations

Spaces in the northeast lot or on the roof of the parking structure are the best location for vanpool parking as these are the least desirable spaces for Gold Line riders.

Facility Upkeep

The parking facilities were clean and free of trash/debris.

Facility Maintenance

The parking facilities appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the structure and surface lot are good.

Lighting

Parking structure first floor minimum lighting level of service is D. Parking structure roof minimum lighting level of service is E. Northeast Lot minimum lighting level of service is D.

Safety

There is a dangerous situation at the exit-only lane of the parking structure as a driver may mistakenly enter into that lane which may result in a head-on collision.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve parking wayfinding among facilities
- Improve parking signage at facility entrances, especially to prevent entering from the exit lane
- Increase bicycle lockers
- Upgrade lighting
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

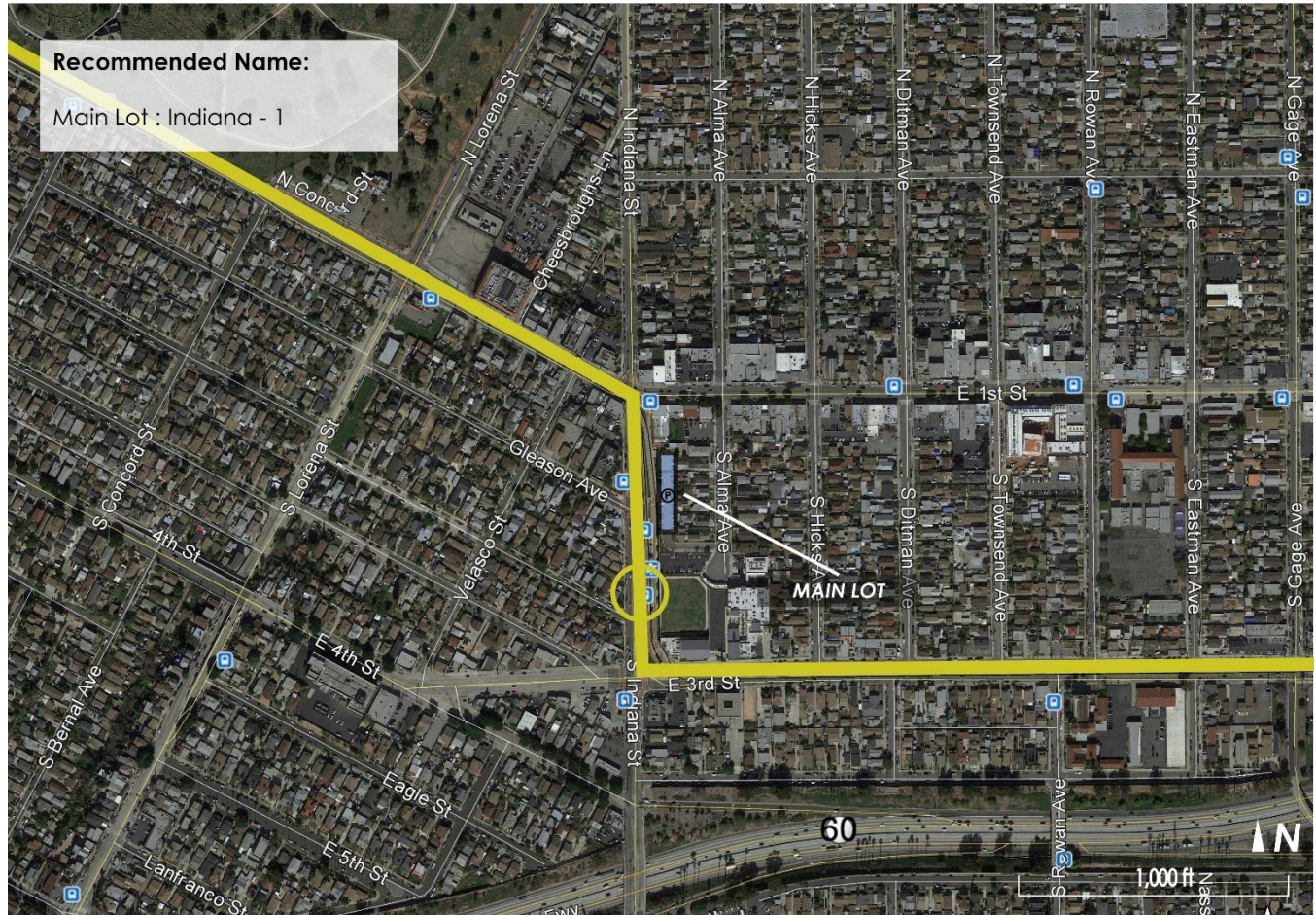
INDIANA

Address: 177 South Alma Ave., Los Angeles, CA 90063

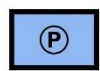
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 42 in one surface lot (5 permit spaces)



LEGEND



Parking Facility

Gold Line



Indiana Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	42	33	5	2	2
Time Period	Occupancy				
Weekday Daytime	71%	82%	0%	50%	100%
Weekday Evening	10%				
Weekend	19%				

*The two reserved spaces are Zipcar spaces.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The Indiana lot offers access from Alma Ave. which is a dead-end St. off of East 1st St. There is one entry lane and one exit lane.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- Individuals from Ramona High School due to cluster of cars parked in back of lot near the school

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	10	0	0%

Bicycle Infrastructure Rating: Low

No Class I or Class II bicycle facilities in the vicinity of the station. On-site bike racks are located adjacent to the surface lot but are difficult to find.



Photo 59: Bike Racks

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 60: East 1st St. which Provides Access to Parking Lot

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity to the station with sidewalks that are in good condition. Adequate wayfinding directs riders who park to either train platform.

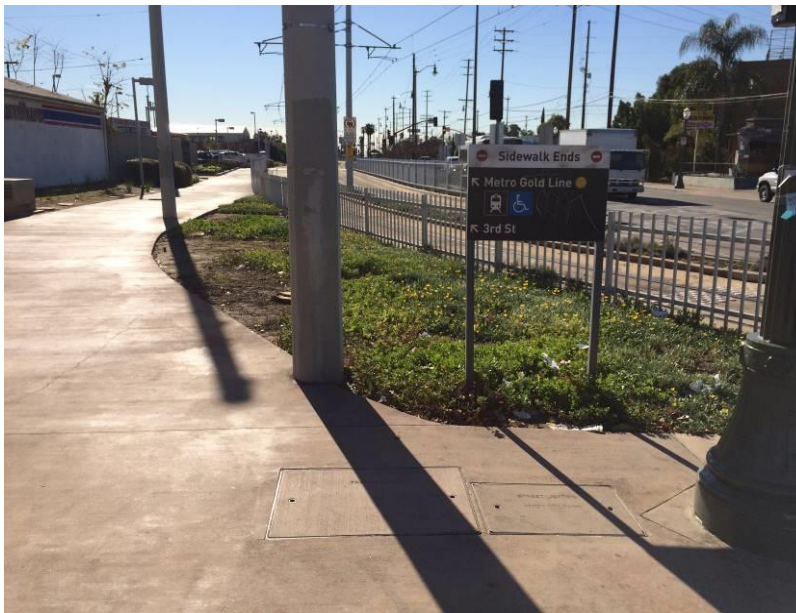


Photo 61: Sidewalk along Indiana St.

Parking Signage and Wayfinding Rating: Medium

There is parking wayfinding signage along East 1st St. that directs riders who drive to the lot. The signage could be increased in size. The entrance to the parking lot is easy to drive past as there is no sign after turning off of Alma Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

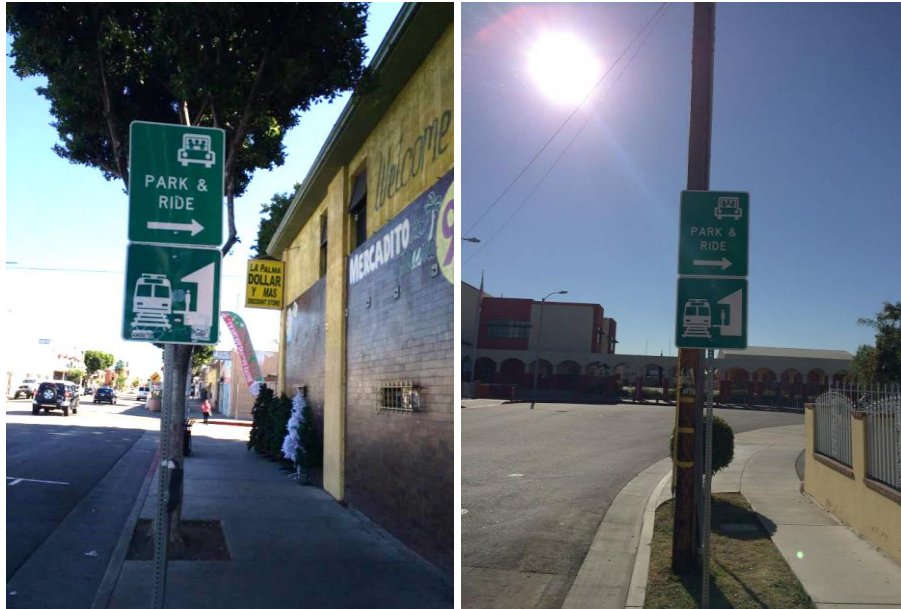


Photo 62: Wayfinding Signage on East 1st St. (L); Wayfinding Signage on Alma Ave. (R)

Potential Carshare Locations

If additional spaces for carshare are desired, the spaces adjacent to the existing carshare spaces are good candidates.

Potential Vanpool Locations

Ideal vanpool parking spaces are those in the northern end of the lot, as these are least desirable for Gold Line riders.

Facility Upkeep

The parking lot was clean and free of trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve parking signage at lot entrance
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

For Union Station, refer to Red Line section.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

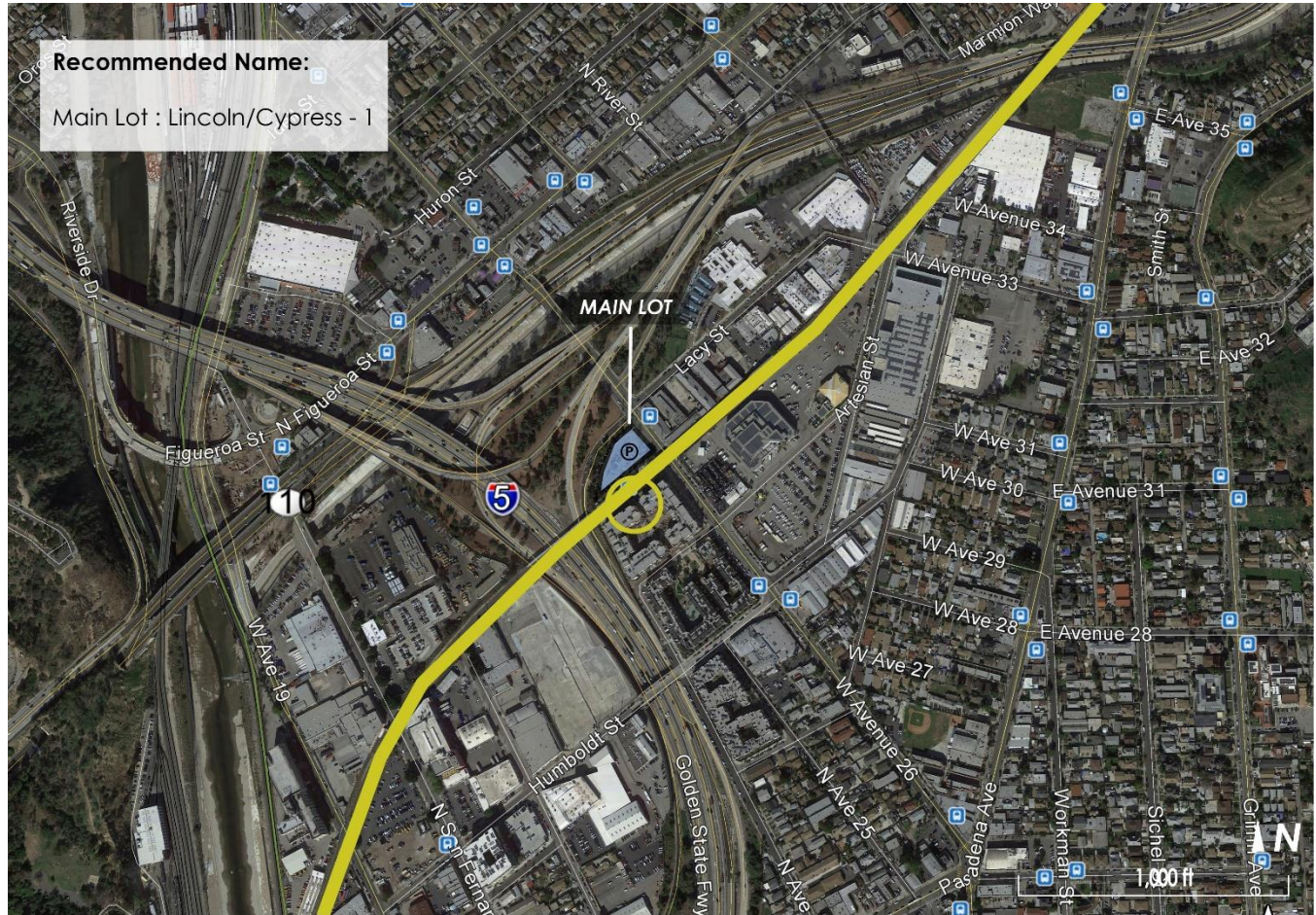
LINCOLN/CYPRESS

Address: 370 West Ave. 26, Los Angeles, CA 90031

Owner: City of Los Angeles

Operator: Metro

Total Number of Parking Spaces: 94 in one surface lot (15 permit spaces)



Recommended Name:
Main Lot : Lincoln/Cypress - 1

LEGEND



Parking Facility

Gold Line



Lincoln/Cypress Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	94	73	15	4	2
Time Period	Occupancy				
Weekday Daytime	95%	100%	87%	25%	100%
Weekday Evening	26%				
Weekend	36%				

*The two reserved spaces are for Zipcar.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The Lincoln/Cypress lot offers one entry and exit lane from Ave. 26. Turning left on to Ave. 26 can be challenging during peak traffic periods.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	10	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. On-site bike racks are located adjacent to Platform 2 (towards East Los Angeles).



Photo 63: Bike Racks Adjacent to Platform 2

Pedestrian Infrastructure Rating: Medium

There are sidewalks along Ave. 26 providing access to the station area. To cross Ave. 26, there is a signalized crosswalk at Lacy St. to the north of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

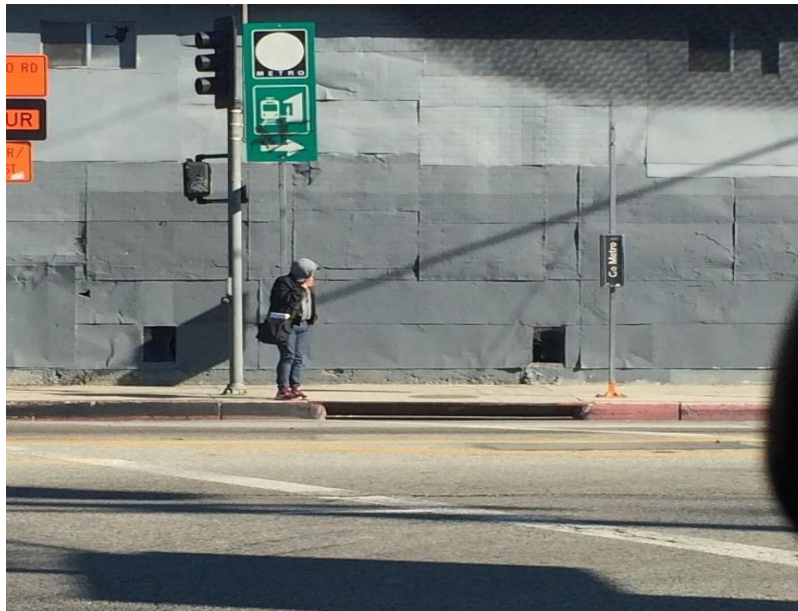


Photo 64: Crosswalk at Lacy St.



Photo 65: Sidewalk along Ave. 26

Parking Signage and Wayfinding Rating: Medium

There are wayfinding signs along Ave. 26 that identify the station location and a sign that points to the parking lot. There is a wayfinding sign at the end of the off-ramp onto Ave. 26 from I-110 as well as at the I-5 northbound transition to I-110. The station monument sign helps identify the parking as it is next to the parking lot entrance.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 66: Station Monument Sign next to Parking Lot Entrance

Potential Carshare Locations

If additional spaces for carshare are desired, there is one space between the Zipcar and ADA spaces that would be a good candidate.

Potential Vanpool Locations

Ideal locations for vanpool parking are those spaces on the north side of the lot closest to Ave. 26, as these spaces are the least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lot was clean and free of trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is a bit faded and the pavement quality is good.

Lighting

Minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed in the parking lot. There were some homeless living along Ave. 26 which may deter some riders from walking to and from the station or waiting for the bus near the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Upgrade lighting
- Restripe spaces
- Improve safety on sidewalks near station
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

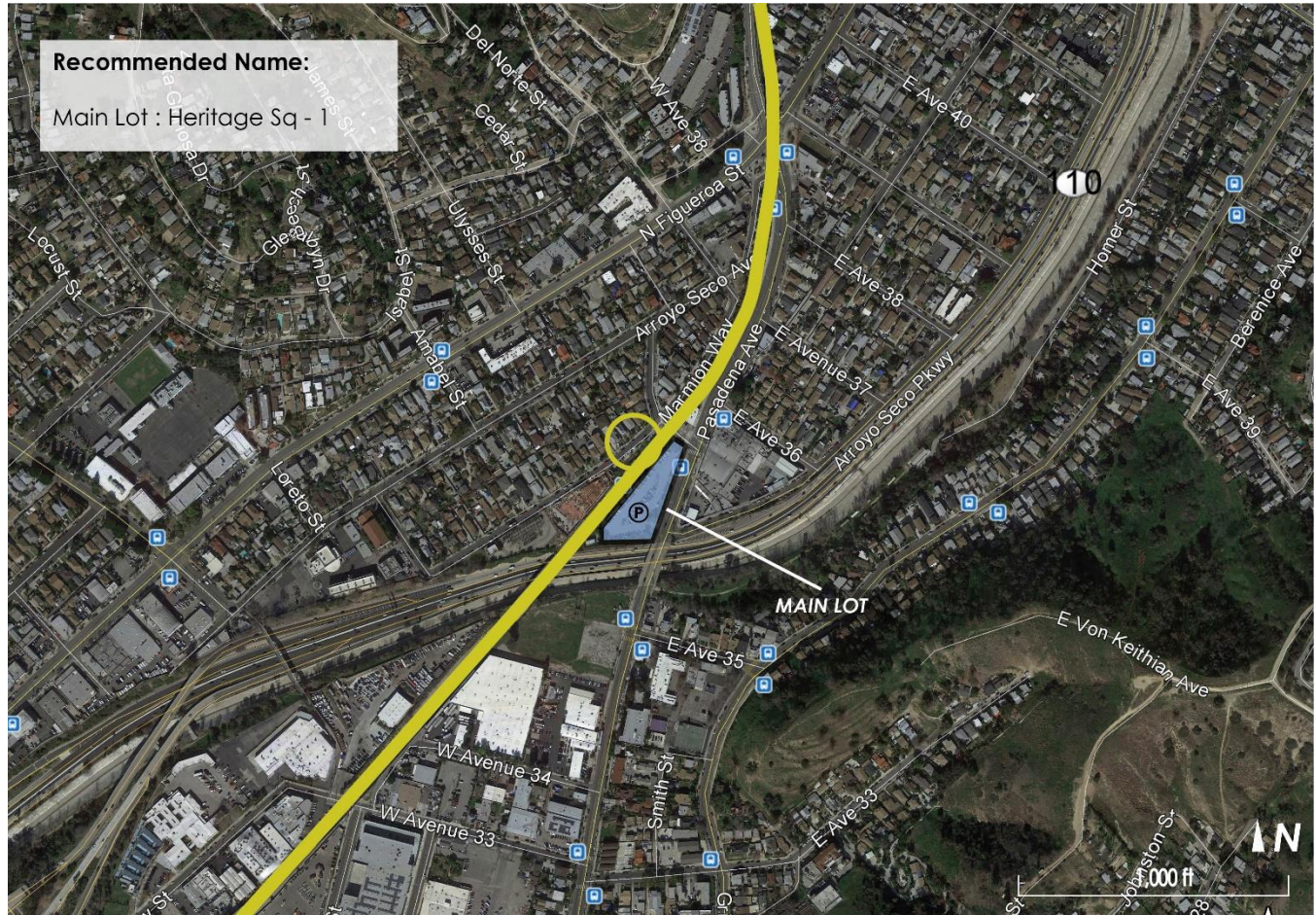
HERITAGE SQUARE

Address: 3545 Pasadena Ave., Los Angeles, CA 90031

Owner: Metro

Operator: Metro

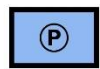
Total Number of Parking Spaces: 129 in one surface lot (11 permit spaces)



Recommended Name:

Main Lot : Heritage Sq - 1

LEGEND



Parking Facility

Gold Line



Heritage Square Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	129	115	11	3	N/A
Time Period	Occupancy				
Weekday Daytime	98%	100%	100%	33%	N/A
Weekday Evening	19%				
Weekend	16%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The Heritage Square lot offers access from Pasadena Ave. There is one entry lane and one exit lane. Turning left out of the lot may be challenging during periods of heavy traffic.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- Possibly nearby residents/businesses due to cluster or cars parked near entrance

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	4	1	25%

Bicycle Infrastructure Rating: Low

No Class I or Class II bicycle facilities in the vicinity of the station. On-site bike racks are located adjacent to the platform along Marmion Way and can be difficult to find if a bicyclist is expecting them to be adjacent to the parking lot.



Photo 67: Bike Racks Adjacent to Platform along Marmion Way

Pedestrian Infrastructure Rating: Medium

There is good pedestrian connectivity to the station with sidewalks that are in good condition. Adequate wayfinding directs riders who park to either train platform.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 68: Sidewalk along Pasadena Ave.

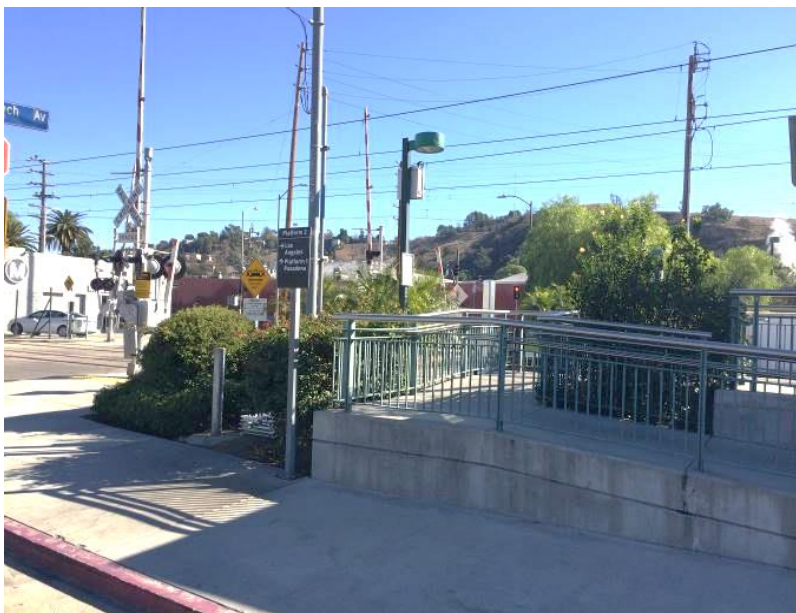


Photo 69: Sidewalk along Marmion Way

Parking Signage and Wayfinding Rating: Medium

There is parking wayfinding signage along Pasadena Ave. from both directions that directs riders who drive to the lot. The signage could be increased in size. There is no signage at the lot entrance.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 70: Wayfinding Signage along Pasadena Ave.

Potential Carshare Locations

Non-ADA spaces closest to the platform are the most ideal location for carshare spaces.

Potential Vanpool Locations

Spaces in the southern end of the lot are the most ideal for vanpool parking, as these are the least desirable spaces for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

There was some litter on the ground in the parking lot.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Improve parking signage at lot entrance
- Introduce bicycle lockers
- Improve upkeep
- Increase number of permit parking spaces (10 additional)
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

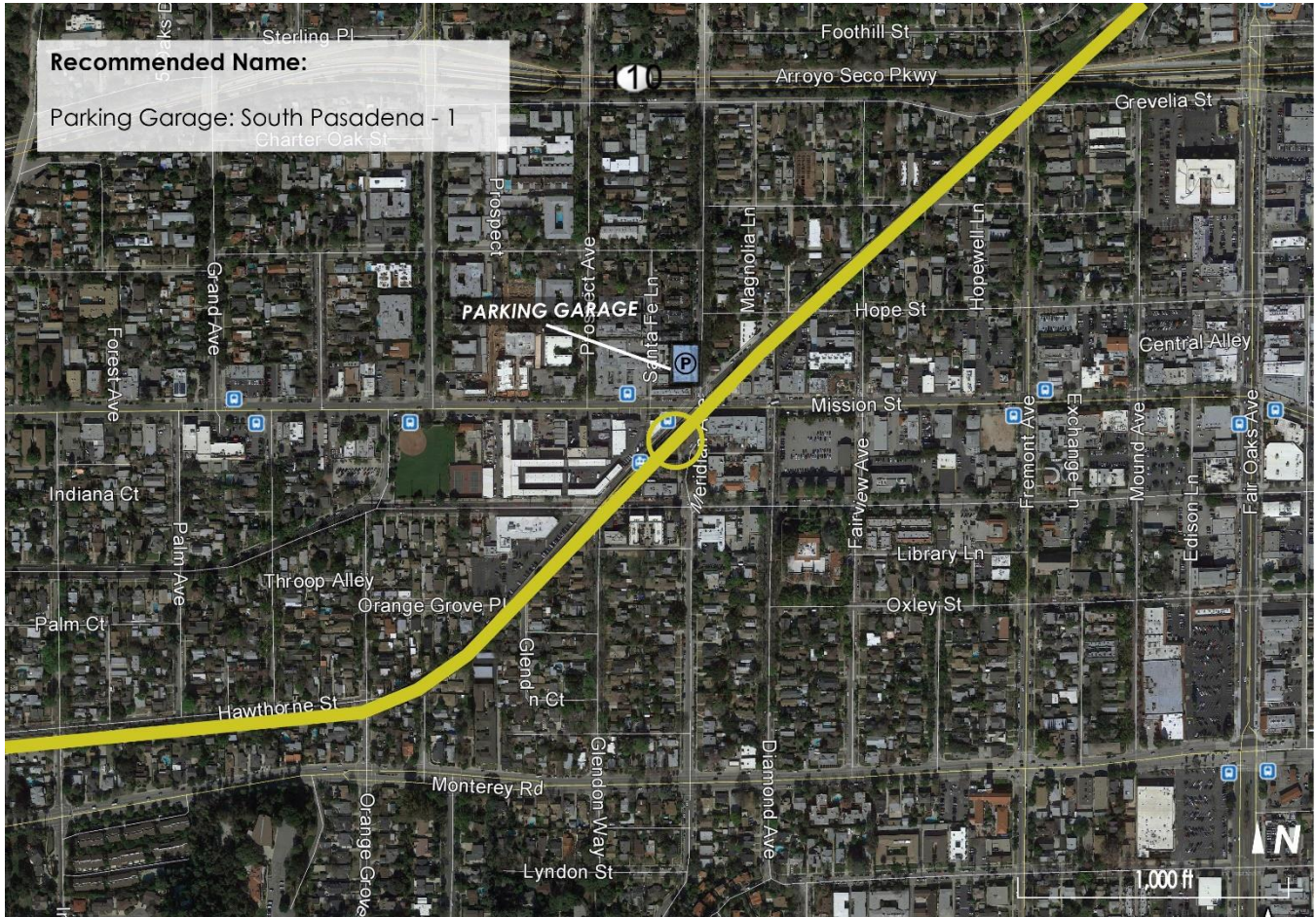
SOUTH PASADENA

Address: 807 Meridian Ave., South Pasadena, CA 91030

Owner: City of South Pasadena

Operator: City of South Pasadena

Total Number of Parking Spaces: 142 in one parking structure (all paid spaces)



LEGEND



Parking Facility

Gold Line



South Pasadena Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	142	N/A	136	6	N/A
Time Period	Occupancy				
Weekday Daytime	41%	N/A	43%	0%	N/A
Weekday Evening	11%				
Weekend	19%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The South Pasadena parking structure offers one entry lane and one exit lane from Meridian Ave. Due to the low traffic volumes on Meridian Ave., exiting right or left out of the parking structure is not too difficult.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- Any others who opt to pay the daily/monthly fee

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	24	6	25%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. On-site bike racks are located in the parking structure and also near the platform bound towards Sierra Madre Villa station. There is no signage directing bicyclists to bike parking in the parking structure



Photo 71: Bike Racks in Parking Structure

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 72: Bike Racks near Station Platform

Pedestrian Infrastructure Rating: High

There is good sidewalk connectivity to the station area. Sidewalks are wide and in good condition. There is limited signage in the parking structure directing Metro riders to the station platform area.



Photo 73: Sidewalks near Station Platform (L); Sidewalk along Meridian Ave. (R)

Parking Signage and Wayfinding Rating: Low

There are no wayfinding signs directing Metro riders to the parking garage. The façade of the garage has a sign indicating parking but there is no Metro logo or anything that suggests that the garage is for transit riders.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 74: Parking Structure Entrance

Potential Carshare Locations

If spaces for carshare are desired, the best location are non-ADA spaces closest to the elevator, as these are the most convenient for accessing the station area.

Potential Vanpool Locations

The most ideal location for vanpool parking is the northwestern corner of the parking structure as these are the least desirable for Gold Line riders.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure appears to be generally well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good. The parking structure floor is dirty and would benefit from power washing. There are also areas where water puddles.

Lighting

Minimum lighting level of service is E.

Safety

Visibility of pedestrians is challenging at the garage entrance/exit crosswalk, even with the mirrors that are in place.

Security

There are some areas in the parking structure that are very dark as they separated by shear walls and could be higher risk areas from a security standpoint.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking structure entrance
- Upgrade lighting
- Powerwash
- Improve bicycle infrastructure near station

User-friendliness would also be improved with a simpler payment system that allows one-time payment for those who are infrequent riders who park at this parking structure.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

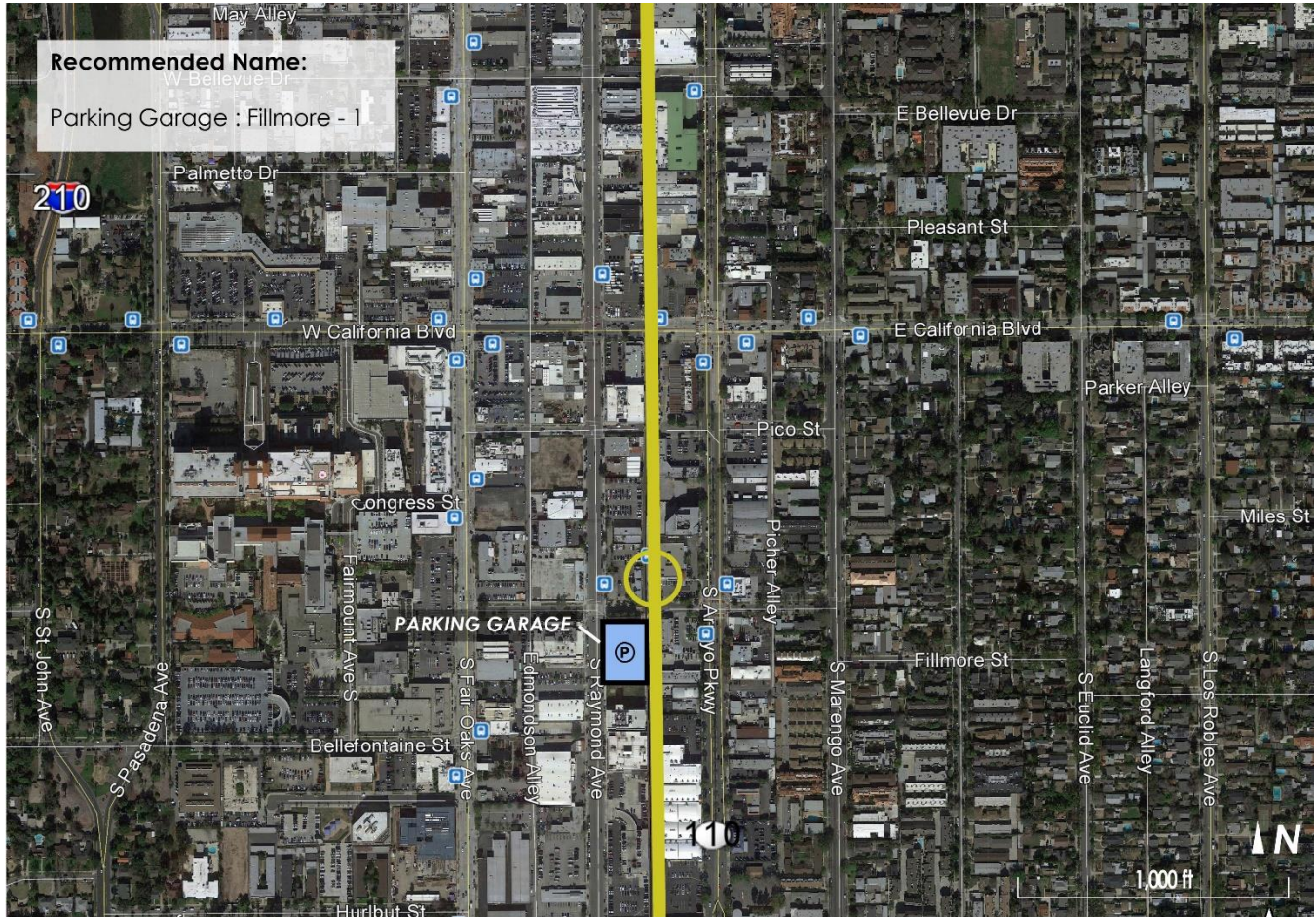
FILLMORE

Address: 750 South Raymond Ave., Pasadena, CA 91105

Owner: Fillmore Raymond MOB LLC

Operator: Fillmore Raymond MOB LLC

Total Number of Parking Spaces: 155 on top two floors of a parking structure (all paid spaces)



LEGEND



Parking Facility

Gold Line



Fillmore Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	155	121	30	4	N/A
Time Period	Occupancy				
Weekday Daytime	86%	98%	50%	25%	N/A
Weekday Evening	5%				
Weekend	15%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The Fillmore parking structure offers one lane in from and one lane out to Raymond Ave. The Metro parking area is located on the top two floors of the garage so Metro riders who park must pull a ticket at the entry and drive through the medical office building parking area before arriving to a nested parking area that requires insertion of the ticket to enter and exit.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	20	2	10%

Bicycle Infrastructure Rating: Low

No Class I or Class II bicycle facilities in the vicinity of the station. Bike racks are located outside on ground level near the station platform area.



Photo 75: Bike Racks next to Sidewalk

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 76: Bike Racks Closer to Station Platform

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity to the station with wide sidewalks. Adequate wayfinding from the garage directs Metro riders who park at the station to ground level, where the platform is located.

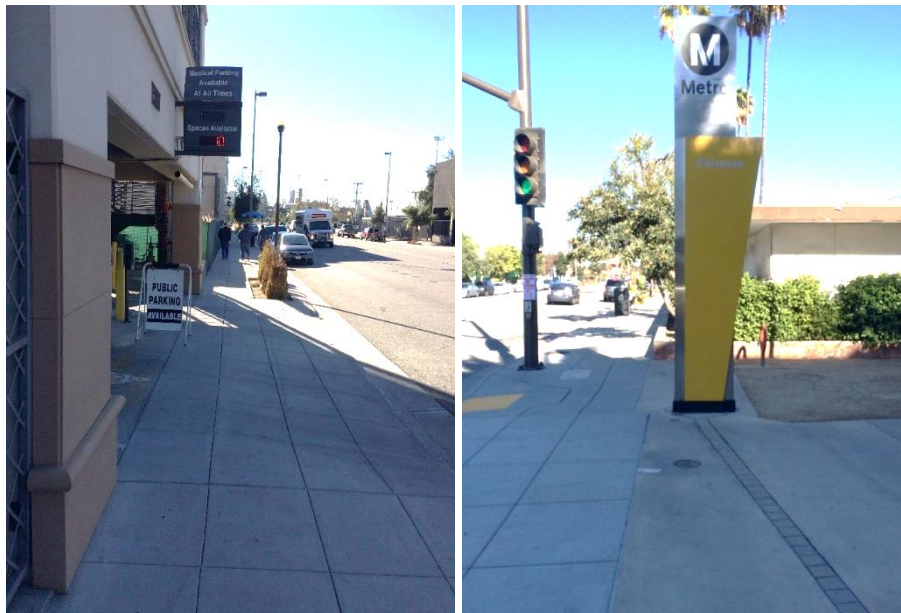


Photo 77: Sidewalk along Raymond Ave. Looking South (L); Sidewalk along Raymond Ave. Looking North (R)

Parking Signage and Wayfinding Rating: Low

There is no parking wayfinding signage along Raymond Ave. There is a parking space counter sign mounted perpendicular to the façade that can be seen from a distance while driving on Raymond Ave. but nothing that indicates Metro parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 78: Signage at Entrance to Parking Garage

Potential Carshare Locations

Non-ADA spaces on the first floor of the parking garage would be the best locations for carshare spaces within the parking structure. These would be outside of the Metro nested parking area and would require an agreement with the property owner.

Potential Vanpool Locations

Spaces on the roof furthest from the stairs are the most ideal for vanpool parking as these spaces are the least desirable to Gold Line riders.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Parking structure fourth floor minimum lighting level of service is E. Parking structure roof minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at parking structure entrance
- Upgrade lighting
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

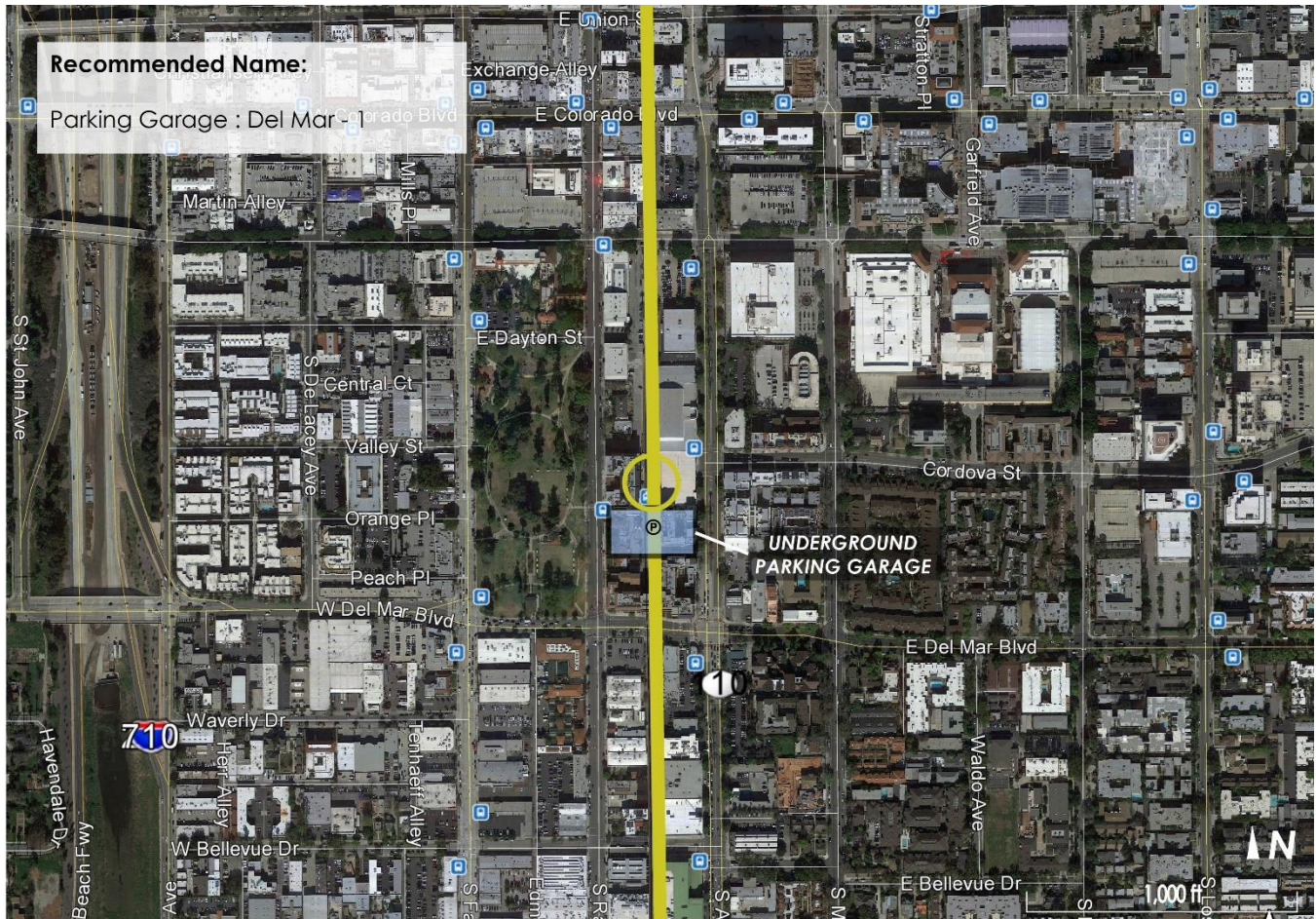
DEL MAR

Address: 202 South Raymond Ave., Pasadena, CA 91105

Owner: City of Pasadena

Operator: City of Pasadena

Total Number of Parking Spaces: 610 in one underground parking structure (all paid spaces)



LEGEND

- P Parking Facility
- Gold Line
- Del Mar Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	610	N/A	594	16	N/A
Time Period	Occupancy				
Weekday Daytime	38%	N/A	38%	19%	N/A
Weekday Evening	25%				
Weekend	25%				

Note that all counts include vehicles parked in spaces designated as “Retail Only” and the magnitude of vehicles in these spaces was much higher on weekday evening and weekend counts. Vehicles parked in other spaces may also have been parked for the purpose of visiting local retail establishments.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

Access to the Del Mar parking structure is available from both Raymond Ave. and Arroyo Parkway. There is one entry lane and one exit lane at each St.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- The following user groups due to the public-serving nature of the garage:
 - Retail customers and employees
 - Apartment visitors

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	24	5	21%

Bicycle Infrastructure Rating: Low

No Class I or Class II bicycle facilities in the vicinity of the station. On-site bike racks are located in a bike storage room that is not well-maintained.



Photo 79: Poorly Maintained Bicycle Storage Room

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 80: Entrance to Bicycle Room

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity to the station with wide sidewalks. There is adequate wayfinding from the garage to direct Metro riders who park to the station.

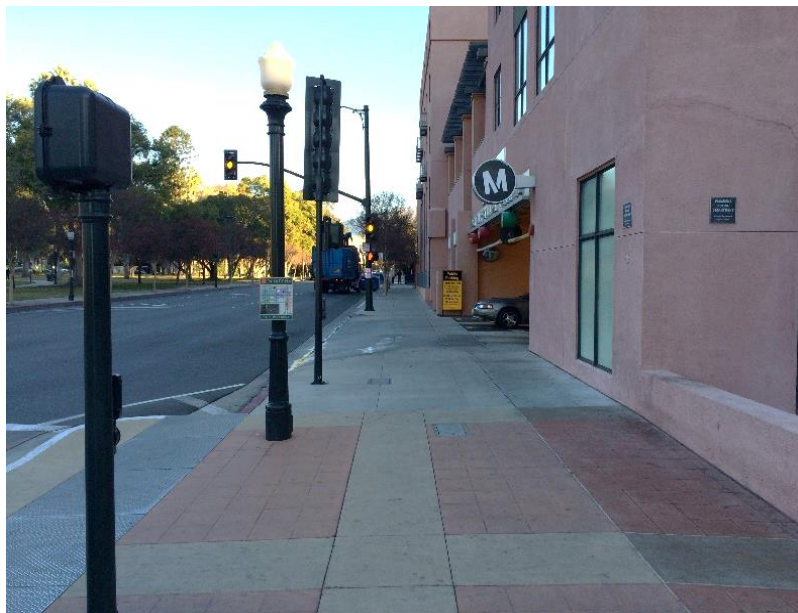


Photo 81: Sidewalk along Raymond Ave. Looking North

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 82: Sidewalk along Raymond Ave. Looking South

Parking Signage and Wayfinding Rating: Medium

There is some parking wayfinding signage along Raymond Ave. but none along Arroyo Parkway. There are Metro logos mounted perpendicular to the façade that can be seen from a distance while driving on Raymond Ave. and Arroyo Parkway.



Photo 83: Wayfinding Signage along Raymond Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 84: Metro Signage at Entrance to Parking Garage

Potential Carshare Locations

Non-ADA spaces on the first floor of the parking structure that are closest to the elevators would be the best locations for carshare spaces within the parking structure. There are currently two Zipcar spaces on Arroyo Parkway.

Potential Vanpool Locations

Spaces on the lowest floor of the parking structure would be the most ideal for vanpool parking as these are the least desirable for Gold Line riders.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good. However, the floors are dirty and would benefit from a power wash.

Lighting

Minimum lighting level of service is E.

Safety

Some vehicles were seen speeding through the garage (likely residents who are very familiar with the garage).

Security

Low lighting levels in areas coupled with being an underground parking structure can create areas where individuals may be more vulnerable to crime.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Introduce bicycle lockers
- Upgrade lighting
- Implement traffic calming
- Powerwash
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

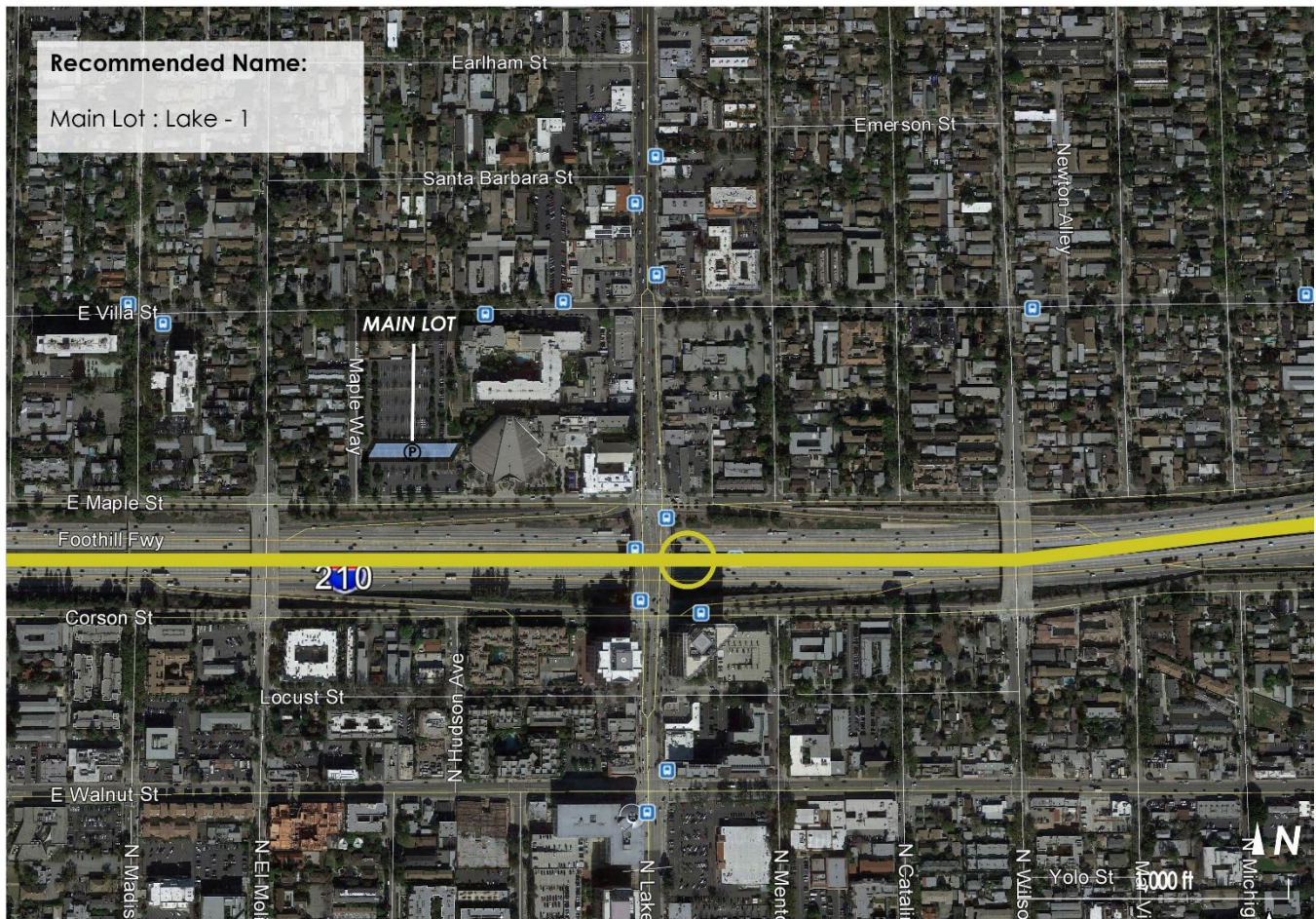
LAKE

Address: 367 Maple Way, Pasadena, CA 91101

Owner: Lake Ave. Church

Operator: Lake Ave. Church

Total Number of Parking Spaces: 22 in one surface lot (all permit spaces) Monday to Friday from 6:00 AM to 6:00 PM



LEGEND



Parking Facility

Gold Line



Lake Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	22	N/A	22	N/A	N/A
Time Period	Occupancy				
Weekday Daytime	73%	N/A	73%	N/A	N/A
Weekday Evening	18%				
Weekend	N/A				

The occupancy count data include Metro patron parking spaces only. However, based on where some vehicles parked, it appears that some Metro patrons may use church-specific parking spaces. There are church activities on weekday evenings and weekends and churchgoers occupy the Metro-designated spaces during that time.

Parking Access

The Lake lot offers access from Maple St., Maple Way and Villa St. In total there are four entry and four exit lanes, two of which are along Maple Way.


Total Lanes in: 4

Total Lanes out: 4

Parking User Groups

- Metro transit riders
- Churchgoers as the lot is owned by Lake Ave. Church

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	12	3	25%

Bicycle Infrastructure Rating: Medium

A Class II bicycle facility provides access to the station. On-site bike racks are located at St. level along Lake Ave. to the northwest and southwest of the station platform.

Pedestrian Infrastructure Rating: Medium

There is only one east/west crossing at Maple St. and Lake Ave. as well as at Corson St. and Lake Ave. Sidewalks in the area are wide and in good condition. Limited signage directs those who park to the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 85: Pedestrian Crosswalks at Intersection of Maple St. and Lake Ave. (L); Sidewalk along Lake Ave. (R)

Parking Signage and Wayfinding Rating: Low

There are parking wayfinding signs on Lake Ave. directing drivers to Maple St. and then a sign on Maple St. directing them to the parking lot. However, there are no signs in the lot directing drivers to the Metro parking spaces. There are no visible signs on other streets.



Photo 86: Wayfinding Signage on Lake Ave.

Potential Carshare Locations

If spaces for carshare are desired, spaces closest to the station would be preferable. These are currently spaces that are designated for church parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Potential Vanpool Locations

Ideal spaces for vanpool parking are those in the northwest corner of the lot, which are currently designated for church parking.

Facility Upkeep

The parking lot was clean and free of trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed in the parking lot. There was a homeless encampment around the bicycle racks at the corner of Lake Ave. and Maple St. which may deter individuals from walking to the station platform from the parking lot or it requires a rider to cross Lake Ave. to access the platform in order to avoid the homeless encampment.



Photo 87: Bike Racks Covered by Homeless Encampment

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding within facility
- Introduce bicycle lockers
- Upgrade lighting
- Improve safety on sidewalks near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

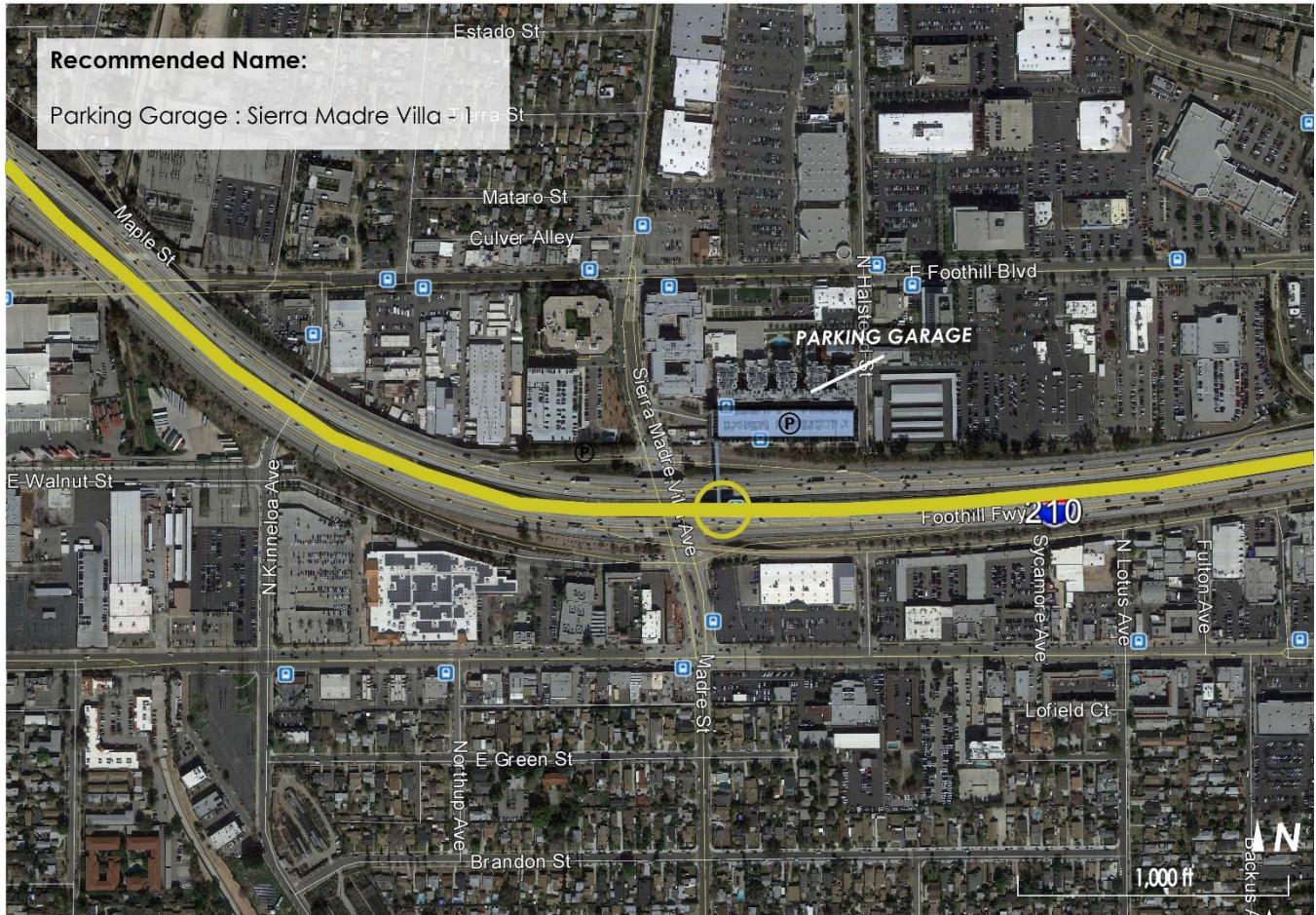
SIERRA MADRE VILLA

Address: 149 North Halstead St., Pasadena, CA 91107

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 965 in one parking structure (124 permit spaces)



Recommended Name:

Parking Garage : Sierra Madre Villa

LEGEND



Parking Facility

Gold Line



Sierra Madre Villa Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	965	811	124	26	4
Time Period	Occupancy				
Weekday Daytime	93%	99%	57%	77%	100%
Weekday Evening	7%				
Weekend	30%				

*The four reserved spaces are for electric vehicles.

Note that the occupancy data are from prior to the opening of the Gold Line Foothill extension. As of July 2016, weekday occupancy levels are around 60%.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The Sierra Madre Villa parking structure offers one entry and two exit lanes from both Sierra Madre Villa Ave. and Halstead St. Those exiting on to Sierra Madre Villa Ave. are required to turn right (northbound).


Total Lanes in: 2

Total Lanes out: 4

Parking User Groups

- Metro transit riders
- A Noise Within Theater users (lease with Metro)
- The Stuart at Sierra Madre Villa residents/guests given pedestrian activity between garage and apartment complex
- Possibly nearby business employees/visitors/customers based on pedestrians entering/exiting on Sierra Madre Villa Ave. (note that Kaiser Permanente garage is free of charge)

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	15	14	93%
Bike Rack Spaces	10	2	20%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. On-site bike racks and bike lockers are located on the ground level near the entrance from Sierra Madre Villa Ave. There are no signs directing bicyclists to the bike parking.

Given that the platform is on the fourth floor, it may be easier to direct bicyclists to park near the bridge to the platform on the fourth floor. It also serves to deter theft as there will be more eyes on the bike parking areas.



Photo 88: Difficult to Find Bike Racks

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 89: Difficult to Find Bike Lockers

Pedestrian Infrastructure Rating: Low

Sidewalks approaching the station area are not continuous as there is no pedestrian east/west crossing for Sierra Madre Villa Ave. on either side of I-210. The closest east/west crossing is at Foothill Blvd. north of the station. Sidewalks in the area appear to be in good condition. Also, pedestrian access from Sierra Madre Villa Ave. to the station is not clear. Once inside, there is good signage directing riders to the fourth floor to access the pedestrian bridge leading to the station platform.



Photo 90: Sidewalk along Sierra Madre Villa Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Signage and Wayfinding Rating: Medium

There is parking wayfinding signage along Foothill Blvd. directing Metro riders who park to the rear entrance to the parking structure off of Halstead St. Also there is signage on Sierra Madre Villa Ave. directing Metro riders who park to the entrance on Sierra Madre Villa Ave.



Photo 91: Wayfinding Signage along Foothill Blvd. (L); Signage when Approaching Halstead St. Entrance (R)

Potential Carshare Locations

If spaces for carshare or vanpool are desired, current permit parking spaces on the fourth floor near the pedestrian bridge to the platform are the best candidates.

Potential Vanpool Locations

Ideal locations for vanpool parking are on the top floor of the parking structure as those are the least convenient for Gold Line riders.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure appears to be well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure fourth floor minimum lighting level of service is D. Parking structure roof minimum lighting level of service is E.

Safety

There are breaks on each floor that allow one-way traffic, in the exiting direction, to bypass driving the full length of the floor. However, these are not well-signed and could result in vehicle conflict.

The exit lane merge onto Halstead St. is dangerous as traffic coming from the first floor may not readily visible and could result in accidents.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Security

There are homeless individuals who live in the parking structure at night. The parking structure is likely used for vehicle storage and there may be abandoned vehicles as well. A security guard indicated that there were break-ins and a vehicle theft around Thanksgiving 2015.

Recommendations

- Increase bicycle lockers
- Introduce bicycle parking signage
- Improve pedestrian wayfinding to station
- Upgrade lighting
- Implement traffic calming, specifically at exit lane merge onto Halstead St.
- Increase enforcement
- Increase safety patrols
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

ARCADIA

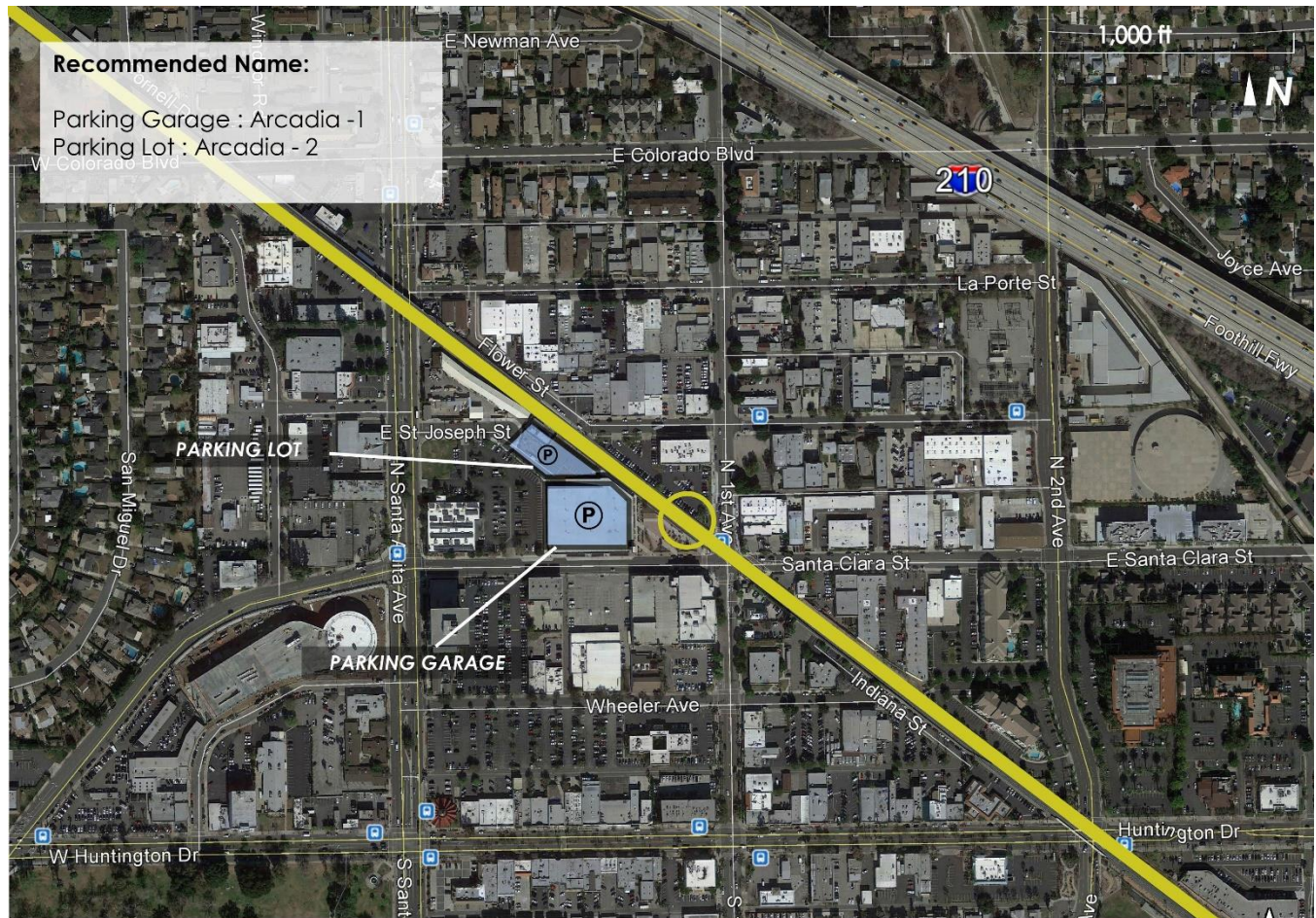
Address: 73 East Santa Clara St., Arcadia, CA 91006

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 300 in one parking structure and one surface lot (no permit spaces)

- Parking Structure: 270
- Parking Lot: 30



Recommended Name:
 Parking Garage : Arcadia -1
 Parking Lot : Arcadia -2

LEGEND



Parking Facility

Gold Line



Arcadia Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	300	289	N/A	9	2
Time Period	Occupancy				
Weekday Daytime	88%	90%	N/A	67%	0%
Weekday Evening	15%				
Weekend	33%				

*Three reserved spaces are for electric vehicles. One electric vehicle space is also an ADA space and is included in the ADA space inventory.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The first level of the parking structure may be entered and exited from either East Santa Clara St. on the south or Front St. on the north, with one entry and one exit lane from each St. The second level of the parking structure has a ramp with one lane in each direction and is accessed from Front St. or by exiting the first level of the parking structure and turning right. The surface lot has a single entry and single exit lane off of Front St.


Total Lanes in: 4

Total Lanes out: 4

Parking User Groups

- Metro transit riders
- Possible adjacent uses on the weekend, based on some cars parked on the west end of the first level of the parking structure.

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	24	100%
Bike Rack Spaces	40	4	10%

Bicycle Infrastructure Rating: Medium

A Class II bicycle facility provides access to the station. Bike racks are located adjacent to the platform in the plaza area. Bike lockers are located on the first level of the parking structure adjacent to the elevators.



Photo 92: Bicycle Racks Adjacent to Platform

Pedestrian Infrastructure Rating: High

The station is at the edge of Downtown Arcadia and offers good pedestrian access from either East Santa Clara St. or North 1st Ave. The platform is in the middle and riders must cross one set of tracks to access the platform.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

A small sign adjacent to the elevator on the second level of the parking structure directs riders to the first level in order to access the platform. There is no sign from the parking lot, although it is adjacent to the tracks.



Photo 93: No Signage in Parking Lot Directing to Platform Entrance

Parking Signage and Wayfinding Rating: Medium

There is parking wayfinding signage directing to the parking facilities along East Santa Clara St. for drivers heading westbound. If entering the garage from East Santa Clara St., there is no signage explicitly directing drivers to the second level of the parking structure or to the surface lot.

There is parking wayfinding signage directing drivers on both southbound and northbound Santa Anita Ave. to parking. However, signage for northbound drivers is partially obscured by trees, while approaching East Santa Clara St., and by an on-street parking sign while approaching Front St.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 94: Signage along Santa Anita Ave. Directing to Station and Parking

Potential Carshare Locations

If spaces for carshare are desired, the spaces on the eastern end of level one of the parking structure are the best candidates. These would be spaces on the eastern end of the drive aisles across the drive aisle from the ADA spaces.

Potential Vanpool Locations

The most ideal location for vanpool parking is on the western end of the top floor of the parking structure as these spaces are the least desirable for Gold Line riders.

Facility Upkeep

The parking structure and parking lot were clean and free of trash/debris.

Facility Maintenance

The parking structure and parking lot are new and appear to be well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure first level minimum lighting level of service is E. Parking structure second level minimum lighting level of service is C. Parking lot minimum lighting level of service is E.

Safety

Entering from East Santa Clara St. while heading westbound is dangerous if buses are parked along the curb as it may be necessary to do a right turn in front of a bus that may be obscuring pedestrians walking in front of the parking structure entrance. Exiting on to East Santa Clara St. is dangerous when buses are parked to the east of the entry/exit. The buses limit visibility of oncoming traffic, whether turning right or left at exit.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Security

On a Saturday afternoon, a couple individuals were seen walking to the second floor of the parking structure and then later loitering on the first floor of the parking structure. An individual was seen standing near the ADA parking area. In both cases, the individuals may have been waiting for arriving Gold Line riders as there is no designated pick-up/drop-off area.



Photo 95: Bus Layover along East Santa Clara St. Prior to Garage Entrance/Exit

Recommendations

- Increase bicycle lockers
- Improve pedestrian wayfinding to station

Consider shifting buses further east if possible to provide more visibility to vehicles entering and exiting from Santa Clara St.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

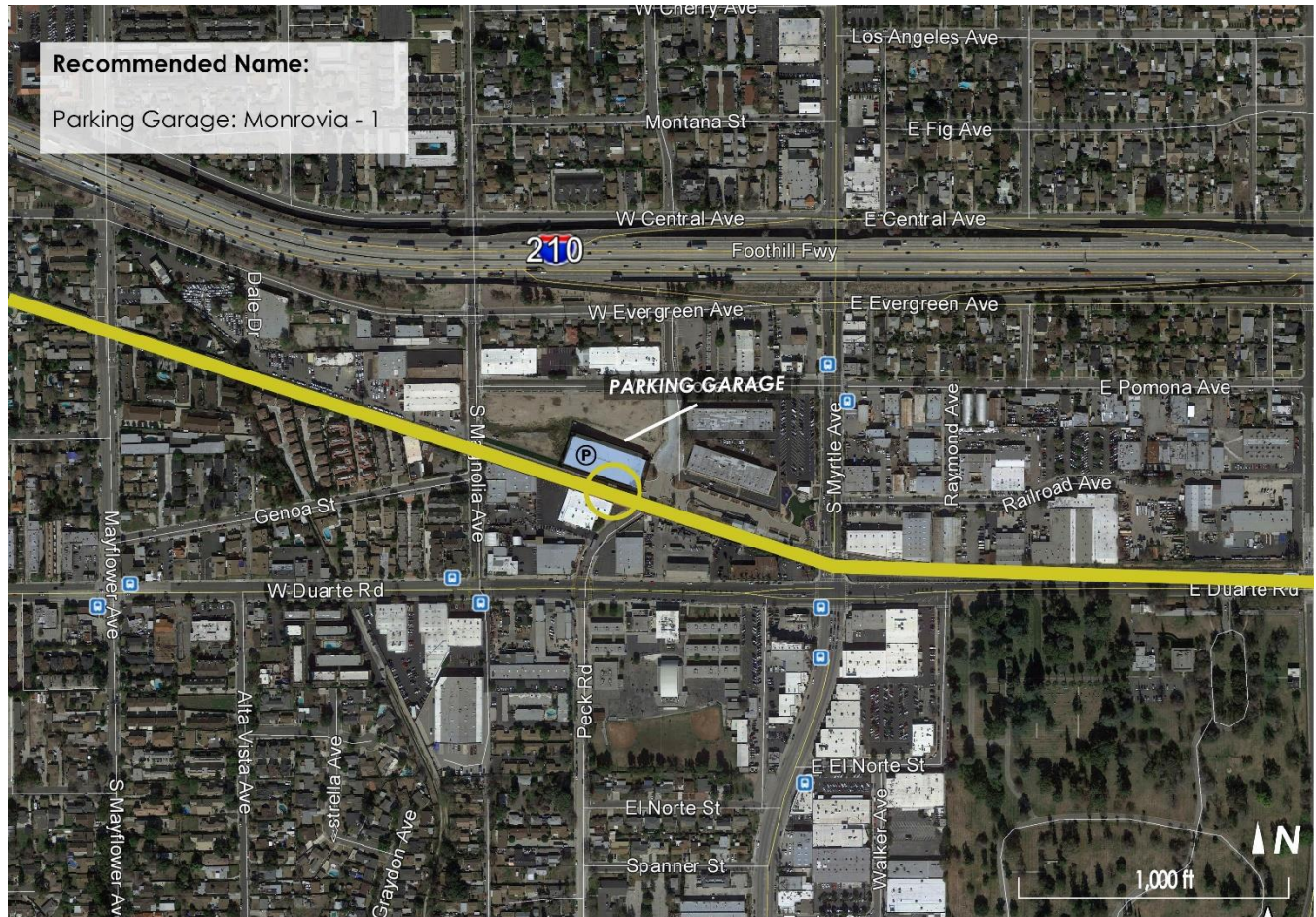
MONROVIA

Address: 1641 South Primrose Ave., Monrovia, CA 91016

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 350 in one parking structure (54 permit spaces)



Recommended Name:
Parking Garage: Monrovia - 1

LEGEND



Parking Facility

Gold Line



Monrovia Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	350	339	N/A	9	2
Time Period	Occupancy				
Weekday Daytime	93%	94%	N/A	78%	50%
Weekday Evening	10%				
Weekend	21%				

*Three reserved spaces are for electric vehicles. One electric vehicle space is also an ADA space and is included in the ADA inventory.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The parking structure is accessed from South Primrose Ave. where it dead ends with a turnaround. Metro riders who park take a right turn to enter and may proceed straight up the ramp or turn left to access the parking area closest to the platform, which includes the ADA and EV charger parking spaces.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	21	88%
Bike Rack Spaces	40	4	10%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. Bike lockers are located inside the parking garage adjacent to the plaza area. Bike racks are located between the garage and the platform. There is a small sign on the garage exterior directing bicyclists to the bike lockers.



Photo 96: Bicycle Racks between Structure and Platform

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 97: Bicycle Lockers inside Structure

Pedestrian Infrastructure Rating: High

The station is accessible from South Myrtle Ave. and South Primrose Ave. South Myrtle Ave. has crosswalks at West Duarte Road.



Photo 98: Plaza Area Connecting to Station Platform

Parking Signage and Wayfinding Rating: Low

There are small parking wayfinding signs along eastbound West Duarte Road and southbound South Myrtle Ave. These signs are branded as Station Square and are different from other Gold Line Foothill extension signs.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 99: Signage along South Myrtle Ave. Directing to Station Platform and Parking

Potential Carshare Locations

If spaces for carshare are desired, non-ADA spaces on the first floor near the elevator are good candidates.

Potential Vanpool Locations

Ideal spaces for vanpool parking are those in the northwestern corner of the structure rooftop as these are the least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure first floor minimum lighting level of service is E. Parking structure roof minimum lighting level of service is C.

Safety

There is a small parking area on the lowest level which has a one-way ramp up. This is an atypical set up and may create some confusion.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 100: One-way Ramp Up from Lowest Level

Recommendations

- Increase bicycle lockers
- More wayfinding to station parking
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

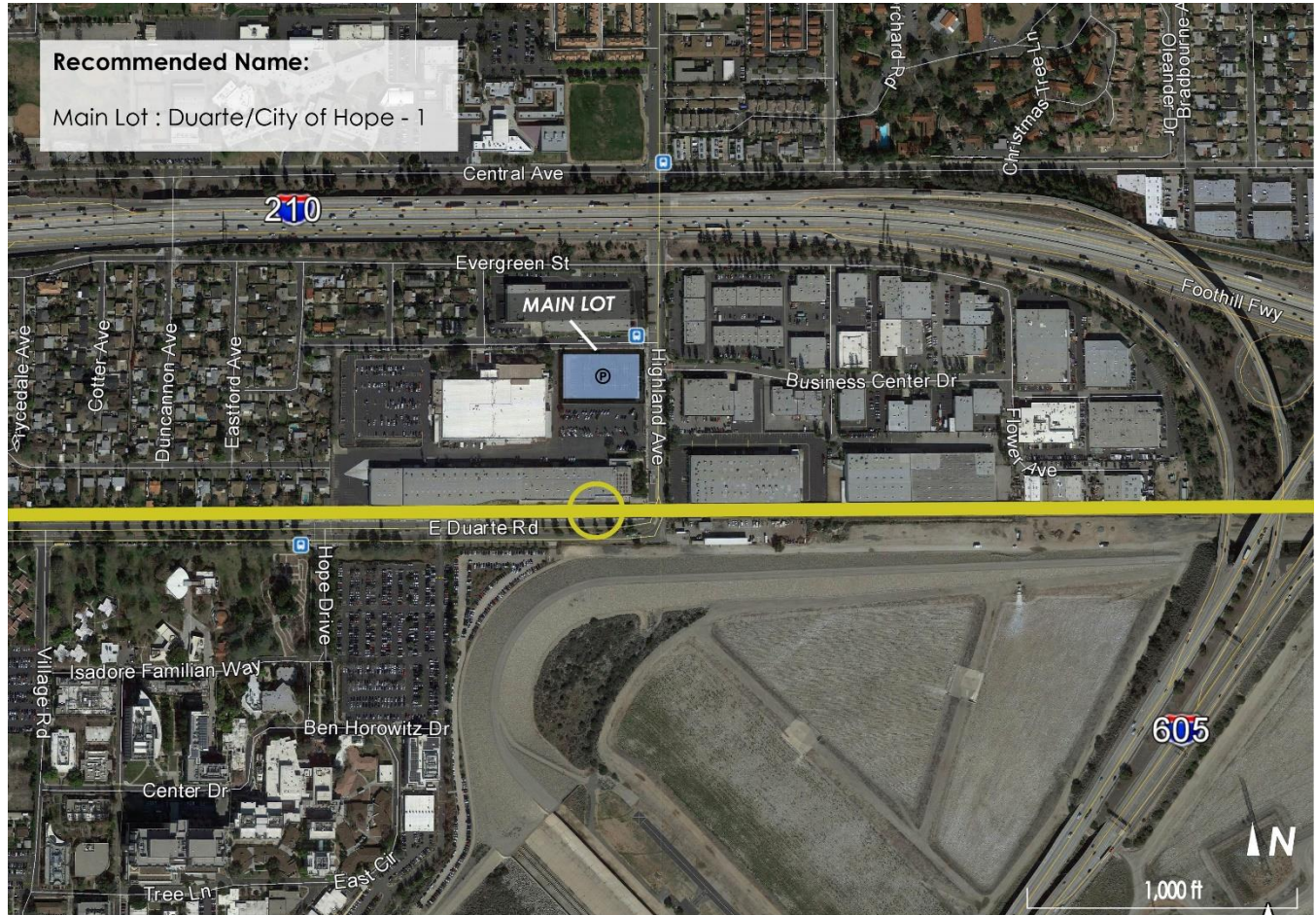
DUARTE/CITY OF HOPE

Address: 1789 Business Center Drive, Duarte, CA 91010

Owner: Metro

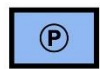
Operator: Metro

Total Number of Parking Spaces: 125 in one surface lot (no permit spaces)



Recommended Name:
Main Lot : Duarte/City of Hope - 1

LEGEND



Parking Facility

Gold Line



Duarte/City of Hope Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	125	116	N/A	6	3
Time Period	Occupancy				
Weekday Daytime	94%	97%	N/A	67%	67%
Weekday Evening	8%				
Weekend	25%				

*Three reserved spaces are for electric vehicles.

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

The parking lot is access from Business Center Drive. Drivers approaching from northbound and southbound Highland Ave. must head westbound on to Business Center Drive. Entering and exiting the lot may be done from both directions but the majority of traffic is likely entering from and exiting to the Highland Ave. side.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	7	29%
Bike Rack Spaces	38	2	5%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. Bike lockers and bike racks are located along Highland Ave. adjacent to the parking lot. Those who approach the station by bike along East Duarte Road may not easily find the bike parking area.



Photo 101: Bicycle Parking along Highland Ave. Adjacent to Parking Lot

Pedestrian Infrastructure Rating: High

The west end of the station is accessible along East Duarte Road while the east end of the station is accessible where Highland Ave. and East Duarte Road meet. Those who park must walk along Highland Ave. to reach the station.

There is minimal signage directing Metro riders who park to the station platform. There is only one small sign that is posted along a fence directing riders to walk south along Highland Ave. It is difficult to see due to the small size and also because the sign and fence are similar in color.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 102: Sidewalk along Highland Ave. Connecting Parking to Station Platform



Photo 103: Small Sign Directing to Platform is Posted to Fence on Left Side

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs along Highland Ave. or East Duarte Road directing drivers to the Metro parking lot. There is a large sign at the corner of Business Center Drive and Highland Ave. that is visible to those approaching from north and south.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 104: Sign Directing Drivers to Metro Parking Lot Entrance

Potential Carshare Locations

If spaces for carshare are desired, spaces along Highland Ave. would be the best locations.

Potential Vanpool Locations

Ideal spaces for vanpool parking are those on the western end of the lot as these are least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lot was clean and free of trash/debris.

Facility Maintenance

The parking lot is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding signage to station parking
- Improve pedestrian wayfinding to station
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

IRWINDALE

Address: 15998 Avenida Padilla, Irwindale, CA 91702

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 350 in one parking structure (76 permit spaces)



Recommended Name:
Parking Garage : Irwindale - 1

LEGEND



Parking Facility

Gold Line



Irwindale Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	350	263	76	9	2
Time Period	Occupancy				
Weekday Daytime	99%	100%	N/A	89%	0%
Weekday Evening	2%				
Weekend	14%				

*Three reserved spaces are for electric vehicles. One electric vehicle space is also an ADA space and is included in the ADA inventory.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The parking structure may be accessed from the north and south end. To access from the north end, drivers enter from Avenida Padilla. To access from the south end, drivers may enter from either northbound or southbound North Irwindale Ave. Drivers may exit on the north end on to Avenida Padilla or on the south end on to North Irwindale Ave., where they may head north or southbound.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	6	25%
Bike Rack Spaces	28	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. Bike lockers are located outside of the parking garage on the way to the station platform. Bike racks are located adjacent to the platform. There is a small sign in the garage directing bicyclists to the bike parking areas.



Photo 105: Sign in Garage Directing to Bicycle Parking

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 106: Bike Lockers at Irwindale Station

Pedestrian Infrastructure Rating: Low

The station is challenging to reach on foot. Pedestrians must walk along busy North Irwindale Ave. and either walk through the parking structure or walk down Irwindale Ave. to reach Avenida Padilla where the station platform is located. There are only sidewalks on one side of Irwindale Ave. There is a sidewalk along the north side of Avenida Padilla for those walking from the garage to the platform.



Photo 107: Sidewalk on North Side of Avenida Padilla

Parking Signage and Wayfinding Rating: Medium

There are small parking wayfinding signs along both northbound and southbound North Irwindale Ave., along northbound Irwindale Ave. and also along westbound Avenida Padilla to direct drivers to the parking garage. Those driving northbound on North Irwindale Ave. will also see the garage on their left.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 108: Signage along Avenida Padilla Directing to Platform and Parking

Potential Carshare Locations

If spaces for carshare are desired, non-ADA spaces on the first floor near the elevator are good candidates.

Potential Vanpool Locations

Ideal spaces for vanpool parking are those on the southern end of the parking structure as these are the least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure second floor minimum lighting level of service is D. Parking structure roof minimum lighting level of service is C.

Safety

Those exiting the garage towards North Irwindale Ave. must watch for vehicles that are merging from the lane that connects Avenida Padilla with North Irwindale Ave. on the west edge of the garage.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Recommendations

- Improve wayfinding signage to station
- Upgrade lighting
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

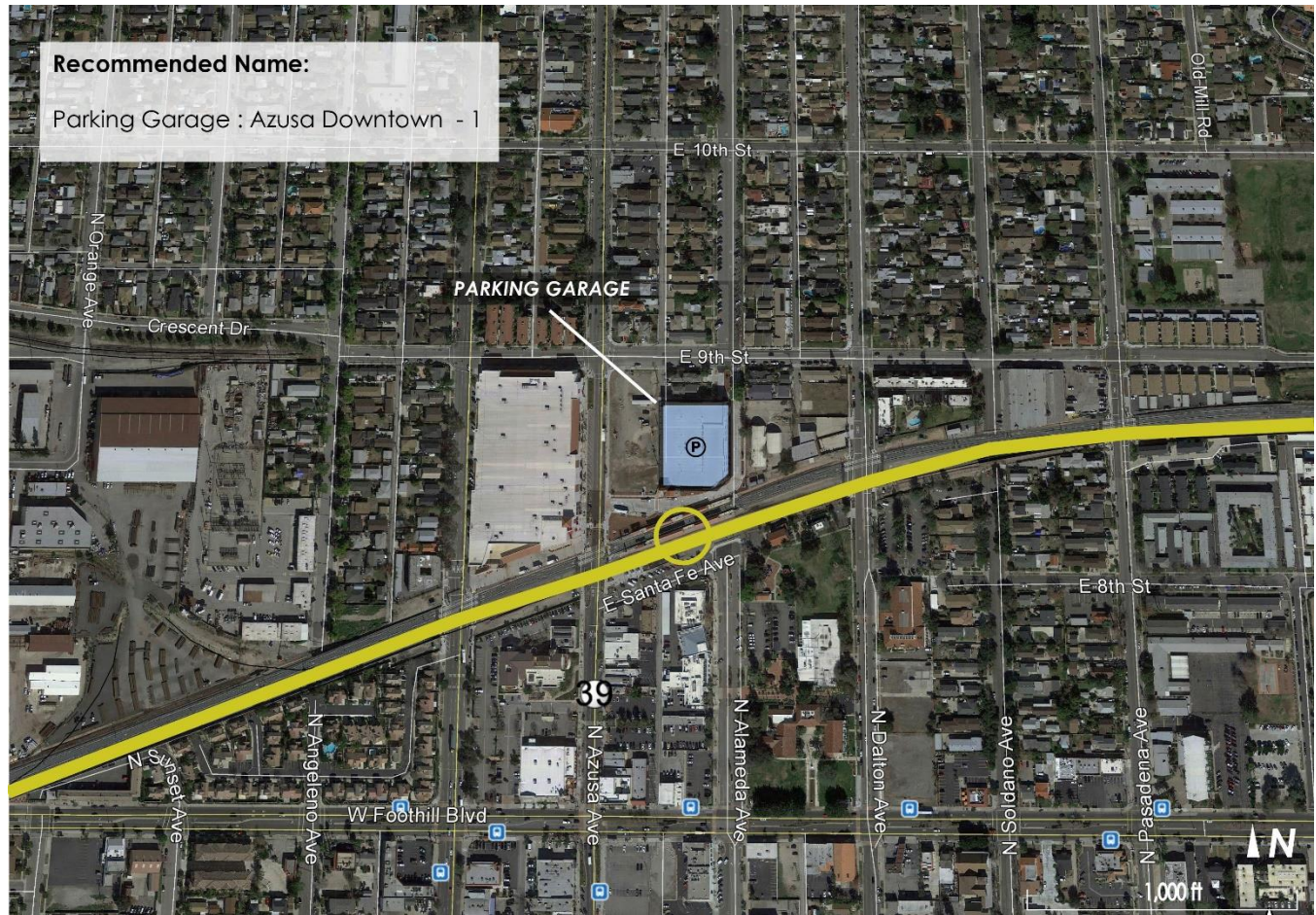
AZUSA DOWNTOWN

Address: 801 N. Alameda Ave., Azusa, CA 91762

Owner: Metro, Foothill Transit and City of Azusa

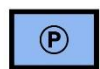
Operator: Metro

Total Number of Parking Spaces: 237 in one parking structure (73 permit spaces); total spaces 547



Recommended Name:
Parking Garage : Azusa Downtown - 1

LEGEND



Parking Facility

Gold Line



Azusa Downtown Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	237	155	73	N/A	9
Time Period	Occupancy				
Weekday Daytime	99%	100%	N/A	N/A	67%
Weekday Evening	8%				
Weekend	21%				

*Nine reserved spaces are for clean air vehicles. There are ADA spaces and electric vehicle spaces on the first level in the City of Azusa parking area.

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

The parking structure is accessed by heading southbound on Alameda Ave. from East 9th St. Upon entering, Metro riders who park must proceed straight and go up to the third floor. A concrete island denotes where Metro parking begins. There is one lane to enter the Metro parking area and one lane to exit. To exit, Metro riders who park proceed down and exit northbound on Alameda Ave.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	21	88%
Bike Rack Spaces	40	2	5%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. Bike lockers and racks are located south of the Gold Line tracks adjacent to Alameda Ave. There is no signage indicating where bicycle parking is located. However if bicyclists proceed in the direction of travel (northbound) on Azusa Ave., then they will see the bike lockers and racks on their right. A bicyclist who arrives from Alameda Ave. may have difficulty finding the bike parking area.



Photo 109: Bicycle Parking Area

Pedestrian Infrastructure Rating: High

The station is well-connected by sidewalks along Azusa Ave. to the rest of Downtown Azusa.

There is no pick-up/drop-off area near the platform for riders. They must be picked up or dropped off on Azusa Ave. or inside the garage on the first level.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Signage and Wayfinding Rating: Medium

There are small parking wayfinding signs that direct drivers heading westbound on East 9th St. and northbound on Azusa Ave. to the parking structure. There were no signs observed on Foothill Blvd. or on North San Gabriel Ave. Drivers on northbound Azusa Ave. should identify the parking structure after seeing the station monument sign. However, it is less apparent to drivers who arrive from East 9th St. There are no signs on the structure that indicate Metro parking.



Photo 110: Signage along Azusa Ave. Directing to Parking



Photo 111: Parking Garage Entrance and Exit with Minimal Signage

Potential Carshare Locations

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

If spaces for carshare are desired, spaces on the roof closest to the elevators are a good location within the Metro parking area. Spaces on the first level in the City of Azusa parking area would be ideal.

Potential Vanpool Locations

Spaces in the northeast corner of the roof would be ideal for vanpool parking as these spaces are least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure third floor minimum lighting level of service is A. Parking structure ramp leading to roof minimum lighting level of service is E (roof lights were off).

Safety

Exiting the garage may be potentially dangerous in two ways. First is those parked on the first level must cross over into the exit lane. The turn for those parked on the first level is a little challenging and may potentially create conflicts with those entering and existing, neither of which stop. However, since those using the City of Azusa parking are more likely to utilize the parking during evening and weekend hours after transit riders have departed, the potential for conflicts may be minimized.

Secondly, the garage exit is out to the bus driveway. Exiting vehicles must pull slightly into the bus driveway to see if there is oncoming traffic.

Security

No issues were observed.



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Photo 112: Garage Entrance and Exit

Recommendations

- Improve wayfinding signage to station parking
- Improve parking signage at facility entrance
- Increase bicycle lockers
- Improve bicycle parking signage
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

APU/CITRUS

Address: 901 B North Citrus Ave., Azusa, CA 91762

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 200 in one parking structure (no permit spaces)



Recommended Name:

Parking Garage : APU/Citrus College - 1

LEGEND



Parking Facility

Gold Line



APU/Citrus College Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	200	190	N/A	8	2
Time Period	Occupancy				
Weekday Daytime	98%	100%	N/A	50%	50%
Weekday Evening	6%				
Weekend	84%				

*Three reserved spaces are for electric vehicles. One electric vehicle space is also an ADA space and is included in the ADA inventory.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Parking Access

The parking structure is accessed from Citrus Ave. Drivers may currently only approach driving southbound on Citrus Ave. and enter by taking a right turn. Upon exiting, drivers must turn left as Citrus Ave. does not continue south of the parking structure yet.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	24	24	100%
Bike Rack Spaces	36	2	6%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities providing station access. Bicyclists must travel through the parking structure to access the bicycle parking. On-site bike racks are located on the ground level (parking structure level L2) south of the parking structure in the plaza between the structure and station platform. Bike lockers are located on the ground level west of the parking structure. There is a sign directing those with bicycles in the garage on level L1 to take the elevator to L2 to access the bike parking areas.



Photo 113: Bicycle Racks Adjacent to the Platform

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

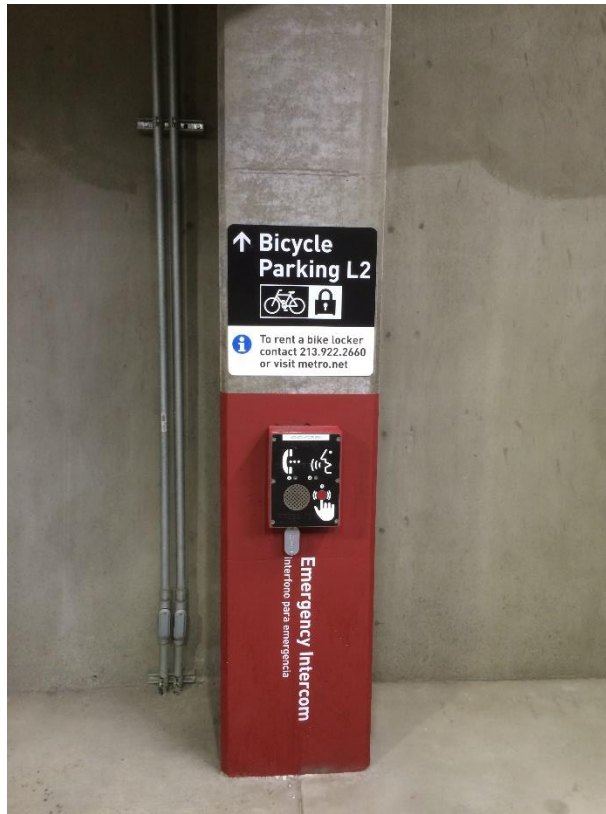


Photo 114: Signage in Garage Directing to Bicycle Parking

Pedestrian Infrastructure Rating: High

Sidewalks in the area only connect with the Rosedale housing areas to the north and west. There is no direct pedestrian path to Azusa Pacific University or Citrus College as Citrus Ave. north of West Foothill Blvd. does not connect to West Foothill Blvd. yet. The extension of Citrus Ave. is expected to open by fall 2016 and once it does, the station will have good pedestrian connectivity.

There is no direct sidewalk access from the platform area. Pedestrians must walk through the garage to enter or exit the station platform area. Shuttles wait adjacent to the garage entrance.

There is no pick-up/drop-off area near the platform for riders. They must be picked up or dropped off inside the garage or near the garage entrance and walk through.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS



Photo 115: View along Citrus Ave. of Parking Garage

Parking Signage and Wayfinding Rating: Medium

For drivers originating to the west, there is parking wayfinding signage directing drivers eastbound on East Promenade. For drivers originating to the east along West Foothill Blvd., there is parking wayfinding signage southbound on North Citrus Ave. to westbound East Foothill Blvd. and northbound North Palm Drive. For drivers originating from the south, there is parking wayfinding signage on northbound North Citrus Ave. directing towards westbound East Foothill Blvd.

Parking wayfinding signage will need to be incorporated to direct drivers northbound on North Citrus Ave. now that the St. extension is open, providing direct access to the parking structure from West Foothill Blvd.



Photo 116: Signage along East Promenade Directing to Station and Parking

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GOLD LINE STATIONS

Potential Carshare Locations

If spaces for carshare are desired, spaces on level two closest to the platform would be ideal.

Potential Vanpool Locations

The most ideal location for vanpool parking is the northeast corner of the roof as these spaces are least desirable for Gold Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking structure was clean and free of trash/debris.

Facility Maintenance

The parking structure is new and appears well-maintained.

Pavement Conditions

The striping is visible and the pavement quality is good.

Lighting

Parking structure second floor minimum lighting level of service is D. Parking structure roof minimum lighting level of service is E.

Safety

There are a couple areas where vehicles dead end, one on level L1 and one on level L3. These areas may create hazards as drivers need to do a three-point U-turn or reverse.

Pick-ups and drop-offs inside the garage are challenging as there is not adequate room for vehicles to pass without the risk of driving into oncoming traffic. There is also no easy path for drivers picking up or dropping off to exit. If the garage is full, they must do a three-point U-turn.

Security

No issues were observed.

Recommendations

- Improve bicycle infrastructure near station

In addition, improving pick-up/drop-off for the station overall should be considered as the garage is not designed to accommodate this.

APPENDIX D – GREEN LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

NORWALK

Address:

West Lot – 12901 Hoxie Ave., Norwalk, CA 90650

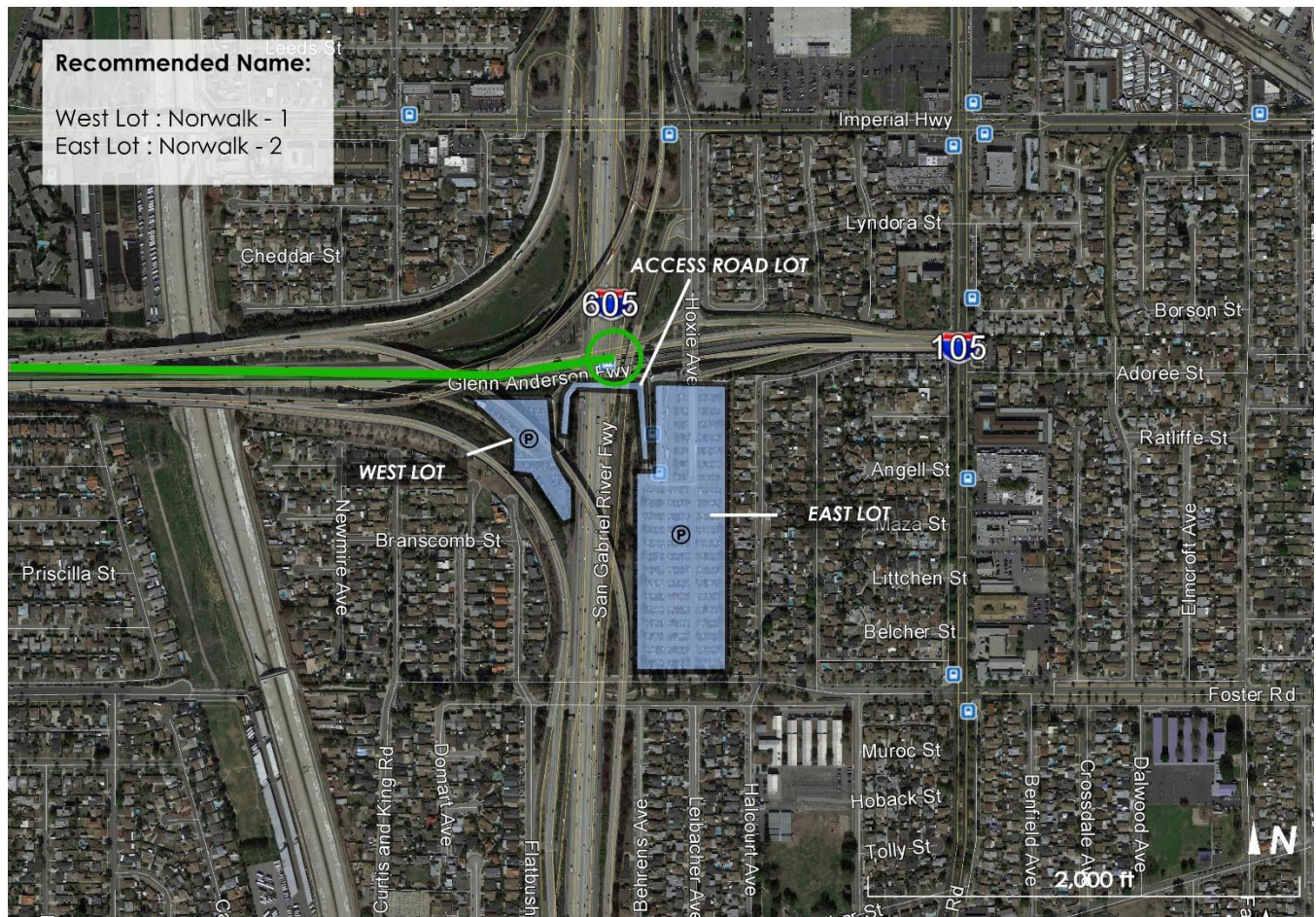
East Lot – 12901 Hoxie Ave., Norwalk, CA 90650

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 1,720 in two surface lots (no permit spaces)

- West Lot: 300 spaces
- East Lot: 1,420 spaces



LEGEND



Parking Facility

Green Line



Norwalk Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	1,720	1,675	N/A	45	N/A
Time Period	Occupancy				
Weekday Daytime	100%	100%	N/A	100%	N/A
Weekday Evening	5%				
Weekend	13%				

*Six parked motorcycles were also observed.

Parking Access

The main entrance to parking at Norwalk is from southbound Hoxie Ave. There are two lanes that allow drivers to enter into the East Lot. A third lane takes drivers to a kiss-and-ride drop-off/pick-up area. The other entry lane is from the eastbound I-105 into the West Lot. Two lanes exit from the East Lot northbound on Hoxie Ave. An access road with on-street parking connects the East Lot and West Lot.


Total Lanes in: 4

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	40	37	93%
Bike Rack Spaces	36	5	14%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. Bicycle racks are located in the East Lot near the platform entrance. Bicycle lockers are mostly located in the northeast corner of the East Lot.

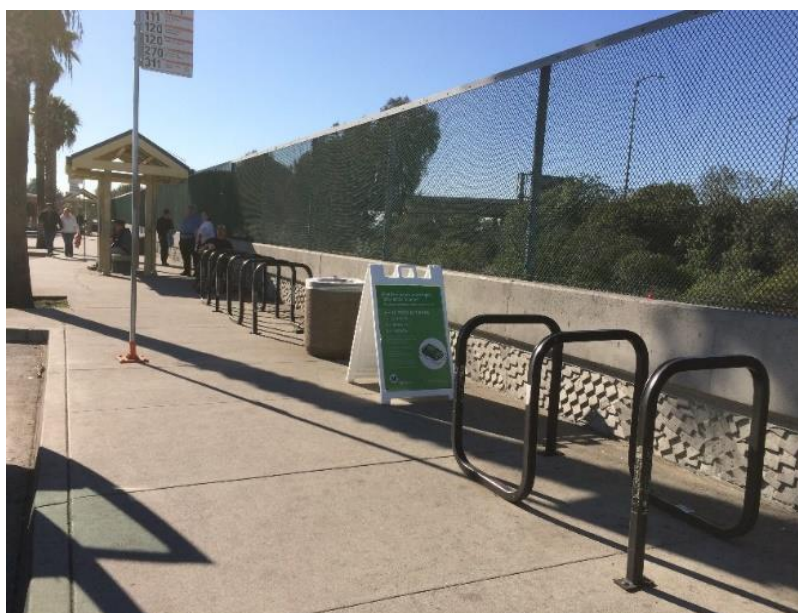


Photo 117: Bicycle Racks

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 118: Bicycle Lockers

Pedestrian Infrastructure Rating: Medium

There is good pedestrian connectivity between the station and the surrounding area. However, there is only a continuous sidewalk on the east side of Hoxie Ave. between the East Lot and Imperial Highway. Pedestrians must cross the busy East Lot entrance/exit area. Some pedestrians park on Studebaker Road and walk along the I-105 eastbound off-ramp to access the station. There are barrier gates at Foster Road and Flatbush Ave., likely to prevent cut-through traffic and parking spillover onto residential streets.



Photo 119: Sidewalk along Hoxie Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 120: Barrier Gate at Flatbush Ave.

Parking Signage and Wayfinding Rating: Low

Limited parking wayfinding signage is visible on freeway off-ramps. There is also a small sign underneath the I-105 freeway entrance sign that is visible to drivers turning southbound on to Hoxie Ave. from westbound Imperial Highway. Upon entering the East Lot drivers will see the station monument sign and the parking lot. Finding the access road spaces and West Lot is not clear when driving from the East Lot. Similarly, for those who enter the West Lot from the I-105 off-ramp, it is not clear how to find the access road spaces, East Lot and exit.



Photo 121: On-Street Spaces along Access Road Connecting the Two Lots

Potential Carshare Locations

If carshare spaces are to be added, spaces near the ADA spaces in the East Lot are the best locations.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Potential Vanpool Locations

Ideal locations for vanpool parking are on the southern end of the East Lot as these are least desirable for Green Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lots were clean and free of trash/debris.

Facility Maintenance

The lots appear to be well-maintained.

Pavement Conditions

Pavement conditions are good and the striping is visible.

Lighting

West Lot minimum lighting level of service is D. East Lot minimum lighting level of service is C.

Safety

Pedestrian safety concerns for those who walk to the station along the I-105 off-ramp.

Some buses were speeding along the drive connecting the West and East Lots which may pose a safety risk to drivers.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Increase number of bicycle lockers
- Upgrade lighting (West Lot)
- Resurface pavement
- Improve landscaping
- Increase parking enforcement
- Initiate permit parking at station for transit riders
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

LAKEWOOD

Address:

North Lot – 12775 Lakewood Blvd., Downey, CA 90242

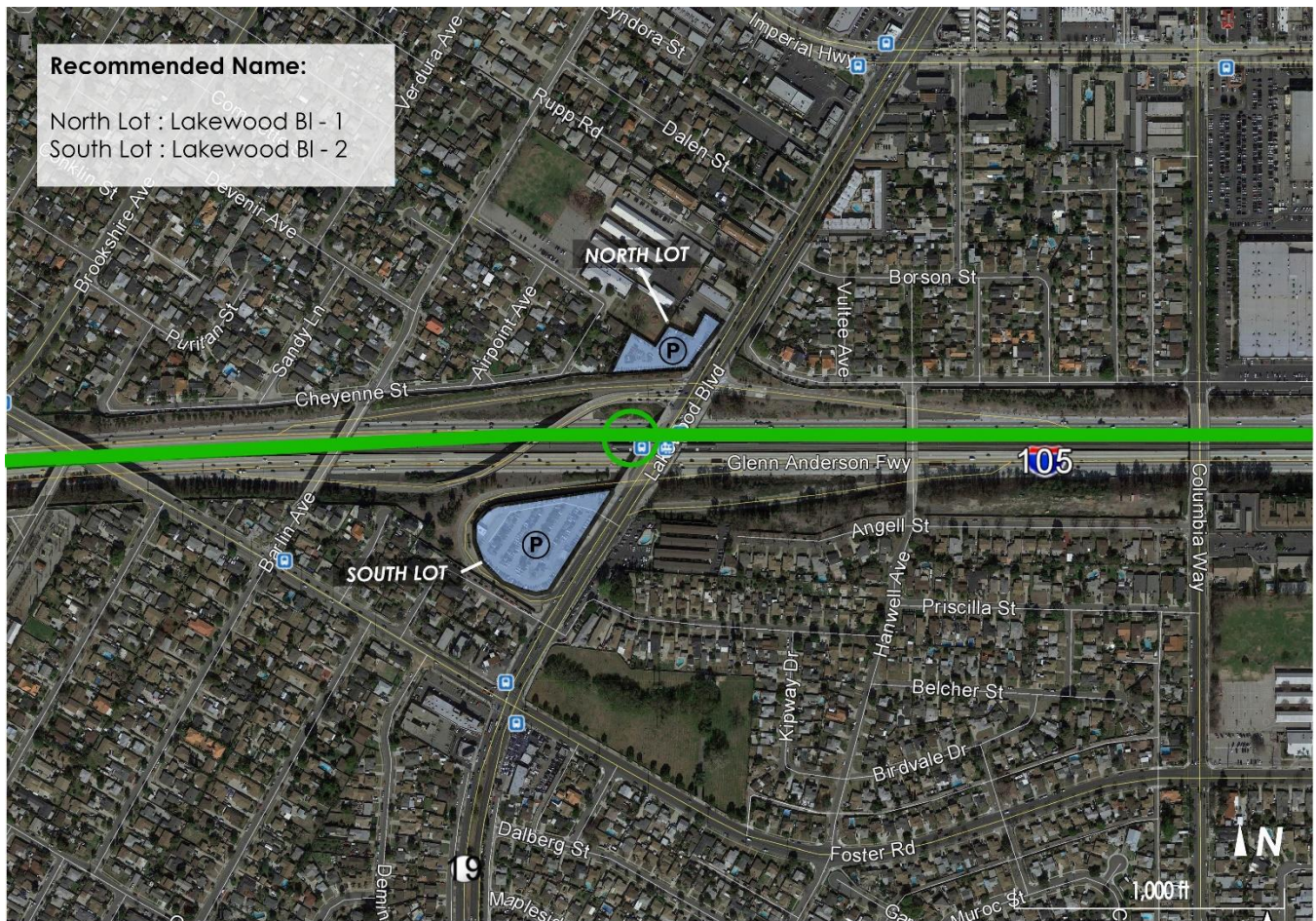
South Lot – 12875 Lakewood Blvd., Downey, CA 90242

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 299 in two surface lots (no permit spaces)

- North Lot: 120 spaces
- South Lot: 179 spaces



LEGEND



Parking Facility

Green Line



Lakewood Blvd Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	299	254	N/A	45	N/A
Time Period	Occupancy				
Weekday Daytime	104%	104%	N/A	100%	N/A
Weekday Evening	5%				
Weekend	25%				

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Both of the Lakewood Station parking lots (North and South) have one entrance and one exit lane each for a total of four lanes. Both lanes can only be accessed from Lakewood Blvd., and only the South Lot can be accessed via a left turn when heading northbound on Lakewood Blvd.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	11	6	55%
Bike Rack Spaces	22	7	32%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. Lakewood Blvd. can be a challenging environment to ride a bicycle. Bicycle racks and lockers are located along the sidewalk adjacent to the South Lot entrance/exit.



Photo 122: Bicycle Lockers Adjacent to Sidewalk

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 123: Bicycle Racks Adjacent to Station Monument Sign

Pedestrian Infrastructure Rating: Medium

There is adequate pedestrian connectivity to the station. The sidewalks are in good condition and are wide. However, if a driver parks in the North Lot, the driver must cross a wide freeway entrance and exit to reach the station platform. This crosswalk is signalized.



Photo 124: Crosswalk at I-105 Entrance/Exit

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 125: Sidewalk along Lakewood Blvd.

Parking Signage and Wayfinding Rating: Low

There is minimal parking wayfinding signage. There is a Park-and-Ride sign on the freeway off-ramp and a small sign at entrance to the North Lot. There are no obvious signs indicating that these are Metro parking facilities.



Photo 126: Sign at Entrance to North Lot

Potential Carshare Locations

There is potential for carshare spaces in the South Lot that are closest to the platform and non-ADA.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Potential Vanpool Locations

Ideal locations for vanpool parking are the southern end of the South Lot or western end of the North Lot. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lots had some litter on the ground.

Facility Maintenance

The parking lots appeared to be generally well-maintained, however some foliage was overgrown.

Pavement Conditions

Pavement conditions are good. Some of the striping is faded.



Photo 127: Faded Striping

Lighting

North Lot minimum lighting level of service is C. South Lot minimum lighting level of service is E.

Safety

Vehicles park in the drive aisles which may challenge driver visibility as well as turning movements within the lots.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between the parking lots
- Improve signage at parking lot entrances
- Upgrade lighting in South Lot
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Increase enforcement
- Initiate permit parking for transit riders
- Improve bicycle infrastructure near station area

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

LONG BEACH

Address:

West Lot – 11455 Long Beach Blvd., Lynwood, CA 90262

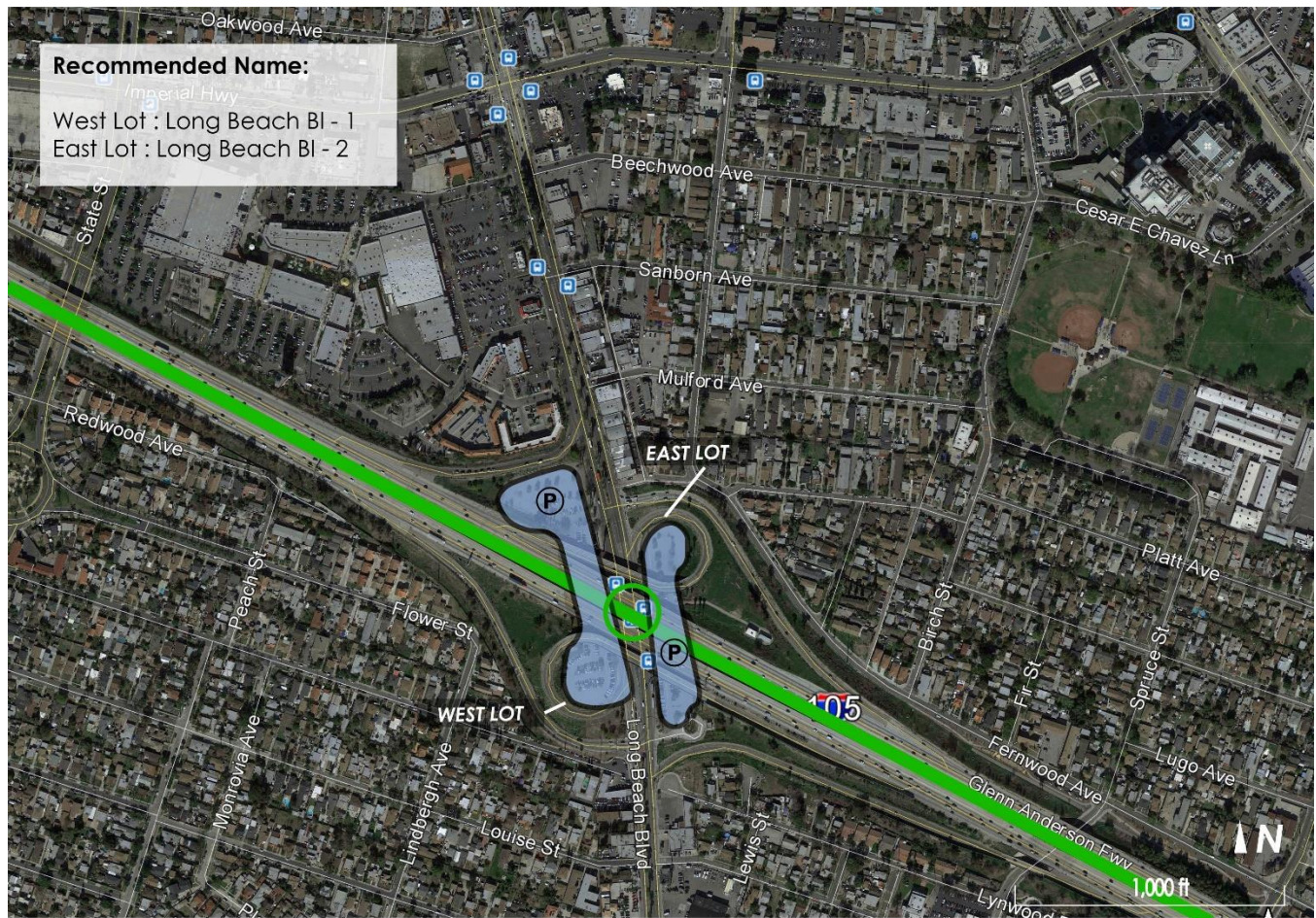
East Lot – 11508 Long Beach Blvd., Lynwood, CA 90262

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 646 in two surface lots (no permit spaces)

- West Lot: 393 spaces
- East Lot: 253 spaces



LEGEND



Parking Facility

Green Line



Long Beach Blvd Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	646	337	N/A	5	N/A
Time Period	Occupancy				
Weekday Daytime	53%	53%	N/A	38%	N/A
Weekday Evening	2%				
Weekend	10%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

The Long Beach station has two surface parking lots, West and East. Each lot has two full access driveways (two entry and two exit lanes per lot).


Total Lanes in: 4

Total Lanes out: 4

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	12	0	0%

*Two bikes attached to fences

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. There are some bike racks in the West Lot, but there are no bike racks in the East Lot. The location of the racks may also be inconvenient, as some passengers locked their bikes to the fences.

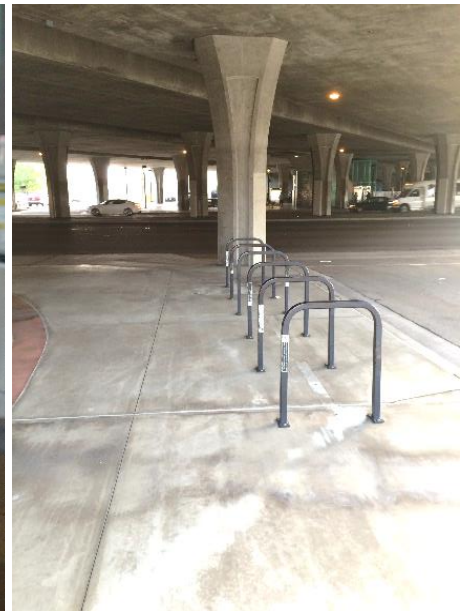
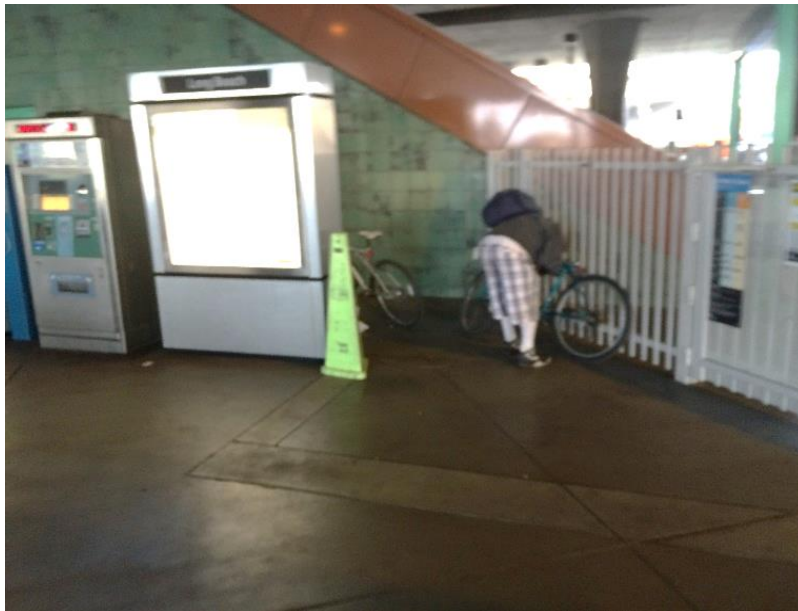


Photo 128: Bikes Locked to Fence (L); Bike Racks (R)

Pedestrian Infrastructure Rating: Low

The pedestrian connectivity to/from the station area is challenging due to a shortage of crosswalks near the station. The sidewalks in and around the station are wide and in good condition.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

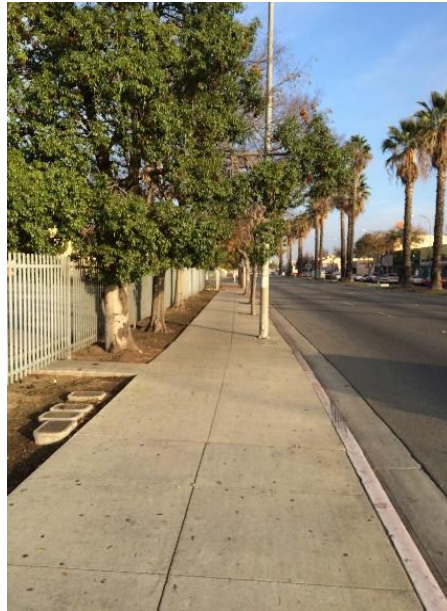


Photo 129: Sidewalk along Long Beach Blvd.

Parking Signage and Wayfinding Rating: Low

There are some parking wayfinding signs on the 105 Freeway at the off-ramps and a monument sign. There is an opportunity to place a parking wayfinding sign on the traffic signal pole or at a light pole near the entrance to the West Lot. There are no signs indicating Metro parking at the lot entrances.



Photo 130: Minimal Signage at Lot Entrance (L); Station Monument Sign (R)

Potential Carshare Locations

Carpool spaces could be located adjacent to ADA spaces, so as to incentive passengers to ride share.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Potential Vanpool Locations

The northern end of the West Lot would be the most ideal location for vanpool parking as it is the least desirable for Green Line riders.

Facility Upkeep

The lots were clean and free of trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained. Some of the medians lack landscaping and are barren.

Pavement Conditions

Pavement is in good condition and striping is visible.

Lighting

West Lot minimum lighting level of service is E. East Lot minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve parking signage at facility entrances
- Upgrade lighting
- Resurface pavement
- Improve landscaping
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

For Willowbrook/Rosa Parks, refer to Blue Line section.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

AVALON

Address:

North Lot – 652 East 116th Place, Los Angeles, CA 90059

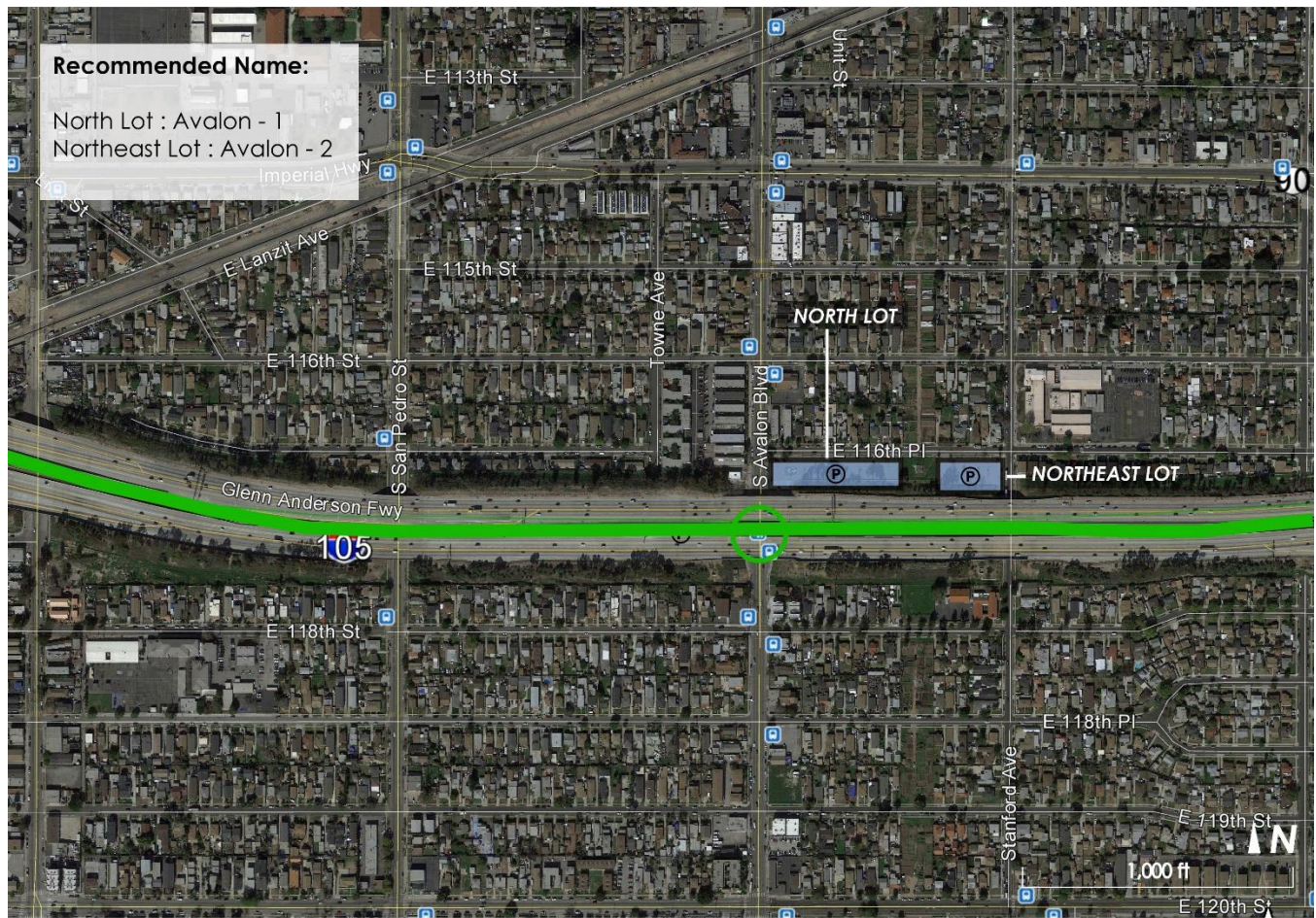
Northeast Lot – 672 East 116th Place, Los Angeles, CA 90059

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 160 in two surface lots (no permit spaces)

- North Lot: 99
- Northeast Lot: 61



LEGEND



Parking Facility



Green Line



Avalon Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	160	160	N/A	5	N/A
Time Period	Occupancy				
Weekday Daytime	4%	4%	0%	20%	N/A
Weekday Evening	1%				
Weekend	1%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

The Avalon station has two surface lots. Each lot has one full access driveway on 116th Place. As such, access to the lots is only possible through 116th Place which is a narrow residential St.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	8	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. Bicycle racks are located along 116th Place.



Photo 131: View along 116th Place

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 132: Station Entrance/Exit under I-105

Pedestrian Infrastructure Rating: Low

Pedestrian connectivity between the station and surrounding areas could be improved. There are uneven sidewalks along the south side of 116th Place adjacent to the parking lots. As seen in the images below, there are even breaks in the pavement that make it difficult to navigate.



Photo 133: Sidewalk along 116th Place Looking West (L); Sidewalk along 116th Place Looking East (R)

Parking Signage and Wayfinding Rating: Low

The monument sign on Avalon Blvd. is visible in either direction. There are no parking wayfinding signs on 116th, but there is a Park-and-Ride sign on Clovis Ave. several blocks east of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

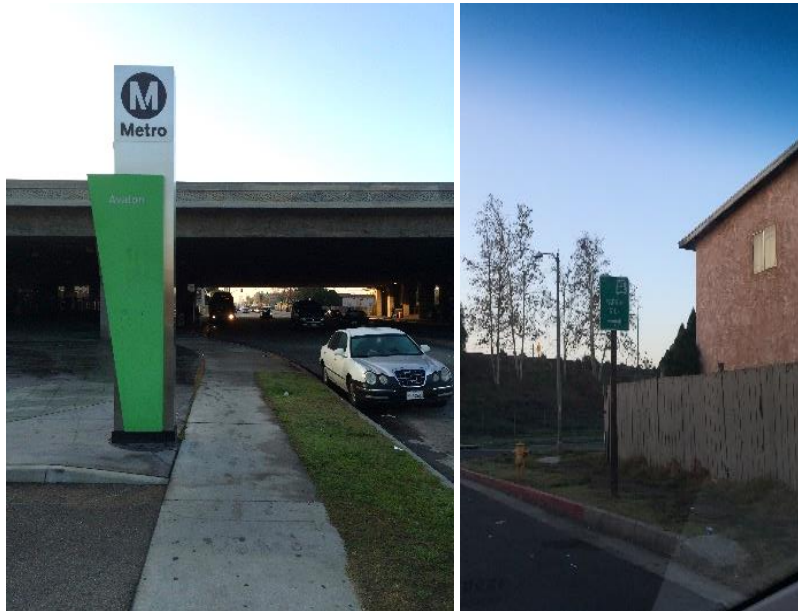


Photo 134: Station Monument Sign along Avalon Blvd. (L); Signage along Clovis Ave. (R)



Photo 135: Signage at Parking Lot

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

The Northeast Lot would be ideal for vanpool parking as it is least desirable for Green Line riders.

Facility Upkeep

There was a lot of trash in the lots.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Facility Maintenance

The parking lots appear to be fairly well-maintained. The sign at the entrance to the Northeast Lot appeared to be broken.



Photo 136: Visible Trash in Parking Lot



Photo 137: Broken Sign at Northeast Entrance to Lot

Pavement Conditions

The striping however, is clearly visible and the pavement quality in the parking lots is good.

Lighting

North Lot minimum lighting level of service is D. Northeast Lot minimum lighting level of service is C.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Upgrade lighting
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

HARBOR FREEWAY

Address: 11600 South Figueroa St., Los Angeles, CA 90061

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 252 in one surface lot (no permit spaces)



Recommended Name:
Main Lot : Harbor Fwy - 1

LEGEND



Parking Facility

Green Line



Harbor Freeway Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	252	246	N/A	6	N/A
Time Period	Occupancy				
Weekday Daytime	58%	59%	N/A	33%	N/A
Weekday Evening	3%				
Weekend	18%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

The Harbor Freeway station has one surface lot. There are two full access driveways on Figueroa St.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	1	0	0%
Bike Rack Spaces	10	1	10%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within a block of the Harbor Freeway station. Bike racks are located near the station entrance.

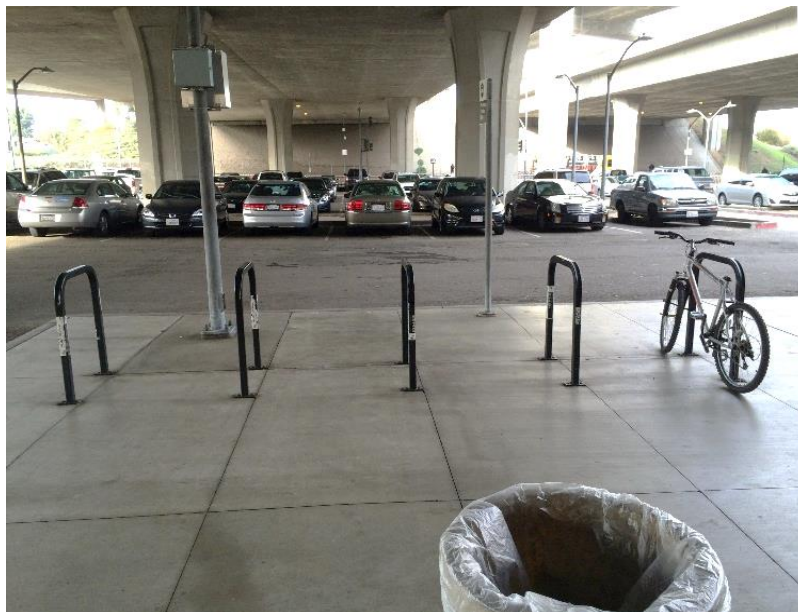


Photo 138: Bike Racks

Pedestrian Infrastructure Rating: Low

Pedestrian connectivity between the station and surrounding area is limited. There is one signalized crosswalk spanning Figueroa on the block between Imperial Highway and West 117th St. Sidewalks on Figueroa St. are in good condition. There is a striped walkway through the parking lot between the bus stops on Figueroa and the platform.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 139: Sidewalk along Figueroa St.

Parking Signage and Wayfinding Rating: Low

No parking wayfinding signs at the lots except for monument signs at the entrances which are low and may be difficult to see. These are only partially visible from Figueroa as they are set back from the sidewalk and not very visible to passing motorists. There is a Caltrans Park-and-Ride on the fence outside the lot; this sign is not oriented to face passing motorists.



Photo 140: Monument Sign at Entrance to Parking Lot

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 141: Park and Ride Sign

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

An ideal location for vanpool parking is the northern end of the lot as it is the least desirable parking for Green Line riders.

Facility Upkeep

The lot was clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained. However, there appeared to be a memorial of candles in one of the landscaped areas in the lot. Some median areas lack landscaping and are barren.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 142: Memorial Candles in a Landscaped Area

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is B.

Safety

No issues were observed.

Security

No current security concerns were observed, although a memorial was observed in a landscaped area.

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking lot entrances
- Resurface pavement
- Improve landscaping
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

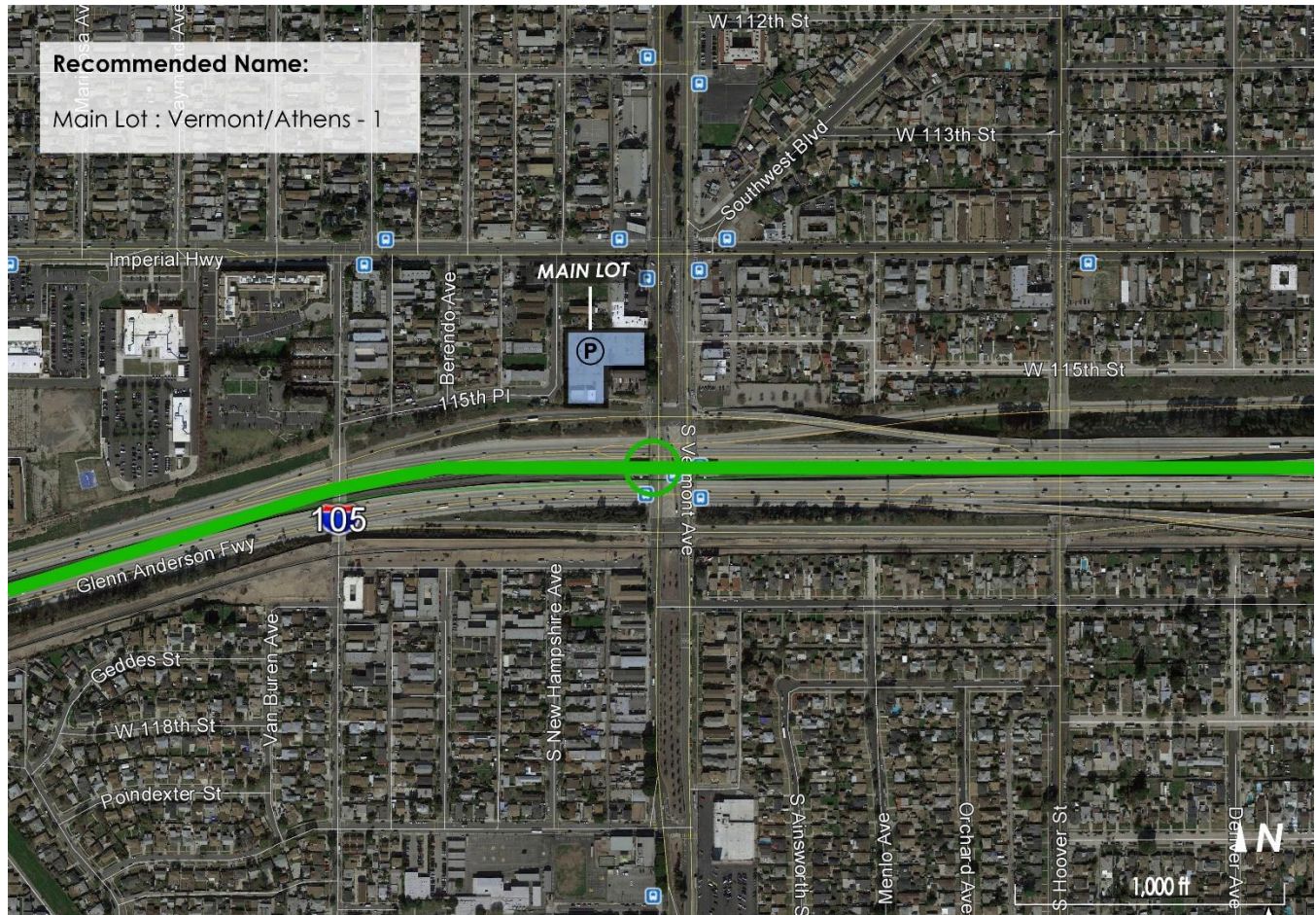
VERMONT/ATHENS

Address: 11455 South Vermont Ave., Los Angeles, CA 90044

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 155 in one surface lot (no permit spaces)



LEGEND



Parking Facility

Green Line



Vermont/Athens Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	155	148	N/A	7	N/A
Time Period	Occupancy				
Weekday Daytime	3%	3%	N/A	0%	N/A
Weekday Evening	4%				
Weekend	3%				

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

The Vermont/Athens station has one surface lot. There is one right-in/right out only driveway on Vermont Ave. and one full access driveway on New Hampshire Ave.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Individuals living in cars

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	N/A	N/A	N/A

Bicycle Infrastructure Rating: Medium

There is a Class II bicycle facility within one block of the station. Vermont Ave. is signed as a bicycle route (Class III). There are no bicycle racks or lockers at the Vermont/Athens station.

Pedestrian Infrastructure Rating: Low

Due to a shortage of crosswalks, there is limited pedestrian connectivity between the station and surrounding area. There are wide sidewalks on Vermont Ave., although there is some buckling due to tree roots.



Photo 143: Sidewalk along Vermont Ave.

Parking Signage and Wayfinding Rating: Low

There is a Caltrans Park-and-Ride sign on the 105 freeway prior to the Vermont exit. Additionally, there are smaller signs on the off-ramps pointing out the direction to turn for the parking lot. However, once on Vermont Ave. there is no parking wayfinding signage to guide motorists to the right-in/right-out only driveway on Vermont Ave. which requires that a U-turn be made at Imperial Highway. The sign on the eastbound I-105 off-ramp is partially obscured by shrubbery.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 144: Station Monument Sign



Photo 145: Sign at Entrance to Parking Lot

Potential Carshare Locations

The spaces closest to the lot entrance/exit are the best suited for carshare parking if desired.

Potential Vanpool Locations

Given the lack of utilization, any portion of the lot may be used for vanpool parking.

Facility Upkeep

The lot had an abundance of trash.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Facility Maintenance

Some of the foliage in the medians is overgrown.

Pavement Conditions

Striping is generally visible and the pavement appears to be in good condition.



Photo 146: Trash in Parking Lot

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

The vehicles in the lot generally appeared to have people living in them. Additionally, homeless were observed loitering on the benches along the pedestrian pathway between the parking lot and Vermont Ave.

Recommendations

- Improve wayfinding to station parking
- Introduce bicycle racks
- Improve landscaping
- Improve upkeep
- Increase safety patrols
- Improve safety on sidewalks near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

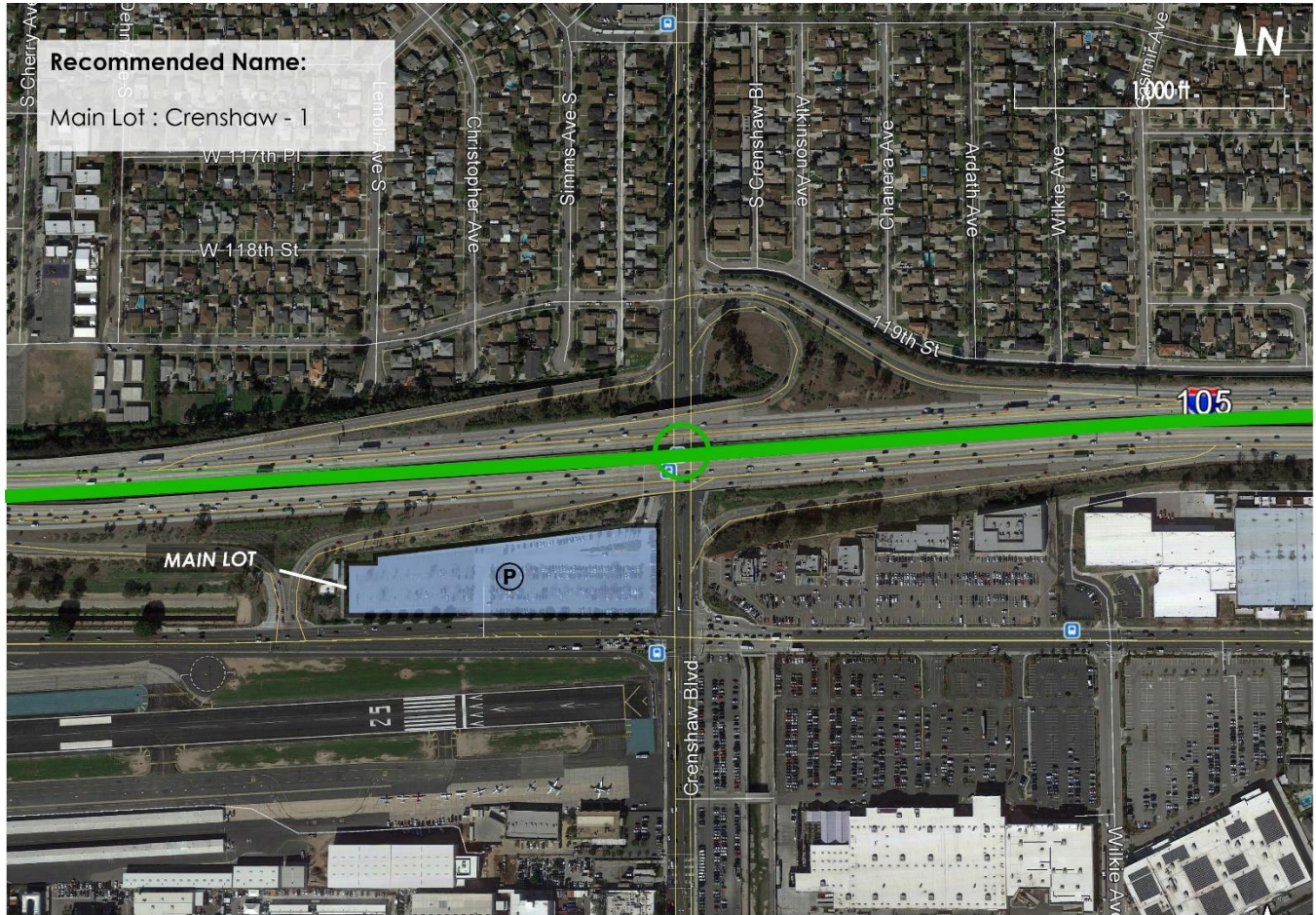
CRENSHAW

Address: 3200 West 120th St., Hawthorne, CA 90250

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 516 in one surface lot (no permit spaces)



LEGEND



Parking Facility

Green Line



Crenshaw Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	516	508	N/A	8	N/A
Time Period	Occupancy				
Weekday Daytime	38%	38%	N/A	50%	N/A
Weekday Evening	16%				
Weekend	47%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

There are two different entry points for the lot, a right turn only entrance from Crenshaw Blvd., and a right and left turn entry into the lot from West 120th St. The only exit point is to West 120th St., with both a right and left turn lane.


Total Lanes in: 3

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Potentially carpoolers based on clusters of cars in the lot
- Casino guests as Harrah's Rincon and Valley View Casino buses were observed departing the lot

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	4	4	100%
Bike Rack Spaces	12	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within a block of the station. The bike racks that are available are only on the east side of Crenshaw Blvd. There are no bike racks but four bike lockers on the west side of Crenshaw which are all in use.



Photo 147: Bike Locker

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 148: Bike Racks along Wall

Pedestrian Infrastructure Rating: Low

Pedestrian connectivity in the station area is challenged as there are no crosswalks to cross Crenshaw between West 118th Place and West 120th St. The sidewalks along Crenshaw are wide and in good condition and there are station entrances on both sides of the St. There is a walkway on the northern side of the lot that leads to the station.



Photo 149: Walkway Leading to Station from Sidewalk on West Side of Crenshaw Blvd.

Parking Signage and Wayfinding Rating: Low

There is no parking wayfinding signage along 120th or Crenshaw to indicate the lot's presence or to direct drivers to the lot. There is a Caltrans Park-and-Ride sign on the freeway before the Crenshaw exit. There is no signage at the lot entrance to indicate Metro parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 150: No Signage at Entrance to Lot

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Spaces on the western end of the lot would be most ideal for vanpool parking as these are the least desirable for Green Line riders.

Facility Upkeep

There was a lot of litter in the parking lot. There were shopping carts in the lot including one filled with garbage.

Facility Maintenance

Some of the foliage in lot medians is overgrown.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 151: Litter in the Parking Lot

Pavement Conditions

Pavement conditions are good and the spaces are visible.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve signage at lot entrance
- Increase the number of bicycle lockers
- Improve landscaping
- Improve upkeep
- Increase security patrols within facility
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

HAWTHORNE/LENNOX

Address:

West Lot – 4445 West 111th St., Inglewood, CA 90304

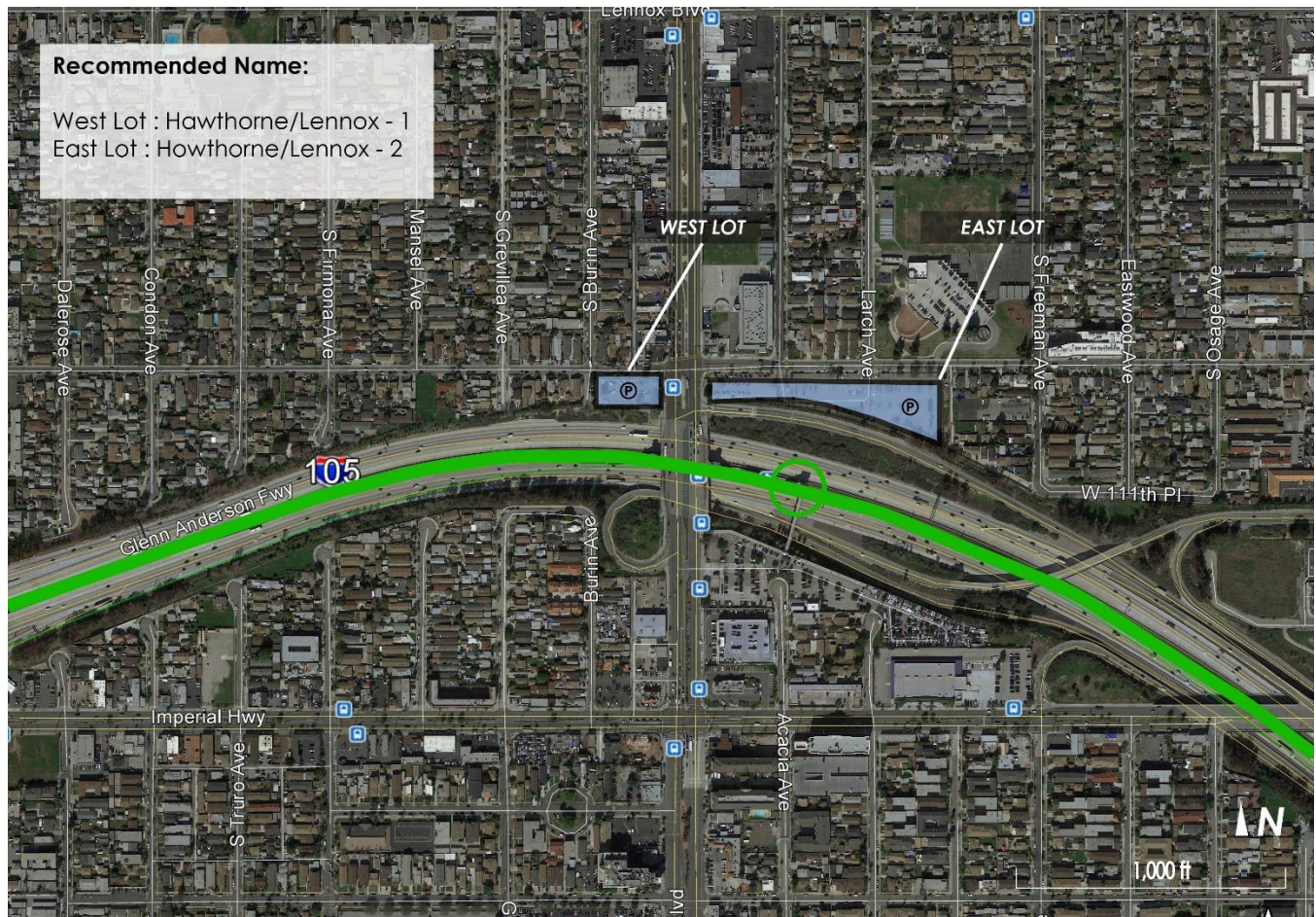
East Lot – 4335 West 111th St., Inglewood, CA 90304

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 362 in two surface lots (no permit spaces)

- West Lot: 46 spaces
- East Lot: 316 spaces



Recommended Name:
 West Lot : Hawthorne/Lennox - 1
 East Lot : Hawthorne/Lennox - 2

LEGEND



Parking Facility

Green Line



Hawthorne/Lennox Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	362	355	N/A	7	N/A
Time Period	Occupancy				
Weekday Daytime	33%	32%	N/A	43%	N/A
Weekday Evening	12%				
Weekend	6%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

There is one entrance and exit for the West Lot, and there are two entrances and exits for the East Lot. Both lots can be accessed only along West 111th St. along the south side of the St. All entrance and exit locations are full access.


Total Lanes in: 3

Total Lanes out: 3

Parking User Groups

- Metro transit riders
- East Lot used as neighborhood and school parking based on observations
- West Lot used as neighborhood, school and business parking based on observations. This lot was more fully occupied at 7:00 AM than at 8:30 AM.

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	8	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. There are bike lanes on Hawthorne Blvd. north of West 111th St., but they don't connect with the station. The only parking provided for bikes are racks for eight bikes, none of which were in use at the time of observations. These racks should be relocated out of the parking lot and closer to the platform.



Photo 152: Bike Racks in Parking Lot that should be Relocated (L); Bike Lane on Hawthorne Blvd. (R)

Pedestrian Infrastructure Rating: Low

Pedestrian access to/from the station is challenging. There is no east/west crosswalk on the south side of West 111th St. at Hawthorne Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Signage and Wayfinding Rating: Low

The monument sign is visible from Hawthorne Blvd. There is also a Caltrans Park-and-Ride sign on the I-105 before Prairie. However, there are no other parking wayfinding signs on the I-105 off ramps or on Hawthorne Blvd. There is no signage at parking lot entrances to indicate Metro parking.



Photo 153: Station Monument Sign

Potential Carshare Locations

There is opportunity for carshare parking in the non-ADA spaces closest to the Metro platform in the East Lot.

Potential Vanpool Locations

The best location for vanpool parking is the eastern end of the East Lot as these spaces are the least desirable for Green Line riders.

Facility Upkeep

There was some litter throughout the lot.

Facility Maintenance

Some of the median areas lack landscaping and are barren.

Pavement Conditions

Pavement conditions were generally good. Some striping is faded.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 154: Faded Striping

Lighting

West Lot minimum lighting level of service is B. East Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Upgrade lighting in East Lot
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Increase enforcement
- Initiate permit parking for adjacent uses
- Improve bicycle infrastructure near station
- Improve pedestrian infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

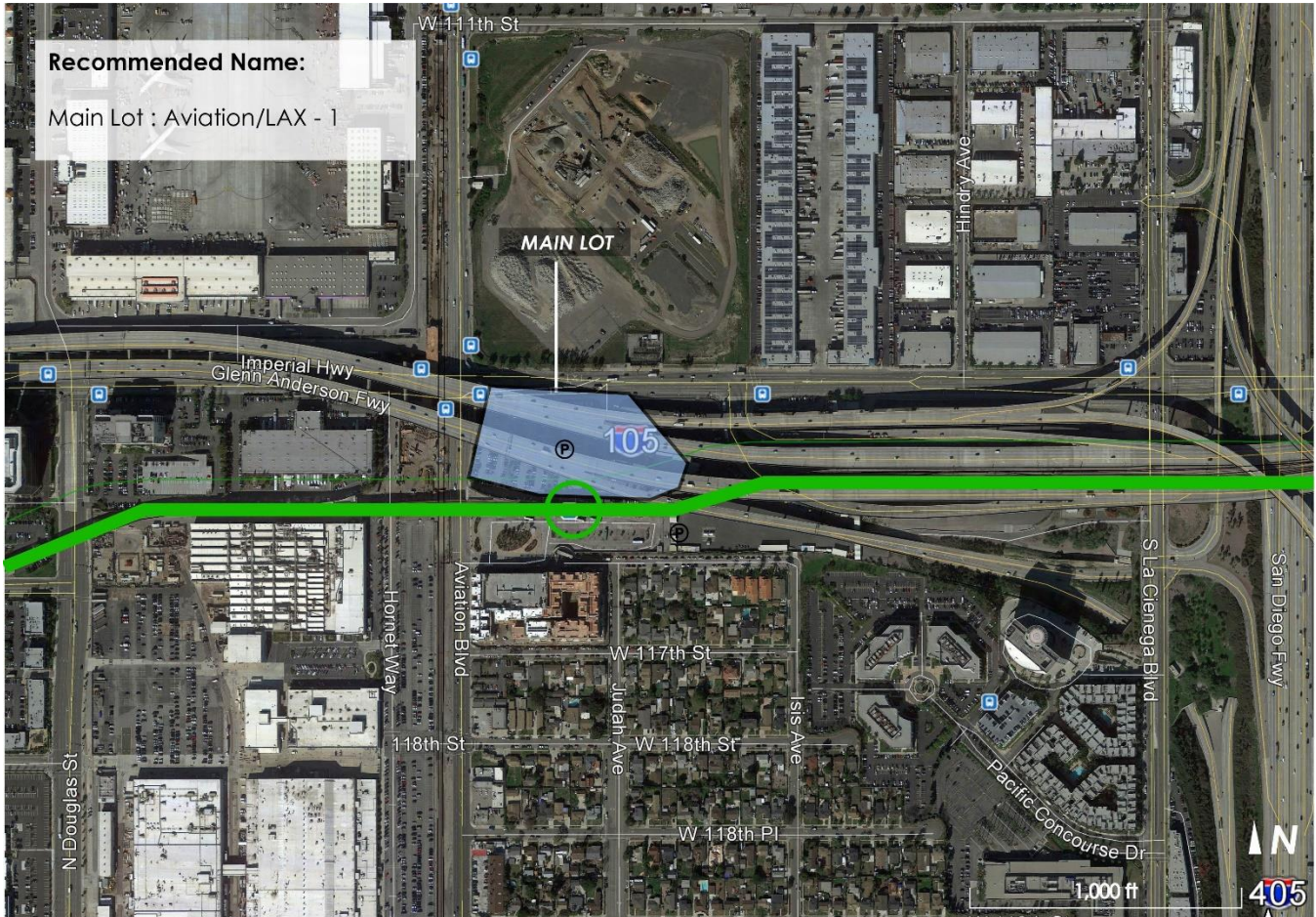
AVIATION/LAX

Address: 5574 West Imperial Highway, Los Angeles, CA 90045

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 390 in one surface lot (no permit spaces)



Recommended Name:
Main Lot : Aviation/LAX - 1

LEGEND



Parking Facility

Green Line



Aviation/LAX Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	390	380	N/A	10	N/A
Time Period	Occupancy				
Weekday Daytime	102%	102%	N/A	100%	N/A
Weekday Evening	82%				
Weekend	95%				

Parking Access

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Aviation/LAX station has one surface lot. There is one full access driveway on Imperial Highway, which allows for a right and left turn into the lot; however, the left turn is not designated for the entrance, but for the turning lane onto Aviation Blvd. Exiting out of the lot is only allowed via right lane turn onto Imperial Highway.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- LAX employees were seen during all observations

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	20	19	95%
Bike Rack Spaces	38	3	8%

Bicycle Infrastructure Rating: Low

Although there are bike lockers and bike racks available at the station, arrival via bike is difficult as no Class I or Class II bicycle facilities are within a block of the station. Neither Imperial nor Aviation have bike paths or lanes, and vehicles along these streets travel at high speeds making biking challenging. A bike was locked to the fence when we did our site visit.



Photo 155: Bike Lockers

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 156: Bike Illegally Locked to Fence

Pedestrian Infrastructure Rating: Medium

While the station area has reasonable pedestrian connectivity, the sidewalks along Aviation Blvd. adjacent to the station are in poor condition. There are no walkways leading to the station from the parking lot.



Photo 157: Sidewalk along Aviation Blvd.

Parking Signage and Wayfinding Rating: Low

There are confusing signs in the lot directing drivers to a pick-up area, but it actually takes drivers to the bus loading area. It is not clear if it is meant to be a kiss-and-ride area. There is a station monument sign at the entrance but otherwise limited signage directing drivers to the parking lot. There is only a small sign at the entrance to indicate Metro parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

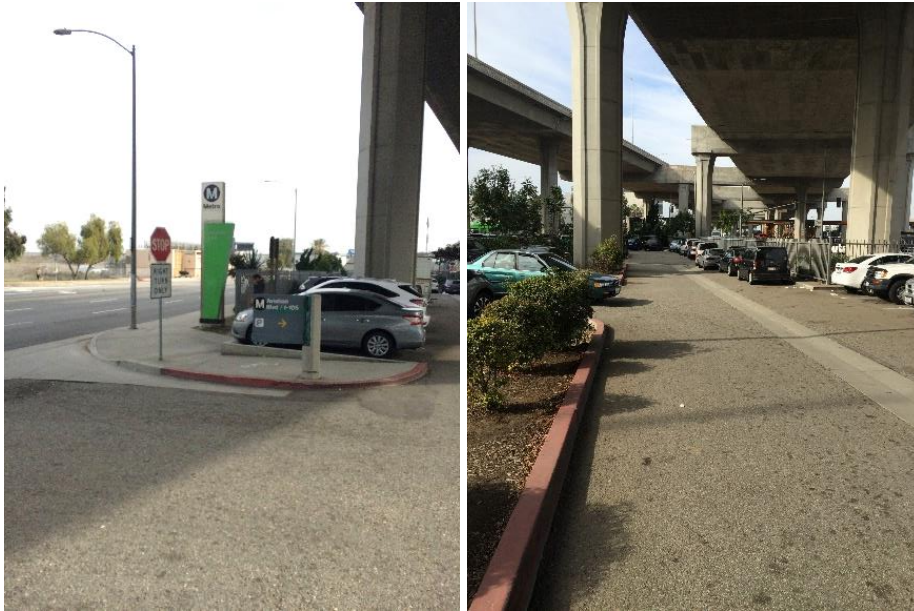


Photo 158: Station Monument Sign (L); Possible Kiss and Ride Area but Unclear Signage (R)

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Spaces on the northern end of the lot are the best-suited for vanpool parking as these are the least desirable for Green Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The lot was clean with no trash/debris.

Facility Maintenance

The parking lot appears to be sufficiently maintained.

Pavement Conditions

Pavement conditions are adequate. Striping of spaces is difficult to see.

Lighting

Minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at parking lot entrance
- Increase the number of bicycle lockers
- Upgrade lighting
- Restripe spaces
- Improve landscaping
- Increase enforcement
- Initiate permit parking for transit riders
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

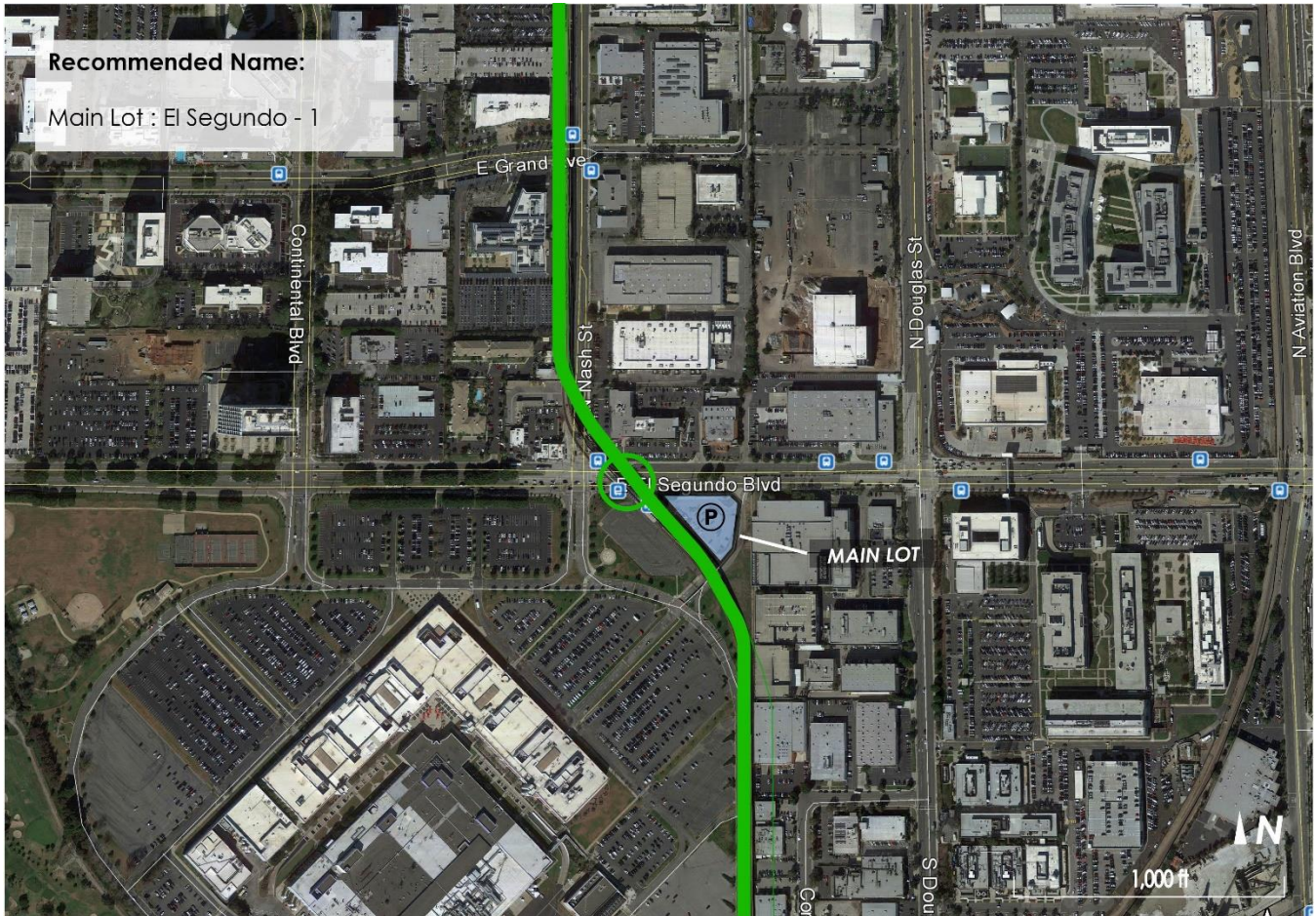
EL SEGUNDO

Address: 2226 East El Segundo Blvd., El Segundo, CA 90245

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 93 in one surface lot (no permit spaces)



LEGEND



Parking Facility

Green Line



El Segundo Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	93	70	N/A	2	21
Time Period	Occupancy				
Weekday Daytime	26%	28%	N/A	0%	21%
Weekday Evening	16%				
Weekend	14%				

- The reserved spaces are for electric vehicle charging (four), vanpool (five), Zipcar carshare (two) and short-term (10).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

The lot has an entry point along El Segundo Blvd. If a motorist is traveling eastbound, they can enter the lot via a right turn. However, the lot cannot be accessed through a left turn. If a motorist is traveling westbound and wants to access the lot, they need to travel to Nash St. and make a U-turn and access the lot by making a right turn as eastbound motorists do. Exits out of the lot can only be made via right turn onto El Segundo Blvd.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- EV charging stations were full at the time of observations and one person was seen charging their vehicle and then walked off site

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	7	7	100%
Bike Rack Spaces	14	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. At the station itself, there is no signage that directs riders to the bicycle parking.



Photo 159: Bike Locker

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

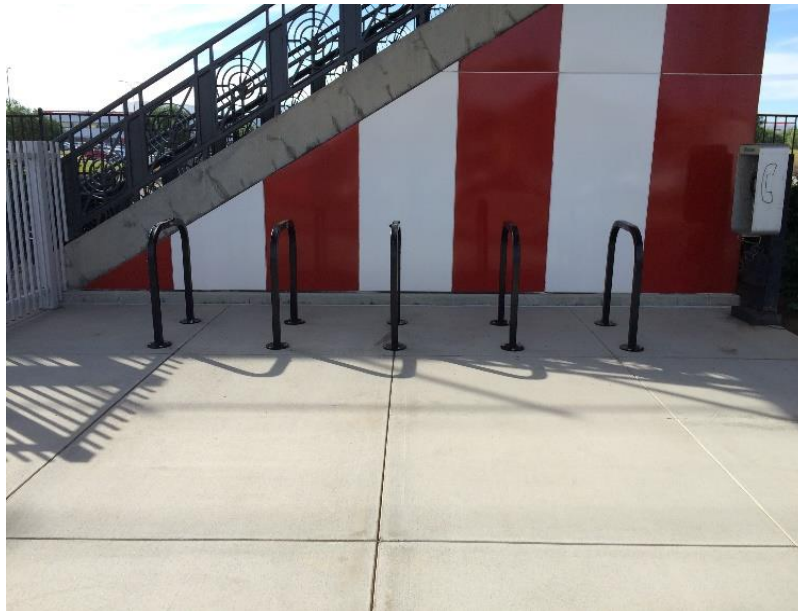


Photo 160: Bike Racks

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity in the area. The sidewalks near the station are wide and in good condition.



Photo 161: Sidewalks inside Station Parking Lot

Parking Signage and Wayfinding Rating: Low

The only parking wayfinding is the monument sign on the south side of El Segundo Blvd. Aside from the monument sign there are no others to indicate Metro parking. If a motorist is traveling westbound on El Segundo, there is no sign indicating that a U-turn must be made at Nash St. in order to access the lot.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 162: Parking Monument Sign (L); Station Monument Sign (R)

Potential Carshare Locations

If additional carshare spaces are to be added, they may be provided adjacent to the current designated spaces.

Potential Vanpool Locations

The best location for vanpool parking is the southeast portion of the lot as these spaces are the least desirable for Green Line riders.

Facility Upkeep

The parking lot appears clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

Pavement has some cracks and the striping is a bit faded in areas.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking lot entrance
- Increase number of bicycle lockers
- Resurface lot
- Restripe spaces
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

DOUGLAS

Address: 700 South Douglas St., El Segundo, CA 90245

Owner: City of El Segundo

Operator: City of El Segundo

Total Number of Parking Spaces: 30 in one surface lot (no permit spaces)



Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	30	28	N/A	2	N/A
Time Period	Occupancy				
Weekday Daytime	87%	93%	N/A	0%	N/A
Weekday Evening	30%				
Weekend	30%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Access

The lot is accessed through the intersection at Douglas St. and Transit Center Way. The lot has one entrance that can accommodate right turns, left turns, and straight pass through. There is only one exit, drivers can exit right, left or straight at the intersection of Douglas St. and Transit Center Way.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Visitors of business immediately to the north on both sides of Douglas based on observation of an individual

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	11	9	82%
Bike Rack Spaces	6	0	0%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the station. The bike racks are not readily visible while some of the bike lockers are currently in the parking lot, a long distance from the platform.



Photo 163: Bike Lockers

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 164: Bike Racks

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity to/from the station area. The sidewalks are in good condition from the parking lot to the station. However, the walk from the parking lot to the station is long and enclosed as there are high walls/fences on both sides. Also, there is no pedestrian wayfinding signage from the lot to the station.

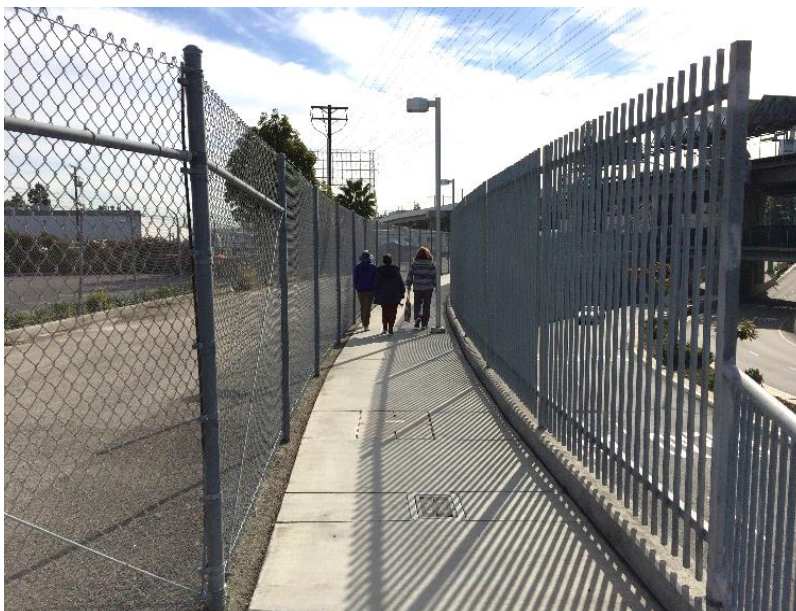


Photo 165: Walkway Connecting Lot to Station Platform

Parking Signage and Wayfinding Rating: Low

There is very little parking wayfinding signage. However, the parking lot is at a traffic signal whose St. name is "Transit Center Way" which helps. The monument signs are easy to see as they are placed at visible locations at the intersection and also on Douglas.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 166: Station Monument Sign (L); Transit Center Way Sign (R)

Potential Carshare Locations

Any carshare spaces may be located closest to the pedestrian walkway connecting the lot with the station platform.

Potential Vanpool Locations

Spaces on the northern end of the lot would be best suited for vanpool parking as these are the least desirable for Green Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lot is clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Minimum lighting level of service is D.

Safety

No issues were observed.

Security

Pedestrian path between the parking lot and the platform is long and feels enclosed. At times, it may feel unsafe to riders.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Increase number of bicycle lockers
- Improve pedestrian wayfinding to station
- Upgrade lighting
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

REDONDO BEACH

Address:

North Lot – 2406 Marine Ave., Redondo Beach, CA 90260

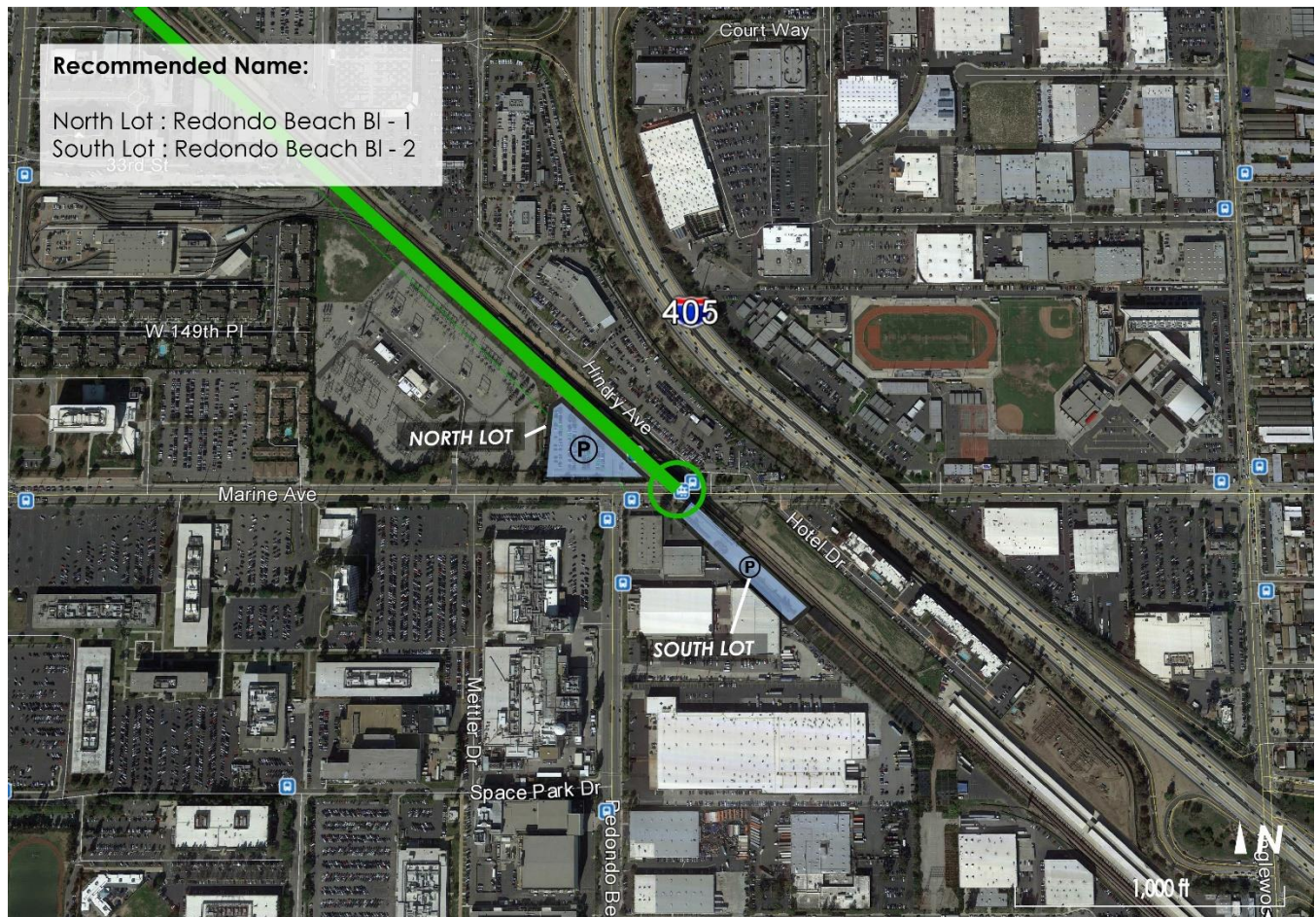
South Lot – 2406 Marine Ave., Redondo Beach, CA 90260

Owner: Southern California Edison

Operator: Metro

Total Number of Parking Spaces: 340 in two surface lots (no permit spaces)

- North Lot: 253 spaces
- South Lot: 87 spaces



LEGEND



Parking Facility

Green Line



Redondo Beach Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	340	312	N/A	11	17
Time Period	Occupancy				
Weekday Daytime	51%	56%	N/A	9%	0%
Weekday Evening	13%				
Weekend	15%				

*The reserved spaces are for vanpool (four) and short-term parking (13).

Parking Access

The Redondo Beach station has two surface lots. The north lot is the main lot, and has three driveways on Marine Ave. The first is an ingress-only bus driveway that is poorly signed. The main entrance is signalized, aligned with the northern terminus of Redondo Beach Ave., and has two inbound and two outbound lanes. The western driveway for the north lot has one inbound and one outbound lane. The south lot, south of Marine Ave. has one full access driveway on Marine Ave.


Total Lanes in: 5

Total Lanes out: 4

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	5	5	100%
Bike Rack Spaces	12	0	0%

*One chained to fence

Bicycle Infrastructure Rating: Medium

There are no bicycle lanes on Marine Ave. There is an on-street bicycle lane on Redondo Beach Ave. which ends at the entrance to the station parking lot.



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

Photo 167: Bike Racks (L); Bike Lockers (R)

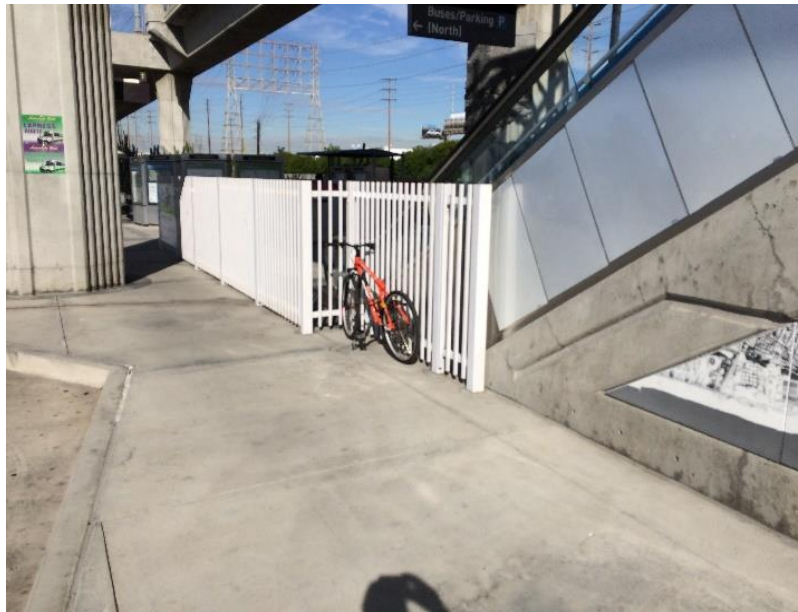


Photo 168: Bike Locked to Fence

Pedestrian Infrastructure Rating: Medium

There is reasonable pedestrian connectivity between the station and surrounding area. Sidewalks are in good condition on Marine Ave. and Redondo Beach Blvd. Internal sidewalks are in excellent condition.



Photo 169: Sidewalk along Marine Ave. Facing West

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 170: Sidewalk along Marine Ave. Facing East

Parking Signage and Wayfinding Rating: Medium

No parking wayfinding signage in the surrounding vicinity; however, the monument sign on Marine is within the sidewalk right-of-way and very visible to passing motorists. The bus-only entrance is poorly signed, with the sign saying 'buses only' tiny and faded. There is a big sign for the south lot on eastbound Marine, which could use a directional arrow pointing to the driveway. However, this lot was empty, and the north lot was not full.



Photo 171: South Lot Entrance Sign

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS



Photo 172: Station Monument Sign

Potential Carshare Locations

Carshare spaces could be placed in the North Lot at the spaces closest to the platform.

Potential Vanpool Locations

There are vanpool spaces in the South Lot. Any additional vanpool spaces may be placed here as these are least desirable for Green Line riders.

Facility Upkeep

The parking lot is clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lots is good.

Lighting

North Lot minimum lighting level of service is E. South Lot minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Increase number of bicycle lockers

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – GREEN LINE STATIONS

- Upgrade lighting

APPENDIX E – ORANGE LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

For North Hollywood, refer to Red Line section.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

VAN NUYS

Address:

North Lot – 14612 Bessemer St., Los Angeles, CA 91411

South Lot – 11415 Aetna St., Los Angeles, CA 91401

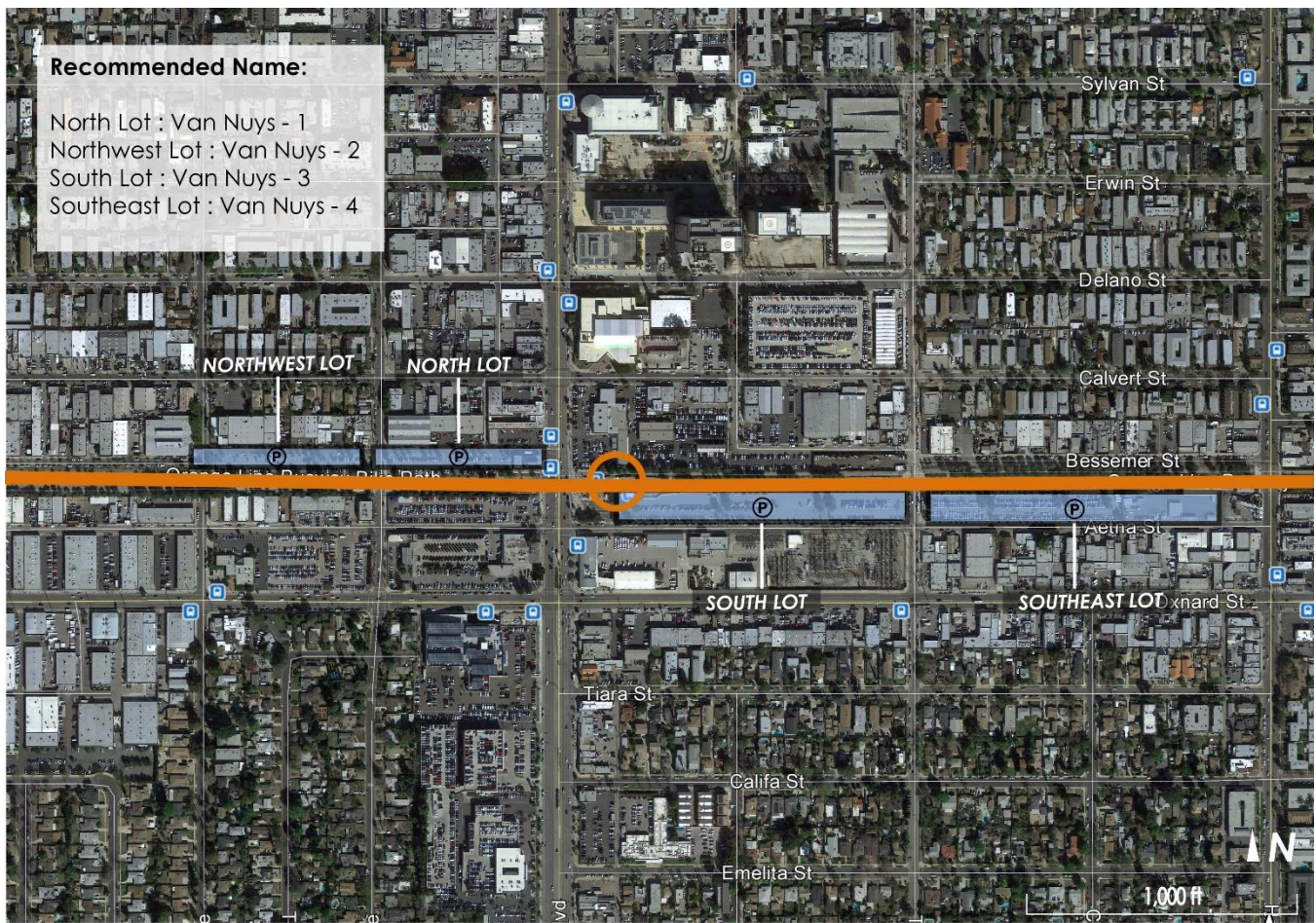
Owner: Metro

Operator: Metro

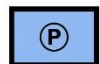
Total Number of Parking Spaces: 307 in two surface lots available to patrons (no permit spaces)

- North Lot: 87 spaces
- South Lot: 220 spaces

There are 726 parking spaces total with 419 spaces, in Northwest and Southeast Lots, being leased out to a car dealership.



LEGEND



Parking Facility

Orange Line



Van Nuys Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	307	288	N/A	17	2
Time Period	Occupancy				
Weekday Daytime	63%	65%	N/A	18%	100%
Weekday Evening	9%				
Weekend	15%				

*The reserved spaces are for Zipcar (carshare).

Parking Access

The Van Nuys station has four surface parking lots, two of which are currently leased out, and two of which are available to Metro patrons. The leased Northwest Lot has two full access driveways and the leased Southeast Lot has one full access driveway. The North Lot, accessible from Bessemer St., has two full access driveways and the South Lot, accessible from Aetna St., has three full access driveways. In total across the four lots, there are eight full access driveways.


Total Lanes in: currently 5

Total Lanes out: currently 5

Parking User Groups

- Metro transit riders
- Northwest and Southeast lots are leased out to car dealers for vehicle storage
- Employees of the industrial uses to the north of the North Lot based on clustering of parked cars
- South Lot appears to have a few vehicles with individuals living in them

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	8	2	25%
Bike Rack Spaces	12	0	0%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running east/west of the station along the Orange Line busway. There are no marked Class II bicycle lanes in the vicinity of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 173: Orange Line Pedestrian and Bicycle Path



Photo 174: Bike Lockers along Orange Line Pedestrian and Bicycle Path

Pedestrian Infrastructure Rating: High

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running east/west of the station along the Orange Line busway. Sidewalks leading to/from the station are in good condition. There is a homeless encampment on Aetna just east of the south lot which blocks the sidewalk, as well as a homeless encampment on Bessemer adjacent to the northwest lot blocking the sidewalk.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 175: Sidewalk along Aetna St.



Photo 176: Sidewalk along Van Nuys Blvd.

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs outside of the station monument sign on Van Nuys which is set back from the sidewalk and does not have great visibility to passing motorists. There are no parking wayfinding signs on Van Nuys, Aetna or Bessemer indicating that Metro parking facilities are nearby or indicating the entrance to parking facilities. There are only small signs at the entrance to each lot.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 177: Sign at Entrance to South Lot



Photo 178: No Wayfinding Signage along Van Nuys Blvd.

Potential Carshare Locations

If carshare spaces are to be designated, the non-ADA spaces closest to the platform in the South Lot would be the most likely location.

Potential Vanpool Locations

Ideal locations for vanpool parking would be the eastern end of the South Lot or western end of the North Lot as these locations are least desirable to Orange Line riders.

Facility Upkeep

The parking lots are clean with no trash/debris.

DRAFT

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lots is good.

Lighting

North Lot minimum lighting level of service is E. South Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

There appear to be individuals living in vehicles in the South Lot as well as outside the eastern end of the South Lot along Aetna St. near Tyrone Ave.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Upgrade lighting
- Improve upkeep
- Increase safety patrols
- Improve safety on sidewalks near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

SEPULVEDA

Address: 15330 West Erwin St., Los Angeles, CA 91411

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 439 parking spaces in one surface lot available to patrons (no permit spaces). There are 1,205 spaces in total with 766 spaces being leased to a car dealership.



Recommended Name:

Main Lot : Sepulveda - 1

LEGEND



Parking Facility

Orange Line



Sepulveda Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	439	415	N/A	24	N/A
Time Period	Occupancy				
Weekday Daytime	40%	41%	N/A	25%	N/A
Weekday Evening	9%				
Weekend	7%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Access

The Sepulveda station has one large surface lot with multiple access points. The termination of Haskell Ave. at the parking lot, and current practice of traffic coming down Haskell and cutting through the parking lot to Sepulveda makes gated access a difficult endeavor. Depending on how the parking lot was gated off, and whether or not some access locations were closed, there would be between three and 10 gated access points.


Total Lanes in: currently 3

Total Lanes out: currently 3

Parking User Groups

- Metro transit riders
- Majority of lot leased to various auto dealers for inventory
- Portions of lot leased to film crews occasionally
- Adjacent industrial use potentially based on clustering of cars close to the use

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	11	5	45%
Bike Rack Spaces	12	0	0%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running northwest/southeast of the station along the Orange Line busway. There are no marked Class II bicycle lanes in the vicinity of the station.



Photo 179: Orange Line Pedestrian and Bicycle Path

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 180: Bike Racks and Lockers

Pedestrian Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running northwest/southeast of the station along the Orange Line busway. Sidewalks leading to/from the station are in good condition. The station is not visible from main roads. Haskell Ave. is used as a cut through between Victory Blvd. and Sepulveda Blvd. The last leg of the cut through involves speeding through the parking lot. Traffic calming measures should be implemented to discourage this cut through and to reduce speeds in the parking lot.



Photo 181: Pedestrian Crosswalk within Lot

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Signage and Wayfinding Rating: Low

There is no monument sign on Sepulveda; instead it is placed at the station where no vehicular traffic can see it. The station is tucked away off the main roads. There is a small parking wayfinding sign on northbound Sepulveda Blvd. directing people to turn left. There is no Metro branding on this sign. No similar sign was observed on southbound Sepulveda. On Victory Blvd., approaching Haskell Ave. from both directions, there are small signs directing patrons to turn onto Haskell for the station. There are no further signs along Haskell to reassure patrons they are headed in the right direction.

Potential Carshare Locations

If carshare spaces are to be designated, the non-ADA spaces closest to the platform would be the most likely location.

Potential Vanpool Locations

Ideal locations for vanpool parking are the northwest or northeast portions of the lot as these are least desirable to Orange Line riders.

Facility Upkeep

The parking lots are clean with no trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is D.

Safety

As mentioned previously, traffic cuts through the lot between Victory Blvd. and Sepulveda Blvd. which compromises pedestrian safety.

Security

No issues were observed. The presence of film crews and potentially others such as car dealers in the lot may serve to deter some crime.

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at lot entrances
- Improve pedestrian wayfinding to station
- Upgrade lighting
- Implement traffic calming to slow down cut-through traffic

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

BALBOA

Address: 6340 North Balboa Blvd., Los Angeles, CA 91316

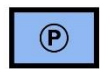
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 273 in one surface lot (9 permit spaces)



LEGEND



Parking Facility

Orange Line



Balboa Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	273	258	9	6	N/A
Time Period	Occupancy				
Weekday Daytime	83%	83%	89%	100%	N/A
Weekday Evening	30%				
Weekend	13%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Access

The Balboa station has one surface lot. There is one full access driveway on Victory Blvd. and one right-in/right-out only driveway on Balboa Blvd. It is challenging at times to turn left out of the Victory driveway onto westbound Victory Blvd. and also difficult to turn out of the Balboa Blvd. driveway and access the northbound left-turn lanes at the Victory Blvd./Balboa Blvd. intersection.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Potentially the office building west of the station across Balboa Blvd., where there is paid parking
- Cluster of vehicles in the northeast corner of the lot some of which may have individuals living in them

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	18	12	67%
Bike Rack Spaces	6	0	0%

*Three bicycles locked to the fence

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running east/west of the station along the Orange Line busway. In the vicinity of the Balboa station, the pedestrian and bicycle path is essentially the sidewalk on the south side of Victory Blvd. There is also an off-street bicycle path south of the station on Balboa Blvd. and there are marked Class II bicycle lanes on Balboa Blvd. north of Victory Blvd.



Photo 182: Bike Racks and Orange Line Pedestrian and Bicycle Path

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Pedestrian Infrastructure Rating: High

The Orange Line Pedestrian and Bicycle path runs along the north side of the busway, and continues running east/west of the station along the Orange Line busway. In the vicinity of the Balboa station, the pedestrian and bicycle path is essentially the sidewalk on the south side of Victory Blvd. Sidewalks are in good condition.

Parking Signage and Wayfinding Rating: Low

The monument sign on Balboa Blvd. is partially obscured by a tree. There are a small signs at both lot entrances. There are no parking wayfinding signs on Balboa or Victory. The station is in particular need of a sign on Westbound Victory Blvd. directing patrons to turn left into the parking lot; if this turn is missed, patrons have to turn left onto southbound Balboa Blvd. and then make a U-turn at the park entrance road.



Photo 183: No Wayfinding along Westbound Victory Blvd.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 184: Station Monument Sign and Sign at Parking Lot Entrance

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

An ideal location for vanpool parking would be the eastern end of the lot as these spaces are least desirable to Orange Line riders.

Facility Upkeep

The parking lot was clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is D.

Safety

No issues were observed.

Security

There may be a couple vehicles on the eastern end of the lot occupied by individuals who are living in them.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at facility entrances
- Upgrade lighting
- Increase safety patrols
- Increase number of permit spaces (10)

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

RESEDA

Address:

Northwest Lot – 18530 Topham St., Los Angeles, CA 91335

Southwest Lot – 18548 Oxnard St., Los Angeles, CA 91356

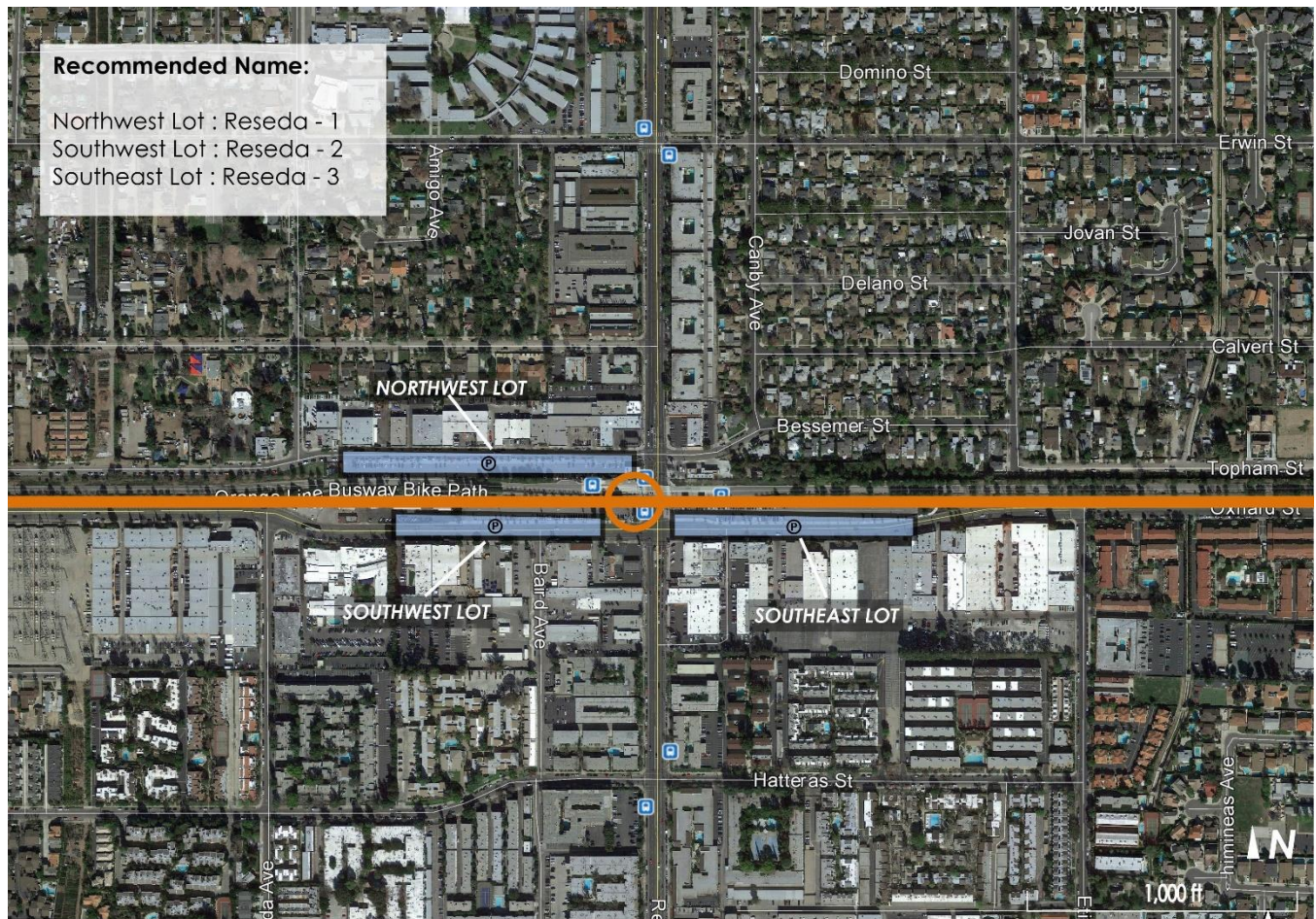
Southeast Lot – 18450 Oxnard St., Los Angeles, CA 91356

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 522 in three surface lots (no permit spaces)

- Northwest Lot: 238 spaces
- Southwest Lot: 127 spaces
- Southeast Lot: 157 spaces



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	522	510	N/A	12	N/A
Time Period	Occupancy				
Weekday Daytime	50%	50%	N/A	42%	N/A
Weekday Evening	8%				
Weekend	11%				

Parking Access

The Reseda station has three surface parking lots: Northwest, Southwest and Southeast. Each lot has two full access driveways (two entry and two exit lanes per lot). The Northwest Lot is accessed from Topham St. while the Southwest and Southeast Lots are accessed from Oxnard St.


Total Lanes in: 6

Total Lanes out: 6

Parking User Groups

- Metro transit riders
- Employees of the industrial uses to the north of the Northwest parking lot based on clustering of parked cars
- Employees of the pet feed store and office/industrial uses close to the western end of the Southwest Lot based on clustering of parked cars

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	14	6	36%
Bike Rack Spaces	6	0	0%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the south side of the busway, and continues running east/west of the station along the Orange Line busway. There are marked Class II bicycle lanes on Reseda Blvd. north and south of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 185: Bike Lockers



Photo 186: Orange Line Pedestrian and Bicycle Path

Pedestrian Infrastructure Rating: High

The Orange Line Pedestrian and Bicycle path runs along the south side of the busway, and continues running east/west of the station along the Orange Line busway. Sidewalks leading to/from the station are in good conditions except for the north side of Oxnard west of the Southwest parking lot which is narrow and overgrown with landscaping. There is no direct access to the station from the Northwest Lot; pedestrians have to walk down Topham to Reseda and around to the platform. There are palm trees on the west side of Reseda Blvd. between Topham and the busway that need maintenance/trimming.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 187: Sidewalk along Oxnard St.

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs outside of the two station monument signs on Reseda, both of which are visible and placed in good locations. Both of the monument signs are on Sherman Way and not visible from Canoga Ave. There are no parking wayfinding signs on Reseda, Oxnard and Topham indicating that Metro parking facilities are nearby. There are small signs posted at the entrance to each parking lot.



Photo 188: No Wayfinding Signage along Oxnard St.

Potential Carshare Locations

If carshare spaces are to be designated, the non-ADA spaces closest to the platform in the Southeast and Southwest parking lots would be the most likely location.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Potential Vanpool Locations

The most ideal locations for vanpool parking would be the west end of the Northwest Lot and east end of the Southeast Lot as these are least desirable to Orange Line riders.

Facility Upkeep

The parking lots were clean with no trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good in the Southeast Lot; the striping in the Northwest and Southwest Lots is fading and in need of a refresh but the pavement quality is good.

Lighting

Northwest Lot minimum lighting level of service is E. Southwest Lot minimum lighting level of service is D. Southeast Lot minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Improve pedestrian wayfinding within parking lots
- Upgrade lighting
- Restripe (Northwest and Southwest Lots)
- Increase enforcement
- Initiate permit parking for adjacent uses, given availability of parking

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

PIERCE COLLEGE

Address: 20245 Victory Blvd., Los Angeles, CA 91367

Owner: Los Angeles Community College

Operator: Metro

Total Number of Parking Spaces: 392 in one surface lot (no permit spaces)



LEGEND



Parking Facility

Orange Line



Pierce College Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	392	380	N/A	10	2
Time Period	Occupancy				
Weekday Daytime	62%	62%	N/A	30%	100%
Weekday Evening	11%				
Weekend	7%				

*Two reserved spaces are for Zipcar (carshare).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Access

Pierce College station has one surface lot. There are two full access driveways on Victory Blvd. and one right-in/right-out only driveway on Winnetka Ave. Southbound queues on Winnetka Ave. at the Winnetka Ave./Victory Blvd. intersection frequently block access to the driveway. Left-turns out of the driveways on Victory Blvd. can be challenging during peak hour.


Total Lanes in: 3

Total Lanes out: 3

Parking User Groups

- Metro transit riders
- Pierce College students and faculty who are clustered in southeast corner of lot

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	7	4	57%
Bike Rack Spaces	12	2	17%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the south side of the busway, and continues running east/west of the station along the Orange Line busway. There are no other bike lanes/routes in the immediate vicinity of the station.



Photo 189: Bike Racks and Lockers adjacent to Orange Line Pedestrian and Bicycle Path

Pedestrian Infrastructure Rating: High

There is good pedestrian connectivity between the station and surrounding area. The sidewalks are in okay condition, however on the east side of Winnetka Ave. north of Victory Blvd. tree roots have caused the sidewalks to buckle. The sidewalk on the north side of Victory Blvd. east of Winnetka Ave. ends approximately 30 feet east of the intersection.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 190: Buckled Sidewalk near Station (L); Where Sidewalk Ends on Victory Blvd. east of Winnetka Ave. (R)

Parking Signage and Wayfinding Rating: Low

The monument sign outside the station is faded. There are no parking wayfinding signs on the streets in the vicinity of the station. There are small signs at parking lot entrances. There is cut-through traffic that speeds through the lot. Motorists turn right into the driveway on Winnetka Ave., and drive through the lot and make a right-turn onto Westbound Victory, avoiding some congestion at the intersection. This lot has an irregular shape with an abundance of drive aisles. The drive aisle on the south edge of the lot serves almost no parking spaces and functions more as a two-lane road. There are also odd internal drive-aisle merge points.



Photo 191: Station Monument Sign

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

An ideal location for vanpool parking is the western end of the lot as it is least desirable for Orange Line riders.

Facility Upkeep

The parking lot was clean with no trash/debris. However, there was some trash overflowing trash bins on Winnetka Ave.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is E.

Safety

The configuration of the drive aisles is conducive to speeding.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve signage at lot entrance
- Upgrade lighting
- Implement traffic calming

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

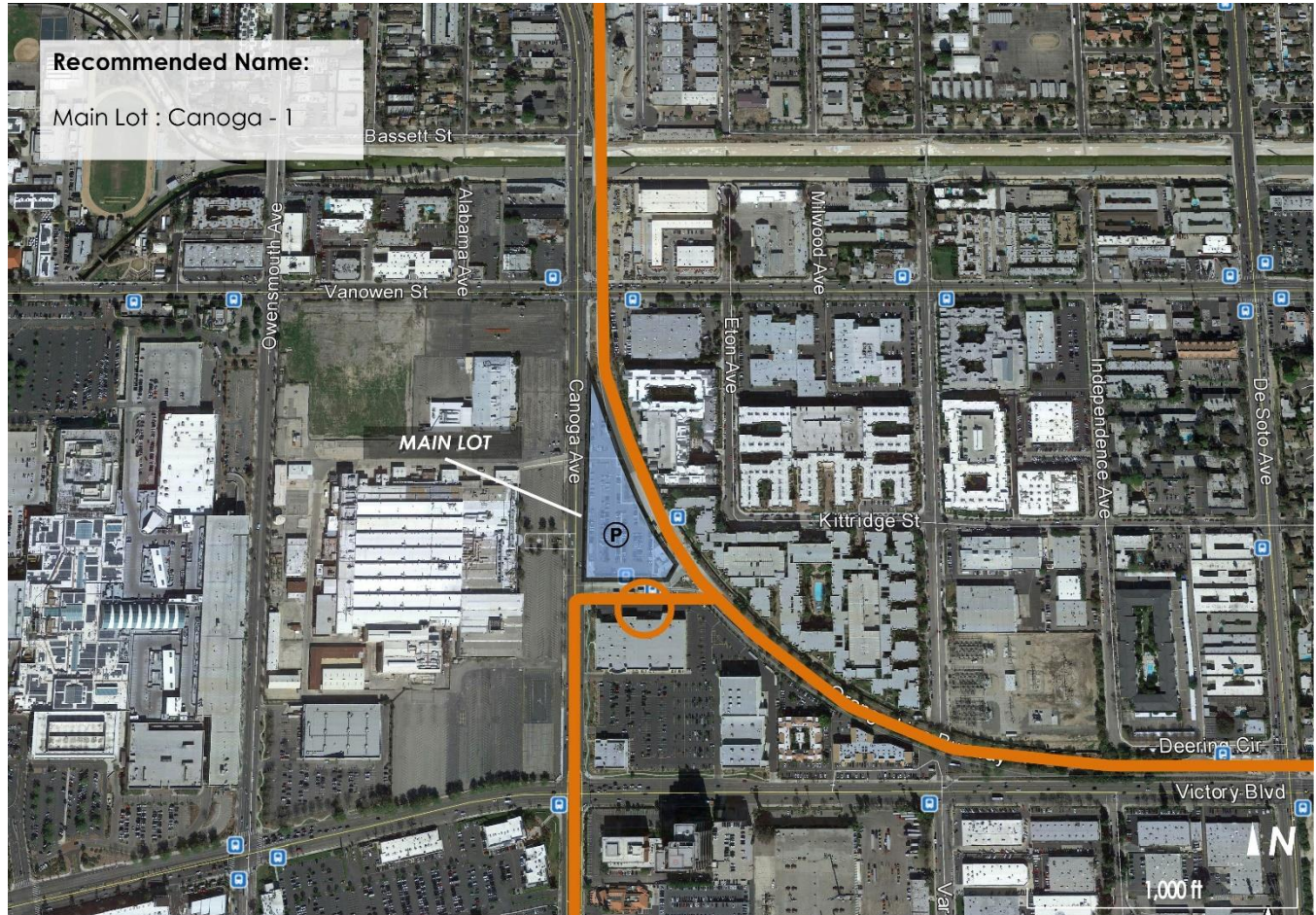
CANOGA

Address: 6650 Canoga Ave., Los Angeles, CA 91303

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 249 spaces in one surface lot (no permit spaces)



Recommended Name:
Main Lot : Canoga - 1

LEGEND



Parking Facility

Orange Line



Canoga Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	249	224	N/A	17	8
Time Period	Occupancy				
Weekday Daytime	61%	66%	N/A	18%	0%
Weekday Evening	8%				
Weekend	9%				

*The reserved spaces consist of three Metro spaces and five for the sheriff.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Access

The Canoga station has one surface parking lot. Access is provided at one signalized access location with two inbound lanes and two outbound lanes, and one non-signalized driveway with one inbound lane and one outbound lane.


Total Lanes in: 3

Total Lanes out: 3

Parking User Groups

- Metro transit riders
- Cluster of vehicles at remote end of lot, potentially businesses or housing to the east

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	22	12	55%
Bike Rack Spaces	24	0	0%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the east side of Canoga Ave. adjacent to the station, and continues running north of the station along the Orange Line busway. There are no other bicycle facilities such as bicycle lanes, sharrows or bike route signs in the immediate vicinity of the station.



Photo 192: Bike Lockers and Racks

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 193: Bike Attached to a Tree

Pedestrian Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the east side of Canoga Ave. adjacent to the station/Parking Lot A. Sidewalks on Canoga Ave. north are in excellent shape and wide. Pedestrian push buttons and curb ramps are present at intersections in the immediate vicinity of the station such as the signalized entrance to the parking lot and the Canoga Ave./Vanowen St. intersection.



Photo 194: Sidewalk along Canoga Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs outside of a single monument sign on Canoga Ave. The monument sign is set back from the sidewalk and is located in the parking lot, making it difficult for passing motorists to see. There are no wayfinding signs on Canoga Ave. or Vanowen St. indicating a Metro parking facility. There are no signs at the parking lot entrances to indicate Metro parking.



Photo 195: Station Monument Sign

Potential Carshare Locations

If the demand existed for carshare spaces, they could be placed in the first row of compact spaces adjacent to the platform, or some of the excess ADA spaces could be repurposed.

Potential Vanpool Locations

The northern portion of the lot would be the most ideal as these spaces are least desirable for Orange Line riders.

Facility Upkeep

The parking lots were clean with no trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lot is good.

Lighting

Minimum lighting level of service is D.

Safety/Security

No issues were observed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at parking lot entrance
- Upgrade lighting

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

SHERMAN WAY

Address:

West Lot – 7170 Canoga Ave., Los Angeles, CA 91303

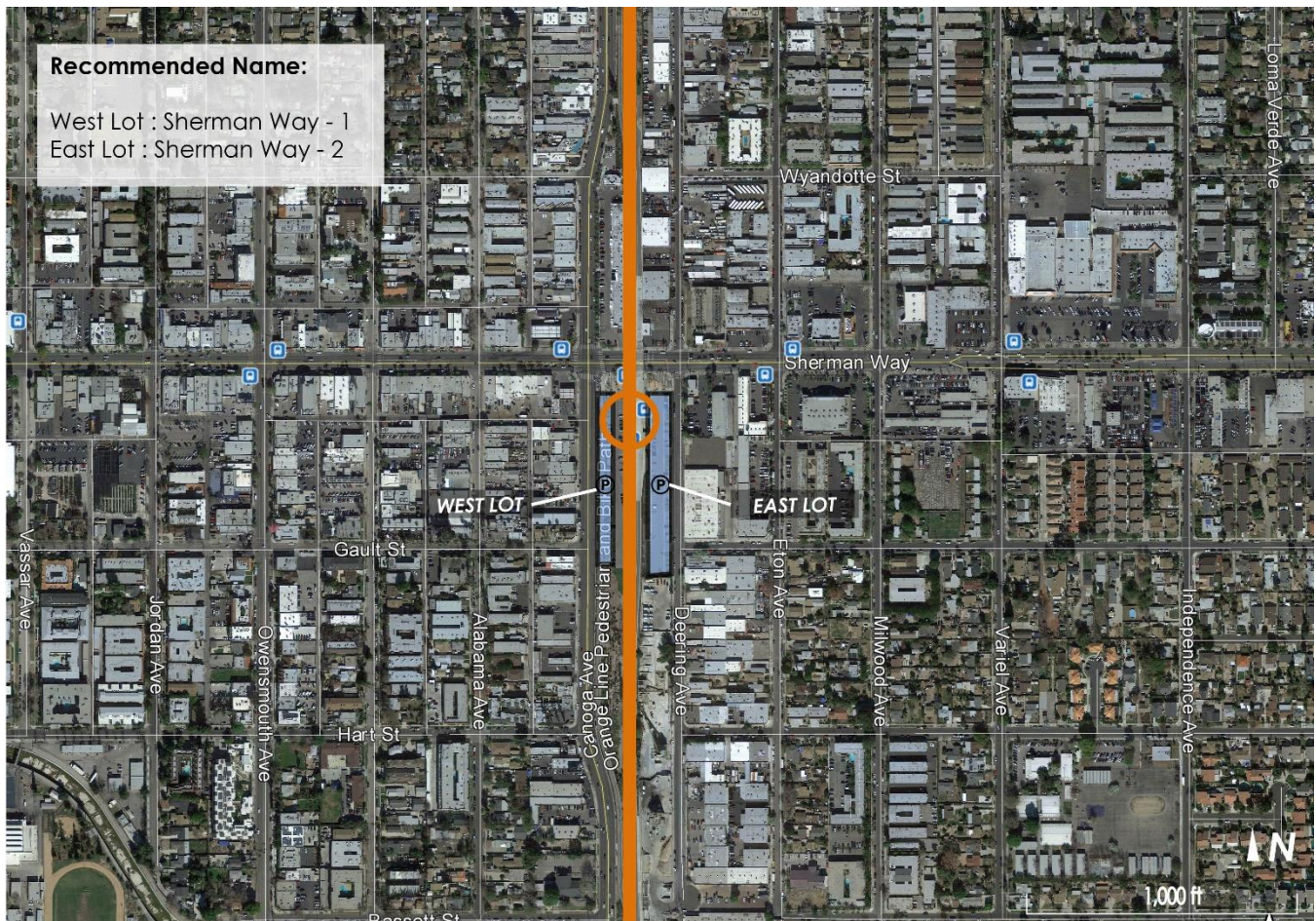
East Lot – 7119 Deering Ave., Los Angeles, CA 91303

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 205 in two surface lots (no permit spaces)

- West Lot: 101 spaces
- East Lot: 104 spaces



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	205	189	N/A	10	6
Time Period	Occupancy				
Weekday Daytime	24%	26%	N/A	10%	0%
Weekday Evening	12%				
Weekend	17%				

*The reserved spaces are for passenger loading.

Parking Access

The Sherman Way station has two parking lots. The east lot has two full access driveways on Deering Ave., and the west lot has two full access driveways on Canoga Ave.


Total Lanes in: 4

Total Lanes out: 4

Parking User Groups

- Metro transit riders
- East Lot: Enterprise Rent-A-Car at 21330 Sherman Way based on bar codes observed on cars windows
- West Lot: businesses on west side of Canoga based on clustering of parked cars

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	14	0	0%
Bike Rack Spaces	24	2	8%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle path runs along the east side of Canoga Ave. adjacent to the station/east lot, and continues running north of the station along the Orange Line busway. There are no other bicycle facilities such as bicycle lanes, sharrows or bike route signs in the immediate vicinity of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 196: Bike Racks and Lockers



Photo 197: Sign Directing to Orange Line Pedestrian and Bicycle Path

Pedestrian Infrastructure Rating: High

The Orange Line Pedestrian and Bicycle path runs along the east side of Canoga Ave. adjacent to the station/east lot. Sidewalks on Sherman Way are wide; sidewalks on Canoga Ave. north of the station are fairly narrow and have obstructions such as parking signs, utility poles and fire hydrants. Pedestrian push buttons and curb ramps are present at intersections in the immediate vicinity of the station such as the Canoga Ave./Sherman Way intersection and Deering Ave./Sherman Way intersection.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 198: Monument Sign at Sherman Way

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs outside of the two station monument signs on Sherman Way. Both of the monument signs are on Sherman Way and not visible from Canoga Ave. The monument signs are set back from the sidewalk, making them more difficult for motorists to see. There are no wayfinding signs on Canoga Ave. or Sherman Way indicating a Metro parking facility. Only small signs at the entrance to each lot.



Photo 199: Station Parking Entrance Sign at Sherman Way Station

Potential Carshare Locations

If demand exists for carshare at this location, non-ADA spaces near the platform in either lot are the best candidates for carshare parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Potential Vanpool Locations

The southern ends of either lot would serve as ideal vanpool parking locations as these are the least desirable areas to park in for Orange Line riders.

Facility Upkeep

The parking lots were clean with no trash/debris.

Facility Maintenance

The parking lots appear to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality in the parking lots is good.

Lighting

West Lot minimum lighting level of service is E. East Lot minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Upgrade lighting
- Increase enforcement
- Initiate permit parking for adjacent uses

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

CHATSWORTH

Address:

North Lot – 10046 Old Depot Plaza Road, Los Angeles, CA 91311

South Lot – 10005 Old Depot Plaza Road, Los Angeles, CA 91311

Owner: City of Los Angeles

Operator: City of Los Angeles

Total Number of Parking Spaces: 609 in two surface lots (no permit spaces)

- North Lot: 517 spaces
- South Lot: 92 spaces



Recommended Name:

North Lot : Chatsworth - 1
South Lot : Chatsworth - 2

LEGEND



Parking Facility

Orange Line



Chatsworth Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	609	575	N/A	20	14
Time Period	Occupancy				
Weekday Daytime	52%	53%	N/A	30%	50%
Weekday Evening	9%				
Weekend	11%				

*The reserved spaces consist of two for electric vehicles, one for the sheriff, one for security, seven short-term 15-minute spaces and three other reserved.

Parking Access

The north lot has three entry/exit driveways. The south lot has one entry/exit driveway. The driveways for both lots are located off of Old Depot Plaza Road which services the Chatsworth train station and bus depot, and also serves as a cut-through St. between Lassen St. and Devonshire St.


Total Lanes in: 4

Total Lanes out: 4

Parking User Groups

- Metro transit riders
- Metrolink riders
- Amtrak riders
- LADOT transit riders
- North part of North Lot leased to film crews occasionally

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	15	6	40%
Bike Rack Spaces	32	0	0%

Bicycle Infrastructure Rating: Medium

The Orange Line Pedestrian and Bicycle terminates to the north at Lassen St., across the St. from the Chatsworth station. The path continues to the south and east along the Orange Line. The Browns Creek Bike Path originates on the north side of Lassen St., parallel to the station and continues north to Browns Canyon. This station has extra bike racks compared to the typical Orange line station, and there are also 10 LADOT bicycle pods, which were all observed empty. There are marked bicycle lanes on Canoga Ave. north of Lassen St., and marked bicycle lanes on Devonshire St. north of the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 200: Bike Lockers and Racks



Photo 201: Additional Bike Racks

Pedestrian Infrastructure Rating: High

Sidewalks are in good shape around the station area. There are generally good internal sidewalks and connections within the station area and parking lots, with the exception of the internal sidewalk running down the center of the north lot that is discontinuous, being often broken up by landscaping.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS



Photo 202: Internal Pedestrian Walkway within Lot (L); Walkway Adjacent to Station Platform (R)

Parking Signage and Wayfinding Rating: Medium

Because the Chatsworth station is a multimodal facility with Metrolink Rail and Amtrak connections, there are large monument signs for this station on both Devonshire St. and Lassen St. Aside from these signs, there are no parking wayfinding signs on the St. to direct patrons to the lots. Once on Old Depot Plaza Road, there is an abundance of wayfinding signs that are generally good, except for the bicycle parking signs that appear to point to the ground.



Photo 203: Station Monument Signs

Potential Carshare Locations

The two spaces next to the Sheriff's spaces in the south lot or the 15-minute spots in the north lot would be good candidates for carshare parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ORANGE LINE STATIONS

Potential Vanpool Locations

Ideal spaces for vanpool parking are spaces on the northern end of the north lot as these are the least desirable for Metro transit and train riders.



Photo 204: Candidate Carshare/Vanpool Spaces would be Adjacent to these Spaces

Facility Upkeep

The parking lot was clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

North Lot minimum lighting level of service is D. South Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Upgrade lighting

APPENDIX F – RED LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

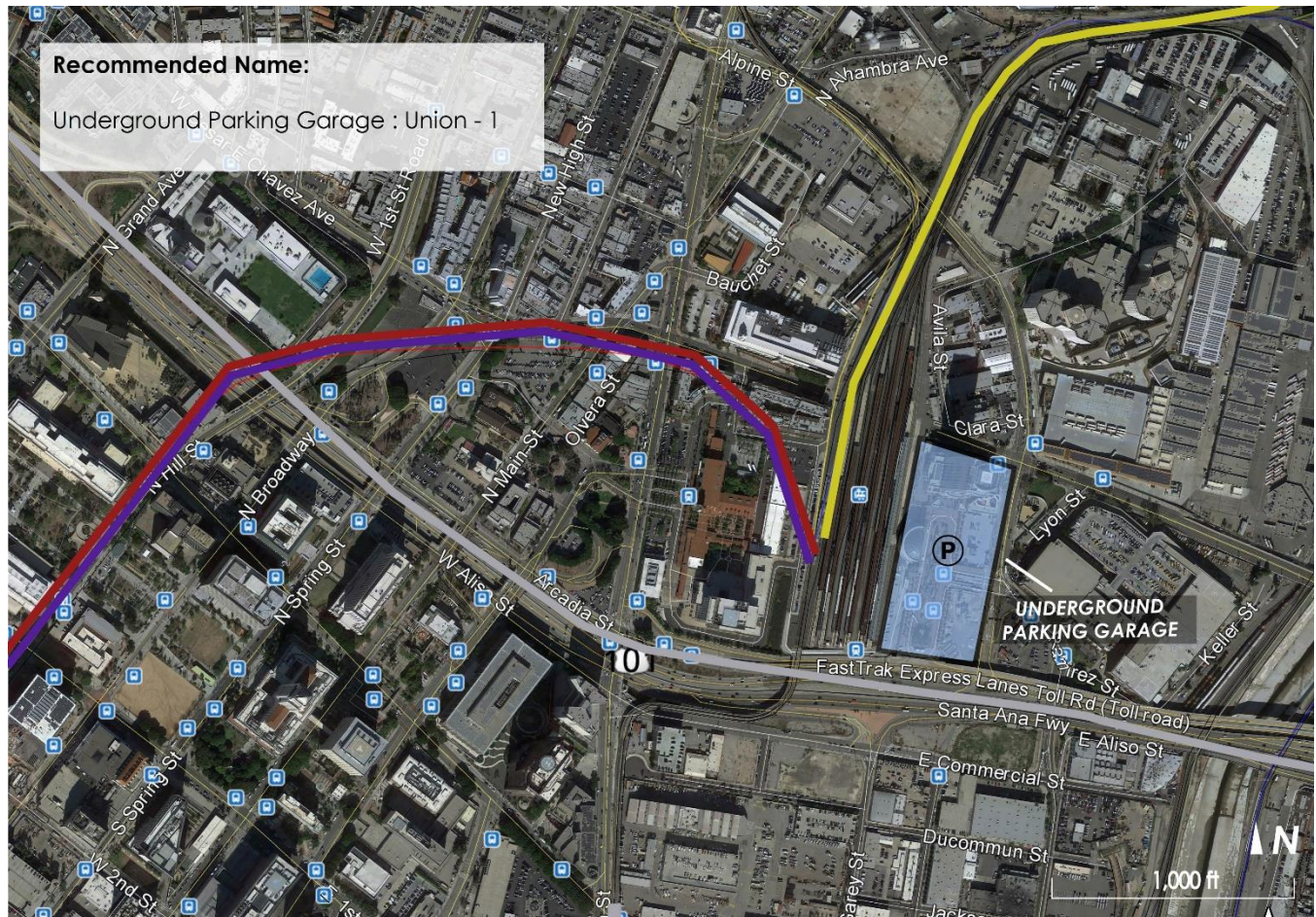
UNION STATION

Address: One Gateway Plaza, Los Angeles, CA 90012

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 2,362 (1,860 are available to transit patrons and the public) in one parking structure (all paid parking)



LEGEND



Parking Facility

Silver Line

Red Line

Purple Line

Gold Line

Union Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	1,860	N/A	1,810	38	12
Time Period	Occupancy				
Weekday Daytime	73%	N/A	73%	76%	50%
Weekday Evening	35%				
Weekend	58%				

*All 12 reserved spaces are for electric vehicles.

Parking Access

The Union Station parking structure has five entry and five exit lanes total. However, several of these are not publicly-accessible. There is one public entry and one public exit lane on each side of Vignes St. The exit lane on the west side of Vignes requires drivers to turn left onto northbound Vignes. The exit lane on the east side of Vignes allows drivers to turn left onto southbound Vignes but it can be a challenging turn as drivers must cross two left turn only lanes.


Total Lanes in: 5

Total Lanes out: 5

Parking User Groups (Publicly-Accessible)

- Metro transit riders
- Metro employees, Board members, Board staff and visitors
- Metrolink riders
- Amtrak riders
- FlyAway shuttle riders
- Public agency fleet vehicles
- Employees of nearby businesses
- Visitors/customers of nearby businesses

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	37	29	78%
Bike Rack Spaces	74	36	49%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities that access the station. Bike racks are located throughout the exterior and a secure bike room is on level P1. Bike lockers are also distributed on level P1. Limited wayfinding to bike parking areas.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 205: Bike Racks

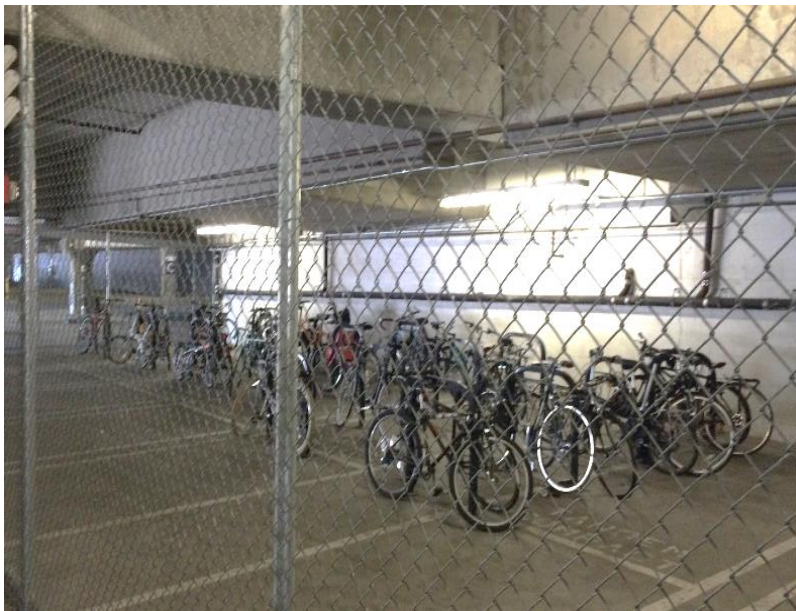


Photo 206: Bike Room on Level P1

Pedestrian Infrastructure Rating: High

There is very good pedestrian connectivity between Union Station and the surrounding area. Sidewalks in the area are wide and in good condition. Signage clearly identifies the station. In the parking structure, signage directs pedestrians to elevator cores that lead to Union Station and Metro headquarters.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 207: Monument Sign at Corner of Cesar Chavez Ave. and Vignes St.

Parking Signage and Wayfinding Rating: Low

While there is signage directing drivers to Union Station, there is limited signage directing drivers to the parking structure entrances. Drivers on southbound Vignes may accidentally turn to enter the pick-up/drop-off area as the parking entrance is the second right. The parking entrance on the east side of Vignes is not well-signed and does not appear to be open to the public.

Potential Carshare Locations

If spaces for carshare are desired, spaces closest to the elevators on upper floors (P1 and P2) of the parking structure would be most suitable.

Potential Vanpool Locations

Ideal spaces for vanpool parking would be those on level P4 of the eastern end of the structure, closest to the entry/exit on the east side of Vignes St.

Facility Upkeep

The parking structure is clean with no trash/debris.

Facility Maintenance

The parking structure appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement is in good condition.

Lighting

Minimum lighting level of service is E.

Safety

Due to shear walls, some of the intersections do not have good visibility which is fine as long as drivers stop as instructed.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking structure entrances
- Upgrade lighting

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

UNIVERSAL CITY/STUDIO CITY

Address:

North Lot – 3901 Lankershim Blvd., Los Angeles, CA 91604

West Lot – 10801 Ventura Blvd., Los Angeles, CA 91604

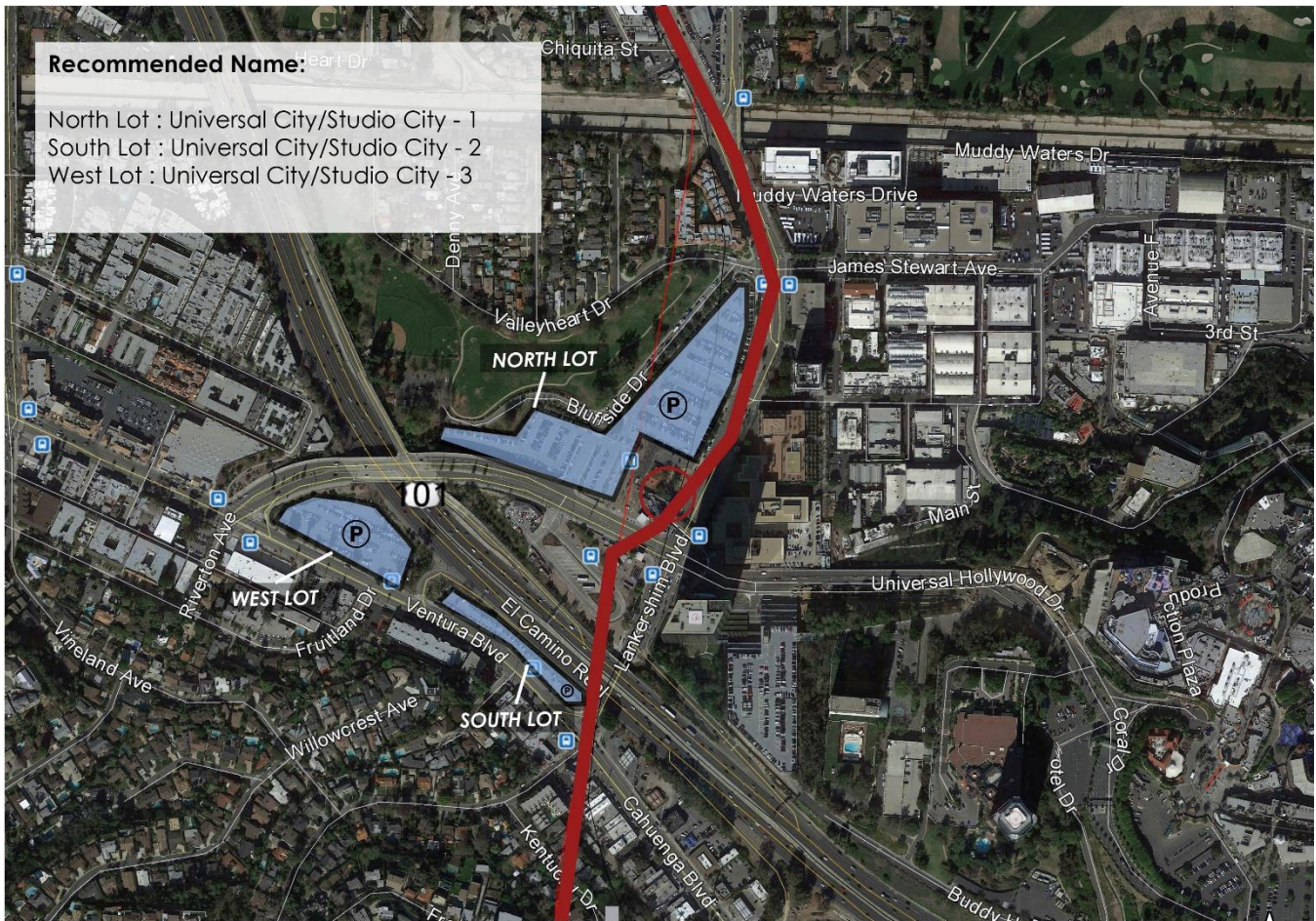
South Lot – 10700 Ventura Blvd., Los Angeles, CA 91604

Owner: Metro (North Lot); County of Los Angeles (West Lot); Caltrans (South Lot)

Operator: Metro (North and South Lots); County of Los Angeles (West Lot)

Total Number of Parking Spaces: 828 in three surface lots (195 permit spaces)

- North Lot: 550 spaces
- West Lot: 198 spaces
- South Lot: 80 spaces



METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	828	613	195	14	6
Time Period	Occupancy				
Weekday Daytime	94%	100%	74%	86%	100%
Weekday Evening	34%				
Weekend	50%				

*The reserved spaces consist of two for Zipcar (carshare) and four for electric vehicles.

Parking Access

The Universal City/Studio City station has three surface parking lots. The North Lot has four entry (two from Lankershim Blvd. and two from Campo De Caheunga) and four exit lanes (on to Lankershim Blvd. and Campo De Cahuenga). The South Lot and West Lot each have one entry and one exit lane on to Ventura Blvd.


Total Lanes in: 6

Total Lanes out: 6

Parking User Groups

- Metro transit riders
- Based on pedestrian activity, potentially the following:
 - Universal Studios employees and visitors
 - Other local businesses employees and visitors

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	31	23	74%
Bike Rack Spaces	16	2	13%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bike facilities within one block of the station. Bike lockers are located adjacent to the station portal on the south side of Campo De Cahuenga. Bike racks are located on both sides of Campo De Cahuenga also near the station portals.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 208: Bike Lockers

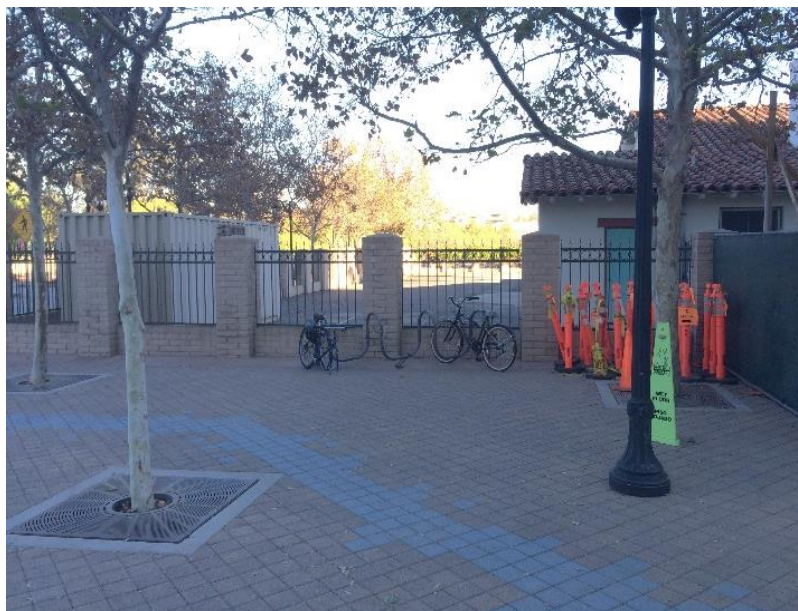


Photo 209: Bike Racks

Pedestrian Infrastructure Rating: High

Sidewalks provide good connectivity between the station and surrounding area. The sidewalks leading to the station are wide and in good condition. Riders who park in the South and West Lots must walk under I-101 to access the station and there is no signage to direct them.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 210: Sidewalk along Lankershim Blvd. Facing South

Parking Signage and Wayfinding Rating: Low

There are small parking wayfinding signs directing Metro riders who park to the North Lot from both Lankershim and Campo De Cahuenga. There is minimal parking wayfinding signage along Ventura Blvd. directing Metro riders who park to the West and South Lots. West and South entrances are not readily visible. There is no signage at parking lot entrances to indicate Metro parking.



Photo 211: Wayfinding Sign along Lankershim Blvd. (L); Wayfinding Sign along Campo De Cahuenga (R)

Potential Carshare Locations

If additional carshare spaces are to be added, they may be located in the North Lot in the same row where the Zipcar and electric vehicle spaces are located.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Potential Vanpool Locations

The most ideal location for vanpool parking would be the West Lot as it is the least desirable for Red Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lots were generally clean. There was some trash in the parkway area adjacent to the West Lot.

Facility Maintenance

The parking lots appear to be generally well-maintained.

Pavement Conditions

The pavement quality in the parking lots is good. The West Lot would benefit from a restriping as the current striping is faded.

Lighting

North Lot minimum lighting level of service is D. West Lot minimum lighting level of service is D. South Lot minimum lighting level of service is D.

Safety

Currently some traffic cuts through from southbound Lankershim Blvd. onto Campo De Cahuenga to avoid congestion at the intersection of Lankershim and Campo De Cahuenga. These vehicles drive at a high rate of speed creating dangerous conditions for pedestrians.

The pedestrian paths in the North Lot that lead to the station portal may create conflict points with vehicles.

Some ADA issues were observed including signs that are out of compliance and ramps that exceed grade limits.

Security

No issues were observed.

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding among parking lots
- Improve signage at parking lot entrances
- Improve pedestrian wayfinding within parking lots (specifically West and South Lots)
- Upgrade lighting
- Restripe spaces (West Lot)
- Implement traffic calming
- Increase enforcement
- Create all-day permit spaces
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

NORTH HOLLYWOOD

Address:

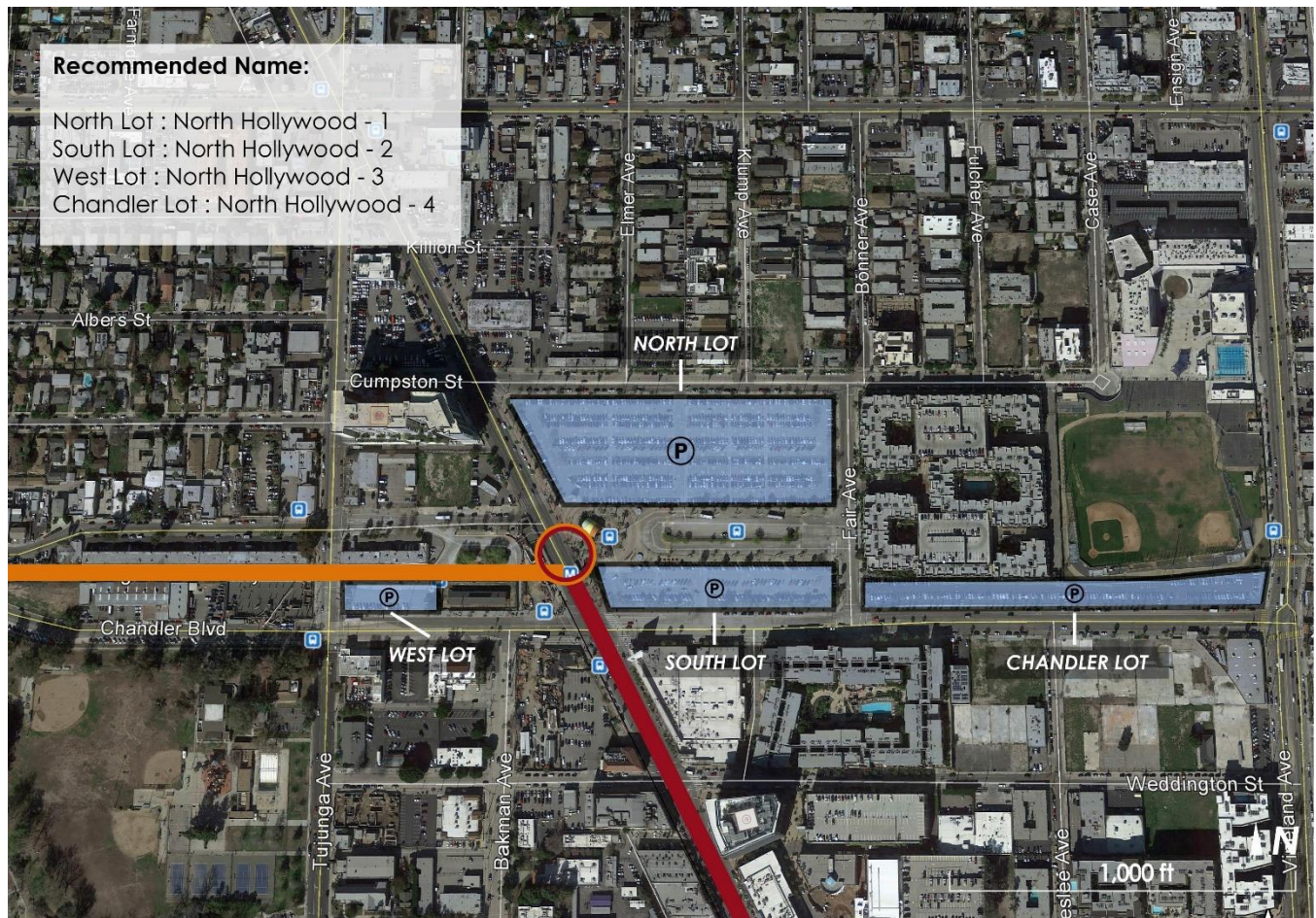
North Lot – 11230 Cumpston St., North Hollywood, CA 91601
South Lot – 11240 Chandler Blvd., North Hollywood, CA 91601
West Lot – 11346 Chandler Blvd., North Hollywood, CA 91601
East Lot – 11143 Chandler Blvd., North Hollywood, CA 91601

Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 1,145 in four surface lots (375 permit spaces)

- North Lot: 744 spaces
- South Lot: 189 spaces
- West Lot: 18 spaces
- Chandler Lot: 194 spaces



LEGEND



Parking Facility

Orange Line



North Hollywood Station

Red Line

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	1,145	733	375	23	14
Time Period	Occupancy				
Weekday Daytime	100%	101%	100%	91%	29%
Weekday Evening	36%				
Weekend	53%				

*The reserved spaces consist of two for Zipcar (carshare), six for custodial staff and six for 5-minute drop-off.

*Eleven motorcycles were parked during weekday daytime count.

Parking Access

The North Hollywood station has four surface parking lots. The North Lot has two entry and two exit lanes while the other three lots each have one entry and one exit lane. The North Lot has access from Cumpston Ave. and Fair Ave. The South and West Lots have access from Chandler Blvd., while the Chandler Lot has access from Fair Ave. All exit lanes can turn right or left except the exit from the Chandler Lot which requires a right turn onto Fair Ave.


Total Lanes in: 5

Total Lanes out: 5

Parking User Groups

- Metro transit riders
- Based on pedestrian activity, potentially the following:
 - Employees and customers of retail along Chandler Blvd. and Lankershim Blvd.
 - Residents and guests of nearby residential buildings
 - Employees and customers of other local businesses

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	41	36	88%
Bike Rack Spaces	101	68	67%

Bicycle Infrastructure Rating: Medium

A Class II bike facility runs along Chandler Blvd. east and west of the station. Bike racks and lockers are located near the station portal.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 212: Chandler Bike Path



Photo 213: Bike Lockers and Racks

Pedestrian Infrastructure Rating: High

Sidewalks provide very good access to the station. The sidewalks leading to the station are wide and in good condition.

Parking Signage and Wayfinding Rating: Low

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

There are small parking wayfinding signs along northbound and southbound Lankershim Blvd. that direct drivers to parking in the North and South Lots. The sign on southbound Lankershim Blvd. is partially obscured by a tree. No parking wayfinding signs are present on Chandler Blvd. There is a small sign on westbound Cumpston St. and lot signage along Fair Ave. There are no signs directing drivers to the Chandler Lot or West Lot. There is no signage at lot entrances to indicate Metro parking.



Photo 214: Wayfinding Sign on Lankershim Blvd.

Potential Carshare Locations

If additional carshare spaces are to be added, they may be located in the North or South Lot adjacent to the ADA spaces.

Potential Vanpool Locations

An ideal location for vanpool parking is the eastern end of the Chandler Lot as these spaces are the least desirable for Red Line riders. However, due to high parking utilization at this station, we do not recommend that it be used for vanpool parking.

Facility Upkeep

The parking lots had some trash on the ground.

Facility Maintenance

The parking lots appear to be generally well-maintained.

Pavement Conditions

The pavement quality in the parking lots is good. The striping in the South Lot and Chandler Lots is visible. However, striping in the West Lot is faint and confusing in the North Lot, as old striping was not completely removed.

Lighting

North Lot minimum lighting level of service is B. South Lot minimum lighting level of service is D. West Lot minimum lighting level of service is C. Chandler Lot minimum lighting level of service is E.

Safety

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

There are often vehicles waiting along the curb in the South Lot near the 5-minute spaces. This creates a bottleneck making it difficult for vehicles to pass that are attempting to find parking or exit the lot.

While they may create a more direct path of travel to the station portal, pedestrian paths in the North and South Lot create conflict points with vehicles.

Security

There may be individuals living out of their vehicles during off-peak periods (evenings and overnight).

Recommendations

- Introduce curb pick-up/drop-off area in South Lot
- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Increase number of bicycle racks
- Increase number of bicycle lockers
- Upgrade lighting (South Lot and Chandler Lot)
- Restripe spaces (West Lot and North Lot)
- Increase enforcement
- Increase safety patrols
- Increase number of permit parking spaces (50)
- Create all-day permit spaces

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

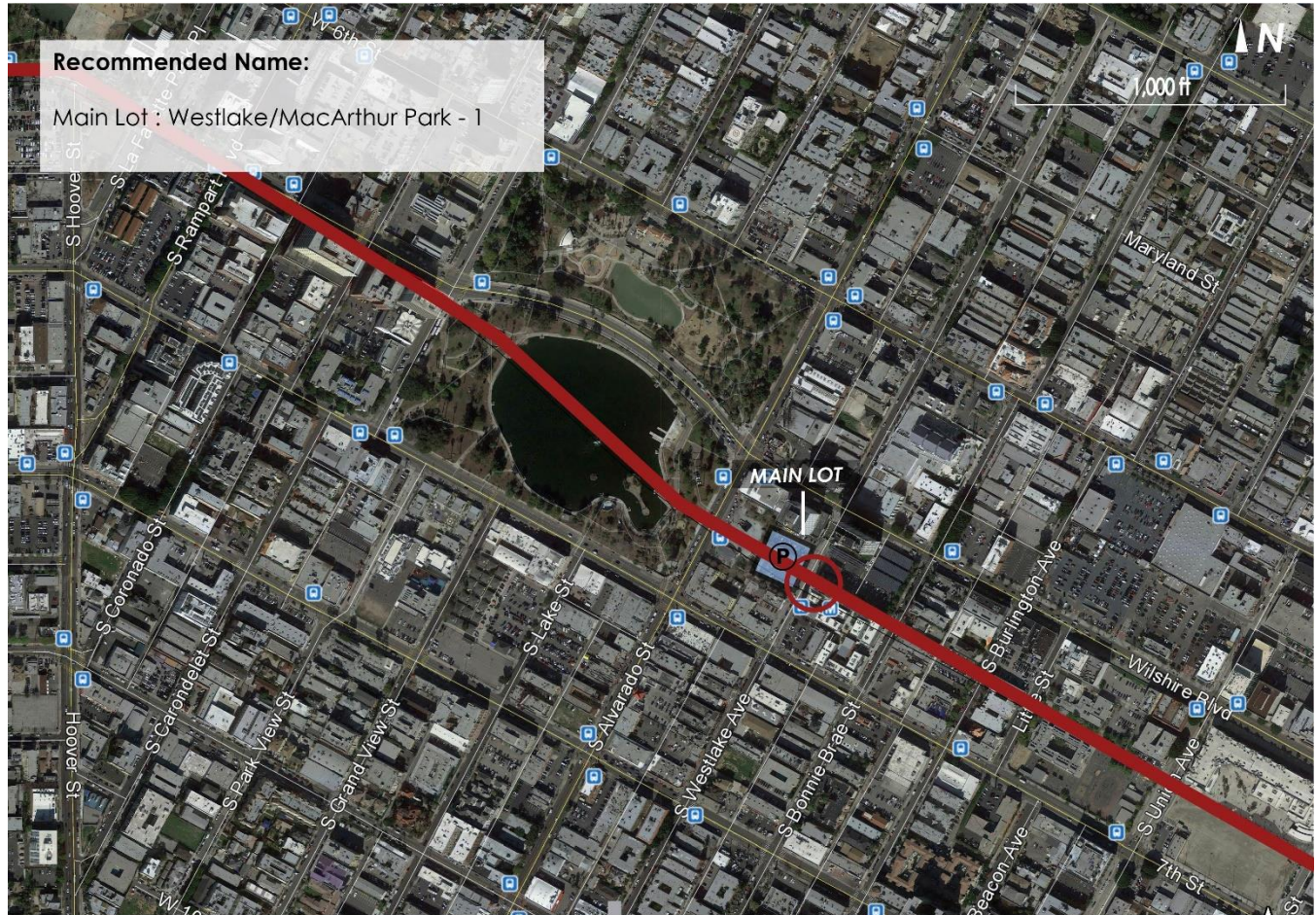
WESTLAKE/MACARTHUR PARK

Address: 685 South Westlake Ave., Los Angeles, CA 90057

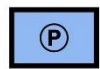
Owner: Metro

Operator: Metro

Total Number of Parking Spaces: 18 in one surface lot (no permit spaces)



LEGEND



Parking Facility

Red Line



Westlake/
MacArthur Park Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	18	15	N/A	1	2
Time Period	Occupancy				
Weekday Daytime	72%	67%	N/A	100%	100%
Weekday Evening	18%				
Weekend	N/A				

*This lot is a kiss-and-ride location as all free spaces have a 10-minute time limit.

*The two reserved spaces are for Zipcar (carshare).

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Parking Access

The Westlake/MacArthur Park lot has one entry and one exit lane from Westlake Ave.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Individuals picking up and dropping off Metro transit riders
- Visitors and customers of adjacent businesses based on observations of pedestrians

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	12	2	17%

Bicycle Infrastructure Rating: Medium

A Class II bicycle facility provides access to the station. On-site bike racks are located near that station portal.

Pedestrian Infrastructure Rating: High

Due to the urban nature of this station, there is very good pedestrian access to the station. Sidewalks in the area are wide and in good condition.



Photo 215: Plaza Area outside Station Portal

Parking Signage and Wayfinding Rating: Low

There is very limited wayfinding signage directing drivers to the parking lot. There is only a small faded sign at the lot entrance to indicate that it is “Kiss n Ride” parking.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS



Photo 216: Sign at Entrance to Lot

Potential Carshare Locations

If additional spaces for carshare are desired, spaces closest to the station portal would be most suitable. These could be next to the current Zipcar spaces or the ADA space.

Potential Vanpool Locations

Given the urban character of this location and the short-term nature of its parking facility, we do not recommend that any vanpool parking be provided.

Facility Upkeep

The parking lot had a lot of litter, likely due to a high turnover of vehicles that park in the lot.

Facility Maintenance

The lot appears to be well-maintained.

Pavement Conditions

The striping is clearly visible and the pavement quality is good.

Lighting

Minimum lighting level of service is A.

Safety

No issues were observed.

Security

No issues were observed in the parking lot. The high turnover of vehicles parking may deter criminal activity but could also serve as a magnet given the highly transient character of the facility.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – RED LINE STATIONS

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking lot entrance
- Resurface pavement
- Improve upkeep
- Increase parking enforcement
- Increase safety patrols

APPENDIX G – SILVER LINE STATIONS

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

SLAUSON

Address:

West Lot – 430 West Slauson Ave., Los Angeles, CA 90003

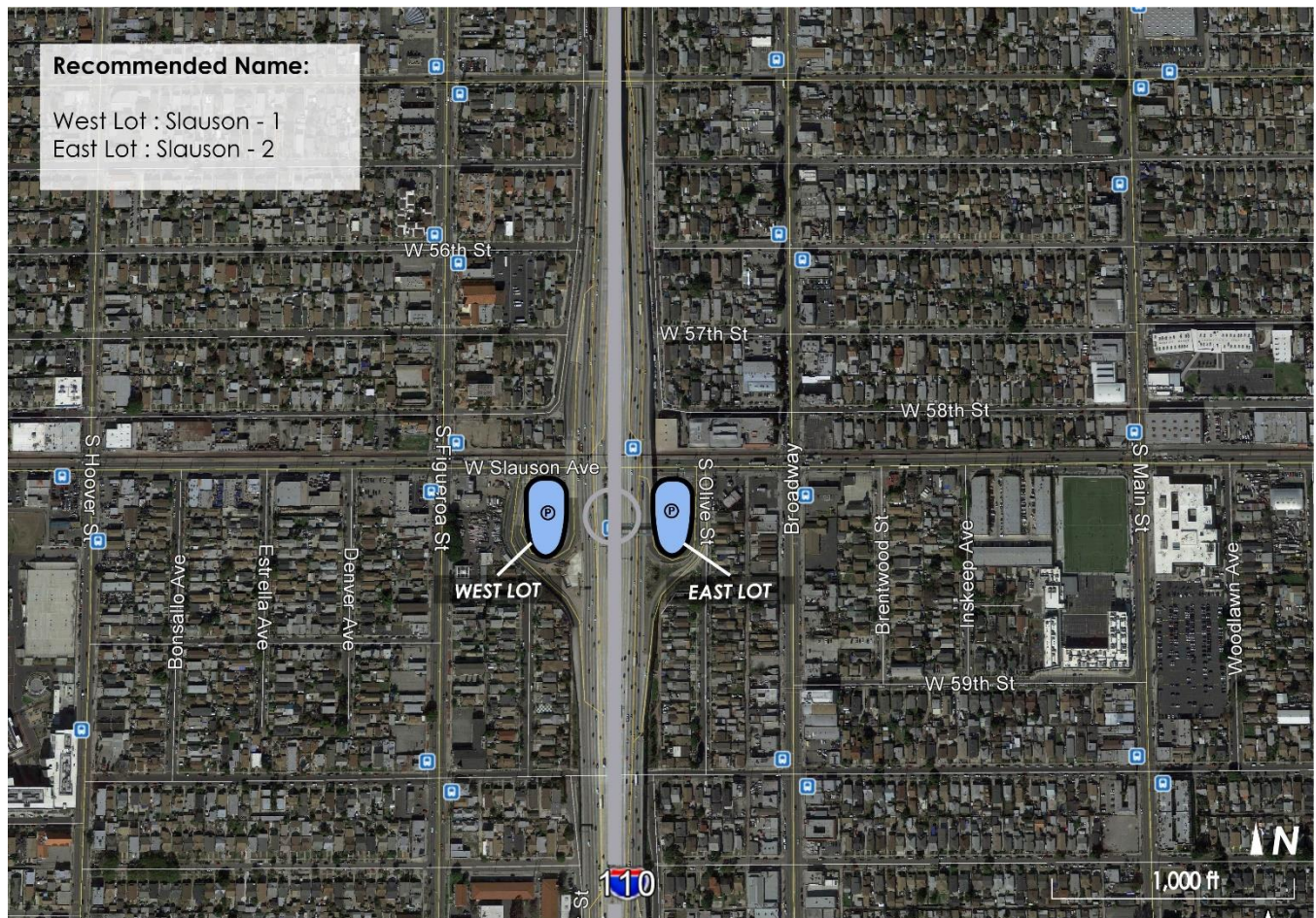
East Lot – 350 West Slauson Ave., Los Angeles, CA 90003

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 150 in two surface lots (no permit spaces)

- West Lot: 85 spaces
- East Lot: 65 spaces



LEGEND



Parking Facility

— Silver Line



Slauson Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	150	143	N/A	7	N/A
Time Period	Occupancy				
Weekday Daytime	7%	7%	N/A	0%	N/A
Weekday Evening	8%				
Weekend	5%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

The Slauson station has two surface lots tucked into between the I-105 freeway and its off-ramps at the I-105/Slauson interchange. Each lot has a single right-in/right-out only driveway. While left-turns are prohibited into and out of the driveways, since there is not a raised median on Slauson Ave., making these turns is still possible despite the prohibition.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	N/A	N/A	N/A

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle facilities within one block of the Slauson station. And there is no bicycle parking at the station itself.

Pedestrian Infrastructure Rating: Medium

The main entrance to the platform is on Slauson under I-110. There is no sidewalk on the north side of Slauson Ave. due to the railroad right-of-way. East/west crosswalks are present but no north/south crosswalks. A staircase in the East Lot also provides access to the platform.



Photo 217: No Sidewalk on North Side of Slauson Ave.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 218: Staircase in East Lot to Provide Access to Station Platform

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs for this station, and no signs at entrances to the lots themselves denoting them as Metro parking facilities. There is one Caltrans sign in the east lot bolted to the freeway retaining wall directing people to call 511 for more info about park-and-ride.



Photo 219: Caltrans Park and Ride Sign

Potential Carshare Locations

The non-ADA spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Potential Vanpool Locations

Either lot may provide vanpool parking as there is ample parking available in both lots.

Facility Upkeep

The parking lots had trash throughout.

Facility Maintenance

The parking lots are poorly maintained. Some median areas lack landscaping and are barren.

Pavement Conditions

The pavement quality is below average and beginning to crack. The striping is faded and poor.



Photo 220: Pavement Cracking in Lot

Lighting

West Lot minimum lighting level of service is E. East Lot minimum lighting level of service is C.

Minimum lighting levels of service are E in the West Lot and C in the East lot.

Safety

The ADA parking spaces have non-standard, non-compliant “ramps.”

Security

There were homeless persons sleeping in both lots during the daytime counts.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 221: Non-Compliant ADA Ramps

Recommendations

- Improve wayfinding to station parking
- Improve wayfinding between parking lots
- Improve signage at parking lot entrances
- Introduce bicycle racks
- Upgrade lighting (West Lot)
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Increase safety patrols
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

MANCHESTER

Address:

West Lot – 431 West Manchester Ave., Los Angeles, CA 90003

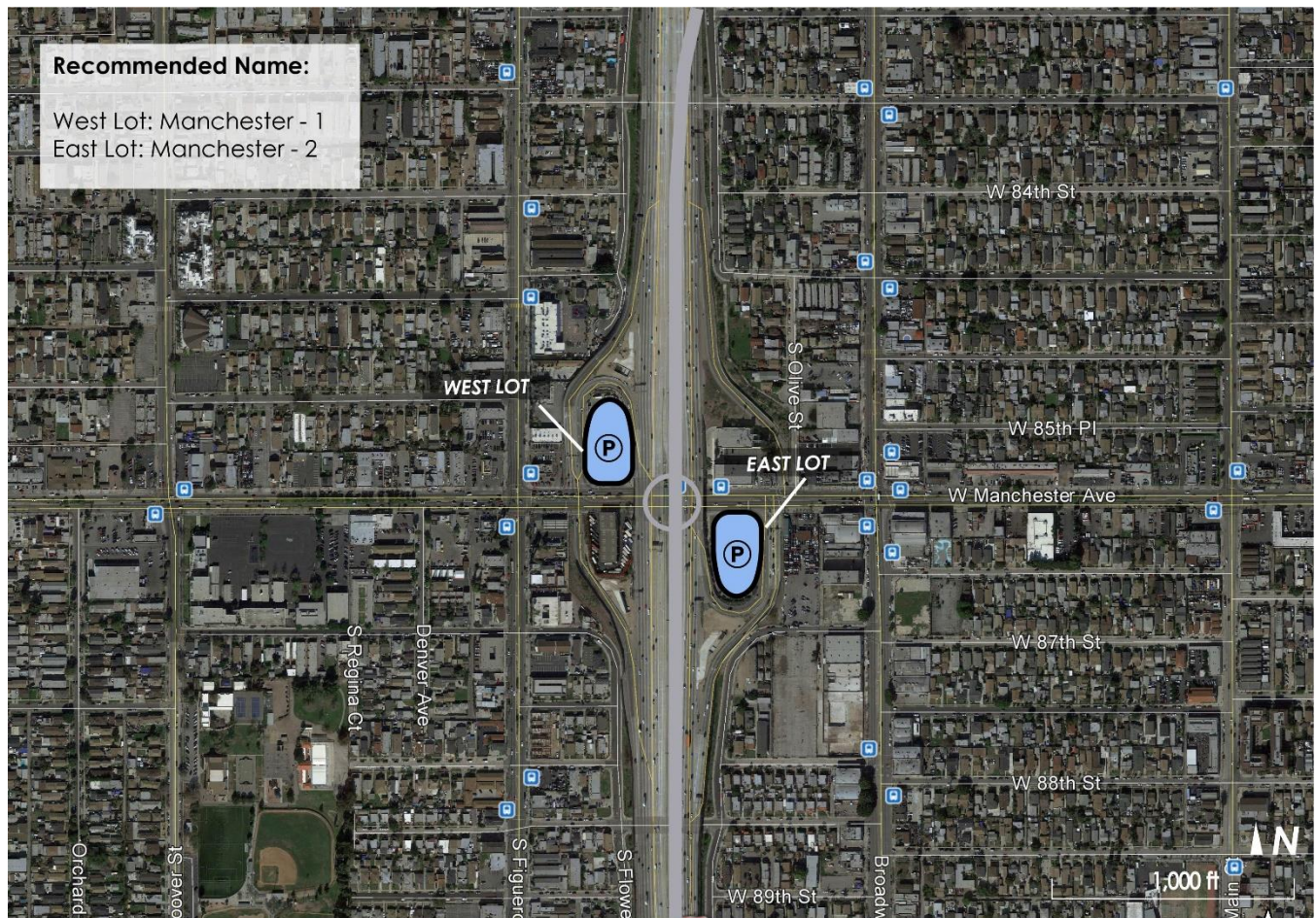
East Lot – 390 West Manchester Ave., Los Angeles, CA 90003

Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 239 in two surface lots (no permit spaces)

- West Lot: 128 spaces
- East Lot: 111 spaces



Recommended Name:
 West Lot: Manchester - 1
 East Lot: Manchester - 2

LEGEND



Parking Facility

— Silver Line



Manchester Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	239	230	N/A	9	N/A
Time Period	Occupancy				
Weekday Daytime	17%	17%	N/A	0%	N/A
Weekday Evening	0%				
Weekend	6%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

The Manchester station has two surface lots tucked into between the I-105 freeway and its off-ramps at the I-105/Manchester interchange. Each lot has a single right-in/right-out only driveway.

Total Lanes in: 2

Total Lanes out: 2


Parking User Groups

- Metro transit riders
- Local businesses park their box trucks in the West Lot during the day



Photo 222: Trucks from Adjacent Businesses Parked in West Lot

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	0	N/A	N/A
Bike Rack Spaces	0	N/A	N/A

Bicycle Infrastructure Rating: Low

There is no bicycle infrastructure in the vicinity of the Manchester station, and no bicycle facilities at the station itself.

Pedestrian Infrastructure Rating: Medium

There are fairly wide sidewalks on Manchester. Crossing Manchester at either of the I-110 ramp intersections is not permitted.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 223: Sidewalk along Manchester Ave. (L); Shortage of Crosswalks at Intersection of Manchester Ave. and I-110 South On-Ramp (R)

Parking Signage and Wayfinding Rating: Low

There are no parking wayfinding signs for this station, and no signs at lot entrances denoting them as Metro parking facilities.

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in each parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

Either lot may provide vanpool parking as utilization is low in both lots.

Facility Upkeep

The parking lots had trash throughout.

Facility Maintenance

The parking lots are poorly maintained. Some median areas lack landscaping and are barren.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 224: Faded Striping and Trash in Lot

Pavement Conditions

The pavement quality is below average and beginning to crack. The striping is faded and poor.

Lighting

West Lot minimum lighting level of service is C. East Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

During evening observations, both of the lots had tents in them, and a vehicle with someone living in it was observed.

Recommendations

- Improve wayfinding to station parking
- Improve signage at parking lot entrances
- Introduce bicycle racks
- Upgrade lighting (East Lot)
- Resurface pavement
- Restripe spaces
- Improve landscaping
- Improve upkeep
- Increase safety patrols
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

For Harbor Freeway, refer to Green Line section.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

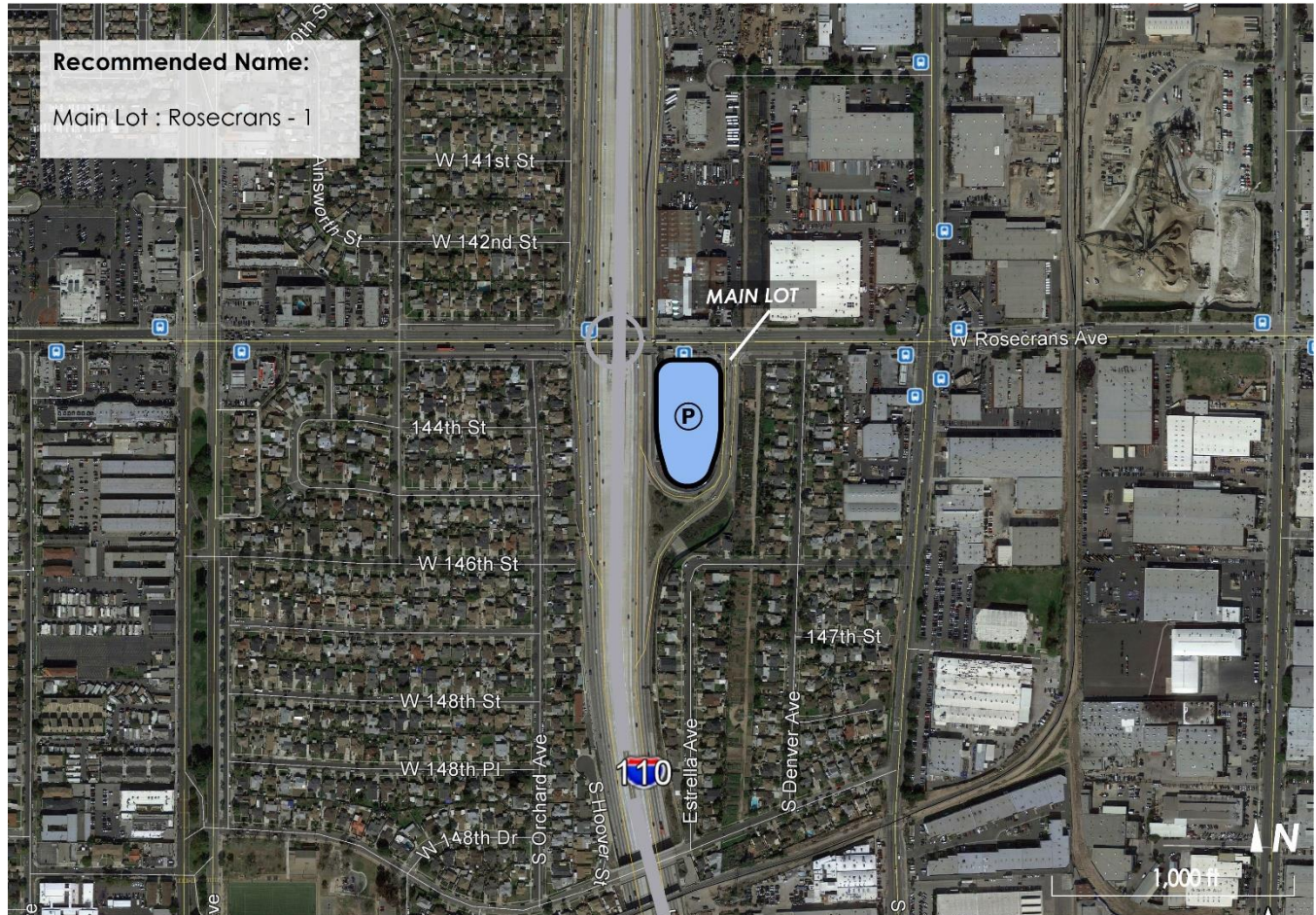
ROSECRANS

Address: 622 West Rosecrans Ave., Gardena, CA 90248

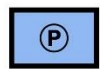
Owner: Caltrans

Operator: Caltrans

Total Number of Parking Spaces: 338 in one surface lot (no permit spaces)



LEGEND



Parking Facility

— Silver Line



Rosecrans Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	338	329	N/A	9	N/A
Time Period	Occupancy				
Weekday Daytime	21%	22%	N/A	11%	N/A
Weekday Evening	1%				
Weekend	7%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

The Rosecrans station has one surface lot tucked into between the I-105 freeway and its off-ramps at the I-105/Rosecrans interchange. The lot has a single right-in/right-out only driveway. While left-turns are prohibited into and out of the driveway, since there is not a raised median on Rosecrans Ave., making these turns is still possible despite the prohibition.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders
- Businesses across Rosecrans based on observations
- Approximately 134 spaces in the back of the lot gated off for another use

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	0	N/A	N/A
Bike Rack Spaces	0	N/A	N/A

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bicycle lanes within one block of the Rosecrans station, and no bicycle facilities at the station itself.

Pedestrian Infrastructure Rating: Medium

Sidewalks are present on Rosecrans and are of an adequate width. There was trash on the sidewalks on Rosecrans over the I-105 freeway.



Photo 225: Trash on Sidewalk along Rosecrans Ave. (L); Sidewalk within Parking Lot (R)

Parking Signage and Wayfinding Rating: Low

The monument sign on Rosecrans is unique to this station. There were no other parking wayfinding signs, and no signs at the lot entrance denoting it as a Metro parking facility.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 226: Station Monument Signs

Potential Carshare Locations

The non-ADA spaces, non-permit spaces closest to the platform in the parking lot would be the most likely location for future carshare spaces when demand exists for them.

Potential Vanpool Locations

The southeast portion of the lot would be the ideal location for vanpool parking as it is the least desirable for Silver Line riders.

Facility Upkeep

There was no trash in the lot although there was graffiti on the side of a utility building within the lot, on the path to the station.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 227: Graffiti on side of Utility Building

Facility Maintenance

The parking lot appears to be adequately maintained.

Pavement Conditions

The striping is clearly visible although the pavement has some cracks.



Photo 228: Cracked Pavement in Lot

Lighting

Minimum lighting level of service is D.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Safety

No issues were observed.

Security

No issues were observed. The presence/activity associated with the leased space at the back of the lot may provide some security.

Recommendations

- Improve wayfinding to station parking
- Improve parking signage at parking lot entrance
- Introduce bicycle racks
- Upgrade lighting
- Resurface pavement
- Improve landscaping
- Increase safety patrols
- Improve bicycle infrastructure near station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

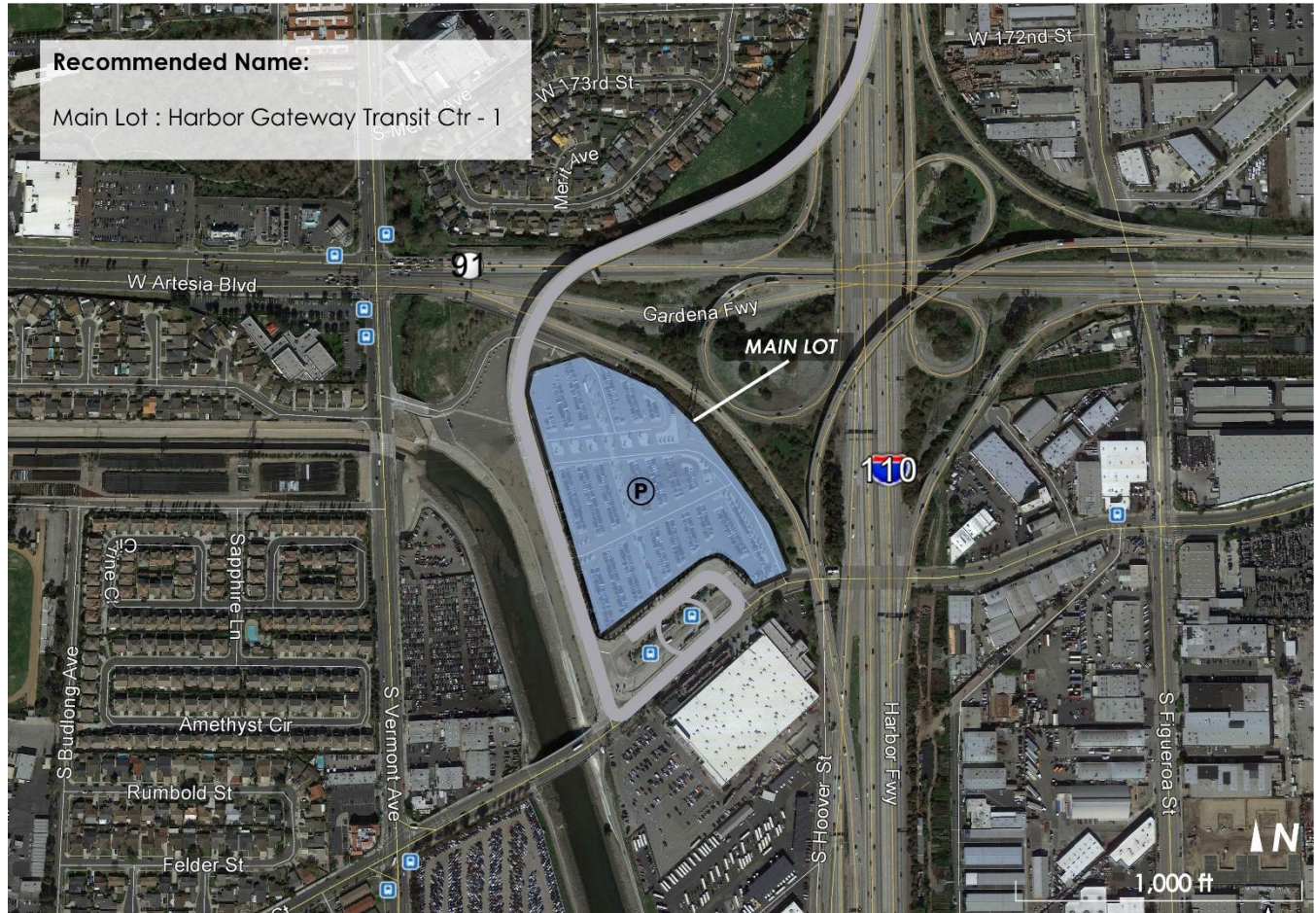
HARBOR GATEWAY TRANSIT CENTER

Address: 731 West 182nd St., Gardena, CA 90248

Owner: Caltrans

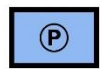
Operator: Caltrans

Total Number of Parking Spaces: 980 in one surface lot (no permit spaces)



Recommended Name:
Main Lot : Harbor Gateway Transit Ctr - 1

LEGEND



Parking Facility

— Silver Line



Harbor Gateway
Transit Center Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	980	941	N/A	19	20
Time Period	Occupancy				
Weekday Daytime	80%	82%	N/A	100%	10%
Weekday Evening	7%				
Weekend	17%				

*The reserved spaces consist of 16 for carpool and four for vanpool.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

There are three entry lanes and three exit lanes with one entry and one exit lane each from Vermont Ave., 182nd St. and the I-110 Express Lanes. Exit lanes on to Vermont and the 1-110 Express Lanes are right turn only.


Total Lanes in: 3

Total Lanes out: 3

Parking User Groups

- Metro transit riders
- Municipal agency transit riders
- Carpoolers using I-110 express lanes based on cluster of vehicles parking near entrance to the express lanes
- School buses observed in lot

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	14	13	93%
Bike Rack Spaces	6	3	50%

Bicycle Infrastructure Rating: Low

There are no Class I or Class II bike facilities within one block of the station. However, there are some facilities a short distance beyond (bike lanes on both Figueroa and Vermont and Dominguez Channel Bike Path). Bike racks are located adjacent to the bus bays while bike lockers are in the parking lot also near the bus bays.



Photo 229: Signage Directing to Dominguez Channel Bike Path

Pedestrian Infrastructure Rating: High

Sidewalks provide good connectivity between the station and surrounding area. They are wide and in good condition. There is good wayfinding signage within the parking area to direct riders to the bus bays.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 230: Sidewalk along West 182nd St. (L); Sidewalk within Parking Lot (R)

Parking Signage and Wayfinding Rating: Medium

There is good parking wayfinding signage along 182nd St. although minimal signage elsewhere. A couple small parking wayfinding signs are located along Vermont Ave. and 182nd St. but are obscured by a chain link fence. There are no signs at lot entrances to denote that it is a Metro parking facility.



Photo 231: Station Monument Sign

Potential Carshare Locations

Any carshare spaces should be located in non-ADA spaces on the southern end of the lot, close to the bus bays.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Potential Vanpool Locations

Currently, there are carpool and vanpool spaces towards the north end of the lot. Any additional vanpool spaces may be added to the northern portion of the lot.

Facility Upkeep

The parking lot was clean with no trash/debris.

Facility Maintenance

The parking lot appears to be well-maintained.

Pavement Conditions

The pavement quality is good although the striping is fading.

Lighting

Minimum lighting level of service is E.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve signage at parking lot entrances
- Increase number of bicycle lockers
- Upgrade lighting
- Improve landscaping
- Improve bicycle infrastructure near station
- Consider moving carpool/vanpool spaces closer to bus bays

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

EL MONTE

Address:

Northeast Lot – 3501 Santa Anita Ave., El Monte, CA 91731

West Lot – 3501 Santa Anita Ave., El Monte, CA 91731

West Structure – 3501 Santa Anita Ave., El Monte, CA 91731

Southeast Lot – 3343 Santa Anita Ave., El Monte, CA 91731

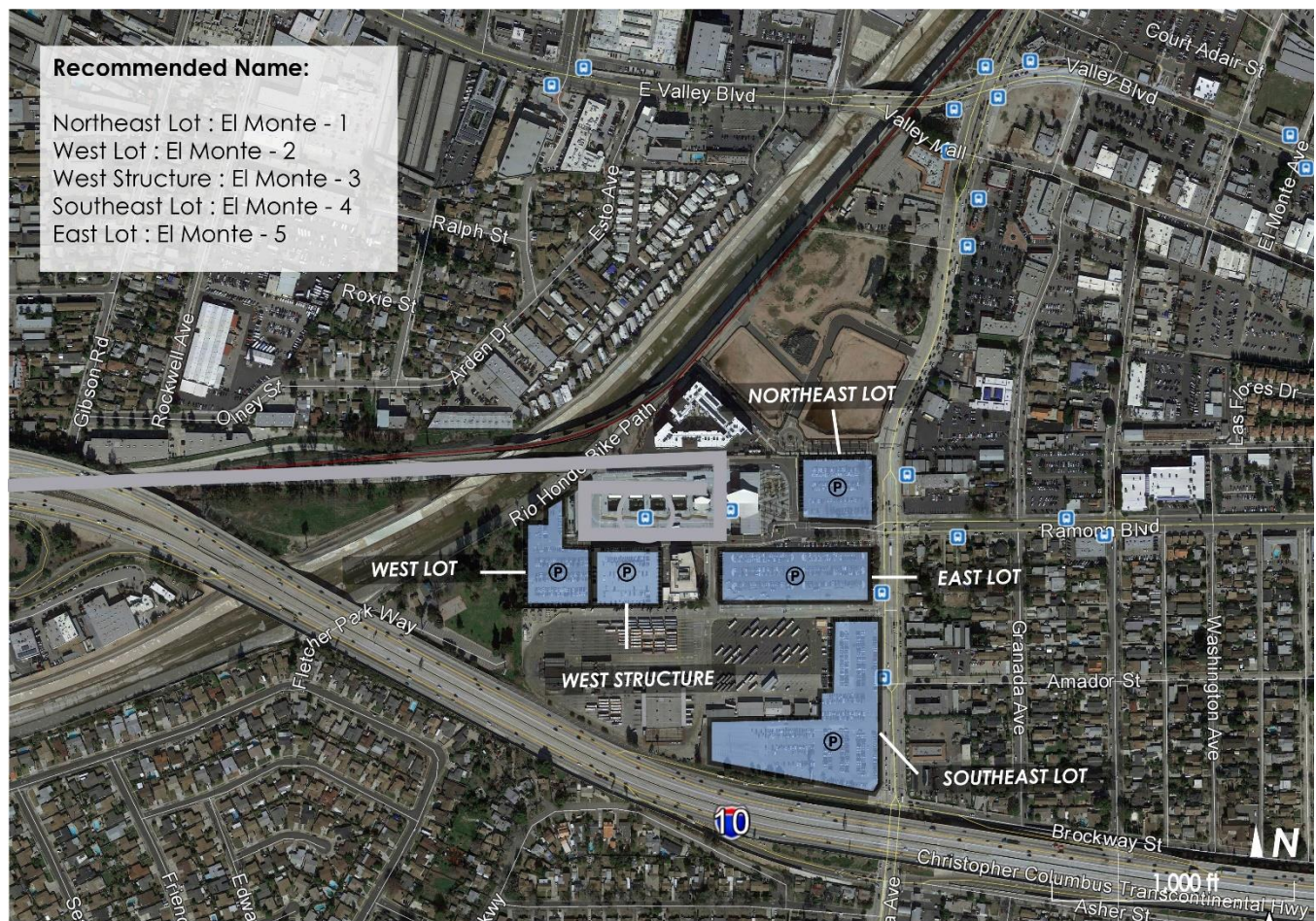
East Lot – 3501 Santa Anita Ave., El Monte, CA 91731

Owner: Metro (Northeast and part of Southeast Lot); Caltrans (West and East Lots and West Structure); City of El Monte (part of Southeast Lot)

Operator: Metro

Total Number of Parking Spaces: 1,435 in four surface lots and one parking structure are available to patrons (no permit spaces)

- Northeast Lot: 188 spaces
- West Lot: 263 spaces
- West Structure: 221 patron spaces (595 spaces total)
- Southeast Lot: 340 spaces
- East Lot: 423 spaces



LEGEND



Parking Facility

— Silver Line



El Monte Station

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	1,435	1,389	N/A	43	3
Time Period	Occupancy				
Weekday Daytime	100%	100%	N/A	100%	67%
Weekday Evening	18%				
Weekend	12%				

*The reserved spaces are 30-minute spaces for pick-up/drop-off.

Parking Access

The Northeast Lot and East Lot both have one entry and one exit lane on to the station access drive. The West Lot has one entry and one exit lane on to an access drive. The parking structure has four entry and four exit lanes to the West Lot and an access drive. The Southeast Lot has two entry and two exit lanes. One pair is on Santa Anita Ave., where the exit lane requires a right turn onto southbound Santa Anita Ave. One pair is on the westbound I-10 on-ramp where the exit lane requires a right turn onto the on-ramp. There are 9 entry lanes and 9 exit lanes in total.


Total Lanes in: 9

Total Lanes out: 9

Parking User Groups

- Metro transit riders
- Foothill transit riders
- Greyhound riders
- Carpools as individuals were observed getting into another vehicle together, perhaps to use the carpool lane on I-10

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	8	2	25%
Bike Rack Spaces	110	41	37%

Bicycle Infrastructure Rating: Medium

A Class I bike facility (Rio Hondo Bike Path) provides access to the station. Bike racks are located near the station platform. Bike lockers are located in the Southeast Lot. There is also a Bike Hub facility that currently has no members, likely due to the fees required.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 232: Bike Racks



Photo 233: Sign Directing to Rio Hondo Bike Path

Pedestrian Infrastructure Rating: Medium

Sidewalks provide good connectivity between the station and surrounding areas. The sidewalks leading to the station area are wide and in good condition. Pedestrians must walk along the service drive adjacent to the Northeast and East Lots to access the station area.

Parking Signage and Wayfinding Rating: Low

No parking wayfinding signage on Santa Anita Ave. or adjacent streets or from I-10 ramps. There is a large monument sign at Santa Anita but it is not clear how to access some of the facilities, especially the parking structure. The signs on the lots do not indicate that these are Metro parking facilities.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 234: Station Monument Sign (L); Signage Directing to a Lot (R)

Potential Carshare Locations

If carshare spaces are to be added, they may be located in the Northeast Lot adjacent to the ADA spaces or in the East Lot near the pedestrian crosswalk.

Potential Vanpool Locations

An ideal location for vanpool parking would be in the southeast portion of the Southeast Lot as these spaces are the least desirable for those using transit.

Facility Upkeep

The parking facilities were generally clean. There was some litter in the Southeast Lot.

Facility Maintenance

The parking facilities are well-maintained.

Pavement Conditions

Striping is visible in most lots and the pavement is in good condition. Striping in the Southeast Lot could be improved.

Lighting

Northeast Lot minimum lighting level of service is D. West Lot minimum lighting level of service is C. West structure first floor minimum lighting level of service is E. West structure roof minimum lighting level of service is C. Southeast Lot minimum lighting level of service is C. East Lot minimum lighting level of service is D.

Safety

No issues were observed.

Security

The western-most portions of the Southeast Lot are desolate and not visible from the station platform area which may increase perception of a lack of security.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Recommendations

- Reconfigure parking to add capacity
- Improve wayfinding to station parking
- Improve wayfinding among parking facilities
- Improve signage at parking facility entrances
- Upgrade lighting (Northeast Lot, East Lot, West Structure)
- Restripe spaces (Southeast Lot)
- Improve landscaping
- Improve upkeep
- Increase enforcement
- Initiate permit parking for transit riders

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

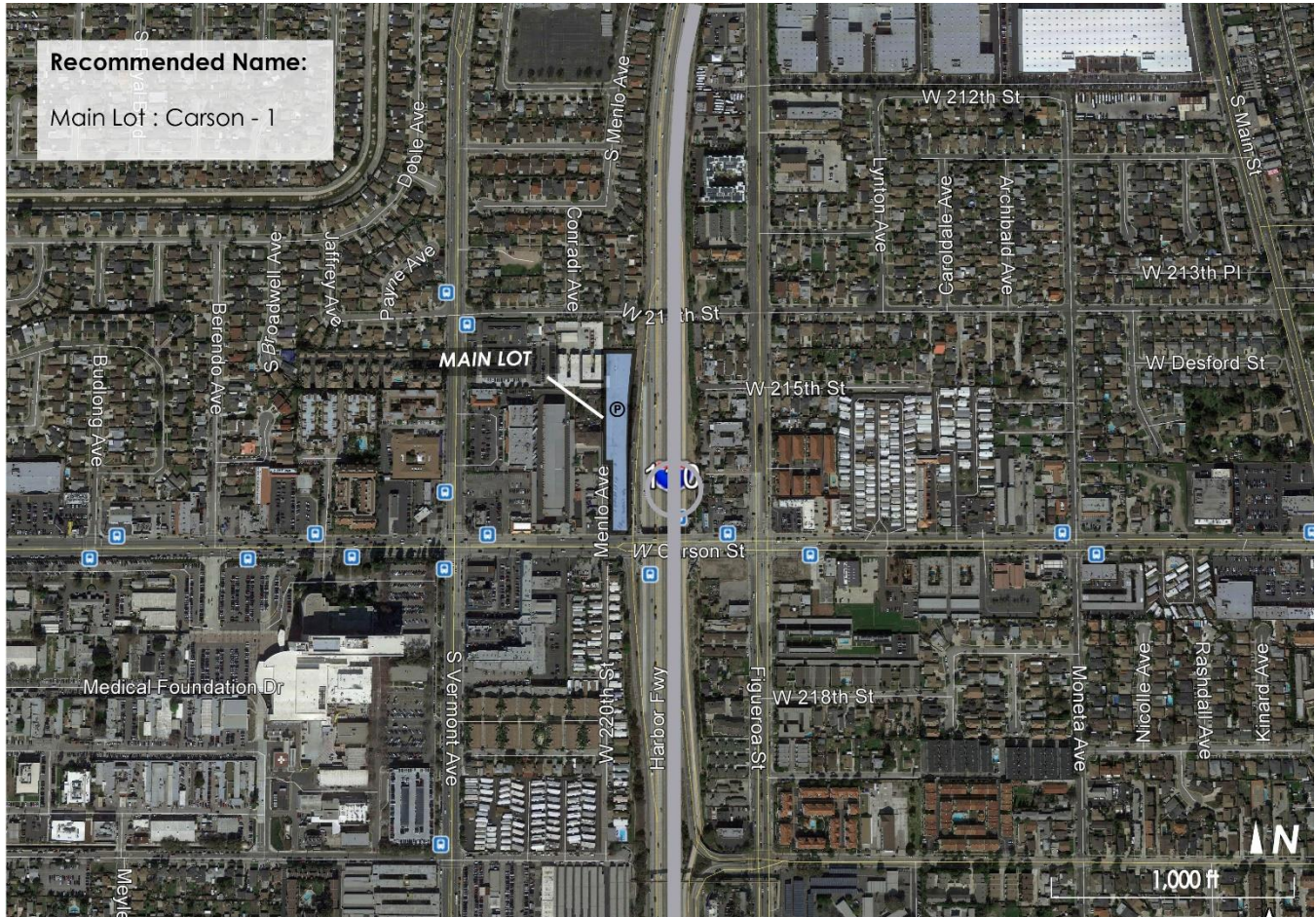
CARSON

Address: 711 West Carson St., Torrance CA 90502

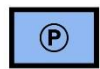
Owner: Caltrans

Operator: Metro

Total Number of Parking Spaces: 143 in one surface parking lot



LEGEND



Parking Facility

— Silver Line



Carson Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	143	139	N/A	4	N/A
Time Period	Occupancy				
Weekday Daytime	16%	17%	N/A	0%	N/A
Weekday Evening	2%				
Weekend	8%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

The parking lot is accessible on Carson St. via a single 3/4 driveway (right/left in, right-out only) on Carson St.


Total Lanes in: 1

Total Lanes out: 1

Parking User Groups

- Metro transit riders

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	N/A	N/A	N/A

Bicycle Infrastructure Rating: Medium

There is a Class II bicycle facility that provides access to the station. However, neither the parking lot nor the platform area have any bike lockers or bike racks.

Pedestrian Infrastructure Rating: High

The station is well-connected by sidewalks along Carson St. There is a heavy volume of vehicles turning right onto Carson St. from the I-110 southbound off-ramp, who are often looking to turn right on red, in potential conflict with a pedestrian walk sign.



Photo 235: Intersection of I-110 and Carson St.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 236: Sidewalk along Carson St.

Parking Signage and Wayfinding Rating: Low

There are Park-and-Ride signs on the I-110 freeway in both directions in advance of the Carson St. exit, as well as small parking wayfinding signs on the off-ramps. There is no parking wayfinding signage on the local streets. There is also a Park-and-Ride sign on Carson St. at the entrance to the parking lot but nothing to identify the lot as a Metro parking facility.



Photo 237: Park and Ride Signage at Entrance to Lot

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 238: Facing Parking Lot Entrance

Potential Carshare Locations

If spaces for carshare are desired, spaces in the southeast portion of the parking lot closest to the crosswalk to access the station are good candidates.

Potential Vanpool Locations

Any vanpool parking would ideally be located in the northern portion of the lot as these are the least desirable spaces for Silver Line riders.

Facility Upkeep

The parking lot had some graffiti and debris/litter. There was also broken glass in the landscaped area next to the entrance.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

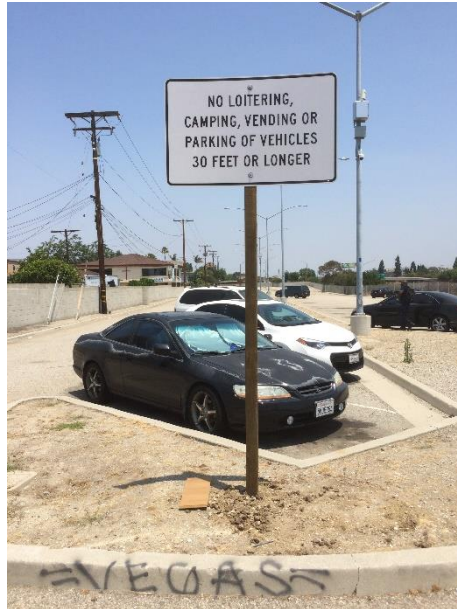


Photo 239: Graffiti in Parking Lot

Facility Maintenance

Median areas lack landscaping and are barren.

Pavement Conditions

The pavement condition and striping in the parking lot is adequate.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

No issues were observed.

Recommendations

- Improve wayfinding signage to station parking
- Improve parking signage at facility entrance
- Increase bicycle racks
- Improve landscaping
- Improve upkeep

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

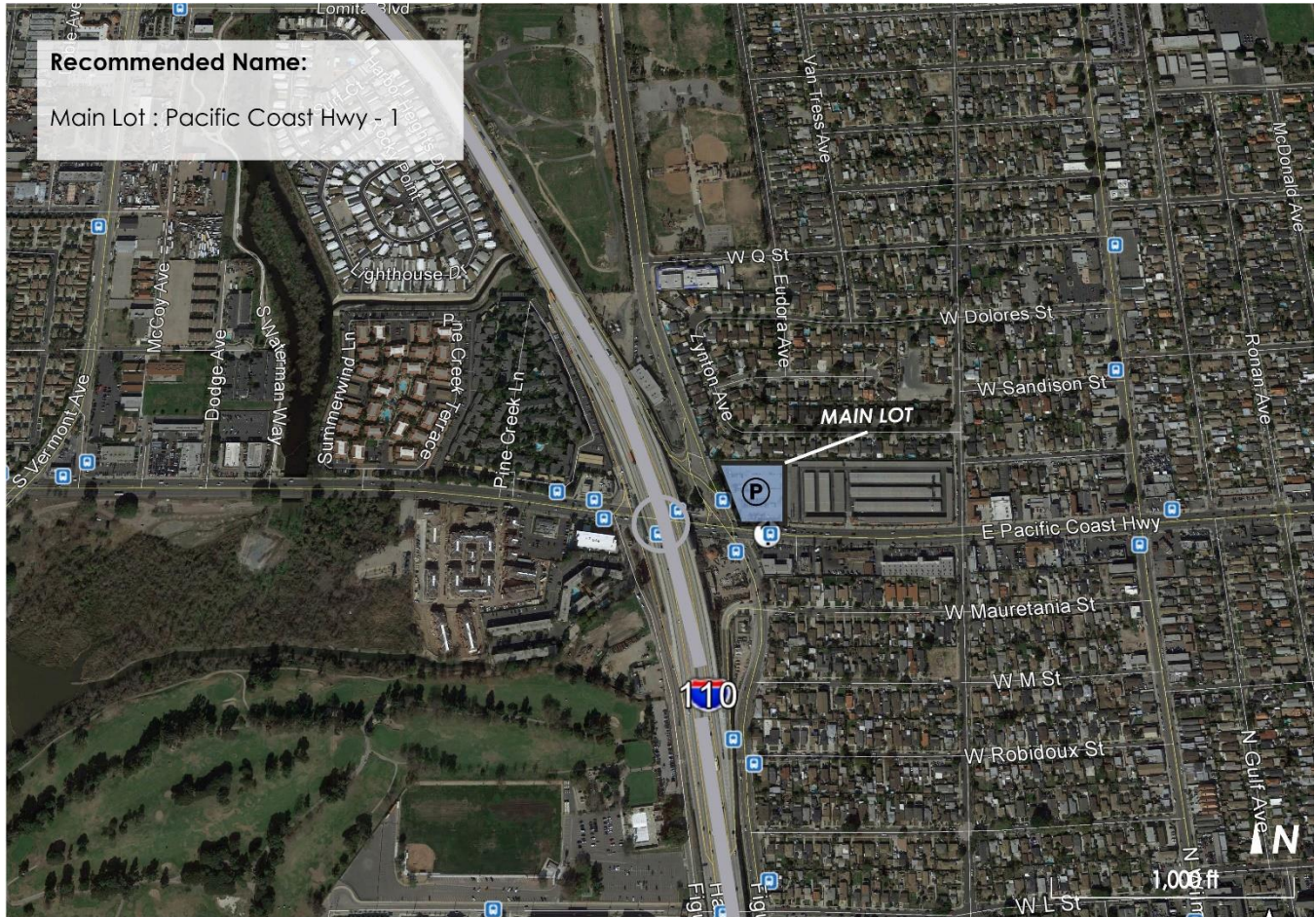
PACIFIC COAST HIGHWAY

Address: 1345 West Pacific Coast Highway, Wilmington CA 90744

Owner: Caltrans

Operator: Metro

Total Number of Parking Spaces: 236 in one surface parking lot



LEGEND



Parking Facility

— Silver Line



Pacific Coast Highway Station

Parking Facility Utilization Summary

	Total	Free Spaces	Permit Spaces	ADA Spaces	Reserved Spaces
Inventory	236	231	N/A	5	N/A
Time Period	Occupancy				
Weekday Daytime	34%	35%	N/A	0%	N/A
Weekday Evening	2%				
Weekend	2%				

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS

Parking Access

The parking lot is accessible on Figueroa St. and Pacific Coast Highway. There is one right-in/right-out only driveway on Figueroa St. and one right-in/right-out only driveway on Pacific Coast Highway.


Total Lanes in: 2

Total Lanes out: 2

Parking User Groups

- Metro transit riders
- Carpoolers meeting up at the parking lot based on observations

Bicycle Parking Utilization Summary

	Inventory	Occupied Spaces	Occupancy %
Lockers	N/A	N/A	N/A
Bike Rack Spaces	8	0	0%

Bicycle Infrastructure Rating: Low

There are no bicycle lanes on Figueroa St. or Pacific Coast Highway. The station does not have bike lockers. Bike racks are provided on the sidewalk on Figueroa St.

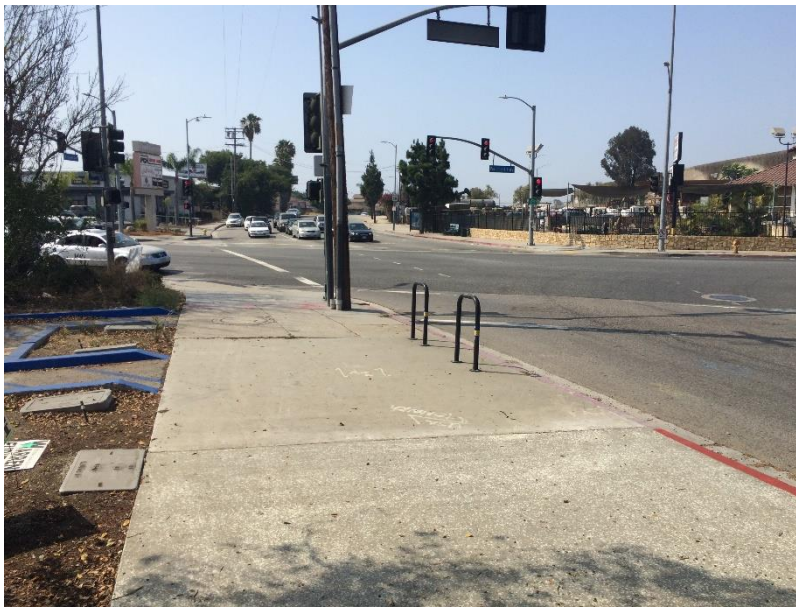


Photo 240: Bike Racks along Figueroa St.

Pedestrian Infrastructure Rating: Medium

The station is well-connected by sidewalks along Pacific Coast Highway and Figueroa St. There is some buckling of sidewalks on Figueroa St. adjacent to the parking lot due to St. trees.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 241: Sidewalk along Pacific Coast Highway

Parking Signage and Wayfinding Rating: Low

There is one parking wayfinding sign on Figueroa St. There are parking wayfinding signs on the I-110 in both directions in advance of the Pacific Coast Highway exit, as well as a sign on the I-110 southbound off-ramp at Pacific Coast Highway. There is no parking wayfinding signage on the I-110 northbound exit ramp at Pacific Coast Highway or on local streets. There is a Park-and-Ride sign at the entrance but nothing to identify the lot as a Metro parking facility.

Potential Carshare Locations

If spaces for carshare are desired, spaces in the southwest portion of the parking lot closest to the station are good candidates.

Potential Vanpool Locations

An ideal location for vanpool parking is in the northeast portion of the parking lot as these spaces are the least desirable to Silver Line riders.

Facility Upkeep

There was trash in the further recesses of the lot including discarded tires and traffic cones. There was graffiti in some areas as well.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 242: Graffiti on Park and Ride Sign next to the Entrance on Pacific Coast Highway



Photo 243: Graffiti on Curb in Parking Lot

Facility Maintenance

The landscaping is not well-maintained at this location.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – SILVER LINE STATIONS



Photo 244: Poorly Maintained Landscaping and Litter in Parking Lot

Pavement Conditions

The pavement condition and striping in the parking lot is good.

Lighting

Minimum lighting level of service is C.

Safety

No issues were observed.

Security

While it is located on a busy corner, the parking lot is large. During site observations, taggers were observed placing graffiti on one of the light poles in the parking lot, as well as St. signs on Pacific Coast Highway adjacent to the parking lot. There were two shopping carts filled with what appeared to be personal items next to one of the station signs under the I-110 freeway on Pacific Coast Highway.

Recommendations

- Improve wayfinding signage to station parking
- Improve parking signage at facility entrance
- Improve landscaping
- Improve upkeep
- Increase security patrols within facility
- Improve bicycle infrastructure near station

APPENDIX H – ADDITIONAL DATA

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

DETAILED INVENTORY WITH OCCUPANCY

Station	Inventory							Occupancy Percentage		
	Free	Permit	ADA	EV	Carshare	Other Reserved	Total	Weekday - Day	Weekday - Evening	Weekend
Florence	90	20	5	0	0	0	115	95%	32%	39%
103rd Street/Watts Towers	66	0	3	0	0	0	69	0%	0%	20%
Willowbrook/Rosa Parks	216	0	8	0	0	10	234	68%	7%	12%
Artesia	251	32	15	0	0	0	298	99%	13%	12%
Del Amo	330	61	8	0	0	0	399	96%	8%	29%
Wardlow	70	17	2	0	0	0	89	100%	20%	45%
Willow	792	36	19	4	2	0	853	88%	6%	13%
Expo/Crenshaw	215	0	10	0	0	0	225	52%	0%	0%
La Cienega/Jefferson	483	0	9	0	2	0	494	68%	23%	100%
Culver City	556	0	12	0	0	0	568	99%	53%	100%
Expo/Sepulveda	0	241	7	0	3	9	260	7%	8%	10%
Expo/Bundy	0	206	8	0	3	0	217	11%	6%	11%
17th Street/SMC	0	54	3	6	2	0	65	25%	17%	28%
Atlantic	251	24	7	0	0	2	284	75%	4%	20%
Indiana	33	5	2	0	2	0	42	71%	10%	19%
Lincoln/Cypress	73	15	4	0	2	0	94	95%	26%	36%
Heritage Square	115	11	3	0	0	0	129	98%	19%	16%
South Pasadena	0	136	6	0	0	0	142	41%	11%	19%
Fillmore	121	30	4	0	0	0	155	86%	5%	15%
Del Mar	0	594	16	0	0	0	610	38%	25%	0%
Lake	0	22	0	0	0	0	22	73%	18%	0%
Sierra Madre Villa	811	124	26	4	0	0	965	93%	7%	30%
Arcadia	289	0	9	2	0	0	300	88%	15%	33%
Monrovia	339	0	9	2	0	0	350	93%	10%	21%
Duarte/City of Hope	116	0	6	3	0	0	125	94%	8%	25%
Irwindale	339	0	9	2	0	0	350	99%	2%	14%
Azusa Downtown	228	0	0	0	0	9	237	99%	8%	21%
APU/Citrus College	190	0	8	2	0	0	200	98%	6%	84%

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

Station	Inventory							Occupancy Percentage		
	Free	Permit	ADA	EV	Carshare	Other Reserved	Total	Weekday - Day	Weekday - Evening	Weekend
Norwalk	1,675	0	45	0	0	0	1,720	100%	5%	13%
Lakewood	254	0	45	0	0	0	299	104%	5%	25%
Long Beach	633	0	13	0	0	0	646	53%	2%	10%
Avalon	155	0	5	0	0	0	160	4%	1%	1%
Harbor Freeway	246	0	6	0	0	0	252	58%	3%	18%
Vermont/Athens	148	0	7	0	0	0	155	3%	4%	3%
Crenshaw	508	0	8	0	0	0	516	38%	16%	47%
Hawthorne/Lennox	355	0	7	0	0	0	362	33%	12%	6%
Aviation/LAX	380	0	10	0	0	0	390	102%	82%	95%
El Segundo	72	0	2	4	0	15	93	26%	16%	14%
Douglas	28	0	2	0	0	0	30	87%	30%	30%
Redondo Beach	312	0	11	0	0	17	340	51%	13%	15%
Van Nuys	288	0	17	0	2	0	307	63%	9%	15%
Sepulveda	415	0	24	0	0	0	439	40%	9%	7%
Balboa	258	9	6	0	0	0	273	83%	30%	13%
Reseda	510	0	12	0	0	0	522	50%	8%	11%
Pierce College	380	0	10	0	2	0	392	62%	11%	7%
Canoga	224	0	17	0	0	8	249	61%	8%	9%
Sherman Way	189	0	10	0	0	6	205	24%	12%	17%
Chatsworth	575	0	20	2	0	12	609	52%	9%	11%
Union Station	0	1,810	38	12	0	0	1,860	73%	35%	58%
Universal City/Studio City	613	195	14	4	2	0	828	94%	34%	50%
North Hollywood	733	375	23	0	2	12	1,145	100%	36%	53%
Westlake/MacArthur Park	15	0	1	0	2	0	18	72%	28%	94%
Slauson	143	0	7	0	0	0	150	7%	8%	5%
Manchester	230	0	9	0	0	0	239	17%	0%	6%
Rosecrans	329	0	9	0	0	0	338	21%	1%	7%
Harbor Gateway Transit Center	941	0	19	0	0	20	980	80%	7%	17%
El Monte	1,389	0	43	0	0	3	1,435	100%	18%	12%
Carson	139	0	4	0	0	0	143	16%	2%	8%
Pacific Coast Highway	231	0	5	0	0	0	236	34%	2%	2%
	18,342	4,017	667	47	26	123	23,222	73%	16%	28%

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

PARKING FACILITY OWNERSHIP DETAILS

Line	Station	Facilities			Parking Spaces			Occupancy	Ownership			Metro-Owned Spaces
		Lots	Garages	On-Street	Lot	Garage	Total	Weekday - Day	Metro	Caltrans	Other	
Blue	Florence	1	0	0	115	0	115	95%	x			115
Blue	103rd Street/Watts Towers	1	0	0	69	0	69	0%			City of Los Angeles	0
Blue/Green	Willowbrook/Rosa Parks	2	0	0	234	0	234	68%		x		0
Blue	Artesia	1	0	0	298	0	298	99%	x			298
Blue	Del Amo	1	0	0	399	0	399	96%	x			399
Blue	Wardlow	2	0	0	89	0	89	100%	x			89
Blue	Willow	2	1	0	159	694	853	88%	x			853
Crenshaw	Florence/West	1	0	0	120	0	120	N/A	x			120
Crenshaw	Florence/La Brea	1	0	0	100	0	100	N/A	x			100
Expo	Expo/Crenshaw	0	1	0	0	225	225	52%			West Angeles Church	0
Expo	La Cienega/Jefferson	0	1	0	0	494	494	68%	x			494
Expo	Culver City	1	0	0	568	0	568	99%			City of Culver City	0
Expo	Expo/Sepulveda	0	1	0	0	260	260	7%	x			260
Expo	Expo/Bundy	0	0	1	217	0	217	11%	x			217
Expo	17th Street/SMC	1	0	0	65	0	65	25%	x			65
Gold	Atlantic	1	1	0	22	262	284	75%	x			284
Gold	Indiana	1	0	0	42	0	42	71%	x			42
Gold	Lincoln/Cypress	1	0	0	94	0	94	95%			City of Los Angeles	0
Gold	Heritage Square	1	0	0	129	0	129	98%	x			129
Gold	South Pasadena	0	1	0	0	142	142	41%			City of South Pasadena	0
Gold	Fillmore	0	1	0	0	155	155	86%			Fillmore Raymond MOB LLC	0
Gold	Del Mar	0	1	0	0	610	610	38%			City of Pasadena	0
Gold	Lake	1	0	0	22	0	22	73%			Lake Avenue Church	0
Gold	Sierra Madre Villa	0	1	0	0	965	965	93%	x			965
Gold	Arcadia	1	1	0	30	270	300	88%	x			300
Gold	Monrovia	0	1	0	0	350	350	93%	x			350
Gold	Duarte/City of Hope	1	0	0	125	0	125	94%	x			125
Gold	Irwindale	0	1	0	0	350	350	99%	x			350
Gold	Azusa Downtown	0	1	0	0	237	237	99%	x			237
Gold	APU/Citrus College	0	1	0	0	200	200	98%	x			200

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

Line	Station	Facilities			Parking Spaces			Occupancy	Ownership			Metro-Owned Spaces
		Lots	Garages	On-Street	Lot	Garage	Total	Weekday - Day	Metro	Caltrans	Other	
Green	Norwalk	2	0	0	1,720	0	1,720	100%		x		0
Green	Lakewood	2	0	0	299	0	299	104%		x		0
Green	Long Beach	2	0	0	646	0	646	53%		x		0
Green	Avalon	2	0	0	160	0	160	4%		x		0
Green/Silver	Harbor Freeway	1	0	0	252	0	252	58%		x		0
Green	Vermont/Athens	1	0	0	155	0	155	3%		x		0
Green	Crenshaw	1	0	0	516	0	516	38%		x		0
Green	Hawthorne/Lennox	2	0	0	362	0	362	33%		x		0
Green	Aviation/LAX	1	0	0	390	0	390	102%		x		0
Green	El Segundo	1	0	0	93	0	93	26%	x			93
Green	Douglas	1	0	0	30	0	30	87%			City of El Segundo	0
Green	Redondo Beach	2	0	0	340	0	340	51%			Southern California Edison	0
Orange	Van Nuys	2	0	0	307	0	307	63%	x			307
Orange	Sepulveda	1	0	0	439	0	439	40%	x			439
Orange	Balboa	1	0	0	273	0	273	83%	x			273
Orange	Reseda	3	0	0	522	0	522	50%	x			522
Orange	Pierce College	1	0	0	392	0	392	62%			LACCD	0
Orange	Canoga	1	0	0	249	0	249	61%	x			249
Orange	Sherman Way	2	0	0	205	0	205	24%	x			205
Orange	Chatsworth	2	0	0	609	0	609	52%			City of Los Angeles	0
Red/Purple/Gold	Union Station	0	1	0	0	1,860	1,860	73%	x			1,860
Red	Universal City/Studio City	3	0	0	828	0	828	94%	x	x	County of Los Angeles	550
Red/Orange	North Hollywood	4	0	0	1,145	0	1,145	100%	x			1,145
Red	Westlake/MacArthur Park	1	0	0	18	0	18	72%	x			18
Silver	Slauson	2	0	0	150	0	150	7%		x		0
Silver	Manchester	2	0	0	239	0	239	17%		x		0
Silver	Rosecrans	1	0	0	338	0	338	21%		x		0
Silver	Harbor Gateway Transit Center	1	0	0	980	0	980	80%		x		0
Silver	El Monte	4	1	0	1,214	221	1,435	100%	x	x	City of El Monte	182
Silver	Carson	1	0	0	143	0	143	16%		x		0
Silver	Pacific Coast Highway	1	0	0	236	0	236	34%		x		0
Total		70	16	1	15,927	7,295	23,222					11,835

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

LIGHTING MEASUREMENT DETAILS

Line	Station	Facility	Minimum	Maximum	Average	Max/Min Ratio	Lighting LOS	
							Minimum Level	
Blue	Florence	Main Lot	0.1	1.7	0.6	17.0	E	
Blue	103rd St/Watts Towers	Main Lot	0.0	0.1	0.0	6.0	E	
Blue/Green	Willowbrook/Rosa Parks	North Lot	1.9	4.4	2.9	2.3	B	
Blue/Green	Willowbrook/Rosa Parks	South Lot	0.4	0.7	0.5	1.8	D	
Blue	Artesia	Main Lot	0.3	7.6	1.7	25.3	D	
Blue	Del Amo	Main Lot	0.9	7.8	3.1	8.7	C	
Blue	Wardlow	North Lot	0.0	1.0	0.3	33.0	E	
Blue	Wardlow	South Lot	0.4	6.3	1.5	15.8	D	
Blue	Willow	North Lot	0.0	1.0	0.3	33.0	E	
Blue	Willow	South Lot	0.1	1.7	0.6	17.0	E	
Blue	Willow	Parking Structure						
		Third Floor	0.8	6.3	2.7	7.9	E	
		Roof	0.3	7.1	2.1	23.7	D	
Expo	Expo/Crenshaw	Parking Garage	Not Measured (church parking in evening)					
Expo	La Cienega/Jefferson	Parking Garage						
		Basement	0.7	19.2	4.9	27.4	E	
		Roof	0.3	6.3	2.4	21.0	D	
Expo	Culver City	Main Lot	0.9	17.4	4.6	19.3	C	
Expo	Expo/Sepulveda	Parking Garage						
		Third Floor	0.6	3.8	2.0	6.3	E	
		Roof	0.2	0.5	0.3	2.5	E	
Expo	Expo/Bundy	Parking Lot	0.6	1.2	0.8	2.0	C	
Expo	17th Street/SMC	Parking Lot	1.0	7.0	3.1	7.0	C	
Gold	Atlantic	Parking Structure						
		First Floor	2.0	18.2	7.6	9.1	D	
		Roof	0.1	9.8	1.9	98.0	E	
Gold	Atlantic	Northeast Lot	0.4	3.5	1.4	8.8	D	
Gold	Indiana	Main Lot	1.1	6.0	3.2	5.5	C	

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

Line	Station	Facility	Minimum	Maximum	Average	Max/Min Ratio	Lighting LOS	
							Minimum Level	
Gold	Lincoln/Cypress	Main Lot	0.1	8.1	1.5	81.0	E	
Gold	Heritage Square	Main Lot	0.3	16.4	3.8	54.7	D	
Gold	South Pasadena	Parking Garage	0.3	8.7	1.7	29.0	E	
Gold	Fillmore	Parking Garage						
		Fourth Floor	0.4	12.5	3.4	31.3	E	
		Roof	0.2	1.5	0.7	7.5	E	
Gold	Del Mar	Parking Garage	0.8	21.5	5.4	26.9	E	
Gold	Lake	Main Lot	0.1	5.0	2.0	50.0	E	
Gold	Sierra Madre	Parking Garage						
		Fourth Floor	1.2	10.1	4.7	8.4	D	
		Roof	0.1	16.1	3.7	161.0	E	
Gold	Arcadia	Parking Garage						
		First Floor	0.6	47.6	11.2	79.3	E	
		Roof	2.0	11.5	7.5	5.8	A	
		Parking Lot	4.5	14.7	7.6	3.3	A	
Gold	Monrovia	Parking Garage						
		First Floor	0.7	19.4	6.2	27.7	E	
		Roof	0.8	6061.0	255.4	7576.3	C	
Gold	Duarte/City of Hope	Parking Lot	1.1	7.2	2.7	6.5	C	
Gold	Irwindale	Parking Garage						
		Second Floor	1.3	23.9	8.1	18.4	D	
		Roof	0.8	9.9	4.1	12.4	C	
Gold	Azusa Downtown	Parking Garage						
		Third Floor	7.9	25.5	11.0	3.2	A	
		Roof	Not Measured (roof lights were off)					
Gold	APU/Citus College	Parking Garage						
		Second Floor	1.0	21.6	6.2	21.6	D	
		Roof	0.9	8.2	3.8	9.1	C	

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

Line	Station	Facility	Minimum	Maximum	Average	Max/Min Ratio	Lighting LOS	
							Minimum Level	
Green	Norwalk	West Lot	0.4	0.7	0.6	1.8	D	
Green	Norwalk	East Lot	0.7	1.1	1.0	1.6	C	
Green	Lakewood	North Lot	0.9	1.4	1.2	1.6	C	
Green	Lakewood	South Lot	0.1	1.2	0.8	12.0	E	
Green	Long Beach	West Lot	0.2	1.0	0.5	5.0	E	
Green	Long Beach	East Lot	0.1	1.5	0.5	15.0	E	
Green	Avalon	North Lot	0.3	0.6	0.5	2.0	D	
Green	Avalon	Northeast Lot	0.7	1.0	0.8	1.4	C	
Silver/Green	Harbor Freeway	Main Lot	1.5	5.4	3.5	3.6	B	
Green	Vermont/Athens	Main Lot	0.9	1.6	1.2	1.8	C	
Green	Crenshaw	Main Lot	0.6	1.0	0.7	1.7	C	
Green	Hawthorne/Lennox	West Lot	2.0	5.0	3.6	2.5	B	
Green	Hawthorne/Lennox	East Lot	0.3	1.9	0.7	6.3	D	
Green	Aviation/LAX	Main Lot	0.3	1.2	0.7	4.0	D	
Green	El Segundo	Main Lot	0.7	7.9	2.5	11.3	C	
Green	Douglas	Main Lot	0.5	9.9	2.9	19.8	D	
Green	Redondo Beach	North Lot	0.2	2.3	0.7	11.5	E	
Green	Redondo Beach	South Lot	0.1	0.2	0.1	2.0	E	
Orange	Van Nuys	North Lot	0.1	2.5	0.6	25.0	E	
Orange	Van Nuys	Northwest Lot	Not Measured (facility is leased out)					
Orange	Van Nuys	South Lot	0.3	3.3	1.2	11.0	D	
Orange	Van Nuys	Southeast Lot	Not Measured (facility is leased out)					
Orange	Sepulveda	Main Lot	0.2	3.3	1.0	16.5	D	
Orange	Balboa	Main Lot	0.2	3.7	1.1	18.5	E	
Orange	Reseda	Northwest Lot	0.1	3.0	0.7	30.0	E	
Orange	Reseda	Southwest Lot	0.4	2.1	1.0	5.3	D	
Orange	Reseda	Southeast Lot	0.1	1.9	0.6	19.0	E	
Orange	Pierce College	Main Lot	0.1	4.3	0.7	43.0	E	
Orange	Canoga	Main Lot	0.6	7.6	1.7	12.7	C	

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

Line	Station	Facility	Minimum	Maximum	Average	Max/Min Ratio	Lighting LOS
							Minimum Level
Orange	Sherman Way	West Lot	0.1	1.9	0.7	19.0	E
Orange	Sherman Way	East Lot	0.2	1.8	0.7	9.0	E
Orange	Chatsworth	North Lot	0.4	3.9	1.1	9.8	D
Orange	Chatsworth	South Lot	0.3	24.1	3.4	80.3	D
Red/Purple/Gold	Union Station	Garage	0.8	14.9	3.3	18.6	E
Red	Universal City/Studio City	North Lot	0.2	5.0	1.2	25.0	D
Red	Universal City/Studio City	South Lot	0.3	2.0	0.9	6.7	D
Red	Universal City/Studio City	West Lot	0.3	5.0	1.4	16.7	D
Red/Orange	North Hollywood	North Lot	1.6	15.3	5.3	9.6	B
Red/Orange	North Hollywood	South Lot	0.3	6.5	2.8	21.7	D
Red/Orange	North Hollywood	West Lot	0.6	3.8	1.9	6.3	C
Red/Orange	North Hollywood	Chandler Lot	0.1	1.8	0.7	18.0	E
Red	Westlake/MacArthur Park	Main Lot	2.9	11.2	6.8	3.9	A
Silver	Slauson	West Lot	0.2	3.0	0.8	15.0	E
Silver	Slauson	East Lot	0.6	4.2	2.3	7.0	C
Silver	Manchester	West Lot	0.8	3.6	1.8	4.5	C
Silver	Manchester	East Lot	0.3	3.9	1.2	13.0	D
Silver	Rosecrans	Main Lot	0.4	3.7	1.3	9.3	D
Silver	Harbor Gateway Transit Center	Main Lot	0.1	2.8	0.8	28.0	E
Silver	El Monte	Northeast Lot	0.2	1.9	0.6	9.5	D
Silver	El Monte	West Lot	0.5	2.4	0.9	4.8	C
Silver	El Monte	Parking Structure					
		First Floor	0.9	42.0	7.4	46.7	E
		Roof	0.5	2.7	1.1	5.4	C
Silver	El Monte	Southeast Lot	1.4	3.9	2.6	2.8	C
Silver	El Monte	East Lot	0.4	5.4	1.4	13.5	D
Silver	Carson	Main Lot	0.7	1.1	0.9	1.6	C
Silver	Pacific Coast Highway	Main Lot	1.2	2.0	1.6	1.7	C

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

DETAILS OF WALKER LEVEL OF SERVICE FOR LIGHTING TABLE

The Illuminating Engineering Society of North America (IESNA) provides recommendations of lighting levels in all different applications including parking lots, garages, and roadways. The IESNA criteria is an industry standard, but is not referenced by the building codes.

The following is a detailed table showing Walker level of service for lighting.

LEVEL OF SERVICE	A	B	C	D
COVERED LEVELS Horizontal Illuminance on pavement				
AVERAGE (fc)	10	8	6	4 ¹
MINIMUM (fc)	4	3	2	1 ²
MAX TO MIN UNIFORMITY RATIO	6:1	8:1	10:1 ²	10:1 ²
TOP LEVEL AND PARKING LOTS Illuminance on pavement				
AVERAGE (fc)	4	3	2 ¹	1 ¹
MINIMUM (fc)	2	1.5	.5 ³	0.2 ⁴
MAX TO MIN UNIFORMITY RATIO	10:1	15:1	15:1 ³	20:1 ⁴

¹ IESNA G-1-03 minimum recommendation when safety and security is a concern are 6.0 fc for covered parking structures, 3.0 fc for top levels of parking structures and lots, and 10 fc average in stairs. This level does not meet these criteria.

² IESNA RP-20-98 minimum recommendation

³ IESNA RP-20-98 minimum recommendation for enhanced security

⁴ IESNA RP-20-98 minimum recommendation for basic lighting

IESNA RP-20-98 (RP-20) Lighting for Parking Structures suggests only minimum illumination values and maximum-to-minimum uniformity ratios. RP-20 has “Basic” and “Enhanced Security” recommendations for lighting a parking lot (also roofs of parking structures would be considered the same category). Enhanced Security lighting levels recommended by RP-20 are for areas in which personal security is likely a problem. They are intended to reduce user apprehension and facilitate the observations of potential assailants according to RP-20. When only using RP-20, the typical Walker design practice is to use 0.5 foot-candles (fc) minimum for roofs of parking structures and a minimum of 1.0 fc for covered parking levels. RP-20 for covered parking areas does not differentiate between “Basic” and “Enhanced Security”.

METRO SUPPORTIVE TRANSIT PARKING PROGRAM

FACILITY ASSESSMENT – ADDITIONAL DATA

IESNA G-1-03 (G-1), Guideline for Security Lighting for People Property and Public Spaces, suggests averages and average-to-minimums lighting levels. It suggests using a higher average if “safety and security is a concern.” G-1-03 does not provide any quantitative analysis to evaluate for safety and security. Generally, it is Walker's opinion that if there is an above average risk of crime incidents in the vicinity of the project, then safety and security is a concern and an average maintained illuminance of 6.0 fc should be provided in parking structures and an average maintained illuminance of 3.0 fc should be provided on roofs of parking structures and in parking lots. The average-to-minimum uniformity ratio should be less than 4:1.

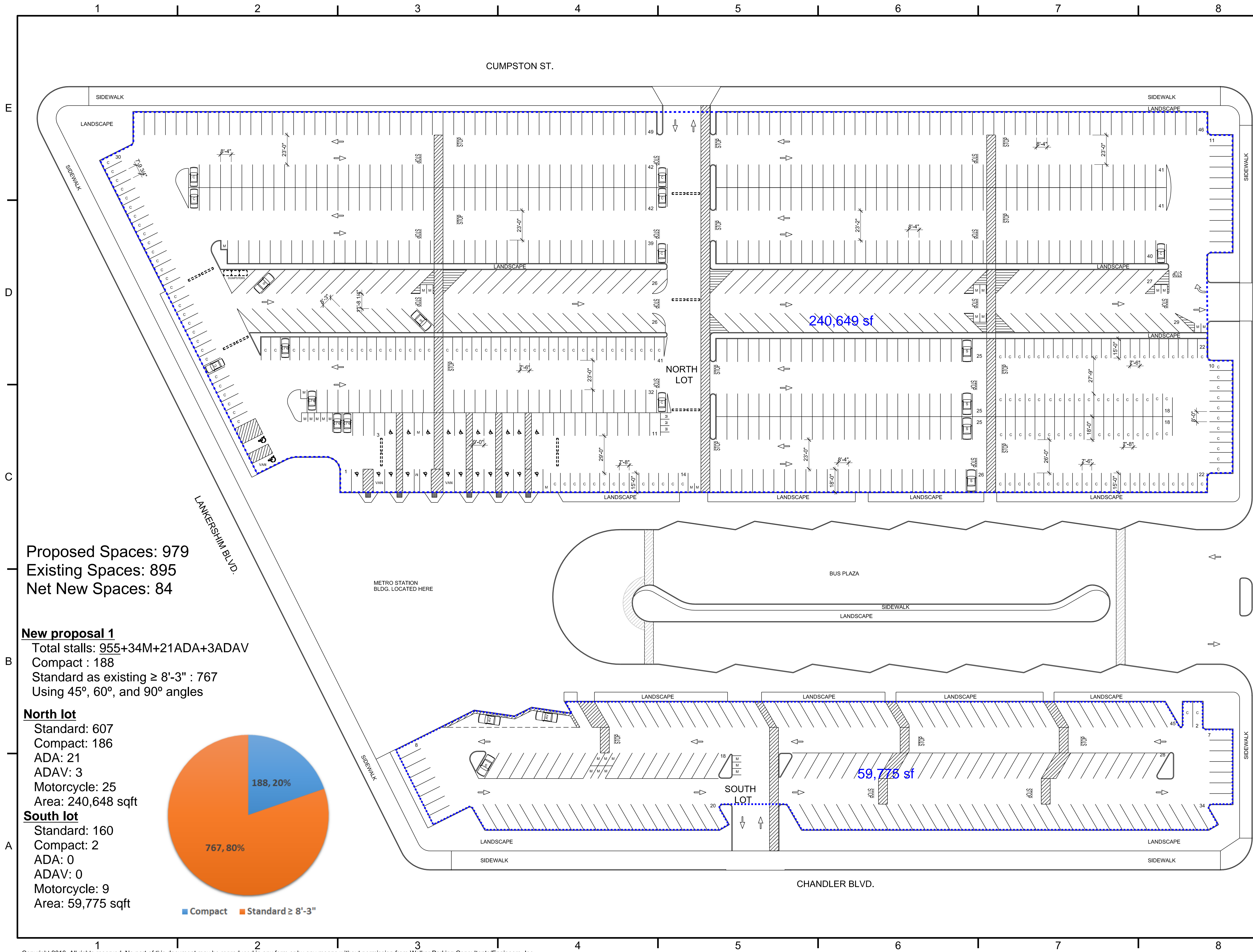


Parking Facility Layouts
C Appendix

APPENDIX C - PARKING FACILITY LAYOUTS

After assessing the condition of Metro’s parking facilities, Walker sought to identify opportunities to increase parking space capacity at several of the larger surface lot facilities. The layouts performed to maximize efficiency are contained in Appendix C and include layouts for surface lots at the North Hollywood, Universal City, and Willowbrook stations.

J:\37-8549-00-LA-METRO-SUPPORTIVE-TRANSIT-PARKING-PROGRAM-MASTER-PLAN\ACAD\BASE\REDLINE\NORTH-HOLLYWOOD-STATION\X-8549-00\FP-ALT.DWG 1/13/2016 12:55:32 PM NGUYEN, VAN



Proposed Spaces: 979
 Existing Spaces: 895
 Net New Spaces: 84

New proposal 1

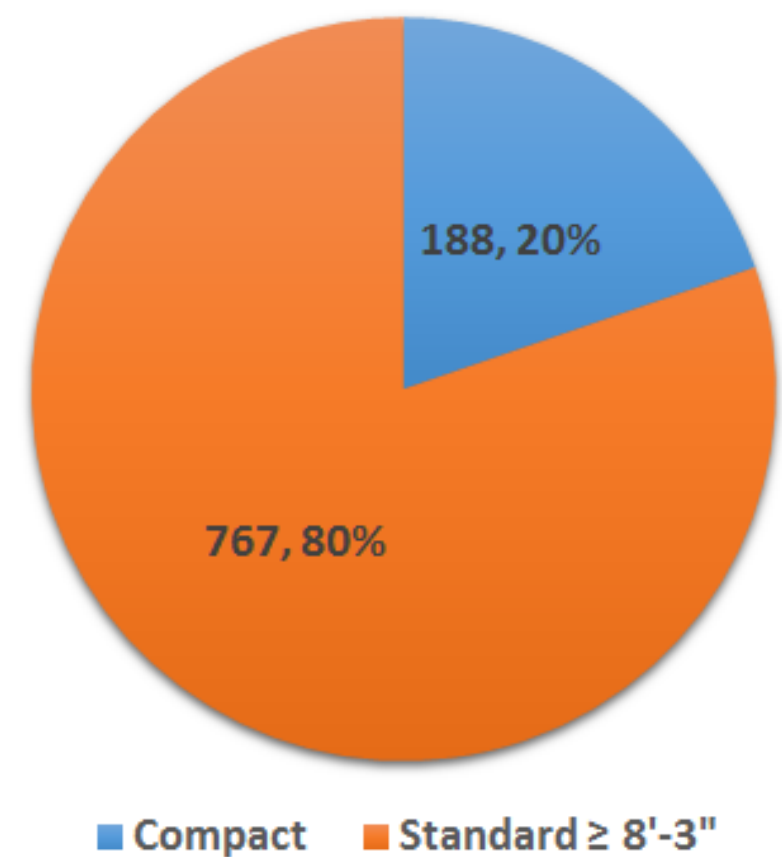
Total stalls: 955+34M+21ADA+3ADAV
 Compact : 188
 Standard as existing $\geq 8'-3"$: 767
 Using 45°, 60°, and 90° angles

North lot

Standard: 607
 Compact: 186
 ADA: 21
 ADAV: 3
 Motorcycle: 25
 Area: 240,648 sqft

South lot

Standard: 160
 Compact: 2
 ADA: 0
 ADAV: 0
 Motorcycle: 9
 Area: 59,775 sqft



WALKER
 PARKING CONSULTANTS
 695 S. Olive Street
 Suite 1100
 Los Angeles, CA 90014
 213.488.4911 Ph.
 213.488.4933 Fax
 www.walkerparking.com

Printed Name & Discipline
 EOR / AOR License Number: xxxxx

OWNERS AND/OR SUBS LOGO

N. HOLLYWOOD METRO
REDLINE PARKING FACILITY
 NORTH HOLLYWOOD
 CALIFORNIA

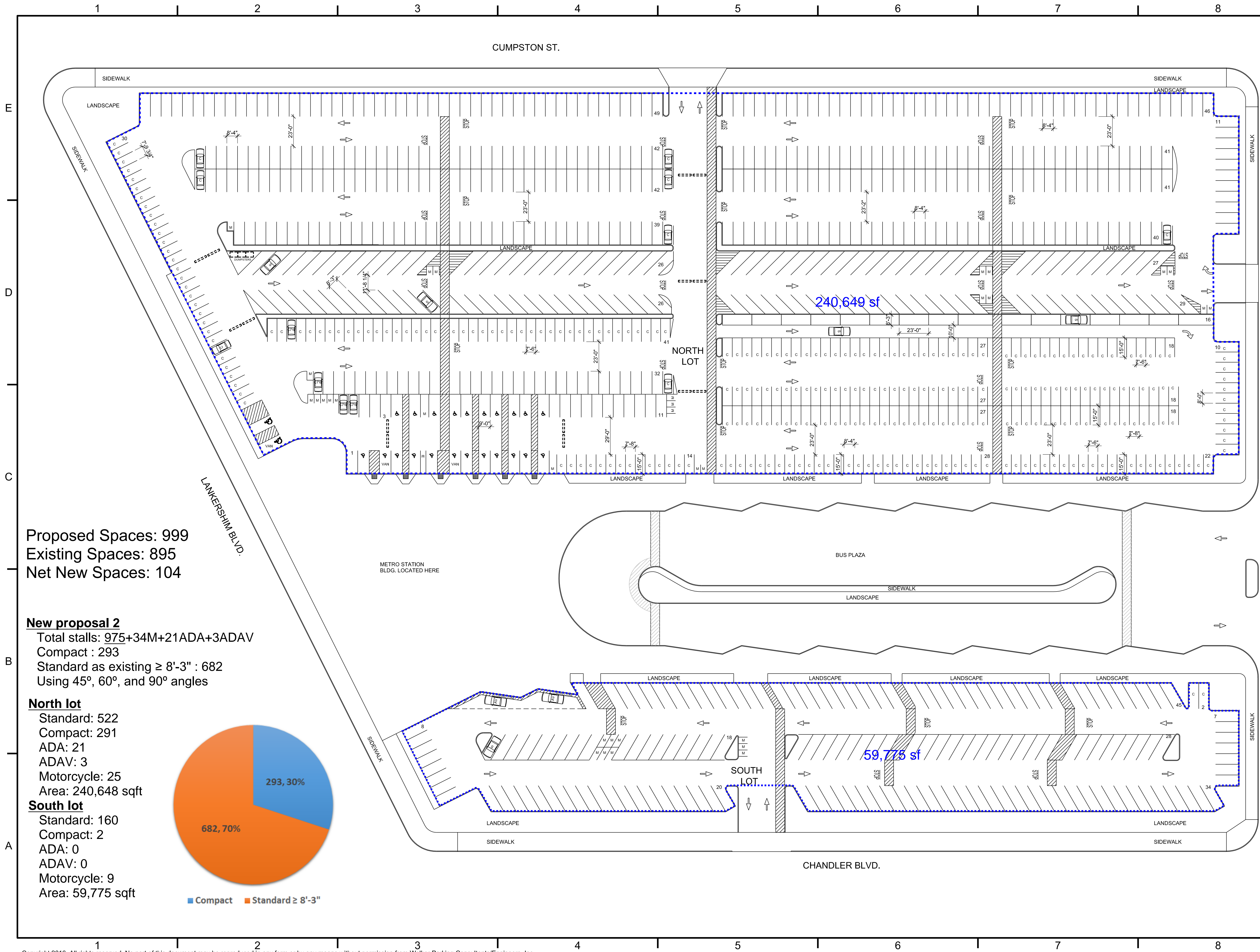
MARK	DATE	DESCRIPTION	ISSUE

PROJECT NO: 37-8549.00
 DRAWN BY: AAA
 CHECKED BY: BBB

SHEET TITLE:
 LINE 1
 LINE 2
 LINE 3

SHT. NO

J:\37-8549.00-LA-METRO-SUPPORTIVE-TRANSIT-PARKING-PROGRAM-MASTER-PLAN\ACAD\BASE\REDLINE\NORTH-HOLLYWOOD-STATION\X-8549.00-FP-ALT.DWG 1/13/2016 12:55:32 PM NGUYEN, VAN



Proposed Spaces: 999
 Existing Spaces: 895
 Net New Spaces: 104

New proposal 2

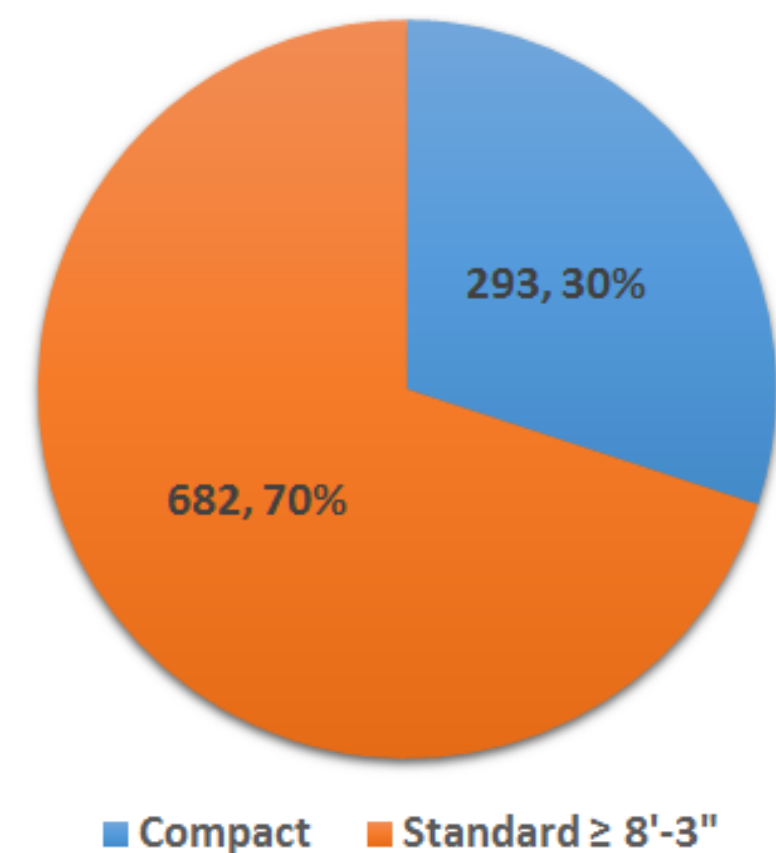
Total stalls: 975+34M+21ADA+3ADAV
 Compact : 293
 Standard as existing $\geq 8'-3"$: 682
 Using 45°, 60°, and 90° angles

North lot

Standard: 522
 Compact: 291
 ADA: 21
 ADAV: 3
 Motorcycle: 25
 Area: 240,648 sqft

South lot

Standard: 160
 Compact: 2
 ADA: 0
 ADAV: 0
 Motorcycle: 9
 Area: 59,775 sqft



WALKER
 PARKING CONSULTANTS
 696 S. Olive Street
 Suite 1100
 Los Angeles, CA 90014
 213.488.4911 Ph.
 213.488.4933 Fax
 www.walkerparking.com

Walker Parking Consultants/Engineers, Inc.
 Firm Certificate of Authority Number: XXXXX

OWNERS AND/OR SUBS LOGO

N. HOLLYWOOD METRO
REDLINE PARKING FACILITY
 NORTH HOLLYWOOD
 CALIFORNIA

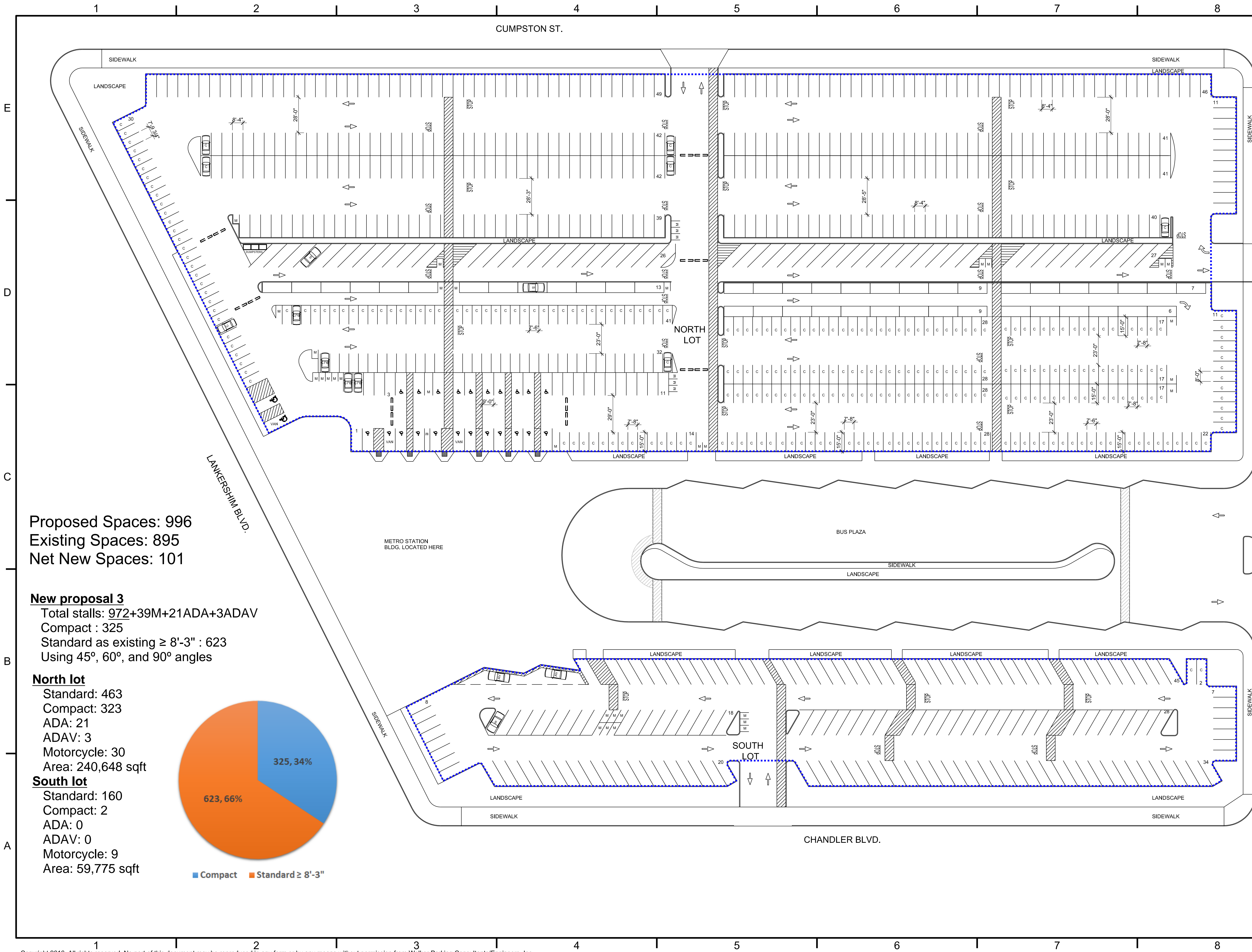
MARK	DATE	DESCRIPTION	ISSUE

PROJECT NO: 37-8549.00
 DRAWN BY: AAA
 CHECKED BY: BBB

SHEET TITLE:
 LINE 1
 LINE 2
 LINE 3

SHT. NO

J:\37-8549.00-LA METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN\CAD\BASE\REDLINE\NORTH HOLLYWOOD STATION\X-8549.00FP-ALT.DWG 1/14/2016 10:47:15 AM NGUYEN, VAN



Proposed Spaces: 996
 Existing Spaces: 895
 Net New Spaces: 101

New proposal 3

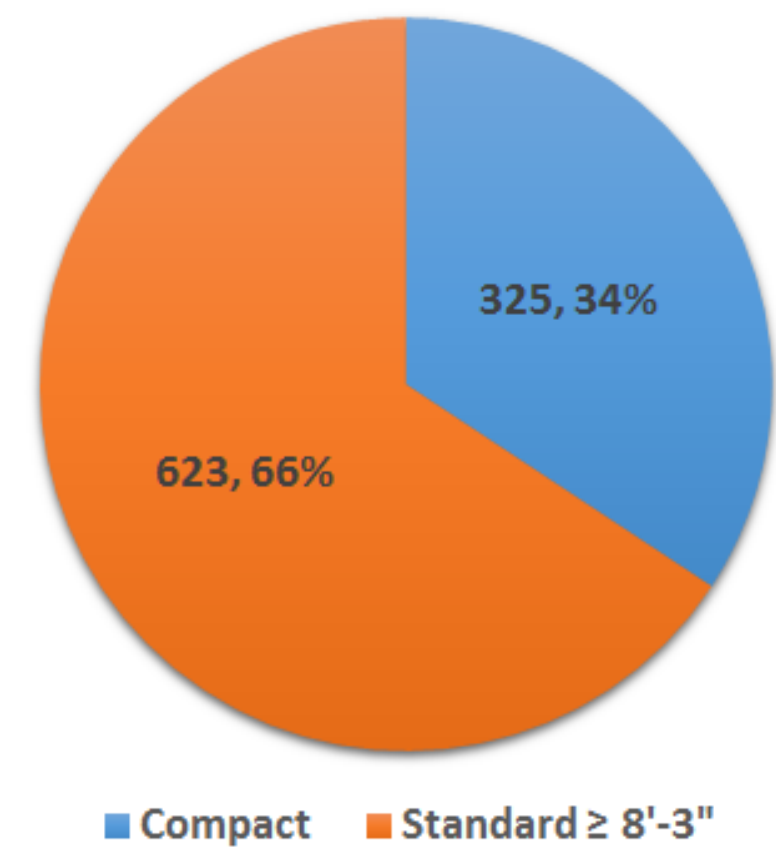
Total stalls: 972+39M+21ADA+3ADAV
 Compact : 325
 Standard as existing $\geq 8'-3"$: 623
 Using 45°, 60°, and 90° angles

North lot

Standard: 463
 Compact: 323
 ADA: 21
 ADAV: 3
 Motorcycle: 30
 Area: 240,648 sqft

South lot

Standard: 160
 Compact: 2
 ADA: 0
 ADAV: 0
 Motorcycle: 9
 Area: 59,775 sqft



■ Compact ■ Standard $\geq 8'-3"$

WALKER PARKING CONSULTANTS
 696 S. Olive Street
 Suite 1100
 Los Angeles, CA 90014
 213.488.4911 Ph
 213.488.4933 Fax
 www.walkerparking.com

Walker Parking Consultants/Engineers, Inc.
 Firm Certificate of Authority Number: XXXXX

Printed Name & Discipline
 EOR / AOR License Number: xxxxx

OWNERS AND/OR SUBS LOGO

N. HOLLYWOOD METRO
REDLINE PARKING FACILITY
 NORTH HOLLYWOOD CALIFORNIA

MARK	DATE	DESCRIPTION	ISSUE:

PROJECT NO: 37-8549.00
 DRAWN BY: AAA
 CHECKED BY: BBB

SHEET TITLE:
PROPOSAL PLAN 3

ALT-3



North Hollywood & Universal Studios

D Appendix

As part of an effort to leverage parking, and development, along transit lines and corridors, the STPP analysis explored the advantages and opportunities to build transit-oriented development at the North Hollywood station by concentrating the parking supply for commuters at Universal City, which may be less suited for development but offers the opportunity to provide parking. Under this scenario, more residential, transit-oriented development would be possible in North Hollywood while maintaining a reasonable parking supply for transit riders who must drive to access Red Line. Appendix D contains the North Hollywood shared parking analysis and Universal City financial feasibility study prepared as part of the STPP, exploring the possibility that parking along an individual line may operate as one comprehensive system, thereby presenting efficiencies and opportunities for management and building transit-oriented development.

MEMORANDUM

UNIVERSAL CITY FEASIBILITY STUDY



PAGE 1

606 South Olive Street, Suite 1100
Los Angeles, CA 90014

DATE: March 21, 2017
TO: Frank Ching, Adela Felix and Wells Lawson
COMPANY: Metro
FROM: Bernard Lee and Steffen Turoff
PROJECT NAME: Universal City Feasibility Study
PROJECT NUMBER: 37-8549.00
SUBJECT: North Hollywood Shared Parking Scenario

Office: 213.488.4911
Fax: 213.488.4983
www.walkerparking.com

INTRODUCTION

The Universal City feasibility study includes an examination of shared parking strategies at the proposed North Hollywood development site. This memorandum provides a brief overview of shared parking and potential parking reduction of a proposed development program that incorporates shared parking concepts.

SHARED PARKING ANALYSIS BACKGROUND

The principles supporting this analysis stem from the concept of shared parking, an accepted practice widely used in mixed use developments and commercial districts. The Urban Land Institute first published *Shared Parking* in 1983. This publication explains the concept of shared parking and describes the use of a model to project peak parking conditions for mixed-use developments, and/or urban settings. Walker led the team that researched and authored *Shared Parking, 2nd Edition*, published in 2005.

ULI/WALKER SHARED PARKING METHODOLOGY

Shared parking is the use of a parking area to serve two or more individual land uses without conflict or encroachment. The ability to share parking spaces is the result of the following two conditions:

1. Variations in the accumulation of vehicles by hour, by day, or by season at the individual land uses, and
2. Relationships among the land uses that result in visiting multiple land uses on the same auto trip.

The key goal of a shared parking analysis is to find the balance between providing adequate parking to support a development from a commercial and operational standpoint, while minimizing the negative aspects of excessive land area or resources devoted to parking. In general, a shared parking analysis considers the types, quantities and user groups of land uses for a development, as well as site- and market-specific characteristics. The ultimate goal of a shared parking analysis is to find the peak period, or design day condition; according to ULI's

MEMORANDUM

UNIVERSAL CITY FEASIBILITY STUDY



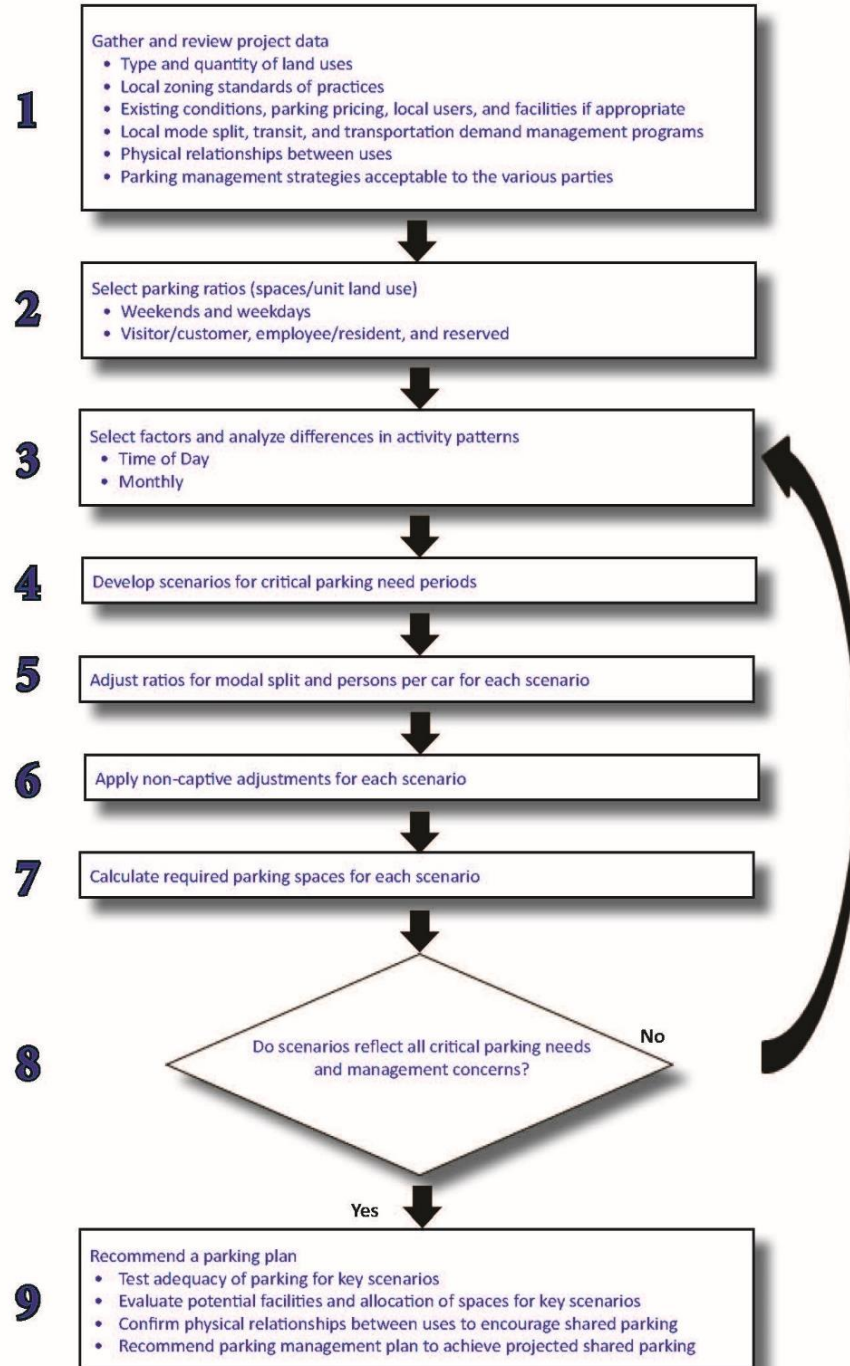
PAGE 2

Shared Parking, 2nd Edition, "A design day or design hour is one that recurs frequently enough to justify providing spaces for that level of parking activity."

Allowing multiple land uses and entities to share parking spaces has allowed for and led to the creation of many popular developments and districts, resulting in the combination of office, residential, retail, and entertainment districts that rely heavily on shared parking for economic viability; traditional downtowns in large and small cities alike have depended on the practice to be compact, walkable and economically viable. In the same way, mixed-use projects have also benefited from the shared parking principle, which offers multiple benefits to a community, not the least of which is a lesser environmental impact from the reduction in required parking needed to serve commercial developments, as well as the ability to create a more desirable mix of uses at one location. When multiple uses do not share parking but instead each provide a separate, reserved supply, the result is typically large amounts of asphalt or parking spaces in some form that sit empty for significant periods of time.

The following flow chart describes the logical progression of a shared parking analysis.

Figure 1: Shared Parking Methodology



Source: Adapted from Shared Parking 2nd Edition, 2005

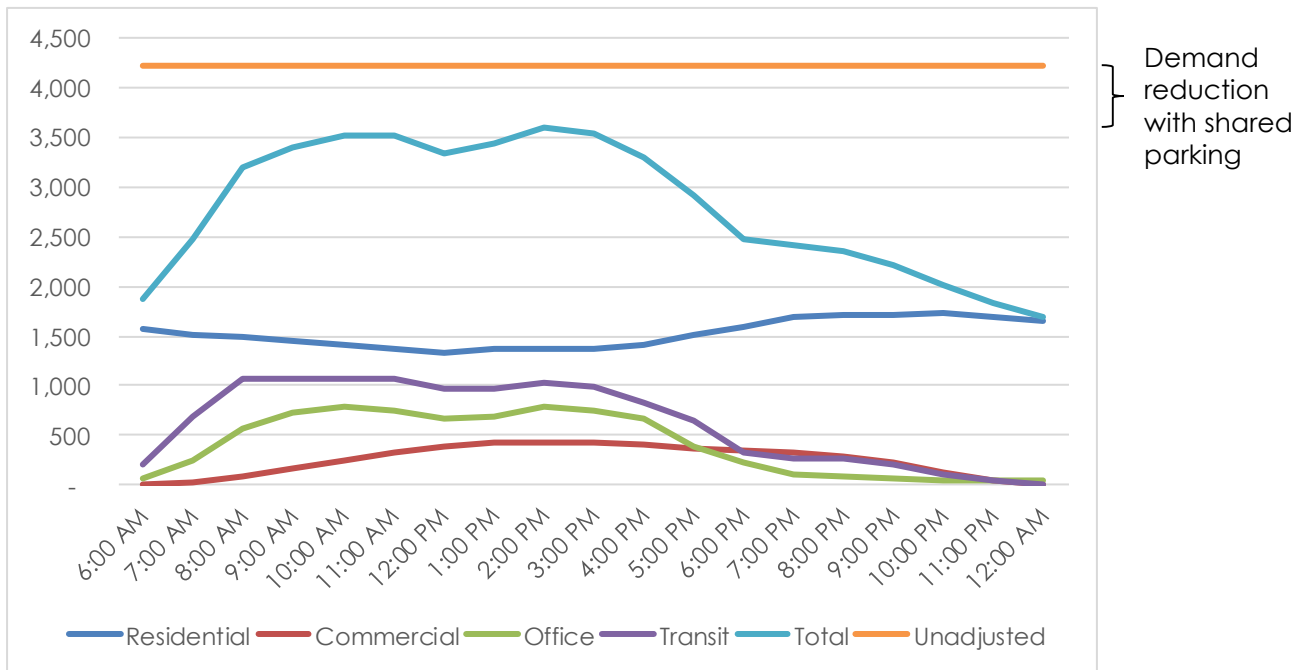
PROPOSED DEVELOPMENT PROGRAM

Walker analyzed the following program with the assumed parking ratios, after all adjustments.

- Residential: 1,435 units (1.2 per unit)
- Commercial: 143,900 square feet (3.0 per 1,000 square feet)
- Office: 380,000 square feet (2.0 per 1,000 square feet)
- Transit Parking: 1,268 spaces

The following chart shows the accumulation of parking demand over the course of a weekday in the peak month of demand for this program, which is December. The modeled program results in a 15% reduction in the peak number of spaces that need to be supplied when shared parking is applied. With shared parking, the recommended number of parking spaces to accommodate the development program is 3,607 spaces instead of 4,220 for stand-alone uses.

Figure 2: Weekday Parking Demand by Hour for Each Use



Source: Walker Parking Consultants; Shared Parking 2nd Edition, 2005

MEMORANDUM

UNIVERSAL CITY FEASIBILITY STUDY



PAGE 1

606 South Olive Street, Suite 1100
Los Angeles, CA 90014

DATE: March 21, 2017
TO: Frank Ching, Adela Felix and Wells Lawson
COMPANY: Metro
FROM: Bernard Lee and Steffen Turoff
PROJECT NAME: Universal City Feasibility Study
PROJECT NUMBER: 37-8549.00
SUBJECT: North Hollywood Shared Parking Scenario

Office: 213.488.4911
Fax: 213.488.4983
www.walkerparking.com

INTRODUCTION

The Universal City feasibility study includes an examination of shared parking strategies at the proposed North Hollywood development site. This memorandum provides a brief overview of shared parking and potential parking reduction of a proposed development program that incorporates shared parking concepts.

SHARED PARKING ANALYSIS BACKGROUND

The principles supporting this analysis stem from the concept of shared parking, an accepted practice widely used in mixed use developments and commercial districts. The Urban Land Institute first published *Shared Parking* in 1983. This publication explains the concept of shared parking and describes the use of a model to project peak parking conditions for mixed-use developments, and/or urban settings. Walker led the team that researched and authored *Shared Parking, 2nd Edition*, published in 2005.

ULI/WALKER SHARED PARKING METHODOLOGY

Shared parking is the use of a parking area to serve two or more individual land uses without conflict or encroachment. The ability to share parking spaces is the result of the following two conditions:

1. Variations in the accumulation of vehicles by hour, by day, or by season at the individual land uses, and
2. Relationships among the land uses that result in visiting multiple land uses on the same auto trip.

The key goal of a shared parking analysis is to find the balance between providing adequate parking to support a development from a commercial and operational standpoint, while minimizing the negative aspects of excessive land area or resources devoted to parking. In general, a shared parking analysis considers the types, quantities and user groups of land uses for a development, as well as site- and market-specific characteristics. The ultimate goal of a shared parking analysis is to find the peak period, or design day condition; according to ULI's

MEMORANDUM

UNIVERSAL CITY FEASIBILITY STUDY



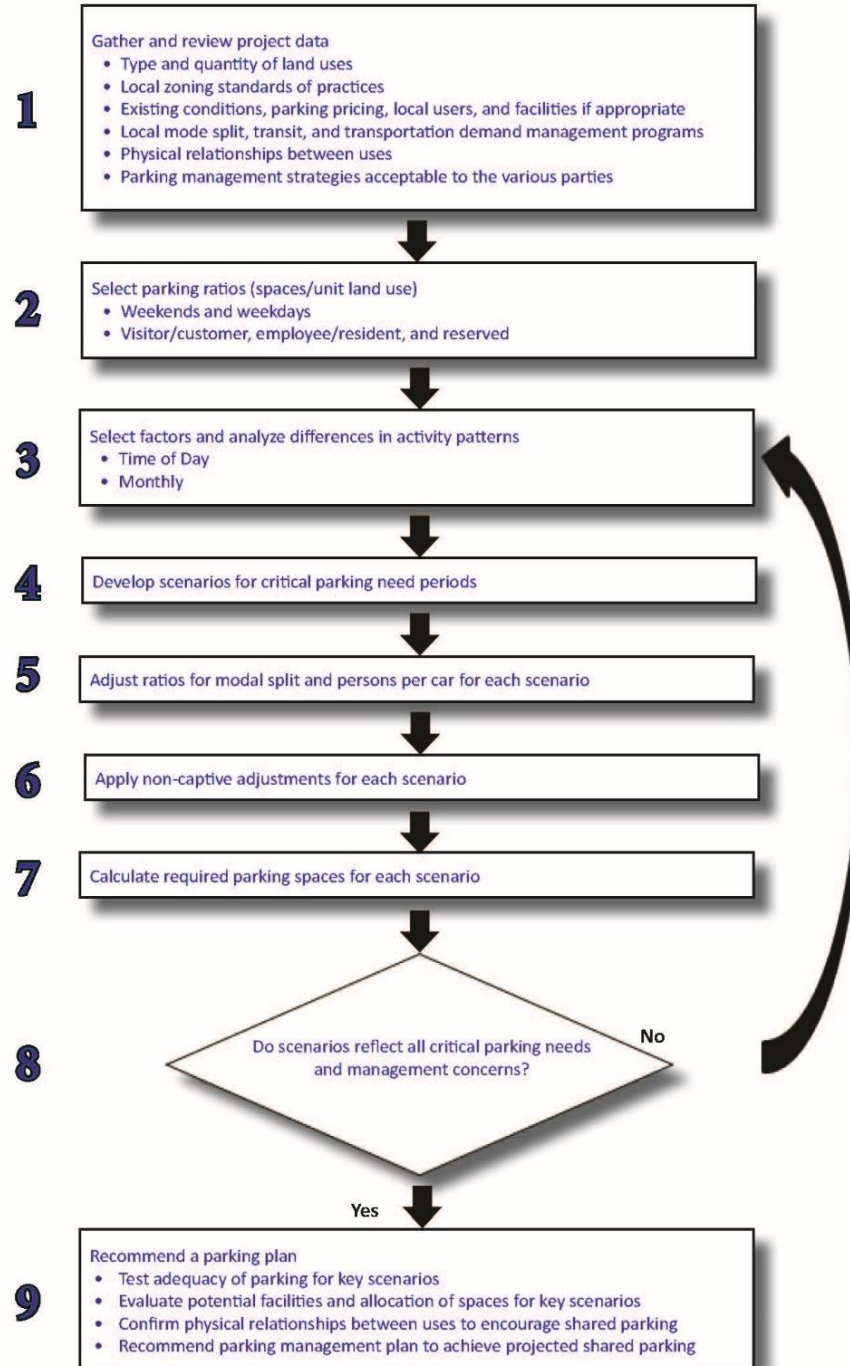
PAGE 2

Shared Parking, 2nd Edition, "A design day or design hour is one that recurs frequently enough to justify providing spaces for that level of parking activity."

Allowing multiple land uses and entities to share parking spaces has allowed for and led to the creation of many popular developments and districts, resulting in the combination of office, residential, retail, and entertainment districts that rely heavily on shared parking for economic viability; traditional downtowns in large and small cities alike have depended on the practice to be compact, walkable and economically viable. In the same way, mixed-use projects have also benefited from the shared parking principle, which offers multiple benefits to a community, not the least of which is a lesser environmental impact from the reduction in required parking needed to serve commercial developments, as well as the ability to create a more desirable mix of uses at one location. When multiple uses do not share parking but instead each provide a separate, reserved supply, the result is typically large amounts of asphalt or parking spaces in some form that sit empty for significant periods of time.

The following flow chart describes the logical progression of a shared parking analysis.

Figure 1: Shared Parking Methodology



Source: Adapted from Shared Parking 2nd Edition, 2005

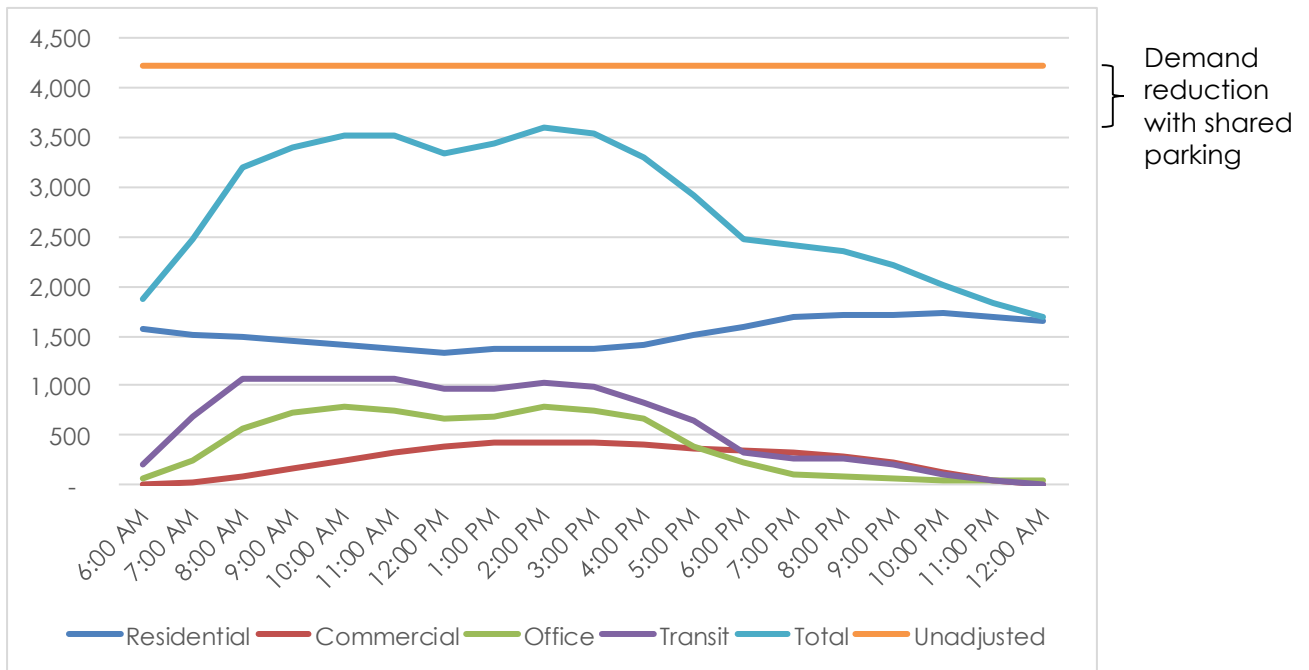
PROPOSED DEVELOPMENT PROGRAM

Walker analyzed the following program with the assumed parking ratios, after all adjustments.


- Residential: 1,435 units (1.2 per unit)
- Commercial: 143,900 square feet (3.0 per 1,000 square feet)
- Office: 380,000 square feet (2.0 per 1,000 square feet)
- Transit Parking: 1,268 spaces

The following chart shows the accumulation of parking demand over the course of a weekday in the peak month of demand for this program, which is December. The modeled program results in a 15% reduction in the peak number of spaces that need to be supplied when shared parking is applied. With shared parking, the recommended number of parking spaces to accommodate the development program is 3,607 spaces instead of 4,220 for stand-alone uses.

Figure 2: Weekday Parking Demand by Hour for Each Use



Source: Walker Parking Consultants; Shared Parking 2nd Edition, 2005



Long-Range Planning and Parking Design Toolkits

E Appendix

**APPENDIX E – LONG RANGE PLANNING & PARKING DESIGN
TOOLKITS**

As part of the STPP a long-range parking planning toolkit was developed to guide the planning of parking facilities along future rail corridors. The toolkit is intended to help planners assess both the type and amount of parking planned at future facilities. The long-range parking planning toolkit asks planners to identify and consider data in the following 11 categories, and is intended to engender a deliberate, forward-thinking process for how Metro plans and manages parking in the future. The attached survey was developed by Metro parking staff to assist Metro’s corridor planners determine an appropriate number of parking spaces for not just specific stations, but the overall lines and corridors that they serve as well.

Long Range Planning – Transit Parking Toolkit

OVERVIEW

This document was developed by Metro’s Parking Management staff to support the parking planning as part of Metro’s transit corridor planning process. The Parking Management unit oversees the day to day functions of parking supporting Metro’s transit system. Parking is an integral component of the transit system and the first and last impression of service for those transit patrons who must drive and park in order to access Metro transit facilities. A well-managed parking system ensures the reliability of parking resources for transit patrons who rely on parking as a crucial part of their trip. A well-managed parking program can support ridership while generating sufficient revenue to be a sustainable enterprise program.

Planning and development around our Metro stations should focus on providing a number of first/last mile transportation alternatives to patrons. While parking will remain a component of future station development and first/last mile solutions, due to the already high non-automobile mode split at many stations and the significant financial and spatial (land) resources necessary to provide parking, automobiles should not be considered the only mode by which Metro riders can access a station. In addition, future demand for parking along our transit system will continue to be impacted by the increasing development of mobility technologies such as self-driving vehicles and expansion of car sharing programs. The use of these technologies today already suggests a likely reduction in the need to access transit facilities by parking one’s own car.

Parking Management staff has developed planning Toolkit to assist corridor planning staff in determining an approximate number of parking spaces required at future stations. The information requested in this document will inform a more robust analysis of the appropriate levels of transit parking to be considered as part of transit corridor planning, design and development. With the information requested, parking staff will be able to support the corridor planning process. The information must be provided for each of the planned stations as each station and the area it serves is unique.

I. DATA

A. Service Area

- Service area refers to the area each station is expected to serve and will determine the demographics of the area it is expected to serve and the services it should provide. These should consider all modes of transportation including, but not limited to: walking, bicycle, bus, car or other. It is important to identify the communities the station will be serving. Please identify by selecting the approximate area around the transit facility that each of your stations is expected to serve:

- 1 mile or less

- 2 miles or less
- 3 miles or less
- 4 miles or more
- Other

B. Distance Among Stations

- Identifying station locations and distance between stations along the alignment will help determine transit patrons' travel patterns and the stations they may prefer. Please provide this information for all stations along the alignment including those without proposed parking.

C. Vehicle Ownership

- Auto dependent communities will require more parking than non-auto dependent communities. Research also indicates households with total incomes of less than \$25,000 are almost 10 times more likely not to have a vehicle when compared with those with incomes greater than \$25,000. Therefore, vehicle ownership information will also help determine the types of patrons the station will serve and types of services that need to be provided. Therefore, it is also important to identify other reasonable modes of travel and access to the transit station. Please provide the vehicle ownership information for each of the stations.

D. Financial Background

- In addition to vehicle ownership, financial background can also help determine the demand for parking at a station. Identify the median income level for each service area at each of the transit stations. Select one of the following:
 - Under \$5,000
 - \$5,000 - \$9,999
 - \$10,000 - \$19,999
 - \$20,000 - \$29,999
 - \$30,000 - \$49,999
 - \$50,000 or more

E. Anticipated Number of Boarding's

- Identifying the anticipated number of boarding's at each station will also help determine the approximate number of parking spaces necessary at each station.

OTHER PLANNING ELEMENTS

A. Existing Public Transit Demand

- Are there any transit services currently being provided at or near the proposed station such as shuttle buses, local buses or other forms of transit? If so, please indicate the location of the closest transit station/s near the proposed station. If the area is currently serviced by public transportation what is expected to happen to the existing lines?
- Will there be additional services provided to feed the new station? If so, also provide their number of boarding's or anticipated boarding numbers?
- Will any stops be relocated to provide greater connectivity to the proposed station?

B. Existing Parking Demand

- What type of parking currently serves the area near the station?
 - On-street parking
 - Restricted
 - Unrestricted
 - Off street parking
 - Publicly available
 - Currently restricted to private users
 - Surface parking lot
 - Parking structure

C. Existing Parking Spaces

- What is the total number of parking spaces currently serving the station within ¼ mile radius? And what is its parking occupancy? And turnover rate?

D. Nearby Parking

- Have shared parking opportunities near the station been explored at any of the stations? If so, have we considered shared parking opportunities? Transit demand along our transit system may have different periods of peak parking demand than the currently existing land uses. Metro peak parking periods typically begin at 5am and an

end around 6pm. Shared use with nearby uses and through joint development projects is expected to be more prevalent as resources are limited and more livable community approaches are being developed. The corridor planning team may consider a shared parking study that looks at peak demand for nearby uses and projected peak demand for the transit station, and compares this to the capacity of nearby parking amenities.

E. Existing Parking Program

- What types of parking programs exist near the station? Please check all that apply?
 - Free
 - Paid
 - Free and Paid
 - Other

- If there is a parking program in place at one of the stations please check off the type of program that exists from the above question?
 - Monthly parking
 - Daily parking
 - Metered parking
 - Public parking

- What are the parking rates?

F. Current Surrounding Uses

- What land uses are currently present around the planned station site?

<input type="checkbox"/> Residential	<input type="checkbox"/> Schools
<input type="checkbox"/> Retail	<input type="checkbox"/> Office
<input type="checkbox"/> Mixed use development	<input type="checkbox"/> Industrial
<input type="checkbox"/> Medical	<input type="checkbox"/> Other
<input type="checkbox"/> Entertainment	

G. Future Development

- Is the area surrounding the station expected to add new development? If so, what type? As future development will have an impact on the demand of parking at the Metro station, check all that apply:

<input type="checkbox"/> Residential	<input type="checkbox"/> Medical
<input type="checkbox"/> Retail	<input type="checkbox"/> Entertainment
<input type="checkbox"/> Mixed use development	<input type="checkbox"/> Schools

- Office
- Industrial

- Will not add any other type of development

First and Last Mile Connections

- What alternative modes are being considered for connecting riders to the station?
Check all that apply:

- | | |
|--|---|
| <input type="checkbox"/> Bus | <input type="checkbox"/> bicycle |
| <input type="checkbox"/> Local shuttle bus | <input type="checkbox"/> Transportation Network Company (Uber/Lyft) |
| <input type="checkbox"/> Metro rail | <input type="checkbox"/> Car Share |
| <input type="checkbox"/> Metrolink | |
| <input type="checkbox"/> walking | |

H. Parking Supply and Demand Assessments

- Has a parking study or plan been developed? If so, what are its findings (or provide a copy)? (Not required)

II. PARKING DEMAND MODEL OUTPUT

Based on the data collected in the previous sections (I & II) this information will be used to run the parking demand model.

Parking Management, with support from Walker Parking Consultants, has developed a ridership versus parking demand model to assess transit ridership and parking pricing. This model can be used as a tool to assess demand at current and future station locations. The model is comprised of four components:

- Base data – parking occupancy, weekday boarding transactions and TAP card activity.
- Station typology assignment – six typologies were established based on station location within the system and in some cases the type of station as discussed above.
- Demand ratios – two demand ratios (peak parking demand as a percentage of weekday boarding transactions and riders who park as a percentage of all first tap on rail riders) with ability to add user-specified values. Specified station values may be used or a typology value may be selected.
- Elasticity curve – the concept of elasticity of demand is that as the cost of parking increases, transit ridership and/or parking demand decreases. The baseline in the model is free parking, as nearly all Metro stations with parking currently offer free parking. Each additional dollar in parking costs results in a further reduction in potential transit ridership demand and/or parking demand. The elasticity curve is applied system-wide and it estimates that daily transit parking would need to exceed \$30 per day to

result in a complete loss of transit parking demand. As examples, the curve estimates a \$2 per day transit parking rate would result in a 7% reduction of transit parking demand and a \$5 per day transit parking rate would result in a 16% reduction of transit parking demand.

The parking demand model estimates peak parking demand values set at price levels starting from free to \$5.00 per day, with increments of \$1.00 per day. At each price level, a low, high and average peak demand with a corresponding number of riders are calculated and compared to the baseline ridership estimate.

Station Type

- Each transit station along our system is unique due to its demographics and location along an alignment. The type of station is determined by the type of service it is expected to provide. Terminus stations have a higher demand for parking than stations at a mid-point location. Listed below are the types of stations on alignments and examples. Please provide the types of stations you are projecting for your project. Below are some examples:

- Mid-Point – Stations that are not a terminus or transfer station such as - Artesia, Aviation, Del Amo, Del Mar, Long Beach, etc.
- Terminus – A station whose location along an alignment falls at the end of rail/bus line such as Chatsworth, Norwalk, etc.
- Terminus Urban – A station whose location along an alignment falls at a major transfer point and shares demand with other adjacent stations such as - North Hollywood.
- Terminus Overflow – Stations which are not terminus stations but that serve as a terminus station’s overflow parking such as - Lakewood, Universal and Wardlow. Terminus overflow stations are also within a reasonable driving distance of approximately one mile and patrons are willing to drive to park.
- Transfer – A transfer station is one that falls within a center of an alignment and provides a large transfer point to other lines for patrons such as – Willowbrook/Rosa Parks.
- Transit Hub – Is a station which provides a multi-modal, major transfer point to other modes of transportation such as – El Monte, Harbor Gateway and Union Station.

- Select one of the station types below for each of your stations:

- | | |
|-------------|---------------------|
| ▪ Mid-Point | ▪ Terminus Urban |
| ▪ Terminus | ▪ Terminus Overflow |

- Transfer
- Transit Hub

Parking Design Toolkit

I. General

The purpose of this document is to establish reasonable and appropriate parking design standards and Toolkit that will serve and meet Metro transit patrons' parking needs. These design standards and Toolkit will ensure that new parking facilities built to serve Metro's transportation system provide an appropriate level of safety and service that meets industry standards and best practices. These parking design standards and Toolkit are meant specifically for Metro parking facilities and are intended to be a guide and not a complete set of design and construction specifications.

II. Parking Design Standards

A. Typology of Parking Facility: Is the Parking facility a Structure or Surface Lot?

Each type of parking facility requires different types of parking equipment and parking management strategies. Knowing what type of parking facility will be proposed allows for timely and proper installation of equipment, infrastructure, planning and the creation of a parking management plan. Knowing the type of parking facility also allows for proper maintenance plans to be created and budgeted. One consideration is the flexibility of surface lots to become potential Joint Development sites, multi-modal hubs, or otherwise repurposed should parking demand not meet expectations or diminish over time. The parking facility layout should allow for a continuous and safe flow of traffic. The design should also provide safe movement for pedestrians from their vehicles to their destination.

B. What is the total number of parking spaces provided?

Knowing the total number of parking spaces provided in the parking facility provides an inventory which can be used to enhance the management of parking resources. The total number of parking spaces provided is dependent on the needs and demands of the project. Project Environmental Impact Reports (EIR's) include the minimum amount of parking spaces but in many cases do not accurately reflect what the actual parking demand at the site will be. Providing more parking spaces than what is needed results in utilizing more land which could be used for other, more appropriate and often better uses. It also creates expenses for maintenance and enforcement that are not necessary.

C. Will this parking facility have a bus stop station area?

Providing bus stops allows for patrons utilizing the parking facilities to utilize buses as a means of first & last mile connections. If the parking facility will include a bus stop within the facility or adjacent, the interaction between buses

and vehicles should be minimal. Bus stops should be separated from the commuter parking area. Buses will need their own right of way to enter and exit the parking facility. Bus circulation systems shall be designed to avoid conflicts between vehicular, bicycle, and pedestrian traffic. Pedestrian access to the bus stops should be safe, ADA compliant and have clear and concise signage to properly direct patrons.

D. Will this parking facility be shared use?

Shared use of a parking facility allows adjacent property owners to share the parking resources. In doing so, it reduces the amount of parking spaces each owner has to provide for their own property, creating opportunities for more compact development and more destinations and services for the public. Shared parking opportunities are available when there are more parking spaces than are utilized or when adjacent properties have different peak hours of parking demand. If the parking facility will be shared use at the same hours of operations between Metro and another party, the parking spaces need to be properly marked, have signs, be nested and separated to avoid spill over and/or improper use of parking by either party.

E. Are there any easements on the parking facility?

Some Metro parking facilities are part of a Memorandum of Understanding (MOU) between Metro and another party which allows Metro to utilize a parking facility to serve Metro transit patrons or Metro allows another party to lease a portion of the land for a specific use.

F. Does the parking facility meet ADA standards?

The parking facility must meet the American with Disabilities Act (ADA) standards. The correct number of accessible parking spaces for disabled persons must be provided and conveniently located via the shortest and most accessible route. Routes should be properly marked and up to date. Sidewalks, ramps and curbs must meet the current ADA standards. Just because an existing parking facility has existing ADA parking does not mean it is in compliance with current ADA standards. ADA signs that meet ADA standards should be properly displayed at all entrances and at each ADA parking space.

G. Does the parking facility provide dedicated parking spaces for carpools and clean air vehicles?

To serve a balanced mix of vehicles and provide flexibility to patrons utilizing the parking facility, alternatives to driving a single occupant vehicle should be provided. Vehicles such as Electric Vehicles, Clean Air Vehicles, in some cases bicycles, motorcycles as well as programs such as vanpool, carpool and car-share

need dedicated parking spaces to provide choices and promote sustainable modes.

H. Is signage properly provided? Does it meet Metro standards?

Signage in parking facilities is essential in providing guidance for displaying rules and regulations, traffic laws, informing patrons of dedicated parking spaces, and directing drivers and pedestrians when wayfinding design cannot sufficiently provide such information. Any sign that is installed in a Metro parking facility should be clearly visible at all hours. Signs should be placed in locations where people expect to see them, such as in the front of spaces, at entrance and exit points, and at decision points in the interior of parking garages. Signs installed at Metro parking facilities should meet Metro design standards.

I. Is there a passenger loading/unloading area?

Providing dedicated areas for vehicles to safely load and unload passengers encourages vehicles that are just dropping off passengers to not utilize long term parking spaces to perform this activity. Loading and unloading activities are not the same as parking, and loading zones should not be used for long term parking. Loading /unloading areas should consist of dedicated curbs that allow vehicles to safely drop off passengers while avoiding blocking off drive aisles. All Loading /unloading areas need to be properly marked with signage/curb markings. As current trends show the increasing use of ride hailing services such as Uber and Lyft to access transit, proper attention and planning for passenger loading and unloading areas is more important than ever.

J. Is the proper infrastructure provided for future parking equipment such as conduit and power?

Parking equipment is often necessary to properly plan, manage and operate parking facilities. Parking equipment can consist of pay stations, vehicle license plate recognition cameras, parking space counter displays, ticket dispensers and gate arms. An increase in market share for electric vehicles could potentially drive the need for additional EV charging spaces in facilities in the future. In order to install this equipment, electricity along with conduit and often times concrete islands amongst other infrastructure need to be provided. It is more efficient and cost effective to plan for and install the parking equipment infrastructure during the construction phase of a parking facility compared to doing it after a parking facility has been built.

K. Is there specific parking equipment standards that should be followed when purchasing equipment?

Metro has developed and implemented TAP card integration technology at its current parking facilities, which allows these facilities to remain ticketless and gateless. This technology identifies transit users through a combination of multipage parking meters and license plate recognition (LPR) cameras linked together on a customized software platform. All future equipment for Metro facilities must be integrated into the same system and requires coordination with Metro Parking Management prior to any purchase of parking equipment.

L. Has the design of the parking facility taken into account future conversion for other uses?

If a parking structure is properly designed it can be adapted to other uses such as housing, storage, hotels, office space, retail, etc., should demands for these uses arise and/or if the demand for parking falls. Certain major design aspects such as structural reinforcement, leveled floors and double helix ramps located on the edges of the structure for circulation can facilitate future conversion of the structure to other uses. Other design details such as the column location and spacing, ceiling height, mechanical and electrical components as well as fire and safety considerations can help support conversion possibilities.

III. Safety

A. Are pedestrian access pathways clear?

The design of the parking facility should allow safe movement of pedestrians from parking spaces to their destination. Likely pedestrian routes should be considered in the design phase to reduce “short cuts” which will eventually damage landscaped areas. All site facilities and amenities need to be accessible to people with disabilities in accordance with ADA standards. Circulation systems shall be designed to avoid conflicts between vehicular, bicycle, and pedestrian traffic. Pedestrian followed by bicyclist circulation shall take precedence over vehicular circulation. Where pedestrian circulation crosses vehicular routes, a crosswalk with yellow striping in plastic paint, speed bumps, or signage shall be provided to emphasize the conflict point and improve its visibility and safety.

B. Does the parking design meet fire safety standards and regulations? Do any parking spaces block Fire mains?

Fire safety standards and regulations needs to be met. All elements of the parking facility need to accommodate the access requirements of emergency service vehicles and equipment. Under no circumstances is fire equipment such as fire mains, to be blocked by improperly parked vehicles or landscaping.

C. Is there safe access to and from the parking facility?

Often times parking facilities are not adjacent to the station platform or bus stations. Access to the platform or bus stations from the parking facility needs to be safe and be made clear by use of wayfinding signs and proper use of lighting for night time. While Metro parking facilities will follow ADA standards, the path leading out of the parking facility onto the station platform also needs to be ADA accessible and safe for all patrons. Often times the path of travel will be on property owned by another municipality, in which case the appropriate parties need to be contacted in order to make access to and from the parking facility safe.

D. Is the lighting provided sufficient for nighttime?

Lighting in a parking facility is essential during nighttime as well as in areas where natural light does not reach or is insufficient. Lighting provides security for everyone utilizing the parking facility and has value as a deterrent to individuals looking for an opportunity to commit a crime and/or vandalism. Each parking facility is unique and the lighting systems for each parking facility should reflect that. Lighting must be bright, efficient and, if applicable, be on photovoltaic sensors.

E. Have the Cal-Green Building Standards Code been referred to?

The California Green Building Standards, effective January 1, 2017, applies to all non-residential projects. This includes parking, surface or structure. The specific division of the Cal Green Building Standards that affects parking is Division 5.1 Planning and Design specifically “Designated Parking” as well as “Electric Vehicle Charging. Cal Green will likely be required for any parking facility whether it is a surface lot or structure. Proper design is needed to include carpool/vanpool, EV stations, bicycle parking/storage, photo-voltaic panels at roof, etc. Any planning and design standards as well as site development will apply as stated on the Cal Green Standards Code.

F. Will parking lot/structure design be standardized at all locations?

Standard design of parking facilities (including materials, signage, striping, lighting fixtures and safety equipment) at each location should be considered. This would provide consistency and standard operating procedures for maintenance and replacement of equipment and lighting.

IV. Bicycle

A. Is there Bicycle infrastructure provided?

Sustainable growth and a reduction in dependency on automobiles are supported by alternatives modes of transportation. By providing bicycle infrastructure in parking facilities Metro can accommodate patrons who prefer to ride their bicycles to the station and store them in a safe and secure environment, potentially reducing the demand for automobile parking spaces as well. In order to provide quality bicycle facilities several factors should be considered including:

- Will the facility provide both short-term (bike racks) and long-term (bike lockers) bicycle parking facilities?
- If parking access equipment is installed in the facility, will there be a safe alternative for bicycle ingress/egress to reach bicycle parking areas?
- Are the bicycle storage areas close to the entrances/exits?
- Is there way finding and signage to direct people to the bicycle facilities?
- Are there any external improvements that could be made to improve bicycle access as part of the project?
- Are the bike lockers and racks made from high quality materials and firmly secured to the ground?
- Is the bike storage area well lit?

V. **Landscaping**

A. Has the Metro landscaping palette been referred to?

Metro has established landscaping standards in order to maintain a sustainable planting palette for all Metro rail stations. The purpose is to maintain landscaping that is native to the specific region, is drought tolerant and helps conserve water. This type of landscaping also helps to minimize the cost of providing and maintaining irrigation systems.

VI. **Layover Break Rooms & Restrooms Facilities for Staff.**

A. Will there be restroom facilities for staff in the parking facility?

If restrooms are going to be provided, a designated area within the facility with proper signage needs to be provided. This area should not be accessible to the public.

B. Will there be a layover-break room for staff?

If a layover-break room will be provided then a designated area with proper signage needs to be provided. This area should not be accessible to the public.



Gold Line 2 Station Area Evaluation

F Appendix

APPENDIX F – GOLD LINE 2 STATION AREA PARKING ANALYSIS

Metro has utilized the ridership versus parking demand model to project the number of parking spaces needed for the five Gold Line 2 extension stations in Los Angeles County (Glendora, San Dimas, La Verne, Pomona, and Claremont). The output of the model indicated a need for fewer parking spaces than envisioned in the Environmental Impact Report for the project. Walker has prepared preliminary fieldwork, evaluation, and inventory of existing parking assets in a quarter-mile radius of each proposed station. Appendix F contains the analysis report in full.



Facility Naming Conventions
G Appendix

APPENDIX G – FACILITY NAMING CONVENTIONS

Metro and Walker determined that a consistent and easy-to-understand naming convention for Metro’s parking facilities would facilitate the use, planning, and operation of the parking system by Metro ridership and staff alike. The memorandum contained in Appendix G details a recommended naming convention for Metro parking facilities. It provides background on the issue, alternatives considered and a recommended parking facility naming convention.

When the STPP work was undertaken, stations with multiple parking facilities used cardinal (north, south, west and east) and intercardinal (northwest, northeast, southwest and southeast) directions relative to the portal or platform to establish the specific parking facility at a given station. As there were at times inconsistent or missing parking facility name signage, it was not often clear to a rider in which parking facility he or she was parked. The attached memorandum was meant to address this issue.

MEMORANDUM

METRO SUPPORTIVE TRANSIT PARKING PROGRAM



PAGE 1

606 South Olive Street, Suite 1100
Los Angeles, CA 90014

DATE: September 27, 2016
TO: Frank Ching and Adela Felix
COMPANY: Metro
FROM: Bernard Lee
PROJECT NAME: Supportive Transit Parking Program
PROJECT NUMBER: 37-8549.00
SUBJECT: Recommended Parking Facility Naming Convention

Office: 213.488.4911
Fax: 213.488.4983
www.walkerparking.com

This memorandum details a recommended naming convention for Metro parking facilities. It provides background on the issue, alternatives considered and a recommended parking facility naming convention.

BACKGROUND

Currently, stations with multiple parking facilities use cardinal (north, south, west and east) and intercardinal (northwest, northeast, southwest and southeast) directions relative to the portal or platform to establish the specific parking facility at a given station. As there may be inconsistent or missing parking facility name signage, it is often not clear to a rider which parking facility he or she is parked in. Metro employees may also not be able to readily differentiate one parking facility from another at each station. The current naming convention requires one to know where the portal or platform is located and where other parking facilities are located. In addition, there is a separate lot numbering scheme in the permit processing system which may also create confusion.

Metro Parking Management is currently working on implementing a Parking Guidance System ("PGS") and new signage at its parking facilities. Therefore, now is an opportune time to implement a new parking facility naming convention.

FACILITY NAMING OPTIONS CONSIDERED

A few options to the existing parking facility naming convention were considered and are described below.

1) **Numeric convention where each line would be represented by a numeric series with individual facilities being represented by numbers within the sequence.**

For example, the Red Line could be series 1000 with the four North Hollywood lots represented as 1001, 1002, 1003 and 1004. Assuming Universal City followed, its three lots could be represented as 1010, 1011 and 1012. Alternately, the scheme could use the Metro transit line numbering convention. The Red Line is denoted as 802 so for example, North Hollywood could be 80201 through 80204 and Universal City could be 80210 through 80212.

PAGE 2

Providing a gap in numeric values between stations is intentional to support potential future addition of parking facilities. The advantage of such a scheme is that the names are short in total character count. However, this scheme is not intuitive as the Metro transit line numbering convention does not mean anything to most transit riders.

2) Transit line name followed by a unique identifier (numeric or letter sequence) for each parking facility.

For example, North Hollywood parking lots could be denoted as *Red Line-1* through *Red Line-4*. Universal City lots could be denoted as *Red Line-10* through *Red Line-12*. The advantage of this scheme is that it is simple. However, the transit line names will change in the next few years which would create rework at the time

3) Station name followed by a unique identifier (numeric or letter sequence) for each parking facility.

For example, North Hollywood parking lots could be denoted as *North Hollywood-1* through *North Hollywood-4*. Universal City lots could be denoted as *Universal City-1* through *Universal City-3*. The advantage of this scheme is that it is also simple. However, the parking facility names are the longest in character count using this scheme and station names periodically change.

RECOMMENDED PARKING FACILITY NAMING CONVENTION

On July 21, 2016, we met with Cory Zelmer's team as part of the outreach effort to other Metro teams. Cory and team are currently working to revise the transit line names. At that point in time, the transit line renaming had not been finalized and would not be finalized in the near future. Therefore, Cory suggested that we avoid using transit line names in any updated naming convention.

With the elimination of option 2, we focused on option 1 and option 3. Option 1 versus option 3 becomes a decision of brevity versus simplicity. We recommend option 3 given its clean approach which supports potential future addition of parking facilities at each station.

PARKING FACILITY ADDITION

If an additional parking facility is added at a station, the last parking facility at that station may be incremented by one. For example, if a parking facility is added at Universal City, it may be called *Universal City-4*.

PARKING FACILITY REMOVAL

If a parking facility is taken out of service, whether temporarily (i.e. leasing a lot to a car dealer) or permanently (i.e. joint development project built on a lot), the facility name may be removed from service. For example, if all North Hollywood lots are removed for development, then the facility names *North Hollywood-1* through *North Hollywood-4* may be removed from future use.

MEMORANDUM

METRO SUPPORTIVE TRANSIT PARKING PROGRAM



WALKER
PARKING CONSULTANTS

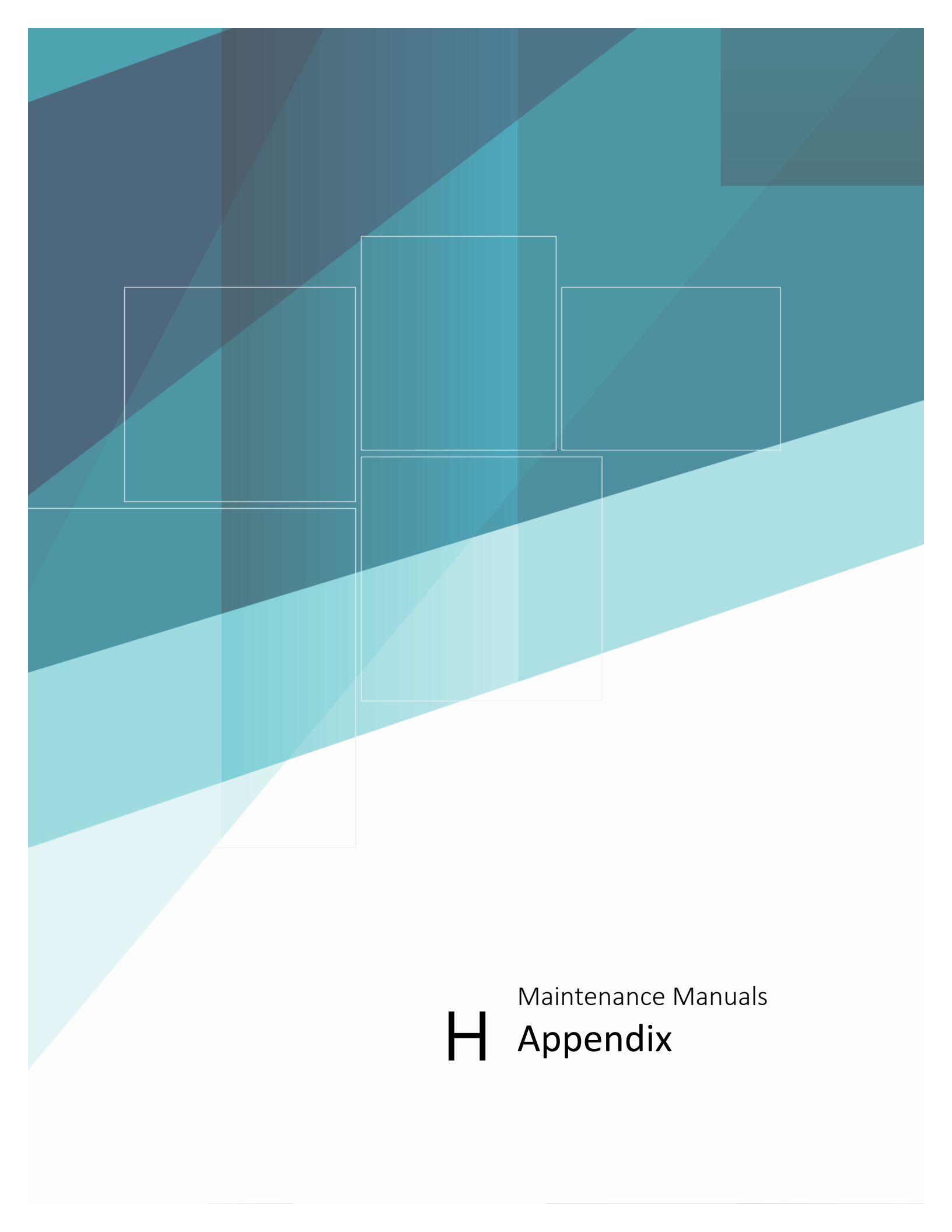
PAGE 3

A new parking facility at North Hollywood for transit riders may continue the naming convention with *North Hollywood-5* to avoid confusion with the existing surface lots.

The attached Appendix contains proposed names for all Metro parking facilities.

Transit Line	Station	Current Name	Recommended Name
Blue	Florence	Main Lot	Florence-1
Blue	103rd St/Watts Towers	Main Lot	103rd St/Watts Towers-1
Blue	Willowbrook/Rosa Parks	North Lot	Willowbrook/Rosa Parks-1
Blue	Willowbrook/Rosa Parks	South Lot	Willowbrook/Rosa Parks-2
Blue	Artesia	Main Lot	Artesia-1
Blue	Del Amo	Main Lot	Del Amo-1
Blue	Wardlow	North Lot	Wardlow-1
Blue	Wardlow	South Lot	Wardlow-2
Blue	Willow St	North Lot	Willow St-1
Blue	Willow St	South Lot	Willow St-2
Blue	Willow St	Southwest Structure	Willow St-3
Expo	Expo/Crenshaw	Parking Garage	Expo/Crenshaw-1
Expo	La Cienega/Jefferson	Parking Garage	La Cienega/Jefferson-1
Expo	Culver City	Main Lot	Culver City-1
Expo	Expo/Sepulveda	Parking Garage	Expo/Sepulveda-1
Expo	Expo/Bundy	On-Street West of Bundy	Expo/Bundy-1
Expo	Expo/Bundy	On-Street East of Bundy	Expo/Bundy-2
Expo	17th St/SMC	Parking Lot	17th St/SMC-1
Gold	Atlantic	Parking Structure	Atlantic-1
Gold	Atlantic	Northeast Lot	Atlantic-2
Gold	Indiana	Main Lot	Indiana-1
Gold	Lincoln/Cypress	Main Lot	Lincoln/Cypress-1
Gold	Heritage Sq	Main Lot	Heritage Sq-1
Gold	South Pasadena	Parking Garage	South Pasadena-1
Gold	Fillmore	Parking Garage	Fillmore-1
Gold	Del Mar	Parking Garage	Del Mar-1
Gold	Lake	Main Lot	Lake-1
Gold	Sierra Madre Villa	Parking Garage	Sierra Madre Villa-1
Gold	Arcadia	Parking Garage	Arcadia-1
Gold	Arcadia	Parking Lot	Arcadia-2
Gold	Monrovia	Parking Garage	Monrovia-1
Gold	Duarte/City of Hope	Parking Lot	Duarte/City of Hope-1
Gold	Irwindale	Parking Garage	Irwindale-1
Gold	Azusa Downtown	Parking Garage	Azusa Downtown-1
Gold	APU/Citrus College	Parking Garage	APU/Citrus College-1
Green	Norwalk	West Lot	Norwalk-1
Green	Norwalk	East Lot	Norwalk-2
Green	Lakewood Bl	North Lot	Lakewood Bl-1
Green	Lakewood Bl	South Lot	Lakewood Bl-2
Green	Long Beach Bl	West Lot	Long Beach Bl-1
Green	Long Beach Bl	East Lot	Long Beach Bl-2
Green	Avalon	North Lot	Avalon-1
Green	Avalon	Northeast Lot	Avalon-2
Green	Harbor Fwy	Main Lot	Harbor Fwy-1
Green	Vermont/Athens	Main Lot	Vermont/Athens-1
Green	Crenshaw	Main Lot	Crenshaw-1
Green	Hawthorne/Lennox	West Lot	Hawthorne/Lennox-1
Green	Hawthorne/Lennox	East Lot	Hawthorne/Lennox-2

Transit Line	Station	Current Name	Recommended Name
Green	Aviation/LAX	Main Lot	Aviation/LAX-1
Green	El Segundo	Main Lot	El Segundo-1
Green	Douglas	Main Lot	Douglas-1
Green	Redondo Beach	North Lot	Redondo Beach-1
Green	Redondo Beach	South Lot	Redondo Beach-2
Orange	Van Nuys	North Lot	Van Nuys-1
Orange	Van Nuys	Northwest Lot	Van Nuys-2
Orange	Van Nuys	South Lot	Van Nuys-3
Orange	Van Nuys	Southeast Lot	Van Nuys-4
Orange	Sepulveda	Main Lot	Sepulveda-1
Orange	Balboa	Main Lot	Balboa-1
Orange	Reseda	Northwest Lot	Reseda-1
Orange	Reseda	Southwest Lot	Reseda-2
Orange	Reseda	Southeast Lot	Reseda-3
Orange	Pierce College	Main Lot	Pierce College-1
Orange	Canoga	Main Lot	Canoga-1
Orange	Sherman Way	West Lot	Sherman Way-1
Orange	Sherman Way	East Lot	Sherman Way-2
Orange	Chatsworth	North Lot	Chatsworth-1
Orange	Chatsworth	South Lot	Chatsworth-2
Red	Union Station	Parking Garage	Union Station-1
Red	Universal City/Studio City	North Lot	Universal City/Studio City-1
Red	Universal City/Studio City	South Lot	Universal City/Studio City-2
Red	Universal City/Studio City	West Lot	Universal City/Studio City-3
Red	North Hollywood	North Lot	North Hollywood-1
Red	North Hollywood	South Lot	North Hollywood-2
Red	North Hollywood	West Lot	North Hollywood-3
Red	North Hollywood	East Lot	North Hollywood-4
Red	Westlake/MacArthur Park	Main Lot	Westlake/MacArthur Park-1
Silver	Slauson	West Lot	Slauson-1
Silver	Slauson	East Lot	Slauson-2
Silver	Manchester	West Lot	Manchester-1
Silver	Manchester	East Lot	Manchester-2
Silver	Rosecrans	Main Lot	Rosecrans-1
Silver	Harbor Gateway Transit Ctr	Main Lot	Harbor Gateway Transit Ctr-1
Silver	El Monte	Northeast Lot	El Monte-1
Silver	El Monte	West Lot	El Monte-2
Silver	El Monte	West Structure	El Monte-3
Silver	El Monte	Southeast Lot	El Monte-4
Silver	El Monte	East Lot	El Monte-5
Silver	Carson	Main Lot	Carson-1
Silver	Pacific Coast Hwy	Main Lot	Pacific Coast Hwy-1



Maintenance Manuals
H Appendix

APPENDIX H – MAINTENANCE MANUALS

As part of the STPP, the Walker team sought to provide Metro with guidelines and procedures for maintaining its Parking Garage Facilities.

The purpose of a maintenance program is to protect the significant investment Metro has made in its parking facilities by coordinating proper and timely preventive maintenance that reduces premature deterioration to ensure that riders who need parking to access transit will be able to do so conveniently. The maintenance program recommended by Walker will address general as well as specific maintenance needs in a cost-effective manner. Maintenance can be separated into two classes: Operational and Structural. Operational maintenance is required to operate a facility effectively. Structural maintenance is required to protect structural integrity. The maintenance guidelines and procedures that Walker provided to Metro are contained in Appendix H were designed for this purpose.

PROJECT NO. 37-8549.00

PARKING GARAGES
MAINTENANCE MANUAL

L.A. METRO
SUPPORTIVE TRANSIT
PARKING PROGRAM
MASTER PLAN
LOS ANGELES, CA

Prepared for:
LOS ANGELES COUNTY
METROPOLITAN
TRANSPORTATION AUTHORITY



WALKER
PARKING CONSULTANTS

606 S. Olive Street, Suite 1100
Los Angeles, CA 90014

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN



PARKING GARAGES MAINTENANCE MANUAL

AUGUST 2016

PROJECT NO. 37-8549.00

SECTION I – MAINTENANCE PROGRAM	2
Introduction	2
A. Objective	2
B. Scope	2
C. Approach	2
D. Definitions	3
Background.....	5
A. Special Conditions	5
B. Maintenance Program Benefits	5
C. Influence of As-Constructed / Existing Conditions on Maintenance	6
D. Facility Descriptions	7
SECTION II – RECOMMENDED PROGRAM	10
A. Operational Maintenance	10
B. Infrastructure Maintenance	16

APPENDIX A – Checklists for Operational and Structural Maintenance

APPENDIX B – Chloride Monitoring

INTRODUCTION

A. OBJECTIVE

This manual provides the Los Angeles County Metropolitan Transportation Authority (Metro) with guidelines and procedures for maintaining its Parking Garage Facilities.

B. SCOPE

The purpose of a maintenance program is to protect initial investment by coordinating proper and timely preventive maintenance that reduces premature deterioration. This maintenance program will address general as well as specific maintenance needs in a cost-effective manner. Maintenance can be separated into two classes: **Operational** and **Structural**. Operational maintenance is required to operate a facility effectively. Structural maintenance is required to protect structural integrity.

Specific repairs exceed the scope of this manual. A qualified engineer should be consulted for structural repairs such as patching, floor slab overlays, traffic topping installation, sealer application, crack repairs, and expansion joint installation. Manufacturers and suppliers should be consulted for mechanical and electrical repairs.

Metro has been supplied with equipment "Owner's Manuals" and service information. Therefore, this Manual will only briefly review those items. The emphasis of this Manual will be on Operational and Infrastructure Maintenance, as these topics are not addressed by the information supplied by the Contractor.

C. APPROACH

Parking facility maintenance primarily includes actions to extend the service life and support the operation of the facility. For your maintenance program, we separated these actions into two main categories:

- Structural
- Operational

Many factors influence the cost of maintaining a parking facility. The types of items that need to be included are as follows:

- Cost of periodic repairs and/or corrective actions that are necessary to maintain serviceability and facility operations. This includes daily or **routine maintenance**.
- Cost of **preventive maintenance** actions that are required to extend the service life of the facility.

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

PARKING GARAGES MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

- Cost of major **structural repairs** to restore structural integrity and serviceability when the effects of aging and deterioration become widespread.
- The **replacement cost** for operational elements at the end of their estimated service life.

Costs are based on regular, timely maintenance that results in favorable long-term maintenance costs. Deferring maintenance can result in shorter service life, early replacement costs, expensive repairs, additional maintenance requirements, and higher maintenance costs. The costs shown do not eliminate long term repairs, but instead, help to keep long term repair costs manageable.

Operating a parking facility requires other procedures and costs in addition to the maintenance items presented. We have not attempted to show the soft costs of operating the facility or the daily operating procedures and costs (such as housekeeping, cashiering, management, other staffing, landscape maintenance, cleaning, taxes (if applicable), utilities, etc.). This cost will vary with the type of structure and the amount of maintenance required.

The average annual operating cost of a parking structure on a per space basis is about \$400 to \$600. Cashiering and management account for 35% to 40% of that cost, while routine and preventative maintenance is about 10% to 18%, utilities are about 10% to 15%, and miscellaneous costs can be as high as 18% to 23%. The expenses, however, can vary dramatically, depending upon variables such as size of facility, geographical location, staffing patterns, method of operation, and local taxes.

D. DEFINITIONS

1. **Housekeeping** is the general cleaning and maintenance of the facility. Routine tasks include sweeping and washing floors, replacing lights, emptying trash, washing windows, and maintaining the grounds.
2. **Preventive maintenance** are tasks to extend the life of the facility and extend the time before major repairs are needed. These include items such as corrosion protection, structural protection and waterproofing, traffic membrane, joint sealants, and expansion joints. Preventive maintenance does not usually entail the major disruptions associated with structural repairs.
3. **Routine maintenance/repairs** are tasks that restore or replace portions of the structure to forestall the need for major repairs. These include partial depth floor repairs at isolated locations to minimize the need for future full depth or total slab replacement. It also includes repairing leaking joint sealant, clearing plugged drain lines, replacing damaged light fixtures, periodic maintenance of sealers and traffic toppings, small area

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

PARKING GARAGES MAINTENANCE MANUAL



WALKER
PARKING CONSULTANTS

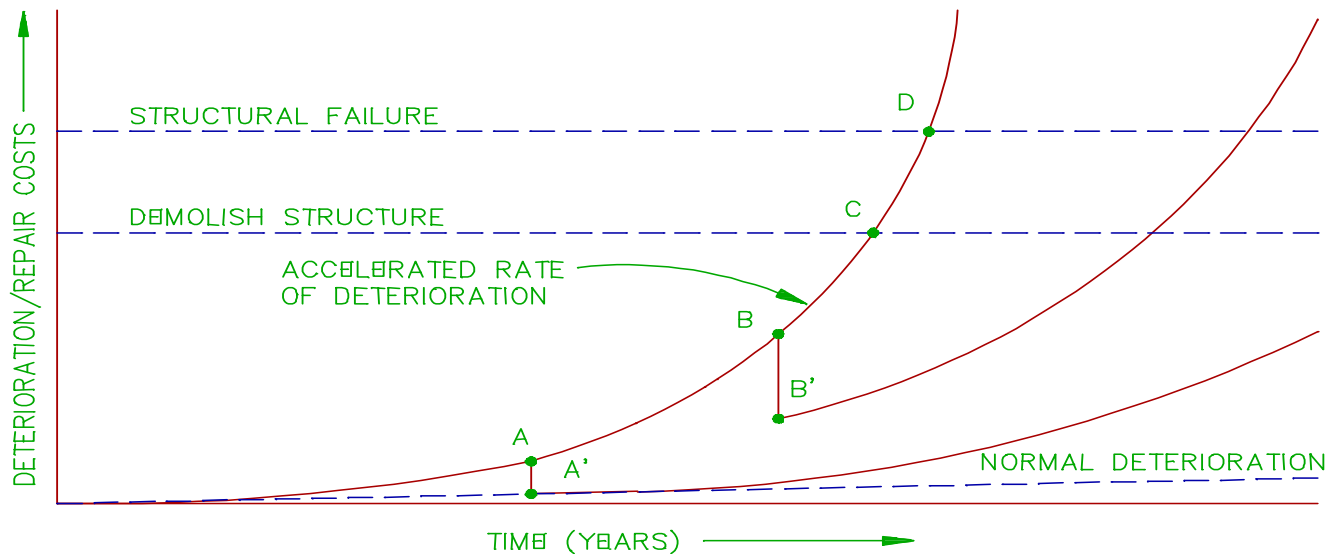
AUGUST 2016

PROJECT NO. 37-8549.00

repairs to spalled or delaminated concrete, replacing expansion joint seals, and other similar work.

4. **Structural repair** costs involve extensive repairs to the structural floor and frame to restore structural integrity. This will occur later in the life of the structure when routine maintenance is no longer effective at slowing down the effects of ongoing deterioration. The intent is to bring the structure back to a condition where routine maintenance is once again effective for many years until another major structural repair project is needed.
5. **Replacement costs** include the cost to replace operational items that are at the end of their service life. Operational items include lighting, elevators, plumbing, security cameras, and parking access and control equipment.
6. **NPDES (National Pollutant Discharge Elimination System)** is a permitting program that aims to address water pollution by regulating the discharge pollutants to waters of the United States. **SWPPP (Storm Water Pollution Prevention Plan)** is a requirement in obtaining a stormwater permit. SWPPP's identify all potential sources of pollution that may be reasonably expected regarding storm water discharge following a storm event. Effort should be made for maintenance activities to conform to NPDES and SWPPP stated goals and objectives.

Figure 1: Operational/Structural Maintenance and Repair Costs



NOTE:

1. Points A – D represent stages of accelerated deterioration in parking structures.
2. Structures repaired at point A cost less overall and last longer than structures repaired at point B. [Compare curve A' to B']

BACKGROUND

A. SPECIAL CONDITIONS

Parking structures are unique facilities and vary in many ways from most buildings. Structurally, parking facilities are more complex than other concrete buildings due to environmental conditions. A preventive maintenance program will help reduce the continuing deterioration.

B. MAINTENANCE PROGRAM BENEFITS

Parking facilities represent a significant commitment of capital. The principal benefit of a maintenance program is protection of that capital investment. When a parking facility is part of a larger facility, such as an office or retail complex, the need for regular maintenance is even more critical. Any parking structure deterioration could also affect the attached facilities. Maintenance must be performed at regular intervals to be cost-effective. Irregular maintenance will provide a marginal return on investment.

Attention to the facility's physical appearance and general cleanliness will promote user confidence. A regular maintenance program will help provide user safety through proper lighting levels, signage, and sound walking and driving surfaces.

C. INFLUENCE OF AS-CONSTRUCTED/EXISTING CONDITIONS ON MAINTENANCE

As-constructed and existing conditions present unique concerns. This section describes specific samples of maintenance items that should be checked during walk-through reviews.

1. **Traffic Topping:** Traffic bearing waterproofing membranes usually occur at the roof level and over any occupied spaces to protect the embedded mild steel reinforcement.
 - a. High Wear Area: Areas where tight turns are made, such as at the top and bottom of express ramps, drive aisles, or entry/exits are subject to higher wear. These areas will probably require recoating or repair sooner than parking areas. Any areas that wear through the membrane should be repaired as soon as possible after the condition is observed.
 - b. Cracks: The traffic bearing membrane is designed to span the shrinkage cracks and flexural bending cracks which typically occur in the structures. Cracks that breach the membrane should be routed and sealed immediately to prevent chloride-laden water from contaminating the concrete. The membrane should be repaired at these locations.
 - c. Blisters or Tears: In some areas the traffic topping may fail prematurely due to improper surface preparation, material failures, and too low temperatures during installation. These items are normally covered under warranty and usually occur during the first few years the structure is in use. Observed areas should be noted during operational inspections and cleaning. Observations should be noted and include a description of the location and extent of the problem.
2. **Penetrating Sealer:** Penetrating sealers help slow down chloride ion migration through the concrete floor slab. Sealers are sometimes applied at supported levels, except where a traffic topping membrane occurs. The sealer penetrates approximately 1/4", but it wears off over time due to heavy traffic. Reapplications should be performed every three to five years.
3. **Expansion Joints:** Expansion joints require a high level of maintenance. There are various types depending on the structure, environment, and use. Examples include rubber gland, silicone, and pre-molded, among others.

If properly maintained and repaired as soon as leaks are discovered, typical joint systems should have a 10- to 12-year life expectancy. Expansion joints will develop leaks at some point in their life. Prompt repair of leaks is important to avoid chloride contamination of the concrete below.

4. **Concrete Repairs:** Miscellaneous and ongoing concrete repairs are to be expected. The cause of chloride ion contamination would most likely come from a marine environment where the structure is constantly exposed to salt water moisture. Salt water damage is not a concern for facilities more than three miles away from a marine environment, however, the chloride ion content of the floor slabs should be regularly monitored at any facility.

Environmental monitoring should also take place with facilities located near industrial areas. Common soil contaminants include mercury, lead, and PCBs, all of which can be harmful to foundation concrete.

5. **Floor Drains:** Accumulation of dirt, leaves, oil, etc. can result in an aggregation of debris in the drain lines. Regular flushing of these lines will reduce buildup in the drain lines; however, it is expected that these lines will still have to be cleaned every few years.

Metro is encouraged to monitor and treat stormwater runoff from structure drains. Use Metro's NPDES General Permit as a guideline for thresholds of contaminant levels. Stormwater discharge may also be treated per the local city's SWPPP program.

D. FACILITY DESCRIPTIONS

See the following page for a sample listing of a parking facility's information. This description should be kept with the maintenance logs of a particular garage.

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN
PARKING GARAGES MAINTENANCE MANUAL**



AUGUST 2016

PROJECT NO. 37-8549.00

FACILITY DESCRIPTION		
ITEM \ FACILITY	Riverfront	Rutherford
Year Built		
No. of Supported Levels	3	4
Slab-on-Grade Area	31,000 (west of Beach St.)	27,600
Supported Floor Area	148,000	105,200
Vehicle Capacity	540	377
Structural System	Precast with field topping	Precast - pretopped
Last Repaired	2008/09	N/A
No. of Stairtowers	3	2
No. of Elevators	3 (hydraulic)	1 (hydraulic)
User Type	Public and Permit	Public and Permit
Parking/Revenue Controls	2 entry gates, 3 exit gates, 1 entry cash machine, 2 entry card readers, 1 entry booth and 1 exit booth	3 lanes (1 reversible), 4 gates, 4 card readers, 1 attendant booth
Security	Emergency Phones, 53 CCTV cameras (monitoring station in DDA office)	Emergency Phones, 53 CCTV cameras (monitoring station in DDA office)
Light Fixture Type	Metal Halide (Flourescent in rooms and stairs)	Metal Halide (Flourescent in rooms and stairs)
Emergency Power	Inverter battery pack for emergency lighting	Inverter battery pack for emergency lighting
Ventilation	Open Structure	Open Structure
Standpipes	Dry Manual	Dry Manual
Fire Sprinklers	None	None
Fire Extinguishers	None	None
Pull Alarms	None	None
Other Features	Roadway and parking lot below east portion. DDA storage area at west end of grade level. Separate entrance ramp for Character Inn Parking. Pedestrian bridges to Character Inn and Citizens Bank at level 3.	Porous concrete at walkway on south side.

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN



PARKING GARAGES MAINTENANCE MANUAL

AUGUST 2016

PROJECT NO. 37-8549.00

Operational maintenance and Structural maintenance each have significantly different characteristics from the other and must be treated as separate maintenance items. See Tables A and B for elements in each class.

Table A – Operational Maintenance Program

- Electrical System
 - Security Monitoring Equipment
 - Mechanical Equipment
 - Elevators and Shafts
 - HVAC System
 - Fire Protection Equipment
 - Clarifiers and Oil-Water Separators
 - Parking and Revenue Control Equipment
 - Graphics, Signage, and Floor Striping
 - Cleaning Requirements
 - Housekeeping
 - Graffiti
 - Sweeping
 - Expansion Joint Seals
 - Washdown
 - Landscaping
 - Painted or Stained Surfaces
 - Drainage
 - Inspection
-

Table B – Structural Maintenance Program

- Concrete Floors
 - Beams, Columns, and Concrete Walls
 - Stair and Elevator Towers
 - Joint Sealant Systems
 - Expansion Joints
 - Floor Joint Sealants
 - Architectural Sealants
 - Traffic Topping Membrane
 - Penetrating Sealer
 - Exposed Steel
 - Masonry
 - Bearing Pads
 - Chloride Monitoring
 - Inspections
-

A. OPERATIONAL MAINTENANCE

1. Electrical System

Adequate lighting is essential and will help ensure secure and easy movement of users. Higher efficiency equipment should be utilized to reduce energy usage.

Inspect all fixtures, including pedestrian “EXIT” signs, emergency light fixtures, and lighted directional/informational signs daily. Replace or repair light fixtures that are not working properly or are damaged.

Studies by manufacturers have shown that the energy consumed by some lamps increases rapidly towards the end of lamp service life. Scheduled relamping before burnout may reduce energy costs. Review service life expectancy versus power consumption with your local lamp supplier. See Table C for typical relamping information.

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN



PARKING GARAGES MAINTENANCE MANUAL

AUGUST 2016

PROJECT NO. 37-8549.00

Table C – Relamp Schedule

Lamp Type	Typical Rated Life (Hours)	Typical Mean Output (% of Max.)	End of Life Output (% of Max.)	Recommended Replacement Life (% of Rated Life)
Metal Halide	10,000 – 20,000	75% - 80%	60% - 70%	70%
Fluorescent	12,000 – 20,000	85% - 90%	75% - 80%	80%
Light Emitting Diode (LED)	25,000 – 50,000	85% - 95%	75% - 85%	85%

Clean and repair electrical conduit exposed to leakage or if rusting. Vulnerable locations for conduit corrosion include under leaking joints, cracks, and at unsleeved floor penetrations. Replace damaged conduit that is loose from its mounting or has exposed conductors. Maintain electrical outlets and junction boxes in safe working condition. If outlets have cover plates, keep them in proper working order.

Clean and paint or replace damaged or rusting electrical panels.

Check, clean, and calibrate timers and photocells. Test ground fault circuit interrupters.

Identify leaking from ceiling boxes and repair source of leak. Windblown water can infiltrate electrical conduit.

Inspect and test inverter battery pack system as recommended by manufacturer.

2. Security Monitoring Equipment

- Telephones operating
 - Emergency
 - Cashier Booths
 - Security Station/Office
 - Intercoms/Audio monitoring devices
- Television surveillance cameras operating
- Emergency call buttons in cashier booths operating

3. Mechanical Equipment

Inspect all mechanical equipment regularly and service as required.



a. Elevators and Shafts

Inspect all elevators, shafts, and associated hardware. Service according to equipment manufacturer's recommendations. Correct leakage into the elevator shaft as soon as it is discovered. A maintenance agreement with a reputable elevator service company or the manufacturer is the most effective method for servicing. The maintenance agreement should include a requirement to clean the shaft side of glass-backed elevators and curtain walls.

Give particular care to cleaning of the tracks or grooves in elevator floor sills. These tracks are in both the elevator cab floor sill and each landing floor sill. Dirt in these tracks can cause the elevator doors to malfunction. Clean the tracks monthly.

b. HVAC System

HVAC systems should be inspected and air filters changed as needed. Service manuals provided for this equipment by the manufacturer should be checked for proper maintenance action. All servicing required should be performed promptly and to the specifications provided by the equipment manufacturer or supplier.

Inspect ventilation fans and necessary support systems monthly. Service manuals provided for this equipment by the manufacturer should be checked for proper maintenance. Perform all servicing required promptly and to the specifications provided by the equipment manufacturer. Keep replacement belts and pulleys for fans in stock and replace worn or damaged parts periodically to reduce chances of breakdown. Direct all questions about servicing to the equipment manufacturer or supplier.

c. Fire Protection Equipment

Periodically check standpipes for proper operation. Check portable fire extinguishers for satisfactory charge monthly. Monitor smoke and heat detectors to help ensure proper functioning. Repair or replace broken extinguishers, cabinets, detectors, and sprinkler heads.

d. Clarifiers and Oil-Water Separators

Clarifiers and separators collect trash and oil from the surface through the drainage system. Inspect the clarifiers and separators, including the sumps, monthly for debris.

Clean out clarifiers and oil-water separators at least semi-annually. Collect the runoff with water vacuums and tanker trucks. Services may be performed by a specialty environmental waste company. Dispose of water, oil, and debris properly as stated in

NPDES and other environmental permits. Replace filter cartridges per manufacturer's recommendations.

e. Parking Control Equipment

Examine all parking equipment monthly. Establish a preventive maintenance program to lessen breakdowns. It is prudent to maintain an inventory of critical parts so maintenance crews can quickly repair the equipment.

Periodic servicing of the parking equipment is essential for smooth operation of the facility. Set up a service agreement with the parking equipment supplier with on-call service to provide help with breakdowns. New equipment added to the facility after original construction must be compatible with existing equipment. Keep copies of operations and service manuals for all equipment on hand for easy reference. Set up a log of maintenance and service calls for each piece of equipment.

4. Graphics, Signage, and Floor Striping

Proper graphics are essential to the smooth operation of your parking facility and must be kept clean and visible. Graphics combining words or symbols with arrows are the most effective for traffic and pedestrian movement control. Keep all entrance, exit, and traffic directional signage and displays clean and legible. Examine paint or facing material for graphics semi-annually for deterioration. Repaint, repair, or replace as required.

Keep floor and stair tower signs directing patrons to their destinations legible and visible from all entrances and exits.

Inspect floor striping after cleaning. Repaint as required, typically at two to four year intervals. Restriping should be performed after medium pressure water cleaning and degreasing of floors. Restriping also will be required after the application of concrete sealers or after the installation of traffic topping. Contact Walker for the latest striping code requirements.

Traffic paint applied over sanded urethane traffic topping is subject to harsher abrasion conditions and has less bond than that applied to bare concrete. Lane markings and stall striping in these areas will have a shortened service life.

5. Cleaning Requirements

a. Housekeeping

Windows should be washed. Floors of stair and elevator towers, security station, and lobbies should be swept regularly. Sweep heavily used areas daily. Damaged window glass or deteriorated glazing should be repaired. Periodically check stair tower roofs for leaks.

b. Graffiti

Graffiti can be easily removed if a protective coating is applied to concrete and metal surfaces. Where coatings are not used, removal may be more difficult. Remove graffiti promptly.

c. Sweeping

A frequently overlooked aspect of parking facility maintenance is proper floor cleaning. Sweep the floor surface of all parking bays weekly. Clean stairs and elevators daily.

Sweeping can be done with hand brooms or mechanized sweepers designed for use in buildings. The maximum allowable weight for mechanized sweeping equipment is 8,000 pounds gross weight or 2,000 pounds gross weight per wheel.

Remove all dirt and debris from the facility. Keep dirt and debris from drain basins and pipes. Blockage will cause system leakage or failure. Remove grease buildup in parking spaces and exit areas with proper degreasers.

d. Expansion Joint Seals

The folds in the top surface of expansion joints will collect debris. This buildup inhibits proper joint movement as the ambient temperature varies. Clean thoroughly as part of your sweeping and washdown tasks. Suggested cleaning techniques include brooming, vacuuming, compressed air blasting, and medium pressure power washing. See Table D.

e. Washdown

In addition to sweeping, an annual washdown with low pressure hoses is advisable. Remove debris collected during the year by flushing the floor surface. Precede the washing by sweeping the facility.

More frequent washdown of critical areas such as entrance lanes and main drive aisle is advisable during the winter when weather permits. If weather does not permit, squeegees or brooms can be used to remove salt-laden slush or water. See Table D for typical water pressures.

In performing a washdown for parking facilities, medium pressure power washing may be used as required. Do not use high pressure water jet cleaning systems on floor slabs near sealants. High pressure water jets can remove traffic toppings, damage sealant, cause leakage, and may lead to serious deterioration. High pressure water cleaning may be used for removing grease spots on the floor slab when care is taken to avoid damage to joint sealant materials. When washing down the floor slabs, take care to

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN



PARKING GARAGES MAINTENANCE MANUAL

AUGUST 2016

PROJECT NO. 37-8549.00

avoid washing sand into the drain system. Temporary filters will prevent sand from getting into the drains.

The runoff generated from the cleaning process must not exceed the levels acceptable by NPDES and other current environmental permits. It is advisable to collect runoff water and dispose of properly per NPDES and SWPPP guidelines.

Table D – Preparation of Concrete Surfaces Using Water

Terminology/ Technique	Purpose/ Use	Typical Water Pressure (psi)	Typical Water Consumption (gpm)	Removal Capability
Low Pressure Washing/Hoses	Cleaning	25 – 40	6-10	Loose sand and debris
Med. Pressure Washing Power Washer	Cleaning	2000 – 4000	10 (minimum)	Loose paint, sludge
High Pressure Washing Compressor*	Light surface preparation	5000 – 8000	18 (minimum)	Sealer, traffic topping, paint removal
Waterblasting*	Heavy surface preparation	8000 – 12000	18 (minimum)	Sealer, traffic topping, patch prep., everything

*High pressure washing and waterblasting are not typical maintenance items. Experienced contractors with an engineer’s direction should perform these procedures.

Traffic topping will appear cleanest on the top floor and drive aisles due to ongoing rinsing by rain. Traffic topping will be progressively dirtier on lower levels and near upper level entrances.

Traffic topping will also be the most susceptible to sun exposure on the top level. Monitor peeling or worn sections of traffic topping regularly.

As part of California's water conservation effort, the washdown should be performed once a year in the winter months, before significant rain events.

f. Landscaping

Landscaping features improve facility appearance. In general, all plantings should be well tended. Frequently clean and cultivate planting areas. Remove dried-out and dead vegetation, and replace with drought-tolerant planting where possible.

Keep walkways clean. The facility perimeter should be clean and presentable. Trash receptacles, placed at convenient locations, will help ensure proper trash disposal. If you keep a well-maintained facility, the users tend to help keep it clean by not littering.

g. Painted Surfaces

Paint doors, guardrails, handrails and standpipes, as required. Painted surfaces will need repainting at three to seven year intervals, depending on exposure conditions.

To increase service life, pay careful attention to surface preparation before painting. Select paint appropriate to the particular application.

Rust stains are usually an indicator of other problems such as concrete cracking, paint failure, or sealant failure. The cause of rust staining should always be determined and corrected before repainting or resealing.

6. Drainage

Los Angeles County is subject to periodic but extreme monsoonal rainfalls. The drainage system must be able to collect and remove a large amount of runoff in a short amount of time. Promptly remove all debris that might clog the drains. All drains should be cleaned periodically to help ensure proper drainage. Large areas of standing water present a hazard to drivers and pedestrians.

Check area drains daily. Inspect drain basins, inlet grates, leaders, downspouts, and all support brackets annually for leaks or distress. Clean sediment basins as required to prevent clogging and ponding. Record all deficiencies noted and program appropriate action.

7. Inspections

In addition to specific inspections required for the preceding items listed within this section, an annual examination of the parking facility is recommended.

B. INFRASTRUCTURE MAINTENANCE

1. Concrete Floors

The largest share of structural maintenance is required by floors. Scaling, spalling, cracking, leaking, and leaching reduce the serviceability and structural integrity of floors.

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN



PARKING GARAGES MAINTENANCE MANUAL

AUGUST 2016

PROJECT NO. 37-8549.00

The top floor and entrance/exit lanes are subjected to the most severe weather exposure conditions. These areas require more frequent treatment of a quality penetrating sealant and heavier application rates than the general parking surfaces. See Table E. Turning areas at bay ends, gutter lines, and ponded areas require special attention. Such areas should be closely monitored. If deterioration develops, apply sealer more frequently. Standing water evaporates, leaving behind large concentrations of salt.

High salt concentrations combine with moisture to accelerate corrosion of embedded reinforcement. Supplemental drains should be installed if large ponding areas develop. Small ponds should be squeegeed into the nearest drain.

Slab-on-grade is typically designed with little reinforcement. Therefore, sealing the slab-on-grade is not part of this maintenance program. If areas of spalling occur, further review by an experienced engineer is recommended. Chloride ion content monitoring will show the need for floor sealer application.

Table E – Penetrating Sealer Application

Area	Frequency
All Supported Tiers	As shown by Chloride Monitoring Program (normally every three to five years) (a)
Stairs and Elevator Lobbies (b)	Every 4-6 years (c)
Beams, Columns, and Bumper Walls (b)	Every 4-6 years (c)

- (a) Top floor, entry/exit areas and lower floors that are subject to more severe exposure may require retreatment every 2 to 3 years. Testing and inspection can be performed to determine degree of exposure.
- (b) Only required for those structural members and areas subject to frequent wetting.
- (c) For maximum effectiveness, the sealer should be applied with the coverage rate recommended by the sealer system manufacturer.

Examine vehicular traffic toppings for wear. Repair damaged areas to prevent leakage and contamination of the floor slab. The integrity of the topping will be jeopardized if left unrepaired. These systems are usually proprietary and should be inspected and repaired by the system manufacturer's authorized representative. To clean traffic topping, the areas should be power scrubbed with a non-sudsing detergent and thoroughly rinsed semiannually. This is in addition to regular sweeping and cleaning procedures.

2. Beams, Columns, and Concrete Walls

Deterioration can affect members other than floors. Beam, column, and concrete wall deterioration is typically caused by water leaking through joints from the floor above. Failed or damaged joint sealants require prompt correction to stop leakage. Distress also can be caused by restraint or excess load.

Precast concrete bumper walls/facades, columns, and beams have embedded lifting loops in their top surfaces or faces. After erection, these connection points are filled with grout. If corrosion-induced spalling occurs, grout patches should be removed and replaced with an elastic sealant, color keyed to the concrete surface.

The combined actions of installing new expansion or joint sealant systems, and/or repair of traffic topping, not only help to arrest deterioration of floor slabs, but also reduce deterioration of beams, columns, and walls. Perform concrete repairs before installing sealants and applying sealers or traffic toppings.

3. Stair and Elevator Towers

Leakage between the parking facility surface and the stair and elevator towers is a common problem. Frequent inspection and repair of damaged joint sealant and flashing between stair towers and the parking facility will reduce the deterioration caused by leaks.

Repair or replace stair tower window glazing as needed.

4. Joint Sealant Systems

To accommodate movement and shrinkage strains within a parking facility, flexible joint sealant systems are used.

- a. **Expansion Joints** accommodate thermal movement of the entire structure. The parking structures are subject to potential wide swings in the average daily temperature, ranging from approximately 40°F on a cold winter night to 100°F during a hot summer day.

Identify and record the types that are present in each parking facility. Folds in expansion joints have to be periodically cleaned of debris to help ensure proper movement of the joint.

Repairs to the expansion joints must be done by an authorized manufacturer's representative or licensed system contractor. This requirement is due to the specialized nature of the joint materials and the need for unique repair equipment necessary to ensure a watertight splice. Most joint manufacturers will void their warranty if repairs are tried by unauthorized parties.

- b. **Construction Joints** are located at predetermined points where concrete floor or wall sections end. These joints are usually tooled and filled with a flexible sealant.
- c. **Control Joints** accommodate cracking by creating a series of weakened planes at predetermined points in the floors and walls. Control joints for supported slabs are tooled and then filled with a flexible sealant to prevent leaking.

- d. **Tee-to-Tee Joints** are located where precast tees meet. Flexible sealant in these joints prevents leaking that can corrode structural connections.

Depending upon structural configuration, wear, and conditions of exposure, a joint sealant can be expected to provide approximately ten years of maintenance-free service. This projected life expectancy is only an average. Under some conditions of exposure, sealants may provide different service life.

Replacement of all joint sealants at eight to twelve year intervals is a realistic and prudent part of structural maintenance. Program sealant replacement costs into the maintenance budget.

Treat concrete floor surfaces, beams, and columns next to leaking joints with a penetrating sealer or traffic topping. This treatment can reduce premature deterioration caused by exposure to salt water.

5. Architectural Sealants

Periodically inspect the condition of architectural sealants and repair as necessary. Areas include sealants at window and door framing, in block masonry, exterior sealants in or adjacent to concrete walks, drives, curbs, landings, at structural precast to adjacent surfaces or dissimilar structure, all control joints, and at exterior perimeters of curbs. Replace all damaged sealants.

6. Exposed Steel

Exposed steel is used at the structural connections between precast members and guardrails. Premature deterioration of metal parts is caused by neglect, which leads to chemical reaction between metal and the corrosive environment. Check for potentially unsafe conditions due to corrosion. Look for rusting of steel sections, angles, and bolts that connect precast walls and cast-in-place floors. These connections on the top level are directly exposed to weather conditions and are vulnerable to surface rusting. Touch up with a weatherproof galvanizing compound as required.

Periodically clean exposed steel and repaint to prevent rusting. Galvanized pieces should be cleaned and touched up with a cold galvanizing compound. Special attention to connections or exposed structural fasteners is essential.

7. Bearing Pads

Precast beams, spandrels, and floor members are set on bearing pads. Bearing pads may be made from steel, hardened plastics, TFE assemblies, neoprene or fiber reinforced neoprene singly or in combination. They help ensure the correct placement of loads and provide partially restrained lateral movement between structural members.

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

PARKING GARAGES MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Weathering, misplaced or omitted pads, and excessive movement can result in the movement of pads from their original positions. As pads move or fail, the resulting deterioration, cracking, spalling, and excessive deflections can affect the structure. Deterioration should be evaluated by an engineer and repaired.

Bearing pads that are missing must be replaced.

8. Inspection

A general inspection of all structural parts is required to help ensure structural integrity. The inspection involves a walk-through survey to note deterioration. The walk-through should be performed annually for new structures in good condition. Older structures that are deteriorating may require more frequent inspection. Areas of deterioration should be noted on a plan sheet for later examination by a qualified engineer. Other less serious conditions such as leaking or staining also should be noted, as they are indicators of future problems.

The results from each inspection should be evaluated by a qualified engineer to determine appropriate maintenance and/or repair. Maintenance may be performed by in-house forces or contracted out. Repair requires specialized contractors.

Appendix A contains daily, weekly, monthly, semi-annual, and annual operational checklists to record maintenance, and an annual structural checklist to determine if any structural maintenance/repairs are required.

APPENDIX A
CHECKLISTS FOR
OPERATIONAL AND
STRUCTURAL
MAINTENANCE

MAINTENANCE MANUAL AND PROGRAM OPERATIONAL AND STRUCTURAL CHECKLISTS

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

Use the following daily, weekly, monthly, semi-annual, and annual operational checklists to record maintenance. The annual structural checklist will help to determine if any structural maintenance/repairs are required. In general, signs of water leaking and rust staining must always be noted. Mechanical and electrical deficiencies should be repaired per manufacturers' and suppliers' recommendations.

The following terms can serve as a measuring scale for prioritizing repairs and maintenance to overall systems or portions of the system. Please note that when terms are applied to an overall system, certain portions of the system may be in a different condition.

- Excellent:** Items in "as new" condition requiring no rehabilitation and should perform in full accordance with its useful expected life.
- Good:** Item is sound and performing its function, although it may show signs of normal wear and tear. Some incidental rehabilitation work may be recommended.
- Fair:** Item is performing adequately at this time but exhibits deferred maintenance, evidence of previous repairs, substandard workmanship, is obsolete, or is approaching the end of its typical useful expected life. Repair, replacement, or maintenance is necessary to prevent further deterioration, or to prolong its useful life.
- Poor:** Item has either failed or cannot be relied upon to continue performing its original function. Present condition could contribute or cause the deterioration of other adjoining elements or systems. Repair or replacement is required.

MAINTENANCE MANUAL AND PROGRAM DAILY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- Lights at bus stops, operating lights in elevator stair tower and indicator lights at each level for elevator operation
- Lights in stairs operating – All levels
- Ceiling and indicator lights in elevator cab operating
- Exit lights illuminated – All levels
- Illuminated signs operating

SECURITY MONITORING EQUIPMENT

- Telephones operating
 - Elevator Cabs
 - Cashier Booths and office
 - Security Station/Office
- Panic Hardware on doors operating
- Television surveillance cameras operating
- Intercom devices operating
- Emergency call buttons in cashier booths operating

CLEANING

- Pick up trash
- Sweep elevator and stair towers
- Sweep office and collection booth
- Wash any parking area required to remove odors

FIRE PROTECTION EQUIPMENT

- Remove dead dried-up vegetation.
- Check portable fire extinguishers for satisfactory charge.
- Test smoke and carbon monoxide detectors to ensure proper functioning. Replace batteries.

**MAINTENANCE MANUAL AND PROGRAM
DAILY OPERATIONAL CHECKLIST**

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

DRAINAGE

- Clean off floor drain grates – All levels
- Squeegee ponded water to nearest drain – All levels

OTHER

- Check for trip hazards and other safety concerns
- Parking and Revenue Control Equipment – gate, detectors loops and card readers for proper operation

Comments and Corrective Action Required:

**MAINTENANCE MANUAL AND PROGRAM
WEEKLY OPERATIONAL CHECKLIST**

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- Replace burned-out lamps.
- Check to ensure unit heaters are functioning properly in tele/comm. Check elevator machine rooms.
- Exposed conduit in good condition
 - No signs of rust
 - Not loose from mounting

MECHANICAL SYSTEM

- Remove dirt from air filter by vacuum cleaner

CLEANING

- Sweep parking area floor
- Vacuum elevator door frame sill – door tracks
- Clean Elevator cab floor and windows – interior
- Wipe down elevator cab interior and doors and frames
- Sweep stairways and elevator lobbies and pick up all litter
- Clean exterior and interior attendant booth
- Remove graffiti and stains
- Remove debris from expansion joints.

OTHER

- Mow lawn and maintain landscaping
- Check to ensure proper operation of ADA accessible door automatic opener.
- Inspect handrails and guardrails

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM MONTHLY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

MECHANICAL EQUIPMENT

A. Elevators

- Normal operation of elevators
- Maintenance performed per service contract

B. HVAC System

- Normal operation of entire system
- Clean air using a vacuum or soak clean, per manufacturer's recommendation.
- Normal operation of ventilation fans (Located in mechanical/electrical and elevator machine rooms). Check for broken or worn pulleys and belts

C. Fire Protection Equipment

- Check standpipes for operation
- Check fire sprinkler system
- Check charge on portable fire extinguishers
- Normal operation of smoke and heat detectors

D. Oil-water separator, check basins for debris buildup.

ELECTRICAL SYSTEM

- Check Light fixture and exposed conduits and repair
- Reset lighting control panel due to changing sunset/sunrise hours. (Not applicable to photo cell controlled circuits.)
- Emergency Power Inverter system - Perform manual test to confirm output voltage and front panel indicators working (per manufacturer's recommendation).

CLEANING

- Wash floors and windows – Office and Booths
- Remove grease buildup and oil spots
- Wipe down doors & frames, railings and window frames in stair/elevator towers (bimonthly)

**MAINTENANCE MANUAL AND PROGRAM
MONTHLY OPERATIONAL CHECKLIST**

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

OTHER

- Lubricate rolling grilles and check for proper operation. Check entrance for proper operation

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM SEMI-ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- A. Control and power panels for proper operation. Verify that daytime circuits are off during the day to avoid wasted energy use and higher energy bills.
- B. Timers and photocells for proper operation
- C. Ground fault circuit interrupters for operation
- D. Emergency Power Inverter system – Check battery connections tight and no corrosion. Test & replace batteries as needed.
- E. Exposed conduit in good condition
 - No signs of rust
 - Not loose from mounting

CASHIERS BOOTH

- A. Vacuum Dirt and lint from heater unit
- B. Vacuum dirt and lint from AC unit and clean or replace filter.
- C. Clean and lubricate cashier transaction drawer

GRAPHICS, SIGNAGE, AND FLOOR STRIPING

- A. Clean signs
 - Directional signs
 - Entrance/exit signs
 - Floor/level designations
- B. Examine paint or facing material for deterioration
- C. Floor striping and graphics

MAINTENANCE MANUAL AND PROGRAM SEMI-ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

CLEANING

- A. Degrease where required
- B. Washdown of entire floor surface including stairways
- C. Vacuum floors of all enclosed rooms (electrical, mechanical, Telecommunications, storage etc.)
- D. Check painted/stained surfaces for touchups
- E. Clean and lubricate cashier transaction drawer

DRAINAGE

- A. Clean out drains
- B. Check for leaks
 - Drain basins
 - Inlet grates
 - Leaders
 - Downspouts and support brackets
 - Floor sleeves

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

PARKING STRUCTURE NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- A. Distribution panels/Panel boards – clean and repair as required (see O & M Manual Section “Power”)
- B. Emergency Power Inverter system – Clean air vents and remove dust from inside cabinet and from fans.

HVAC

- A. Change air filters.

CLEANING

- A. Clean exterior window wall systems at stairs/elevators
- B. Clean interior window wall system of elevator shafts
- C. Clean exterior window of elevator cabs

FIRE PROTECTION EQUIPMENT

- A. Test alarms for proper functioning

OVERALL

- A. General review of all operational components
- B. Prune trees/shrubs

Comments and Corrective Action Required:

ANNUAL STRUCTURAL CHECKLISTS

ANNUAL STRUCTURAL CHECKLIST

PARKING STRUCTURE NAME: _____

INSPECTOR _____

DATE _____

MAINTENANCE MANUAL AND PROGRAM

L.A. METRO

LOS ANGELES COUNTY, CA

FLOORS

_____ Are there rips, tears, debonded areas or signs of embrittlement in the traffic topping?

_____ Are there cracks in the floor slab? If yes, where are they located and how wide are they?

_____ Are there signs of leaking?

_____ Any spalls or delaminations? If yes, how big and where are they located?

BEAMS AND COLUMNS

_____ Are there cracks? Where? If yes, are they vertical or horizontal and how wide?

_____ Are there any signs of leaking?

_____ Are there cracks? Where? If yes, are they vertical or horizontal and how wide?

STAIR/ELEVATOR TOWERS

_____ Are there any signs of a leaking roof?

_____ Are there any cracks in the exterior brick?

_____ Are there any cracks in the mortar joints?

JOINTS

- _____ Are there any signs of leaking, loss of elasticity, or separation from adjacent surfaces?
- Expansion joints
 - Control joints
 - Construction joints
 - Tee-to-tee joints

ARCHITECTURAL SEALANTS

- _____ Are there any signs of leaking, loss of elasticity, or separation from adjacent surfaces?
- Between windows and doors
 - In block masonry
 - Exterior sealants
 - Concrete walks, drives, and curb landings

EXPOSED STEEL

_____ Is there any exposed steel? If yes, where is it located and is it rusted?

MASONRY

_____ Are there any cracks in the masonry?

_____ Are there any cracks in the mortar?

_____ Are there any spalls? If yes, where are they located and how big?

BEARING PADS

_____ Are bearing pads squished, bulging, or out of place? If yes, where?

After answering the above questions, please consult a qualified engineer to discuss your answers.

Comments and Corrective Action Required:

Form 2

Structure Name _____ Location _____	Inspection Date _____ Inspector _____ Next Scheduled Inspection Date _____
--	--

2. MAINTENANCE/REPLACEMENT

Action Required	Frequency Required	Date Last Performed	Date Next Scheduled
A. Structural			
Floor/Beam/Column/Wall Patches			
Joint Repair			
Joint Replacement			
Crack Repair			
Expansion Joint Repair			
Expansion Joint Replacements			
B. Operational			
1. Lighting			
Replace light bulbs Replace/Repair Exposed Conduit Replace Timers and Photocells			
2. Seasonal Preparation			
Cleaning Sweep Floors Wash Down Floors Clean Expansion Joint Glands Paint/Stain Landscaping			

Notes:

Form 3

Structure Name _____ Location _____	Inspection Date _____ Inspector _____ Next Scheduled Inspection Date _____
--	--

3. PREVENTATIVE MAINTENANCE			
Action Required	Frequency Required	Date Last Performed	Date Next Scheduled
Chloride Ion Tests			
Sealer Application			
Traffic Topping Application/Repair			

TEST LOCATIONS			
Location Number	Location	Level	
			CI = Chloride C = Compressive P = Petrographic S = Shear Bond

Notes:

NEXT INSPECTION DATE: _____

	Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
HVAC SYSTEM: - Inspect for proper operation - Check ventilation in enclosed/underground areas - Perform preventative measures		D	M	D	M		
LANDSCAPING: - Remove trash - Mow, trim, and weed	D	D	M M				
PAINTING: - Look for rust on doors/door frames - Look for rust on handrails/guardrails - Look for rust on exposed pipes/pipe guards/conduits - Look for rust on other metal surfaces - Inspect striping - Check signs - Check walls - Inspect curbs - Touch up paint - Repaint					D	D D D D D	M M M M M M M
PARKING CONTROL EQUIPMENT: - Inspect for proper operation - Perform preventative maintenance	D	M					
PLUMBING SYSTEM: - Inspect sanitary facilities - Inspect irrigation - Check floor drains - Check the sump pump - Test the fire protection system - Check drain – water system (for winter)	D D	M D	D M	M M D	M		M

D – Desirable

M - Minimum

	Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
ROOFING/WATERPROOFING: - Check roof for leaks - Check joint sealant in floors - Inspect expansion joints - Inspect windows/doors/walls - Inspect the floor membrane - Check for deterioration				D D D D		M M M M D	M
SAFETY - Check carbon-monoxide monitor(s) - Check handrails/guardrails - Check exit lights - Check emergency lights - Eliminate tripping hazards	D	M D D D		D M M M	M		
SECURITY SYSTEM - Check closed – circuit television - Check audio surveillance - Test panic buttons - Test stair – door alarms	D D D D	M M M M					
GRAPHICS: - Check sign placement - Check sign cleanliness - Check sign visibility - Check sign legibility - Check sign illumination	D D D	M M M		D D	M		M

D – Desirable

M - Minimum

STRUCTURAL SYSTEM:

- Check floor-surface deterioration
- Check for water leakage
- Inspect concrete for cracks
- Inspect structural steel for rust
- Make repairs (see a consultant)
- Replace floor coating (see a consultant)

Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
					D	M
					D	M
					D	M

D – Desirable

M - Minimum

APPENDIX B
CHLORIDE
MONITORING

PROJECT NO. 37-8549.00

SURFACE PARKING LOTS
MAINTENANCE MANUAL

L.A. METRO
SUPPORTIVE TRANSIT
PARKING PROGRAM
MASTER PLAN
LOS ANGELES, CA

Prepared for:
LOS ANGELES COUNTY
METROPOLITAN
TRANSPORTATION AUTHORITY



WALKER
PARKING CONSULTANTS

606 S. Olive Street, Suite 1100
Los Angeles, CA 90014

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

TABLE OF CONTENTS

SECTION I – MAINTENANCE PROGRAM 2

- Introduction 2
 - A. Objective 2
 - B. Scope 2
 - C. Approach 2
 - D. Definitions 3
- Background..... 4
 - A. Special Conditions 4
 - B. Maintenance Program Benefits 4
 - C. Infrastructure Description 5
 - D. Influence of As-Constructed / Existing Conditions on Maintenance 5
 - E. Project Responsibility 7

SECTION II – RECOMMENDED PROGRAM 12

- A. Operational Maintenance 13
- B. Infrastructure Maintenance 17

APPENDIX A – Checklists for Operational and Infrastructure Maintenance

APPENDIX B – Pavement Condition Assessment
ASTM D 6433-07, "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys"

APPENDIX C – Illumination
Federal Energy Management Program, "Guide to FEMP Designated Parking Lot Lighting", 2013

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

INTRODUCTION

A. OBJECTIVE

This manual provides the Los Angeles County Metropolitan Transportation Authority (Metro) with guidelines and procedures for maintaining its Park & Ride and Kiss & Ride Surface Lot Facilities.

B. SCOPE

The purpose of a maintenance program is to protect initial investment by coordinating proper and timely preventive maintenance that reduces premature deterioration. This maintenance program will address general as well as specific maintenance needs in a cost-effective manner. Maintenance can be separated into two classes: **Operational** and **Infrastructure**. Operational maintenance is required to operate a facility effectively. Infrastructure maintenance is required to maintain the facility's fixed elements.

Specific repairs exceed the scope of this manual. A qualified engineer should be consulted for infrastructure repairs to items such as pavement, sidewalks, retaining walls, sound barriers, drains, and embankments. Manufacturers and suppliers should be consulted for repairs and replacement of items such as mechanical and electrical equipment, light poles and foundations, security and surveillance systems, signs, pavement markings, security systems, architectural features, landscaping, and fencing.

Metro has been supplied with equipment "Owner's Manuals" and service information. Therefore, this Manual will only briefly review those items. The emphasis of this Manual will be on Operational and Infrastructure Maintenance, as these topics are not addressed by the information supplied by the contractor.

C. APPROACH

A comprehensive maintenance program requires that an annual budget be established. This budget should begin with the first day of operation and account for costs such as operating expenses, operating maintenance, and infrastructure maintenance. Operating expenses include costs for daily maintenance, supplies, insurance, cashing, management fees, on-site security, infrastructure maintenance, and property, parking, and sales taxes. Operating maintenance includes costs for sweeping and cleaning sidewalks, removing graffiti, replacing light bulbs and ballasts, repairing parking and revenue control equipment, restriping, sign replacement, and landscape maintenance. Infrastructure maintenance costs include conditional assessments, testing, concrete repairs, applications of overlays and penetrating sealers, repairs of traffic topping, routing and sealing cracks, water damage monitoring, security system maintenance, and lighting repairs.

The average annual operating cost of a surface parking lot on a per space basis is about \$100 to \$300. Landscaping, security, and management account for 35% to 40% of that cost, while structural and routine maintenance is about 10% to 18%, utilities are about 10%

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

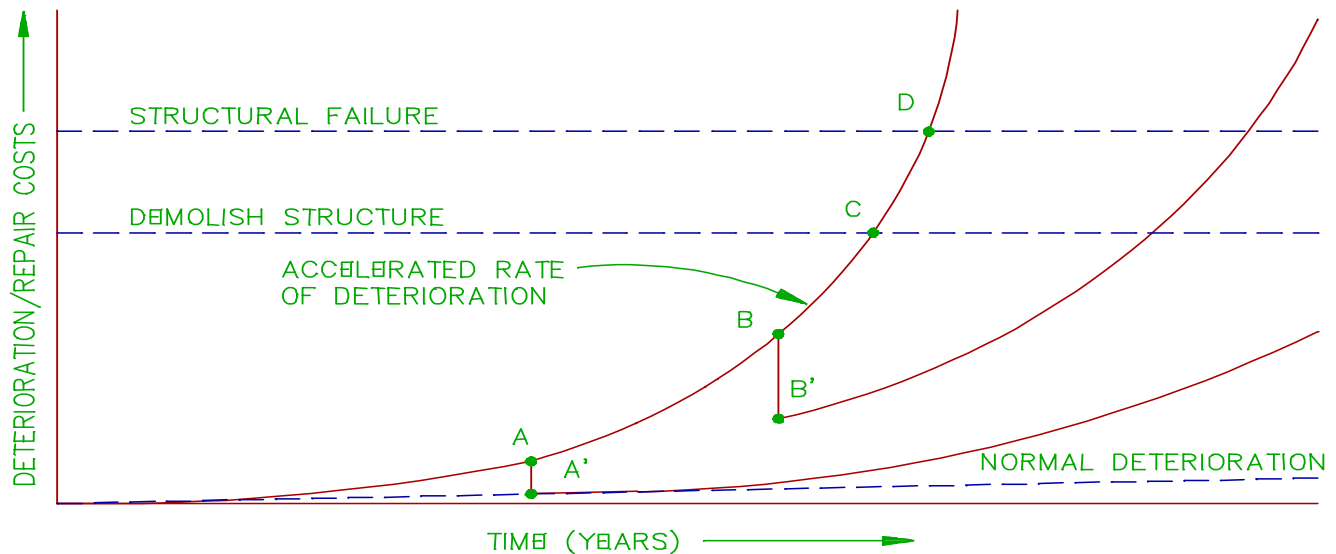
to 15%, and miscellaneous costs can be as high as 18% to 23%. The expenses, however, can vary dramatically, depending upon variables such as size of facility, geographical location, staffing patterns, method of operation, and local taxes.

As shown in Figure 1, operational/structural maintenance and repair costs can increase dramatically over time if a maintenance program is not in place.

D. DEFINITIONS

1. **Housekeeping** is the general cleaning and maintenance of the facility. Routine tasks include replacing light bulbs, cleaning and washing, removing graffiti, emptying trash, pruning trees, and maintaining the grounds.
2. **Preventive maintenance** is tasks to reduce the need for some major repairs. These include items such as sealing cracks and potholes, protecting metal surfaces from corrosion, upgrading security and surveillance systems, installing anti-graffiti coatings on metal surfaces, installing drains to remove nuisance water runoff, and trimming tree roots.
3. **Repairs** are tasks that restore or replace portions of the infrastructure to forestall the need for major repairs. This would include partial depth pavement repairs, replacing damaged sections of fencing, retaining walls or sound barriers, replacing signs and pavement markings, and replacing leaking irrigation systems.

Figure 1: Operational/Structural Maintenance and Repair Costs



NOTE:

1. Points A – D represent stages of accelerated deterioration in parking structures.
2. Structures repaired at point A cost less overall and last longer than structures repaired at point B. [Compare curve A' to B']

BACKGROUND

A. SPECIAL CONDITIONS

Public surface parking lots near transit facilities are unique and serve a vital role in public mobility. They have more amenities than commercial parking lots and are subject to more wear and tear due to regular public use. A preventive maintenance program will help prolong their useful service life.

B. MAINTENANCE PROGRAM BENEFITS

Parking facilities represent a significant commitment of capital. The principal benefit of a maintenance program is protection of that capital investment. When a surface parking lot is part of a larger facility, such as a transit station or commercial business complex, the need for regular maintenance is even more critical. Any surface parking lot deterioration could also affect the attached facilities. Maintenance must be performed at regular intervals to be cost-effective. Irregular maintenance will provide a marginal return on investment.

Attention to the facility's physical appearance and general cleanliness will promote user confidence. A regular maintenance program will help preserve user safety through proper lighting levels, signage, and sound walking and driving surfaces.

C. INFRASTRUCTURE DESCRIPTION

Metro owns and maintains approximately 150 Park & Ride surface lots throughout Los Angeles County, with the majority of lots located adjacent to a transit station. Park & Ride lots provide free and pre-paid spaces and convenient loading for carpools and vanpools.

The surface parking lots provide travelers the option to park their personal vehicles during working hours and complete their journey via light rail or bus rapid transit, which reduces traffic congestion on freeways and roads. Parking lots are a viable option for first mile/last mile connections for thousands of Metro patrons, and are a cost-effective element of Metro's overall network.

A surface lot could contain as few as 20 or as many as 1,000 parking spaces, depending on transit ridership and available land. Safety and usability of the surface parking lot are paramount to their preferred use by the traveling public.

A typical surface lot would be located within Metro right-of-way, with frontage on one or more major arterial streets, and accessible to multiple bus and rail lines. Surface lots may be located on surplus Metro right-of-way, and are subject to the same covenants and agreements as transit-oriented land use. It is not uncommon for major utilities or service rights to be located under or over surface parking lots.

D. INFLUENCE OF AS-CONSTRUCTED/EXISTING CONDITIONS ON MAINTENANCE

Surface parking lots are typically designed and constructed as part of a major transit line program. Generally, the life cycle of a surface parking lot starts with the opening of service of the adjacent transit line. Surface lots near the Blue and Orange lines would be older and showing more signs of use, compared to the Expo and Gold lines which opened more recently. Therefore, surface lots would have different maintenance needs generally based on the age of the adjacent transit line.

A surface parking lot may last between 10 and 30 years, or beyond. Frequently, a surface lot may be absorbed into a transit-oriented development some years after opening for service. Maintenance needs, especially long-term capital costs, should be evaluated regularly for compatibility with transit-oriented development.

As-constructed and existing conditions present unique concerns. This section describes specific maintenance items that should be checked during walk-through reviews.

1. **Pavement Surfaces:** Surfaces of asphalt or concrete that accommodate vehicular and pedestrian travel.

- a. **High Wear Area:** Areas of high vehicular traffic such as entrances, exits, and drive aisles. These areas will require resurfacing or repair sooner than parking areas. Any areas of distress that wear through the pavement should be repaired as soon as possible after the condition is observed.
 - b. **Cracks:** Asphalt pavement is designed to expand and flex through vehicular use, temperature cycling, and other dynamics typical of parking lot surfaces. Concrete is designed to stabilize areas subject to the movements of water and soil. Cracks and depressions that form over time should be routed and sealed immediately to prevent water from eroding pavement. Pavement should be replaced in locations of severe distress.
2. **Light Poles and Foundations:** Overhead light pole standards provide illumination for safe travel during dark hours. Over time, light poles may develop stress such as bending due to wind or seismic forces. Foundations can also be compromised from poor soil or water erosion. Corrosion and failure of electrical components would decrease the efficiency of the illumination. Light pole standards and electrical systems should be observed regularly, stresses noted, and equipment replaced to eliminate hazards.
 3. **Equipment for Electrical, Security, and Fire Protection Systems:** These systems are crucial to a functional parking facility, providing efficient regular service and protection during emergencies. Reliable systems and components should be inspected regularly, and replaced promptly as needed, to ensure reliability.
 4. **Concrete Structure Repairs:** Miscellaneous and ongoing concrete repairs are to be expected for retaining walls, sound barriers, and other structural elements. Control of nuisance water and vegetation is essential to reduce the long term stresses they may impose on concrete structures.
 5. **Drainage:** Elements of the drainage system include gutters, inlets, catch basins, piping, clarifiers, detention areas, and outlets. These elements must be inspected regularly for leaks and erosive damage. Prompt repair would ensure proper conveyance of water and prevent long term damage to infrastructure elements.
 6. **Landscaping, Fencing, and Facilities:** Continual use of transit parking lots by the traveling public would take its toll on the parking lot facilities over time. Removal of graffiti, replacement of damaged fencing, and upkeep of trees and vegetation would provide a pleasant experience for the public and promote the facility's use to more travelers.

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

E. PROJECT RESPONSIBILITY

Project Team:

The following lists parties involved with the construction of Metro surface parking lots on a typical project. Metro is encouraged to provide this information with the Maintenance Plan as a reference.

*****SAMPLE – CUSTOMIZE FOR SPECIFIC LOCATIONS*****

The primary parties involved with the construction of this project were:

<p>Owner: Metro Name of Company</p>	<p>Contact: (Name of Project Manager) Address: 1 Gateway Plaza City, State, Zip: Los Angeles, CA 90012 Phone: 213-922-6000 Email:</p>
<p>Architect: Name of Company</p>	<p>Contact: Address: City, State, Zip: Phone: Email:</p>
<p>Civil Engineer: Name of Company</p>	<p>Contact: Address: City, State, Zip: Phone: Email:</p>
<p>Electrical Engineer: Name of Company</p>	<p>Contact: Address: City, State, Zip: Phone: Email:</p>
<p>Geotechnical Engineer: Name of Company</p>	<p>Contact: Address: City, State, Zip: Phone: Email:</p>

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN
SURFACE PARKING LOTS MAINTENANCE MANUAL**



AUGUST 2016

PROJECT NO. 37-8549.00

Inspection Agency: _____ Name of Company	Contact: _____ Address: _____ City, State, Zip: _____ Phone: _____ Email: _____
General Contractor: _____ Name of Company	Contact: _____ Address: _____ City, State, Zip: _____ Phone: _____ Email: _____

The following is a sample guarantee provision enabling Metro to identify any defective or non-operating workmanship during a 1-year term of maintenance and inspections, and obligates the contractor to remedy such defective or non-operating work at no cost to Metro. Metro may use a similar established provision in lieu of this sample.

*****SAMPLE – CUSTOMIZE FOR SPECIFIC LOCATIONS*****

By the act of executing the Agreement for the construction or repair of Sample Surface Parking Lot ("Project"), the Contractor accepted the following guarantee with Metro ("Owner") covering the project:

Any materials, workmanship, or equipment furnished as part of Project that prove defective or fail to operate properly, within 1 year of date of acceptance of Work required under Project, or as otherwise specified in Contract Documents (damage by wear or violence or casualty not fault of Contractor excepted), shall be repaired and replaced by Contractor promptly upon notification from Owner and without cost to Owner. This guarantee provision applies regardless of whether or not such defective workmanship, materials or equipment are listed in final punch list. Date of acceptance will be established by Owner and Engineer upon finding all items of Project substantially complete as to quality of workmanship and materials.

In general, if Metro finds any items that are believed to be defective during the period of (date of facility opening) through (one year after facility opening), Metro should notify the General Contractor. A number of items specified have separate or longer guarantee periods which are noted in the following section. Correction of defective work is not the same as either the specified maintenance periods or routine service during the guarantee periods, for which contact should be made directly to the subcontractor involved.

SPECIFIED GUARANTEES AND WARRANTIES

*****SAMPLE – CUSTOMIZE FOR SPECIFIC LOCATIONS*****

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Specification Division	Contractor	Comments
Existing Conditions (Division 02)		
Subsurface Investigation (Section 023000)	Company Name Address Phone	
Demolition (Section 024000)	Company Name Address Phone	
Site Remediation (Section 025000)	Company Name Address Phone	
Concrete (Division 3)		
Cast-in-Place Concrete (Section 033000)	Company Name Address Phone	
Precast Concrete (Section 034000)	Company Name Address Phone	
Masonry (Division 04)		
Common Work Results for Masonry (Section 040500)	Company Name Address Phone	
Thermal and Moisture Protection (Division 7)		
Waterproofing (Section 071000)	Company Name Address Phone	
Weather Barriers (Section 072500)	Company Name Address Phone	
Specialties (Division 10)		
Information Specialties (Section 101000)	Company Name Address Phone	
Signage (Section 101400)	Company Name Address Phone	

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Specification Division	Contractor	Comments
Safety Specialties (Section 104000)	Company Name Address Phone	
Equipment (Division 11)		
Operation and Maintenance of Equipment (Section 110100)	Company Name Address Phone	
Vehicle and Pedestrian Equipment (Section 111000)	Company Name Address Phone	
Facility Maintenance and Operation Equipment (Section 118000)	Company Name Address Phone	
Fire Suppression (Division 21)		
Operation and Maintenance of Fire Suppression (Section 210100)	Company Name Address Phone	
Fire Extinguishing Systems (Section 212000)	Company Name Address Phone	
Electrical (Division 26)		
Lighting (Section 265000)	Company Name Address Phone	
Electronic Safety and Security (Section 280000)	Company Name Address Phone	
Fire Detection and Alarm (Section 284600)	Company Name Address Phone	
Earthwork (Division 31)	Company Name Address Phone	

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Specification Division	Contractor	Comments
Bases, Ballasts, and Paving (Division 32)	Company Name Address Phone	
Flexible Paving (Section 321200)	Company Name Address Phone	
Rigid Paving (Section 321300)	Company Name Address Phone	
Curbs, Gutters, Sidewalks, and Driveways (Section 321600)	Company Name Address Phone	
Fences and Gates (Section 323100)	Company Name Address Phone	
Retaining Walls (Section 323200)	Company Name Address Phone	
Site Furnishings (Section 323300)	Company Name Address Phone	
Planting (Section 329000)	Company Name Address Phone	
Utilities (Division 33)		
Stormwater Utilities (Section 334000)	Company Name Address Phone	
Electrical Utilities (Section 337000)	Company Name Address Phone	

L.A. METRO SUPPORTIVE TRANSIT PARKING PROGRAM MASTER PLAN

SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Operational maintenance and Infrastructure maintenance each have significantly different characteristics from the other and must be treated as separate maintenance items. See Tables A and B for elements in each class.

Table A – Operational Maintenance Program

- Electrical System
 - Security Monitoring Equipment
 - Fire Protection Equipment
 - Parking Control Equipment
 - Graphics, Signage, and Pavement Markings
 - Cleaning Requirements
 - Housekeeping
 - Graffiti
 - Sweeping
 - Washdown
 - Architectural Elements
 - Painted or Stained Surfaces
 - Landscaping
 - Drainage
 - Inspection
-

Table B – Infrastructure Maintenance Program

- Pavement
 - Curbs, Gutters, Sidewalks, and Driveways
 - Lighting
 - Fencing
 - Storm Drains, Clarifiers, Oil Water Separators
 - Retaining Walls and Sound Barriers
 - Inspections
-

A. OPERATIONAL MAINTENANCE

1. Electrical System

Adequate lighting is essential and will help ensure secure and easy movement of users.

Inspect all fixtures daily, including pedestrian "EXIT" signs, emergency light fixtures, and lighted directional/informational signs. Replace or repair light fixtures that are not working properly or are damaged.

Studies by manufacturers have shown that the energy consumed by some lamps increases rapidly towards the end of lamp service life. Scheduled relamping before burnout may reduce energy costs. Review service life expectancy versus power consumption with your local lamp supplier. See Table C for typical relamping information.

Table C – Relamp Schedule

Lamp Type	Typical Rated Life (Hours)	Typical Mean Output (% of Max.)	End of Life Output (% of Max.)	Recommended Replacement Life (% of Rated Life)
High Pressure Sodium	24,000	85% - 90%	70% - 80%	80%
Metal Halide	10,000 – 20,000	75% - 80%	60% - 70%	70%
Fluorescent	12,000 – 20,000	85% - 90%	75% - 80%	80%
Light Emitting Diode (LED)	25,000 – 50,000	85% - 95%	75% - 85%	85%

Clean and repair electrical conduit exposed to rain water or if rusting. Vulnerable locations for conduit corrosion include light pole foundations, junction boxes, and sign enclosures. Replace damaged conduit that is loose from its mounting or has exposed conductors. Maintain electrical outlets and junction boxes in safe working condition. If outlets have cover plates, keep them in proper working order.

Clean and paint or replace damaged or rusting electrical panels.

Check, clean, and calibrate timers and photocells. Test ground fault circuit interrupters. Check fuses for burnouts.

Identify leaking from platform ceiling boxes and repair source of leak. Windblown water can infiltrate electrical conduit.

Inspect, clean, and test emergency lighting systems as recommended by manufacturer.

2. Security Monitoring Equipment

Test the following items regularly to ensure proper operation:

- a. Television surveillance cameras
- b. Intercoms/Audio monitoring devices
- c. Emergency telephones
- d. Emergency call buttons inside cashier booths

The importance of maintaining security monitoring devices cannot be overstressed. Maintain security monitoring systems in proper working order always. Daily inspection of all equipment is required. Correct deficiencies immediately.

3. Fire Protection Equipment

Check portable fire extinguishers for satisfactory charge monthly. Test smoke and carbon monoxide detectors to help ensure proper functioning. Repair or replace broken extinguishers, cabinets, and detectors.

4. Parking Control Equipment

Examine all parking equipment monthly. Establish a preventive maintenance program to lessen breakdowns. It is prudent to maintain an inventory of critical parts so maintenance crews can quickly repair the equipment.

Periodic servicing of the parking equipment is essential for smooth operation of the facility. Set up a service agreement with the parking equipment supplier with on-call service to provide help with breakdowns. New equipment added to the facility after original construction must be compatible with existing equipment. Keep copies of operations and service manuals for all equipment on hand for easy reference. Set up a log of maintenance and service calls for each piece of equipment

5. Graphics, Signage, and Pavement Marking

Proper graphics are essential to the smooth operation of the parking facility and must be kept clean and visible. Graphics combining words or symbols with arrows are the most effective for traffic and pedestrian movement control. Keep all entrance, exit, and traffic directional signage and displays clean and legible. Examine paint or facing material for graphics semi-annually for deterioration. Repaint, repair, or replace as required.

Keep sidewalk signs directing patrons to their destinations legible and visible from all decision points, entrances, and exits.

Inspect pavement striping semi-annually after cleaning. Repaint as required, typically at two to four year intervals. Restriping should be performed after medium pressure water cleaning and degreasing of pavement. Restriping also will be required after the application of joint sealers. Contact Walker for the latest striping code requirements.

6. Cleaning

a. Housekeeping

Keep walkways clean. Passenger loading areas, floors, stairs, ramps, walkways, and security stations should be swept regularly. Sweep heavily used areas daily. The facility should be clean and presentable. Trash receptacles, placed at convenient locations, will help ensure proper trash disposal. Users tend to keep a well-maintained facility clean by not littering.

b. Graffiti

Graffiti can be easily removed if a protective coating is applied to concrete and metal surfaces. Where coatings are not used, removal may be more difficult. Remove graffiti promptly.

c. Sweeping

A frequently overlooked aspect of parking facility maintenance is proper surface cleaning. Sweep the parking lot surfaces weekly. Clean sidewalks daily. Remove dirt and debris from pavement cracks and potholes regularly with hand brooms.

Sweeping can be done with hand brooms or mechanized sweepers designed for use in parking lots. Mechanized sweepers must not exceed levels of noise or dust pollution acceptable by NPDES and other current environmental permits.

Remove all dirt and debris from the facility. Keep dirt and debris from drain basins and pipes. Blockage will cause system leakage or failure. Remove grease buildup in parking spaces and exit areas with proper degreasers.

d. Washdown

In addition to sweeping, an annual washdown with low pressure hoses is advisable. Remove debris collected during the year by sweeping the pavement and sidewalk surfaces. Use soap or chemical additives as needed to remove significant oily deposits. High pressure washing may be performed if it will not damage crack sealants. See Table D for typical water pressures.

**L.A. METRO SUPPORTIVE TRANSIT PARKING
PROGRAM MASTER PLAN**
SURFACE PARKING LOTS MAINTENANCE MANUAL



AUGUST 2016

PROJECT NO. 37-8549.00

Collect the wash water runoff with water vacuums and tanker trucks. Services may be performed by a specialty environmental waste company. Dispose of wash water properly as stated in NPDES and other environmental permits.

Temporary burlap or straw filters will prevent sand from getting into the drains.

Table D – Preparation of Concrete Surfaces Using Water

Terminology/ Technique	Purpose/ Use	Typical Water Pressure (psi)	Typical Water Consumption (gpm)	Removal Capability
Low Pressure Washing/Hoses	Cleaning	25 – 40	6-10	Loose sand and debris
Med. Pressure Washing Power Washer	Cleaning	2000 – 4000	10 (minimum)	Loose paint, sludge
High Pressure Washing Compressor*	Light surface preparation	5000 – 8000	18 (minimum)	Sealer, traffic topping, paint removal
Waterblasting*	Heavy surface preparation	8000 – 12000	18 (minimum)	Sealer, traffic topping, patch prep., everything

*High pressure washing and waterblasting are not typical maintenance items. Experienced contractors with an engineer’s direction should perform these procedures.

As part of California's water conservation effort, the washdown should be performed once a year in the winter months, before significant rain events.

e. Architectural Elements

Sweep, clean, and wash sculptures and artwork. Sweep and clean benches and seating areas weekly. Remove bird waste from seating areas.

f. Painted or Stained Surfaces

Paint exposed light poles and foundations, retaining walls, sound barriers, structural elements, fascia panels, guardrails, bollards, exposed pipes, conduits, and handrails

as required. Painted or stained surfaces will need repainting at three to seven year intervals, depending on exposure conditions.

To increase service life, pay careful attention to surface preparation before painting. Select a paint appropriate to the particular application.

Rust stains are usually an indicator of other problems such as concrete cracking, paint failure, or sealant failure. The cause of rust staining should always be determined and corrected before repainting or resealing.

7. Landscaping

Landscaping features improve facility appearance and provide stormwater collection and storage. In general, all plantings should be well tended. Frequently clean landscaped areas of debris and trash. Trim tree branches that block lighting or extend past the facility border. Remove and dispose of dead or dying vegetation. Check plantings annually for disease or rotting, typically to be performed by a certified arborist or biologist.

Daily pick up fallen leaves and palm fronds. Sweep walkways clear of loose gravel, tree bark, or soil. Inspect the sprinkler systems for exposed piping or broken sprinkler heads, especially if they are leaking.

8. Drainage

Los Angeles County is subject to periodic but extreme monsoonal rainfalls. The drainage system must be able to collect and remove a large amount of runoff in a short amount of time. Promptly remove all debris that might clog the drains. All drains should be cleaned periodically to help ensure proper drainage. Large areas of standing water present a hazard to drivers and pedestrians.

Check area drains daily. Inspect drain basins, inlet grates, leaders, downspouts, and all support brackets annually for leaks or distress. Clean sediment basins as required to prevent clogging and ponding. Record all deficiencies noted and program appropriate action.

9. Inspections

In addition to specific inspections required for the preceding items listed within this section, an annual examination of the parking facility is recommended.

B. INFRASTRUCTURE MAINTENANCE

1. Asphalt and Concrete Pavement

The largest share of Infrastructure maintenance is required by pavement. Scaling, spalling, cracking, ponding, and leaking reduce the serviceability and structural integrity of pavement surfaces.

Uncovered pavement areas are subjected to the most severe weather exposure conditions. These areas require more frequent treatment of a quality asphalt slurry seal and heavier application rates than covered areas. See Table E. Sidewalks, gutters, and ponded areas require special attention. Such areas should be closely monitored. If deterioration develops, apply slurry seal more frequently. Supplemental drains should be installed if large ponding areas develop. Small ponds should be squeegeed into the nearest gutter or drain.

Table E – Asphalt Slurry Seal Application

Area	Frequency
All Asphalt Surfaces	As needed for minor cracking and wear (normally every 4-6 years) (a)
Drive Aisle Turning Areas (b)	Every 4-6 years (c)
Adjacent to Gutters (b)	Every 4-6 years (c)
Parking Areas	Every 8-10 years (c)

- (a) Entry/exit areas that are subject to more severe exposure may require retreatment every 2 to 5 years. Testing and inspection can be performed to determine degree of exposure.
- (b) Only required for surfaces and areas subject to frequent wetting.
- (c) For maximum effectiveness, the sealer should be applied with the coverage rate recommended by the sealer system manufacturer.

2. Curbs, Gutters, Sidewalks, and Driveways

Cracks or uneven surfaces on sidewalks present the most common tripping hazard to pedestrians. Regularly inspect all sidewalk surfaces for slab uplift, particularly near trees. Trim tree roots and install root barrier prior to replacing uplifted sidewalk slabs. Minor cracks and spalls should be routed and repaired with concrete crack sealant. More severely damaged sidewalk sections should be completely replaced with new concrete.

Curbs and gutters capture and convey stormwater runoff and nuisance water from the parking surface. Inspect semi-annually all curbs and gutters for cracks and uplifts. As part of infrastructure examination, note the presence of water runoff leaving the asphalt and not reaching the gutter, as the asphalt/gutter interface may be compromised from excessive poor runoff. Water will infiltrate the interface and exacerbate the pavement damage. Heavily damaged sections of curb or gutter should be repaired in full to the nearest score line.

Driveways provide vehicles entry and exit to the parking lot from streets. Inspect semi-annually for cracks and uplifts and other distress as for sidewalks and gutters. Distressed concrete in driveways could damage vehicles entering or exiting the parking lot, prompting complaints from users. Repair as for sidewalks and gutters.

3. Lighting

Adequate lighting is essential for safe use during nighttime hours. Users of the facility would feel more comfortable and safe with sufficient illumination.

Inspect the parking facility during nighttime hours to accurately determine illumination. Check for and note areas of darkness, especially walkways with insufficient lighting. Regularly review complaints by users and neighbors regarding lighting intensity and quality.

Refer to "Operational Maintenance – Electrical Systems" for more guidance.

In addition, semi-annually check light poles for deformities such as corrosion, dents, or bending. Check fuses and grounding for adequacy. Note the severity of each deformity from one inspection to the next. For economy of scale, when selecting light poles to be replaced, identify ten or more in multiple locations close to one another, so that all can be replaced under a single contract.

4. Fencing

Inspect fencing for deficiencies such as graffiti, missing sections of wire mesh, poles are bent or missing, wire mesh is bent or folded down at the top, or wire mesh is cut resulting in sharp exposed points. Promptly replace deficiencies to reduce the likelihood of vandalism to the parking facility.

Security fencing should be present when the parking lot facility borders state highways, flood control channels, alleys, or other secured areas. Inspect fencing for missing or damaged barbed wire. Coordinate with neighbor if the parking lot borders an airfield or other areas of high-security.

5. Storm Drains, Clarifiers, and Oil-Water Separators

Clarifiers and separators collect trash and oil from the pavement surface through the drainage system. Inspect the clarifiers and separators, including the sumps, monthly for debris.

Clean out clarifiers and oil-water separators at least semi-annually. Collect the runoff with water vacuums and tanker trucks. Services may be performed by a specialty environmental waste company. Dispose of oil and debris properly as stated in NPDES

and other environmental permits. Replace filter cartridges per manufacturer's recommendations.

6. Retaining Walls and Sound Barriers

Early signs of cracking, spalling, leaks, or other damage must be noted immediately to prevent further deterioration and maintain structure integrity. Note any movement of soil embankments. Distress can be caused by nuisance water, damaged or clogged drainage, vegetation roots, or poor soil. Failed or damaged joint sealants require prompt correction to stop leakage and prevent further deterioration. Distress also can be caused by restraint or excess load.

Cracks and leaks require immediate corrective routing and sealant to avoid deterioration. For sound barriers, which are typically masonry walls with non-pre-stressed reinforcement, and which would not support an embankment, consider replacement of masonry unit cells showing severe deterioration.

7. Infrastructure Examination

A general examination of all infrastructure parts is required to help prolong service life. The infrastructure examination typically involves a walk-through survey to note deterioration. The walk-through should be performed annually for new surface lots in good condition. Older surface lots that are deteriorating would require a more detailed examination. Areas of deterioration (potholes, etc.) should be noted on a plan sheet for later examination by a qualified engineer. Other less serious conditions such as ponding, "bird baths", excess abrasion should also be noted, as they are indicators of future problems.

Whenever possible, use non-destructive methods for examination, such as Ground Penetrating Radar (GPR) for voids. Take extra care in observing corroded metal, as older paint may flake off and create a dust hazard.

The results from each inspection should be evaluated by a qualified engineer to determine appropriate maintenance and/or repair. Maintenance may be performed by in-house forces or contracted out. Repair requires specialized contractors.

Appendix A contains daily, weekly, monthly, semi-annual, and annual operational checklists to record maintenance, and an annual structural checklist to determine if any structural maintenance/repairs are required.

APPENDIX A
CHECKLISTS FOR
OPERATIONAL AND
INFRASTRUCTURE
MAINTENANCE

MAINTENANCE MANUAL AND PROGRAM OPERATIONAL AND INFRASTRUCTURE CHECKLISTS

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

Use the following daily, weekly, monthly, semi-annual, and annual operational checklists to record maintenance. The annual structural checklist will help to determine if any structural maintenance/repairs are required. In general, signs of water leaking and rust staining must always be noted. Mechanical and electrical deficiencies should be repaired per manufacturers' and suppliers' recommendations.

The following terms can serve as a measuring scale for prioritizing repairs and maintenance to overall systems or portions of the system. Please note that when terms are applied to an overall system, certain portions of the system may be in a different condition.

- Excellent:** Items in "as new" condition requiring no rehabilitation and should perform in full accordance with its useful expected life.
- Good:** Item is sound and performing its function, although it may show signs of normal wear and tear. Some incidental rehabilitation work may be recommended.
- Fair:** Item is performing adequately at this time but exhibits deferred maintenance, evidence of previous repairs, substandard workmanship, is obsolete, or is approaching the end of its typical useful expected life. Repair, replacement, or maintenance is necessary to prevent further deterioration, or to prolong its useful life.
- Poor:** Item has either failed or cannot be relied upon to continue performing its original function. Present condition could contribute or cause the deterioration of other adjoining elements or systems. Repair or replacement is required.

MAINTENANCE MANUAL AND PROGRAM DAILY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- Lights in parking lots operating
- Lights along walkways operating
- Lights along stairs operating
- Lights at train platforms operating
- Lights for signs and kiosks operating
- Lights at bus stops operating

SECURITY MONITORING EQUIPMENT

- Telephones operating
 - Emergency
 - Cashier Booths
 - Security Station/Office
- Surveillance cameras operating
- Emergency call buttons in cashier booths operating

CLEANING

- Pick up trash
- Remove graffiti
- Remove posters, stickers, adhesive graffiti
- Pick up palm fronds
- Pick up fallen tree branches
- Sweep leaves and rocks away from pedestrian walkways
- Sweep out debris from pavement cracks

FIRE PROTECTION EQUIPMENT

- Remove dead dried-up vegetation.
- Check portable fire extinguishers for satisfactory charge.

MAINTENANCE MANUAL AND PROGRAM DAILY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

- Test smoke and carbon monoxide detectors to ensure proper functioning. Replace batteries.

DRAINAGE

- Clean off drain grates
- Squeegee ponded water to nearest drain

INSPECTION

- Check ADA tactile warning surfaces for deterioration
- Check for trip hazards and other safety concerns
- Note areas of ponded water
- Check for missing or damaged signs

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM WEEKLY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- Exposed conduit in good condition
 - No signs of rust or corrosion
 - Not loose from mounting
 - No wires or cables exposed
- Light poles
 - Handhole covers are present
 - Remove anything illegally attached (banners, flyers, etc.)

CLEANING

- Remove abandoned bicycles
- Mow grass

INSPECTION

- Check fencing
 - Note cut outs in mesh
 - Note folded mesh
 - Note bent posts
 - Note missing sections
- Check pipe bollards and flexible delineators
 - Note dents
 - Note if bent or damaged
 - Note if missing

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM MONTHLY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

FIRE PROTECTION EQUIPMENT

- Check portable fire extinguishers for satisfactory charge.
- Test smoke and carbon monoxide detectors to ensure proper functioning. Replace batteries.

PAVEMENT

A. Entrances and exits

- Cracks – measure length, width, depth
- Potholes – measure diameter, depth
- Check for loose pavement, aggregate

B. Drive Aisles

- Cracks – measure length, width, depth
- Potholes – measure diameter, depth
- Check for loose pavement, aggregate

C. Sidewalks

- Cracks – how many, measure depth
- Note slab uplift – measure height difference
- Note tree root damage.

ILLUMINATION

A. Light poles

- Check for bending
- Check for dents
- Remove tree branches and canopies blocking light

MAINTENANCE MANUAL AND PROGRAM MONTHLY OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

B. Light pole foundations

- Bending
- Cracked, damaged
- Pavement around the foundation is damaged

C. Lighting trespass

- Review complaints from neighbors about excessive lighting

MECHANICAL EQUIPMENT

A. Parking and Revenue Control Equipment

- Check entrance and exit lanes for proper operation
 - Ticket dispenser
 - Gate
 - Fee computer
 - Card access reader
 - Detectors and loops
 - Security Station or Booth

DRAINAGE

A. Stormwater Clarifiers

- Inspect clarifiers for leaks
- Remove trash and debris
- Replace filters and cartridges per manufacturers' instructions
- Refer to Metro's National Pollutant Discharge Elimination System (NPDES) General Permit. Follow specific guidelines and procedures

B. Oil-Water Separators

- Inspect separators for leaks
- Remove oil, grease, and other residue with a vacuum
- Dispose of oil, grease, and other residue
- Refer to Metro's National Pollutant Discharge Elimination System (NPDES) General Permit. Follow specific guidelines and procedures

CLEANING

A. Wash floors and windows

**MAINTENANCE MANUAL AND PROGRAM
MONTHLY OPERATIONAL CHECKLIST**

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

- Security station/office
 - Booths
- B. Remove grease buildup and oil spots
- All parking areas
 - Passenger pick-up / drop-off areas
- C. Sweep out debris from pavement cracks
- D. Trim shrubs

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM SEMI-ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- A. Control and power panels for proper operation. Verify that daytime circuits are off during the day to avoid wasted energy use and higher energy bills.
- B. Timers and photocells for proper operation
- C. Ground fault circuit interrupters for operation
- D. Fuses at light poles for operation
- E. Exposed conduit in good condition
 - No signs of rust
 - Not loose from mounting
 - No exposed wires or cables

FIRE PROTECTION EQUIPMENT

- A. Test alarms for proper functioning

LANDSCAPE

- A. Prune trees
- B. Remove dead and dried out vegetation

GRAPHICS, SIGNAGE, AND FLOOR STRIPING

- A. Clean signs
 - Directional signs
 - Entrance/exit signs
 - Floor/level designations
- B. Examine paint or facing material for deterioration
- C. Pavement striping and markings
 - Check "STOP" lettering, STOP bar, directional arrows and markings

MAINTENANCE MANUAL AND PROGRAM SEMI-ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

- Check parking space stripes and lettering
- Check ADA accessible parking spaces, drive aisles, and pathways.
- Restore markings if more than 25% of the marking is missing or weathered

CLEANING

- A. Degrease where required
- B. Washdown of entire facility including security station and lobby
- C. Check painted/stained surfaces for touchups

DRAINAGE

- A. Clean out drains
- B. Check for leaks
 - Drain basins
 - Inlet grates
 - Retaining wall weep drains
 - Downspouts and support brackets
- C. Examine gutters. Note the following:
 - Water ponding
 - Cracks in gutters are filled with water
 - Asphalt adjacent to gutters is cracked. Surface water runoff infiltrates cracks before reaching the gutter
 - Sections of gutter are uplifted from adjacent sections. Measure amount of displacement.

**MAINTENANCE MANUAL AND PROGRAM
SEMI-ANNUAL OPERATIONAL CHECKLIST**

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

Comments and Corrective Action Required:

MAINTENANCE MANUAL AND PROGRAM ANNUAL OPERATIONAL CHECKLIST

INSPECTOR _____

DATE _____

SURFACE LOT NAME: _____

L.A. METRO

LOS ANGELES COUNTY, CA

ELECTRICAL SYSTEM

- A. Distribution panels
- B. Electrical conduit

SEASONAL PREPARATION

- A. Washdown parking lot, sidewalks, landscaped areas
- B. Flush
 - Drains
 - Irrigation systems
 - Hosebibs
 - Other piping
- C. Check for blockages
- D. Remove dead and dried-out vegetation, particularly around fences and light poles.

FIRE PROTECTION EQUIPMENT

- A. Test alarms for proper functioning

OVERALL

- A. General review of all operational components
- B. Prune trees/shrubs

Comments and Corrective Action Required:

ANNUAL INFRASTRUCTURE CHECKLISTS

ANNUAL INFRASTRUCTURE CHECKLIST

SURFACE LOT NAME: _____

INSPECTOR _____

DATE _____

MAINTENANCE MANUAL AND PROGRAM

L.A. METRO

LOS ANGELES COUNTY, CA

PAVEMENT

_____ When was the last pavement overlay or slurry seal application? Which one? (Typically applied every 5 years.)

_____ When was the last crack sealing application? (Typically applied every 2 – 3 years.)

_____ Are there any of the following types of unsealed cracks? If so, measure and record the width and depth:

- _____ • Longitudinal
(along major travel direction)
- _____ • Transverse
(across major travel direction)
- _____ • Block
(collection of cracks)
- _____ • Alligator
(cracks forming small, sharp-edged pieces of pavement)
- _____ • Slippage
(crescent shaped cracks caused by vehicle turns)
- _____ • Reflection
(shaped like a substructure object, such as a building foundation or manhole). Measure the distance to the nearest physical object.

_____ Is the pavement surface weathered or raveling? Is there loose tar or aggregate?

_____ Are there potholes? If so, how many? Measure the depth and diameter of the largest pothole.

_____ Are there depressions with ponded water? (i.e., "bird baths"). If so, how many? Measure the diameter of the largest depression.

_____ Are there depressions without water? (i.e., rings of dried salt or dirt where water has evaporated). If so, how many? Measure the diameter of the largest ring.

_____ If the pavement is concrete, is there spalling?

_____ If the pavement is concrete, is there exposed steel reinforcement? Where?

_____ If the parking lot is on a hillside, is pavement cracking parallel to the hillside edge? Is soil from the hillside eroding under the pavement?

CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS

_____ Are there cracks? Where? If yes, are they longitudinal or transverse to paths of travel? Measure the width and depth.

ANNUAL INFRASTRUCTURE CHECKLISTS

ANNUAL INFRASTRUCTURE CHECKLIST

SURFACE LOT NAME: _____

INSPECTOR _____

DATE _____

MAINTENANCE MANUAL AND PROGRAM

L.A. METRO

LOS ANGELES COUNTY, CA

_____ Is water ponding in the cracks? Is there spalling? (loose pieces of concrete)

_____ Is there vertical slab uplift? Where? Measure the vertical difference. Measure the length to the nearest score line in both directions.

_____ If there is vertical slab uplift, is it caused by tree roots? Measure the vertical difference. Measure the length from the tree root to the nearest score line in both directions.

_____ For painted curbs (red, white, blue, green, etc.), is the paint peeling or weathered? Is the percentage of paint that is still visible less than 50%?

LIGHTING

_____ Are any light poles bending or tilted? How many?

_____ Are any light poles dented or have drilled holes? How many?

_____ Is there corrosion or rust for any section on a light pole?

_____ Are the light pole foundations tilting or out of plumb? How many?

_____ Are the light pole foundations cracked or spalling? How many?

FENCING

_____ Are holes cut into the fence mesh that are large enough for a person to crawl through?

_____ Is the fence mesh bent or folded at the top? At the bottom? On an edge?

_____ Are pieces of fence mesh missing, with exposed sharp edges?

_____ Are fence posts bent? Dented? Missing? How many?

_____ If there is razor wire, is it bent or missing? Is the razor wire folded down or moved, large enough for a person to crawl through?

_____ Are safety bollards bent or dented?

STORM DRAINS, CLARIFIERS, OIL-WATER SEPARATORS

_____ When was the last time a clarifier or oil-water separator was emptied? (Typically once a year). Identify which type is on-site.

ANNUAL INFRASTRUCTURE CHECKLISTS

ANNUAL INFRASTRUCTURE CHECKLIST

SURFACE LOT NAME: _____

INSPECTOR _____

DATE _____

MAINTENANCE MANUAL AND PROGRAM

L.A. METRO

LOS ANGELES COUNTY, CA

_____ When was the last time a clarifier cartridge or filter was replaced? (Typically every 5 years).

_____ Is there corrosion on the concrete at grate inlets? Around the grate frame?

_____ Is there standing water over or near an inlet? Measure the length and width of the standing water.

_____ Does an inlet contain water, even though there has NOT been a recent rain event?

_____ Near a manhole, clarifier, or separation structure, is there a distinct odor? Describe the odor (rotten eggs, biological waste, or other).

RETAINING WALLS AND SOUND BARRIERS

_____ Are there cracks? Where? If yes, are they longitudinal, transverse, or diagonal to the wall height? Measure the width and depth.

_____ Is there any exposed steel? If yes, where is it located? Is it rusted?

_____ Is there spalling? (loose pieces of concrete, masonry, or mortar)

_____ Is the soil behind a retaining wall showing signs of eroding? (i.e., slipping, granular, loose, spilling over the wall)

_____ Is vegetation showing through cracks in a wall? Note roots, branches, leaves. How many pieces of vegetation are protruding through the wall?

_____ Are there signs of water damage (efflorescence) on the face of the wall?

_____ Are there vertical streaks of corrosion along the face of the wall? Identify the source, if possible.

EXAMINATION

_____ List any references used to determine type and severity of distress. (i.e., ASTM, Federal, State level references)

_____ Provide the name, address, and telephone number of the manufacturer for any device or equipment used on the site.

_____ Provide the model number for any device or equipment used on site. If the model has been discontinued, contact the manufacturer for a suitable replacement model to keep on file.

After answering the above questions, please consult a qualified engineer to discuss your answers.

Comments and Corrective Action Required:

Form 2

Surface Lot Name _____ Location _____	Inspection Date _____ Inspector _____ Next Scheduled Inspection Date _____
--	--

2. MAINTENANCE/REPLACEMENT

Action Required	Frequency Required	Date Last Performed	Date Next Scheduled
A. Structural			
Asphalt Slurry Seal Repair			
Asphalt Repair			
Concrete Repair			
Crack Repair			
B. Operational			
1. Lighting			
Replace light bulbs			
Replace/Repair Exposed Conduit			
Replace Timers and Photocells			
2. Seasonal Preparation			
Cleaning			
Sweeping			
Washdown			
Flush Drains			
Paint			
Landscaping			
3. Fire Protection			
Replace Nonfunctioning items			

Notes:

Form 3

Surface Lot Name _____ Location _____	Inspection Date _____ Inspector _____ Next Scheduled Inspection Date _____
--	--

3. PREVENTATIVE MAINTENANCE			
Action Required	Frequency Required	Date Last Performed	Date Next Scheduled
Paint metal surfaces			
Upgrade security and surveillance systems			
Replace non-performing drainage systems			
Install anti-graffiti coatings			
Trim tree roots			

LOCATIONS			
Location Number	Location	Level	

Notes:

NEXT INSPECTION DATE: _____

Parking Maintenance Tasks and Recommended Frequencies

	Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
CLEANING: - Sweep localized areas - Sweep all areas/curbs - Empty trash cans - Clean walls - Remove graffiti - Wash parking-area floors - Clean parking-control equipment	D D D	M D M M D	M D M	M D D		M	
DOORS AND HARDWARE: - Check hinges/latches - Check mechanized doors - Check panic hardware on security doors - Lubricate mechanized doors	D D D	M M M		D	M		
ELECTRICAL SYSTEM: - Check light fixtures - Relamp fixtures - Inspect special units - Check distribution panels - Perform preventive maintenance		D D	M	M		D	M

D – Desirable

M - Minimum

	Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
<p>FIRE PROTECTION SYSTEM:</p> <ul style="list-style-type: none"> - Inspect for proper operation - Test equipment for proper operation - Perform preventive measures 		D	M	D	M		
<p>LANDSCAPING:</p> <ul style="list-style-type: none"> - Remove trash - Mow, trim, and weed 	D	D	M				
<p>PAINTING:</p> <ul style="list-style-type: none"> - Look for rust on doors/door frames - Look for rust on handrails/guardrails - Look for rust on exposed pipes/pipe guards/conduits - Look for rust on other metal surfaces - Inspect striping - Check signs - Check walls - Inspect curbs - Touch up paint - Repaint 					D	D	M
<p>PARKING CONTROL EQUIPMENT:</p> <ul style="list-style-type: none"> - Inspect for proper operation - Perform preventative maintenance 	D	M					
<p>PLUMBING SYSTEM:</p> <ul style="list-style-type: none"> - Inspect sanitary facilities - Inspect irrigation - Check floor drains - Check the sump pump - Test the fire protection system - Check drain – water system (for winter) 	D	M	D	M			
	D	D	M	M	M		M

D – Desirable

M - Minimum

	Daily	Weekly	Semimonthly	Monthly	Quarterly	Semiannually	Annually
ROOFING/WATERPROOFING: - Check roof for leaks - Check joint sealant in floors - Inspect expansion joints - Inspect windows/doors/walls - Inspect the floor membrane - Check for deterioration				D D D D		M M M M D	M
SAFETY - Check carbon-monoxide monitor(s) - Check handrails/guardrails - Check exit lights - Check emergency lights - Eliminate tripping hazards	D	M D D D		D M M M	M		
SECURITY SYSTEM - Check closed – circuit television - Check audio surveillance - Test panic buttons - Test stair – door alarms	D D D D	M M M M					
PAVEMENT MARKINGS AND SIGNAGE: - Check signs and markings placement - Check sign cleanliness - Check signs and markings visibility - Check signs and markings legibility - Check sign illumination	D D D	M M M		D D	M		M

D – Desirable

M - Minimum

APPENDIX B
PAVEMENT
CONDITION
ASSESSMENT



Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys¹

This standard is issued under the fixed designation D 6433; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the determination of roads and parking lots pavement condition through visual surveys using the Pavement Condition Index (PCI) method of quantifying pavement condition.

1.2 The PCI for roads and parking lots was developed by the U.S. Army Corps of Engineers (1, 2).² It is further verified and adopted by DOD and APWA.

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 6.

2. Terminology

2.1 Definitions of Terms Specific to This Standard:

2.1.1 *additional sample*—a sample unit inspected in addition to the random sample units to include nonrepresentative sample units in the determination of the pavement condition. This includes very poor or excellent samples that are not typical of the section and sample units, which contain an unusual distress such as a utility cut. If a sample unit containing an unusual distress is chosen at random it should be counted as an additional sample unit and another random sample unit should be chosen. If every sample unit is surveyed, then there are no additional sample units.

2.1.2 *asphalt concrete (AC) surface*—aggregate mixture with an asphalt cement binder. This term also refers to surfaces constructed of coal tars and natural tars for purposes of this practice.

2.1.3 *pavement branch*—a branch is an identifiable part of the pavement network that is a single entity and has a distinct function. For example, each roadway or parking area is a separate branch.

2.1.4 *pavement condition index (PCI)*—a numerical rating of the pavement condition that ranges from 0 to 100 with 0 being the worst possible condition and 100 being the best possible condition.

2.1.5 *pavement condition rating*—a verbal description of pavement condition as a function of the PCI value that varies from “failed” to “excellent” as shown in Fig. 1.

2.1.6 *pavement distress*—external indicators of pavement deterioration caused by loading, environmental factors, construction deficiencies, or a combination thereof. Typical distresses are cracks, rutting, and weathering of the pavement surface. Distress types and severity levels detailed in Appendix X1 for AC, and Appendix X2 for PCC pavements must be used to obtain an accurate PCI value.

2.1.7 *pavement sample unit*—a subdivision of a pavement section that has a standard size range: 20 contiguous slabs (± 8 slabs if the total number of slabs in the section is not evenly divided by 20 or to accommodate specific field condition) for PCC pavement, and 2500 contiguous square feet, ± 1000 ft² (225 ± 90 m²), if the pavement is not evenly divided by 2500 or to accommodate specific field condition, for AC pavement.

2.1.8 *pavement section*—a contiguous pavement area having uniform construction, maintenance, usage history, and condition. A section should have the same traffic volume and load intensity.

2.1.9 *portland cement concrete (PCC) pavement*—aggregate mixture with portland cement binder including nonreinforced and reinforced jointed pavement.

2.1.10 *random sample*—a sample unit of the pavement section selected for inspection by random sampling techniques, such as a random number table or systematic random procedure.

3. Summary of Practice

3.1 The pavement is divided into branches that are divided into sections. Each section is divided into sample units. The type and severity of pavement distress is assessed by visual

¹ This practice is under the jurisdiction of ASTM Committee E17 on Vehicle - Pavement Systems and is the direct responsibility of Subcommittee E17.41 on Pavement Testing, Evaluation, and Management Methods.

Current edition approved Dec. 1, 2007. Published January 2008. Originally approved in 1999. Last previous edition approved in 2003 as D 6433 – 03.

² The boldface numbers in parentheses refer to the list of references at the end of this standard.

Standard PCI™ Rating Scale		Suggested Colors
100	Good	Dark Green
85	Satisfactory	Light Green
70	Fair	Yellow
55	Poor	Light Red
40	Very Poor	Medium Red
25	Serious	Dark Red
10	Failed	Dark Grey
0		

FIG. 1 Pavement Condition Index (PCI), Rating Scale, and Suggested Colors

inspection of the pavement sample units. The quantity of the distress is measured as described in [Appendix X1](#) and [Appendix X2](#). The distress data are used to calculate the PCI for each sample unit. The PCI of the pavement section is determined based on the PCI of the inspected sample units within the section.

4. Significance and Use

4.1 The PCI is a numerical indicator that rates the surface condition of the pavement. The PCI provides a measure of the present condition of the pavement based on the distress observed on the surface of the pavement, which also indicates the structural integrity and surface operational condition (localized roughness and safety). The PCI cannot measure structural capacity nor does it provide direct measurement of skid resistance or roughness. It provides an objective and rational basis for determining maintenance and repair needs and priorities. Continuous monitoring of the PCI is used to establish the rate of pavement deterioration, which permits early identification of major rehabilitation needs. The PCI provides feedback on pavement performance for validation or improvement of current pavement design and maintenance procedures.

5. Apparatus

5.1 *Data Sheets*, or other field recording instruments that record at a minimum the following information: date, location, branch, section, sample unit size, slab number and size, distress types, severity levels, quantities, and names of surveyors. Example data sheets for AC and PCC pavements are shown in [Figs. 2 and 3](#).

5.2 *Hand Odometer Wheel*, that reads to the nearest 0.1 ft (30 mm).

5.3 *Straightedge or String Line*, (AC only), 10 ft (3 m).

5.4 *Scale*, 12 in. (300 mm) that reads to 1/8 in. (3 mm) or better. Additional 12-in. (300 mm) ruler or straightedge is needed to measure faulting in PCC pavements.

5.5 *Layout Plan*, for network to be inspected.

6. Hazards

6.1 Traffic is a hazard as inspectors may walk on the pavement to perform the condition survey.

7. Sampling and Sample Units

7.1 Identify branches of the pavement with different uses such as roadways and parking on the network layout plan.

7.2 Divide each branch into sections based on the pavements design, construction history, traffic, and condition.

7.3 Divide the pavement sections into sample units. If the pavement slabs in PCC have joint spacing greater than 25 ft (8 m) subdivide each slab into imaginary slabs. The imaginary slabs all should be less than or equal to 25 ft (8 m) in length, and the imaginary joints dividing the slabs are assumed to be in perfect condition. This is needed because the deduct values developed for jointed concrete slabs are less than or equal to 25 ft (8 m).

7.4 Individual sample units to be inspected should be marked or identified in a manner to allow inspectors and quality control personnel to easily locate them on the pavement surface. Paint marks along the edge and sketches with locations connected to physical pavement features are acceptable. It is necessary to be able to accurately relocate the sample units to allow verification of current distress data, to examine changes in condition with time of a particular sample unit, and to enable future inspections of the same sample unit if desired.

7.5 Select the sample units to be inspected. The number of sample units to be inspected may vary from the following: all of the sample units in the section, a number of sample units that provides a 95 % confidence level, or a lesser number.

7.5.1 All sample units in the section may be inspected to determine the average PCI of the section. This is usually precluded for routine management purposes by available manpower, funds, and time. Total sampling, however, is desirable for project analysis to help estimate maintenance and repair quantities.

7.5.2 The minimum number of sample units (*n*) that must be surveyed within a given section to obtain a statistically adequate estimate (95 % confidence) of the PCI of the section

7.5.2.2 Calculate the revised minimum number of sample units (Eq 1) to be surveyed using the calculated standard deviation (Eq 2). If the revised number of sample units to be surveyed is greater than the number of sample units already surveyed, select and survey additional random sample units. These sample units should be spaced evenly across the section. Repeat the process of checking the revised number of sample units and surveying additional random sample units until the total number of sample units surveyed equals or exceeds the minimum required sample units (n) in Eq 1, using the actual total sample standard deviation.

7.5.3 Once the number of sample units to be inspected has been determined, compute the spacing interval of the units using systematic random sampling. Samples are spaced equally throughout the section with the first sample selected at random. The spacing interval (i) of the units to be sampled is calculated by the following formula rounded to the next lowest whole number:

$$i = N/n \quad (3)$$

where:

N = total number of sample units in the section, and

n = number of sample units to be inspected.

The first sample unit to be inspected is selected at random from sample units 1 through i . The sample units within a section that are successive increments of the interval i after the first randomly selected unit also are inspected.

7.6 A lesser sampling rate than the above mentioned 95 % confidence level can be used based on the condition survey objective. As an example, one agency uses the following table for selecting the number of sample units to be inspected for other than project analysis:

Given	Survey
1 to 5 sample units	1 sample unit
6 to 10 sample units	2 sample units
11 to 15 sample units	3 sample units
16 to 40 sample units	4 sample units
over 40 sample units	10 %

7.7 Additional sample units only are to be inspected when nonrepresentative distresses are observed as defined in 2.1.1. These sample units are selected by the user.

8. Inspection Procedure

8.1 The definitions and guidelines for quantifying distresses for PCI determination are given in Appendix X1 for AC pavements. Using this test method, inspectors should identify distress types accurately 95 % of the time. Linear measurements should be considered accurate when they are within 10 % if remeasured, and area measurements should be considered accurate when they are within 20 % if remeasured. Distress severities that one determines based on ride quality are considered subjective.

8.2 *Asphalt Concrete (AC) Surfaced Pavement*—Individually inspect each sample unit chosen. Sketch the sample unit, including orientation. Record the branch and section number and the number and type of the sample unit (random or additional). Record the sample unit size measured with the hand odometer. Conduct the distress inspection by walking over the sidewalk/shoulder of the sample unit being surveyed, measuring the quantity of each severity level of

every distress type present, and recording the data. Each distress must correspond in type and severity to that described in Appendix X1. The method of measurement is included with each distress description. Repeat this procedure for each sample unit to be inspected. A copy of a Blank Flexible Pavement Condition Survey Data Sheet for Sample Unit is included in Fig. 2.

8.3 *PCC Pavements*—Individually inspect each sample unit chosen. Sketch the sample unit showing the location of the slabs. Record the sample unit size, branch and section number, and number and type of the sample unit (random or additional), the number of slabs in the sample unit and the slab size measured with the hand odometer. Perform the inspection by walking over the sidewalk/shoulder of the sample unit being surveyed and recording all distress existing in the slab along with their severity level. Each distress type and severity must correspond with that described in Appendix X2. Summarize the distress types, their severity levels and the number of slabs in the sample unit containing each type and severity level. Repeat this procedure for each sample unit to be inspected. A copy of a Blank Jointed Rigid Pavement Condition Survey Data Sheet for Sample Unit is included in Fig. 3.

9. Calculation of PCI for Asphalt Concrete (AC) Pavement

9.1 Add up the total quantity of each distress type at each severity level, and record them in the “Total Severities” section. For example, Fig. 4 shows five entries for the Distress Type 1, “Alligator Cracking”: 5L, 4L, 4L, 8H, and 6H. The distress at each severity level is summed and entered in the “Total Severity” section as 13 ft² (1.2 m²) of low severity and 14 ft² (1.3 m²) of medium severity. The units for the quantities may be either in square feet (square meters), linear feet (meters), or number of occurrences, depending on the distress type.

9.2 Divide the total quantity of each distress type at each severity level from 9.1 by the total area of the sample unit and multiply by 100 to obtain the percent density of each distress type and severity.

9.3 Determine the deduct value (DV) for each distress type and severity level combination from the distress deduct value curves in Appendix X3.

9.4 Determine the maximum corrected deduct value (CDV). The procedure for determining maximum CDV from individual DVs is identical for both AC and PCC pavement types.

9.5 The following procedure must be used to determine the maximum CDV.

9.5.1 If none or only one individual deduct value is greater than two, the total value is used in place of the maximum CDV in determining the PCI; otherwise, maximum CDV must be determined using the procedure described in 9.5.2-9.5.5.

9.5.2 List the individual deduct values in descending order. For example, in Fig. 4 this will be 25.1, 23.4, 17.9, 11.2, 7.9, 7.5, 6.9, and 5.3.

9.5.3 Determine the allowable number of deducts, m , from Fig. 5, or using the following formula (see Eq 4):

$$m = 1 + (9/98)(100 - HDV) \leq 10 \quad (4)$$

ASPHALT SURFACED ROADS AND PARKING LOTS CONDITION SURVEY DATA SHEET FOR SAMPLE UNIT										SKETCH:		
BRANCH <u>SPRINGFIELD</u> SECTION <u>001</u> SAMPLE UNIT <u>1</u>												
SURVEYED BY <u>KAK</u> DATE <u>10 Jul 93</u> SAMPLE AREA <u>2500 sf</u>												
1. Alligator Cracking		6. Depression		11. Patching & Util Cut Patching		16. Shoving						
2. Bleeding		7. Edge Cracking		12. Polished Aggregate		17. Slippage Cracking						
3. Block Cracking		8. Jt. Reflection Cracking		13. Potholes		18. Swell						
4. Bumps and Sags		9. Lane/Shoulder Drop Off		14. Railroad Crossing		19. Weathering/Raveling						
5. Corrugation		10. Long & Trans Cracking		15. Rutting								
DISTRESS SEVERITY	QUANTITY								TOTAL	DENSITY %	DEDUCT VALUE	
1 L	1x5	1x4	1x4						13	0.52	7.9	
1 H	1x8	1x6							14	0.56	23.4	
7 L	32	15	18	24	41				130	5.20	7.5	
8 M	20	15	35	27	23	10	13		143	5.72	25.1	
11 H	3x4	2x5							22	0.88	17.9	
13 L	1								1	0.04	11.2	
15 L	4	9	8						21	0.84	6.9	
19 L	250								250	10.0	5.3	

FIG. 4 Example of a Flexible Pavement Condition Survey Data Sheet

6

Adjustment of Number of Deduct Values

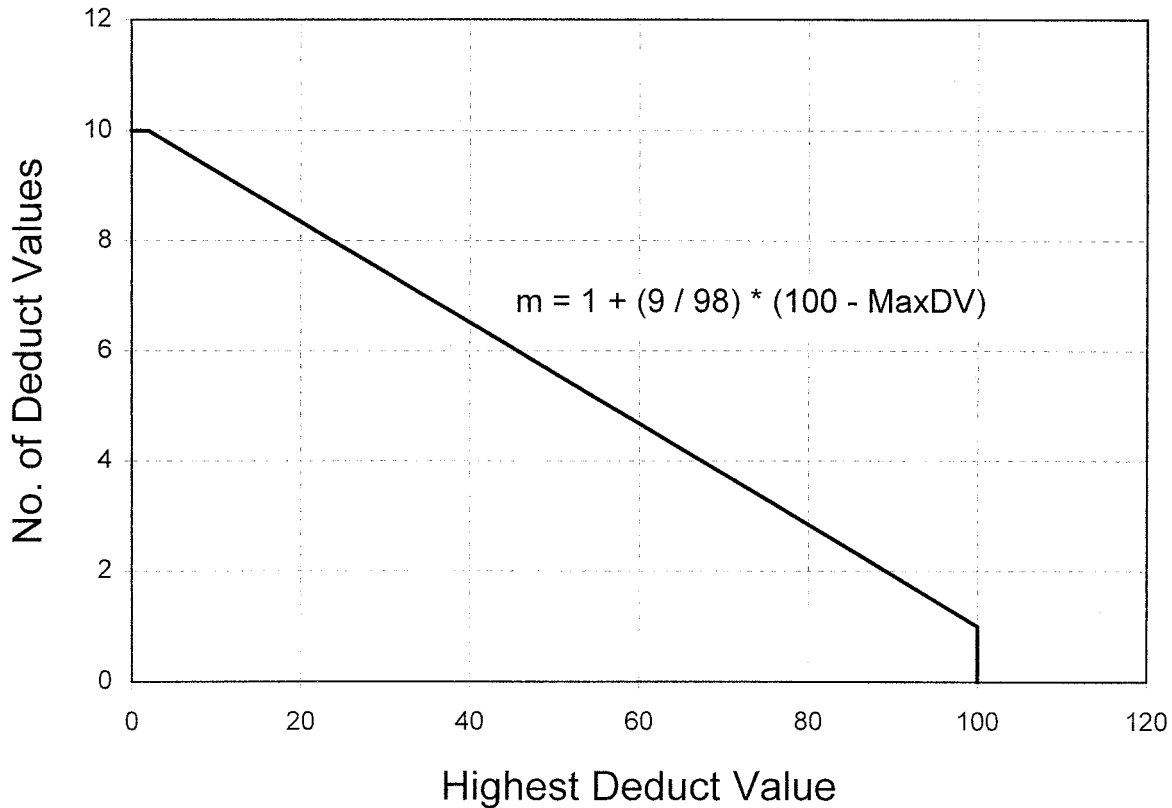


FIG. 5 Adjustment of Number of Deduct Values

where:

m = allowable number of deducts including fractions (must be less than or equal to ten), and
 HDV = highest individual deduct value.

(For the example in Fig. 4, $m = 1 + (9/98)(100-25.1) = 7.9$).

9.5.4 The number of individual deduct values is reduced to the m largest deduct values, including the fractional part. For the example in Fig. 6, the values are 25.1, 23.4, 17.9, 11.2, 7.9, 7.5, 6.9, and 4.8 (the 4.8 is obtained by multiplying 5.3 by $(7.9 - 7 = 0.9)$). If less than m deduct values are available, all of the deduct values are used.

9.5.5 Determine maximum CDV iteratively, as shown in Fig. 6.

9.5.5.1 Determine total deduct value by summing individual deduct values. The total deduct value is obtained by adding the individual deduct values in 9.5.4, that is, 104.7.

9.5.5.2 Determine q as the number of deducts with a value greater than 2.0. For example, in Fig. 6, $q = 8$.

9.5.5.3 Determine the CDV from total deduct value and q by looking up the appropriate correction curve for AC pavements in Fig. X4.15 in Appendix X3.

9.5.5.4 Reduce the smallest individual deduct value greater than 2.0 to 2.0 and repeat 9.5.5.1-9.5.5.3 until $q = 1$.

9.5.5.5 Maximum CDV is the largest of the CDVs.

9.6 Calculate PCI by subtracting the maximum CDV from 100: $\text{PCI} = 100 - \text{max CDV}$.

9.7 Fig. 6 shows a summary of PCI calculation for the example AC pavement data in Fig. 4. A blank PCI calculation form is included in Fig. 2.

10. Calculation of PCI for Portland Cement Concrete (PCC) Pavement

10.1 For each unique combination of distress type and severity level, add up the total number of slabs in which they occur. For the example in Fig. 7, there are two slabs containing low-severity corner break (Distress 22L).

10.2 Divide the number of slabs from 10.1 by the total number of slabs in the sample unit and multiply by 100 to obtain the percent density of each distress type and severity combination.

10.3 Determine the deduct values for each distress type severity level combination using the corresponding deduct curve in Appendix X4.

10.4 Determine PCI by following the procedures in 9.5 and 9.6, using the correction curve for PCC pavements (see Fig. X4.20 in Appendix X4) in place of the correction curve for AC pavements.

$m = 1 + (9/98)(100 - 25.1) = 7.9 < 8$
 Use highest 7 deducts and 0.9 of eighth deduct.
 $0.9 \times 5.3 = 4.8$

#	Deduct Values								Total	q	CDV
1	25.1	23.4	17.9	11.2	7.9	7.5	6.9	4.8	104.7	8	51.0
2	25.1	23.4	17.9	11.2	7.9	7.5	6.9	2	101.9	7	50.0
3	25.1	23.4	17.9	11.2	7.9	7.5	2	2	96.0	6	46.0
4	25.1	23.4	17.9	11.2	7.9	2	2	2	90.5	5	47.0
5	25.1	23.4	17.9	11.2	2	2	2	2	84.6	4	48.0
6	25.1	23.4	17.9	2	2	2	2	2	75.4	3	48.0
7	25.1	23.4	2	2	2	2	2	2	59.5	2	44.0
8	25.1	2	2	2	2	2	2	2	38.1	1	38.0
9											
10											

Max CDV = 51
 PCI = 100 - Max CDV = 49
 Rating = FAIR

FIG. 6 Calculation of Corrected PCI Value—Flexible Pavement

10.5 Fig. 7 shows a summary of PCI calculation for the example PCC pavement distress data in Fig. 8.

$$PCI_S = \overline{PCI}_r = \frac{\sum_{i=1}^n (PCI_{ri} \cdot A_{ri})}{\sum_{i=1}^n A_{ri}} \quad (5)$$

11. Determination of Section PCI

11.1 If all surveyed sample units are selected randomly, then the PCI of the section (PCI_S) is calculated as the area weighted PCI of the randomly surveyed sample units (\overline{PCI}_r) using equation 5:

CONCRETE SURFACED ROADS AND PARKING LOTS CONDITION SURVEY DATA SHEET FOR SAMPLE UNIT					
BRANCH <u>SECOND</u>		SECTION <u>001</u>		SAMPLE UNIT <u>1</u>	
SURVEYED BY <u>KAK</u>		DATE <u>10 Jul 93</u>		SAMPLE AREA <u>20 slabs</u>	
Distress Types			SKETCH:		
21. Blow up/Buckling 22. Corner Break 23. Divided Slab 24. Durability Crack 25. Faulting 26. Joint Seal 27. Lane/Shoulder 28. Linear Cracking 29. Patching (Large) 30. Patching (Small)		31. Polished Aggregate 32. Popouts 33. Pumping 34. Punchout 35. Railroad Crossing 36. Scaling 37. Shrinkage 38. Spalling Corner 39. Spalling Joint			
DIST TYPE	SEV	NO. SLABS	DENSITY %		DEDUCT VALUE
26	H	—	100		8.0
22	L	3	15		12.6
22	M	1	5		7.7
23	M	3	15		30.5
30	M	4	20		4.4
34	M	2	10		25.1
38	L	6	30		5.8
39	H	1	5		9.0

FIG. 7 Example of a Jointed Rigid Pavement Condition Survey Data Sheet

where:

- \overline{PCI}_r = area weighted PCI of randomly surveyed sample units,
- PCI_{ri} = PCI of random sample unit i ,
- A_{ri} = area of random sample unit i ,
- n = number of random sample units surveyed.

If additional sample units, as defined in 2.1.1, are surveyed, the area weighted PCI of the surveyed additional units (\overline{PCI}_a) is calculated using equation 6. The PCI of the pavement section is calculated using equation 7.

$$\overline{PCI}_a = \frac{\sum_{i=1}^m (PCI_{ai} \cdot A_{ai})}{\sum_{i=1}^m A_{ai}} \tag{6}$$

$$PCI_s = \frac{\overline{PCI}_r(A - \sum_{i=1}^m A_{ai}) + \overline{PCI}_a(\sum_{i=1}^m A_{ai})}{A} \tag{7}$$

$m = 1 + (9/98)(100 - 30.5) = 7.4 < 8$
 Use highest 7 deducts and 0.4 of eighth deduct.
 $0.4 \times 4.4 = 1.76$

#	Deduct Values								Total	q	CDV
1	30.5	25.1	12.6	9.0	8.0	7.7	5.8	1.76	100.5	7	50.0
2	30.5	25.1	12.6	9.0	8.0	7.7	2	1.76	96.7	6	49.5
3	30.5	25.1	12.6	9.0	8.0	2	2	1.76	91.0	5	51.0
4	30.5	25.1	12.6	9.0	2	2	2	1.76	85.0	4	49.0
5	30.5	25.1	12.6	2	2	2	2	1.76	78.0	3	50.0
6	30.5	25.1	2	2	2	2	2	1.76	67.4	2	50.0
7	30.5	2	2	2	2	2	2	1.76	44.3	1	44.3
8											
9											
10											

Max CDV = 51
 PCI = 100 - Max CDV = 49
 Rating = FAIR

FIG. 8 Calculation of Corrected PCI Value—Jointed Rigid Pavement

\overline{PCI}_a = area weighted PCI of additional sample units,
 PCI_{ai} = PCI of additional sample unit i ,
 A_{ai} = area of additional sample unit i ,
 A = area of section,
 m = number of additional sample units surveyed, and
 PCI_s = area weighted PCI of the pavement section.

11.2 Determine the overall condition rating of the section by using the section PCI and the condition rating scale in Fig. 1.

12. Report

12.1 Develop a summary report for each section. The summary lists section location, size, total number of sample units, the sample units inspected, the PCIs obtained, the average PCI for the section, and the section condition rating.

APPENDIXES
(Nonmandatory Information)
X1. Distress in Asphalt Pavements

X1.1 During the field condition surveys and validation of the PCI, several questions are commonly asked about the identification and measurement of some of the distresses. The answers to these questions for each distress are included under the heading “How to Measure.” For convenience, however, the most frequently raised issues are addressed below:

X1.1.1 If alligator cracking and rutting occur in the same area, each is recorded separately at its respective severity level.

X1.1.2 If bleeding is counted, polished aggregate is not counted in the same area.

X1.1.3 Spalling as used herein is the further breaking of pavement or loss of materials around cracks or joints.

X1.1.4 If a crack does not have the same severity level along its entire length, each portion of the crack having a different severity level should be recorded separately. If, however, the different levels of severity in a portion of a crack cannot be easily divided, that portion should be rated at the highest severity level present.

X1.1.5 If any distress, including cracking and potholes, is found in a patched area, it is not recorded; its effect on the patch, however, is considered in determining the severity level of the patch.

X1.1.6 A significant amount of polished aggregate should be present before it is counted.

X1.1.7 A distress is said to be raveled if the area surrounding the distress is broken (sometimes to the extent that pieces are removed).

X1.2 The reader should note that the items above are general issues and do not stand alone as inspection criteria. To properly measure each distress type, the inspector must be familiar with its individual measurement criteria.

X1.3 Nineteen distress types for asphalt-surfaced pavements are listed alphabetically in this manual.

RIDE QUALITY

X1.4 Ride quality must be evaluated in order to establish a severity level for the following distress types:

X1.4.1 Bumps.

X1.4.2 Corrugation.

X1.4.3 Railroad crossings.

X1.4.4 Shoving.

X1.4.5 Swells.

X1.4.6 To determine the effect these distresses have on ride quality, the inspector should drive at the normal operating speed and use the following severity-level definitions of ride quality:

X1.4.6.1 **L**—Low. Vehicle vibrations, for example, from corrugation, are noticeable, but no reduction in speed is necessary for comfort or safety. Individual bumps or settlements, or both, cause the vehicle to bounce slightly, but create little discomfort.

X1.4.6.2 **M**—Medium. Vehicle vibrations are significant and some reduction in speed is necessary for safety and comfort. Individual bumps or settlements, or both, cause the vehicle to bounce significantly, creating some discomfort.

X1.4.6.3 **H**—High. Vehicle vibrations are so excessive that speed must be reduced considerably for safety and comfort. Individual bumps or settlements, or both, cause the vehicle to bounce excessively, creating substantial discomfort, safety hazard, or high potential vehicle damage.

X1.4.7 The inspector should drive at the posted speed in a sedan that is representative of cars typically seen in local traffic. Pavement sections near stop signs should be rated at a deceleration speed appropriate for the intersection.

ALLIGATOR CRACKING (FATIGUE)

X1.5 *Description*—Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the asphalt concrete surface under repeated traffic loading. Cracking begins at the bottom of the asphalt surface, or stabilized base, where tensile stress and strain are highest under a wheel load. The cracks propagate to the surface initially as a series of parallel longitudinal cracks. After repeated traffic loading, the cracks connect, forming many sided, sharp-angled pieces that develop a pattern resembling chicken wire or the skin of an alligator. The pieces are generally less than 0.5 m (1.5 ft) on the longest side. Alligator cracking occurs only in areas subjected to repeated traffic loading, such as wheel paths. Pattern-type cracking that occurs over an entire area not subjected to loading is called “block cracking,” which is not a load-associated distress.

X1.5.1 *Severity Levels:*

X1.5.1.1 **L**—Fine, longitudinal hairline cracks running parallel to each other with no, or only a few interconnecting cracks. The cracks are not spalled (**Fig. X1.1**).



FIG. X1.1 Low-Severity Alligator Cracking

X1.5.1.2 **M**—Further development of light alligator cracks into a pattern or network of cracks that may be lightly spalled (Fig. X1.2).

X1.5.1.3 **H**—Network or pattern cracking has progressed so that the pieces are well defined and spalled at the edges. Some of the pieces may rock under traffic (Fig. X1.3).

X1.5.2 *How to Measure*—Alligator cracking is measured in square meters (square feet) of surface area. The major difficulty in measuring this type of distress is that two or three levels of severity often exist within one distressed area. If these portions can be easily distinguished from each other, they should be measured and recorded separately; however, if the different levels of severity cannot be divided easily, the entire area should be rated at the highest severity present. If alligator cracking and rutting occur in the same area, each is recorded separately as its respective severity level.

BLEEDING

X1.6 *Description*—Bleeding is a film of bituminous material on the pavement surface that creates a shiny, glasslike, reflecting surface that usually becomes quite sticky. Bleeding is caused by excessive amounts of asphaltic cement or tars in the mix, excess application of a bituminous sealant, or low air void content, or a combination thereof. It occurs when asphalt fills the voids of the mix during hot weather and then expands onto the pavement surface. Since the bleeding process is not reversible during cold weather, asphalt or tar will accumulate on the surface.

X1.6.1 Severity Levels:

X1.6.1.1 **L**—Bleeding only has occurred to a very slight degree and is noticeable only during a few days of the year. Asphalt does not stick to shoes or vehicles (Fig. X1.4).

X1.6.1.2 **M**—Bleeding has occurred to the extent that asphalt sticks to shoes and vehicles during only a few weeks of the year (Fig. X1.5).

X1.6.1.3 **H**—Bleeding has occurred extensively and considerable asphalt sticks to shoes and vehicles during at least several weeks of the year (Fig. X1.6).

X1.6.2 *How to Measure*—Bleeding is measured in square meters (square feet) of surface area. If bleeding is counted, polished aggregate should not be counted.



FIG. X1.3 High-Severity Alligator Cracking



FIG. X1.4 Low-Severity Bleeding



FIG. X1.5 Medium-Severity Bleeding



FIG. X1.2 Medium-Severity Alligator Cracking

BLOCK CRACKING

X1.7 *Description*—Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces. The blocks may range in size from approximately 0.3 by 0.3 m (1 by 1 ft) to 3 by 3 m (10 by 10 ft). Block cracking is caused mainly by shrinkage of the asphalt concrete and daily



FIG. X1.6 High-Severity Bleeding

temperature cycling, which results in daily stress/strain cycling. It is not load-associated. Block cracking usually indicates that the asphalt has hardened significantly. Block cracking normally occurs over a large portion of the pavement area, but sometimes will occur only in nontraffic areas. This type of distress differs from alligator cracking in that alligator cracks form smaller, many-sided pieces with sharp angles. Also, unlike block, alligator cracks are caused by repeated traffic loadings, and therefore, are found only in traffic areas, that is, wheel paths.

X1.7.1 Severity Levels:

X1.7.1.1 **L**—Blocks are defined by low-severity³ cracks (Fig. X1.7).

³ See definitions of longitudinal transverse cracking within Appendix X2.10.

X1.7.1.2 **M**—Blocks are defined by medium-severity³ cracks (Fig. X1.8).

X1.7.1.3 **H**—Blocks are defined by high-severity³ cracks (Fig. X1.9).

X1.7.2 *How to Measure*—Block cracking is measured in m² (ft²) of surface area. It usually occurs at one severity level in a given pavement section; however, if areas of different severity levels can be distinguished easily from one another, they should be measured and recorded separately.

BUMPS AND SAGS

X1.8 Description:

X1.8.1 Bumps are small, localized, upward displacements of the pavement surface. They are different from shoves in that shoves are caused by unstable pavement. Bumps, on the other hand, can be caused by several factors, including:

X1.8.1.1 Buckling or bulging of underlying PCC slabs in AC overlay over PCC pavement.

X1.8.1.2 Frost heave (ice, lens growth).

X1.8.1.3 Infiltration and buildup of material in a crack in combination with traffic loading (sometimes called “tenting”).

X1.8.1.4 Sags are small, abrupt, downward displacements of the pavement surface. If bumps appear in a pattern perpendicular to traffic flow and are spaced at less than 3 m (10 ft), the distress is called corrugation. Distortion and displacement that occur over large areas of the pavement surface, causing large or long dips, or both, in the pavement should be recorded as “swelling.”

X1.8.2 Severity Levels:

X1.8.2.1 **L**—Bump or sag causes low-severity ride quality (Fig. X1.10).

X1.8.2.2 **M**—Bump or sag causes medium-severity ride quality (Fig. X1.11).

X1.8.2.3 **H**—Bump or sag causes high-severity ride quality (Fig. X1.12).

X1.8.3 *How to Measure*—Bumps or sags are measured in linear meters (feet). If the bump occurs in combination with a crack, the crack also is recorded.



FIG. X1.7 Low-Severity Block Cracking



FIG. X1.8 Medium-Severity Block Cracking



FIG. X1.9 High-Severity Block Cracking

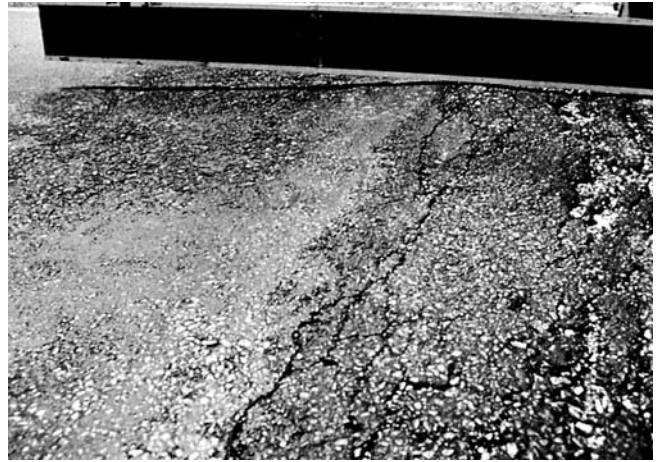


FIG. X1.12 High-Severity Bumps and Sags

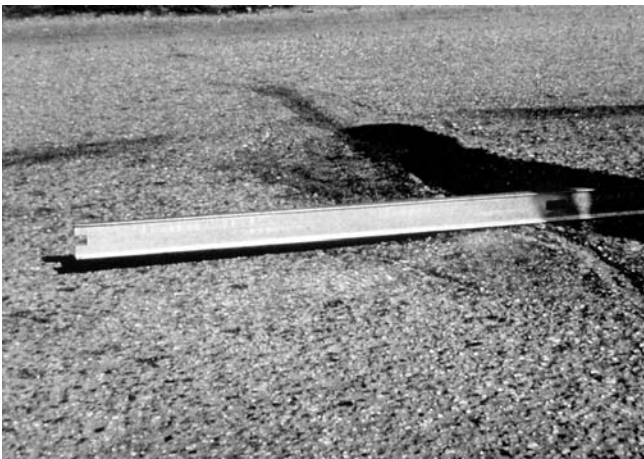


FIG. X1.10 Low-Severity Bumps and Sags



FIG. X1.11 Medium-Severity Bumps and Sags

the traffic direction. This type of distress usually is caused by traffic action combined with an unstable pavement surface or base.

X1.9.1 *Severity Levels:*

X1.9.1.1 **L**—Corrugation produces low-severity ride quality (Fig. X1.13).

X1.9.1.2 **M**—Corrugation produces medium-severity ride quality (Fig. X1.14).

X1.9.1.3 **H**—Corrugation produces high-severity ride quality (Fig. X1.15).

X1.9.2 *How to Measure*—Corrugation is measured in square meters (square feet) of surface area.

DEPRESSION

X1.10 *Description*—Depressions are localized pavement surface areas with elevations slightly lower than those of the surrounding pavement. In many instances, light depressions are not noticeable until after a rain, when ponding water creates a “birdbath” area; on dry pavement, depressions can be spotted by looking for stains caused by ponding water. Depressions are created by settlement of the foundation soil or are a result of

CORRUGATION

X1.9 *Description*—Corrugation, also known as “washboarding”, is a series of closely spaced ridges and valleys (ripples) occurring at fairly regular intervals, usually less than 3 m (10 ft) along the pavement. The ridges are perpendicular to



FIG. X1.13 Low-Severity Corrugation



FIG. X1.14 Medium-Severity Corrugation

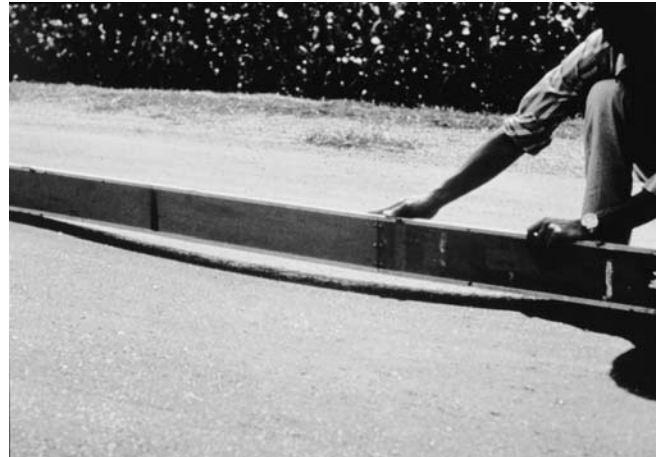


FIG. X1.17 Medium-Severity Depression

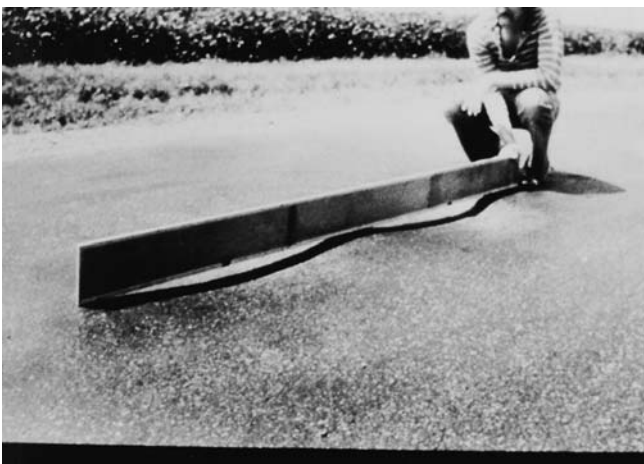


FIG. X1.15 High-Severity Corrugation

improper construction. Depressions cause some roughness, and when deep enough or filled with water, can cause hydroplaning.

X1.10.1 *Severity Levels (Maximum Depth of Depression):*

X1.10.1.1 **L**—13 to 25 mm (½ to 1 in.) (Fig. X1.16).

X1.10.1.2 **M**—25 to 50 mm (1 to 2 in.) (Fig. X1.17).

X1.10.1.3 **H**—More than 50 mm (2 in.) (Fig. X1.18).

X1.10.2 *How to Measure*—Depressions are measured in square meters (square feet) of surface area.

EDGE CRACKING

X1.11 *Description*—Edge cracks are parallel to and usually within 0.3 to 0.5 m (1 to 1.5 ft) of the outer edge of the pavement. This distress is accelerated by traffic loading and can be caused by frost-weakened base or subgrade near the edge of the pavement. The area between the crack and pavement edge is classified as raveled if it is broken up (sometimes to the extent that pieces are removed).

X1.11.1 *Severity Levels:*

X1.11.1.1 **L**—Low or medium cracking with no breakup or raveling (Fig. X1.19).

X1.11.1.2 **M**—Medium cracks with some breakup and raveling (Fig. X1.20).

X1.11.1.3 **H**—Considerable breakup or raveling along the edge (Fig. X1.21).

X1.11.2 *How to Measure*—Edge cracking is measure in linear meters (feet).



FIG. X1.16 Low-Severity Depression

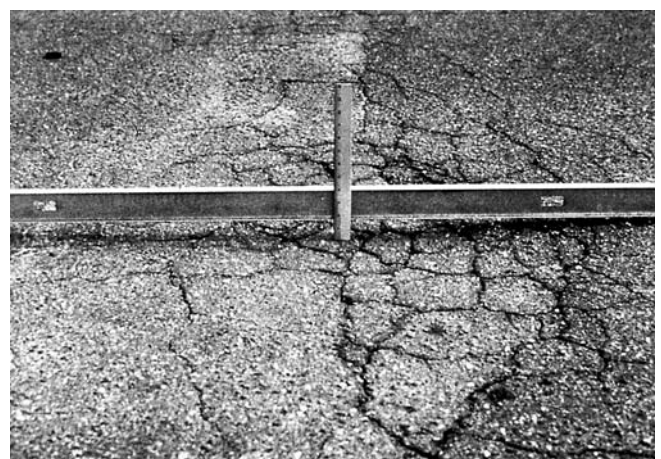


FIG. X1.18 High-Severity Depression



FIG. X1.19 Low-Severity Edge Cracking



FIG. X1.20 Medium-Severity Edge Cracking



FIG. X1.21 High-Severity Edge Cracking

**JOINT REFLECTION CRACKING
(From Longitudinal and Transverse PCC Slabs)**

X1.12 *Description*—This distress occurs only on asphalt-surfaced pavements that have been laid over a PCC slab. It does not include reflection cracks from any other type of base, that is, cement- or lime-stabilized; these cracks are caused

mainly by thermal- or moisture-induced movement of the PCC slab beneath the AC surface. This distress is not load-related; however, traffic loading may cause a breakdown of the AC surface near the crack. If the pavement is fragmented along a crack, the crack is said to be spalled. A knowledge of slab dimension beneath the AC surface will help to identify these distresses.

Severity Levels:

X1.12.1.1 **L**—One of the following conditions exists (Fig. X1.22): Nonfilled crack width is less than 10 mm ($\frac{3}{8}$ in.), or filled crack of any width (filler in satisfactory condition).

X1.12.1.2 **M**—One of the following conditions exists (Fig. X1.23): Nonfilled crack width is greater than or equal to 10 mm ($\frac{3}{8}$ in.) and less than 75 mm (3 in.); nonfilled crack less than or equal to 75 mm (3 in.) surrounded by light secondary cracking; or, filled crack of any width surrounded by light secondary cracking.

X1.12.1.3 **H**—One of the following conditions exists (Fig. X1.24): Any crack filled or nonfilled surrounded by medium- or high-severity secondary cracking; nonfilled cracks greater than 75 mm (3 in.); or, a crack of any width where approximately 100 mm (4 in.) of pavement around the crack are severely raveled or broken.

X1.12.2 *How to Measure*—Joint reflection cracking is measured in linear meters (feet). The length and severity level of each crack should be identified and recorded separately. For example, a crack that is 15 m (50 ft) long may have 3 m (10 ft) of high severity cracks, which are all recorded separately. If a bump occurs at the reflection crack, it is recorded also.

LANE/SHOULDER DROP-OFF

X1.13 *Description*—Lane/shoulder drop-off is a difference in elevation between the pavement edge and the shoulder. This distress is caused by shoulder erosion, shoulder settlement, or by building up the roadway without adjusting the shoulder level.

Severity Levels:

X1.13.1.1 **L**—The difference in elevation between the pavement edge and shoulder is > 25 mm (1 in.) and < 50 mm (2 in.) (Fig. X1.25).

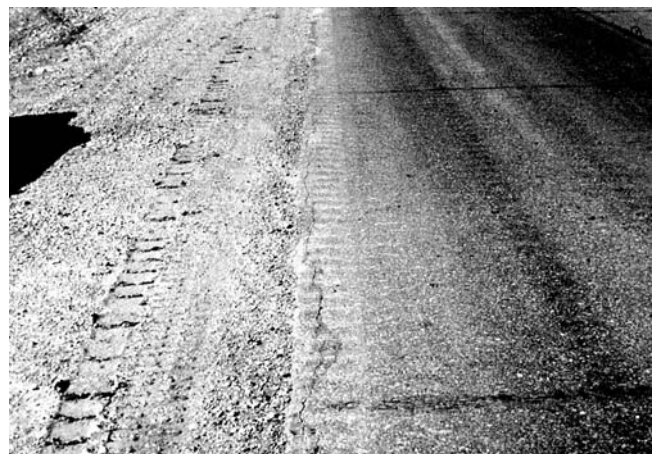


FIG. X1.22 Low-Severity Joint Reflection Cracking



FIG. X1.23 Medium-Severity Joint Reflection Cracking

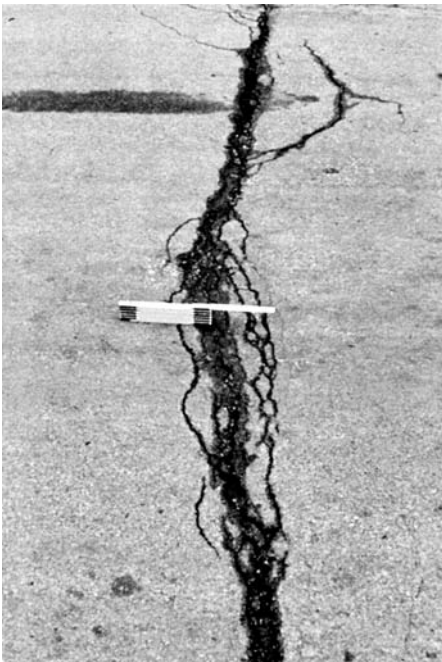


FIG. X1.24 High-Severity Joint Reflection Cracking



FIG. X1.25 Low-Severity Lane/Shoulder Drop-Off



FIG. X1.26 Medium-Severity Lane/Shoulder Drop-Off

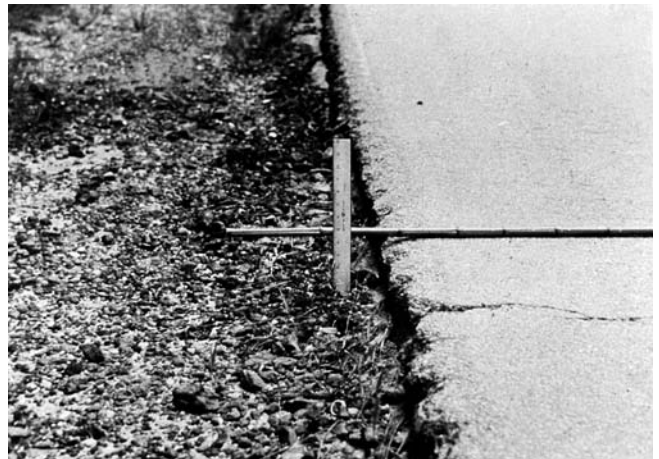


FIG. X1.27 High-Severity Lane/Shoulder Drop-Off

X1.13.1.2 **M**—The difference in elevation is > 50 mm (2 in.) and < 100 mm (4 in.) (Fig. X1.26).

X1.13.1.3 **H**—The difference in elevation is > 100 mm (4 in.) (Fig. X1.27).

X1.13.2 *How to Measure*—Lane/shoulder drop-off is measured in linear meters (feet).

**LONGITUDINAL AND TRANSVERSE CRACKING
(Non-PCC Slab Joint Reflective)**

X1.14 *Description:*

X1.14.1 Longitudinal cracks are parallel to the pavement's centerline or laydown direction. They may be caused by:

X1.14.1.1 A poorly constructed paving lane joint.

X1.14.1.2 Shrinkage of the AC surface due to low temperatures or hardening of the asphalt, or daily temperature cycling, or both.

X1.14.1.3 A reflective crack caused by cracking beneath the surface course, including cracks in PCC slabs, but not PCC joints.

X1.14.1.4 Transverse cracks extend across the pavement at approximately right angles to the pavement centerline or direction of laydown. These types of cracks are not usually load-associated.

X1.14.2 *Severity Levels:*

X1.14.2.1 **L**—One of the following conditions exists (Fig. X1.28): nonfilled crack width is less than 10 mm (3/8 in.), or filled crack of any width (filler in satisfactory condition).

X1.14.2.2 **M**—One of the following conditions exists (Fig. X1.29): nonfilled crack width is greater than or equal to 10 mm and less than 75 mm (3/8 to 3 in.); nonfilled crack is less than or equal to 75 mm (3 in.) surrounded by light and random cracking; or, filled crack is of any width surrounded by light random cracking.

X1.14.2.3 **H**—One of the following conditions exists (Fig. X1.30): any crack filled or nonfilled surrounded by medium- or high-severity random cracking; nonfilled crack greater than 75 mm (3 in.); or, a crack of any width where approximately 100 mm (4 in.) of pavement around the crack is severely broken.

X1.14.3 *How to Measure*—Longitudinal and transverse cracks are measured in linear meters (feet). The length and severity of each crack should be recorded. If the crack does not have the same severity level along its entire length, each portion of the crack having a different severity level should be recorded separately.

PATCHING AND UTILITY CUT PATCHING

X1.15 *Description*—A patch is an area of pavement that has been replaced with new material to repair the existing pavement. A patch is considered a defect no matter how well it is performing (a patched area or adjacent area usually does not perform as well as an original pavement section). Generally, some roughness is associated with this distress.

X1.15.1 *Severity Levels:*

X1.15.1.1 **L**—Patch is in good condition and satisfactory. Ride quality is rated as low severity or better (Fig. X1.31).

X1.15.1.2 **M**—Patch is moderately deteriorated, or ride quality is rated as medium severity, or both (Fig. X1.32).



FIG. X1.29 Medium-Severity Longitudinal and Transverse Cracking



FIG. X1.30 High-Severity Longitudinal and Transverse Cracking



FIG. X1.31 Low-Severity Patching and Utility Cut Patching



FIG. X1.28 Low-Severity Longitudinal and Transverse Cracking

X1.15.1.3 **H**—Patch is badly deteriorated, or ride quality is rated as high severity, or both; needs replacement soon (Fig. X1.33).

X1.15.2 *How to Measure*—Patching is rated in ft² of surface area; however, if a single patch has areas of differing



FIG. X1.32 Medium-Severity Patching and Utility Cut Patching



FIG. X1.33 High-Severity Patching and Utility Cut Patching

severity, these areas should be measured and recorded separately. For example, a 2.5 m² (27.0 ft²) patch may have 1 m² (11 ft²) of medium severity and 1.5 m² (16 ft²) of low severity. These areas would be recorded separately. Any distress found in a patched area will not be recorded; however, its effect on the patch will be considered when determining the patch's severity level. No other distresses, for example, are recorded within a patch. Even if the patch material is shoving or cracking, the area is rated only as a patch. If a large amount of pavement has been replaced, it should not be recorded as a patch but considered as new pavement, for example, replacement of a complete intersection.

POLISHED AGGREGATE

X1.16 *Description*—This distress is caused by repeated traffic applications. Polished aggregate is present when close examination of a pavement reveals that the portion of aggregate extending above the asphalt is either very small, or there are no rough or angular aggregate particles to provide good skid resistance. When the aggregate in the surface becomes smooth to the touch, adhesion with vehicle tires is considerably reduced. When the portion of aggregate extending above the surface is small, the pavement texture does not significantly

contribute to reducing vehicle speed. Polished aggregate should be counted when close examination reveals that the aggregate extending above the asphalt is negligible, and the surface aggregate is smooth to the touch. This type of distress is indicated when the number on a skid resistance test is low or has dropped significantly from a previous rating.

X1.16.1 *Severity Levels*—No degrees of severity are defined; however, the degree of polishing should be clearly evident in the sample unit in that the aggregate surface should be smooth to the touch (Fig. X1.34).

X1.16.2 *How to Measure*—Polished aggregate is measured in square meters (square feet) of surface area. If bleeding is counted, polished aggregate should not be counted.

POTHOLES

X1.17 *Description*—Potholes are small—usually less than 750 mm (30 in.) in diameter—bowl-shaped depressions in the pavement surface. They generally have sharp edges and vertical sides near the top of the hole. When holes are created by high-severity alligator cracking, they should be identified as potholes, not as weathering.

X1.17.1 *Severity Levels:*

X1.17.1.1 The levels of severity for potholes less than 750 mm (30 in.) in diameter are based on both the diameter and the depth of the pothole, according to Table X1.1.

X1.17.1.2 If the pothole is more than 750 mm (30 in.) in diameter, the area should be determined in square feet and divided by 0.5 m² (5.5 ft²) find the equivalent number of holes. If the depth is 25 mm (1 in.) or less, the holes are considered medium-severity. If the depth is more than 25 mm (1 in.), they are considered high-severity (Figs. X1.35-X1.37).

X1.17.2 *How to Measure*—Potholes are measured by counting the number that are low-, medium-, and high-severity and recording them separately.

RAILROAD CROSSING

X1.18 *Description*—Railroad crossing defects are depressions or bumps around, or between tracks, or both.

X1.18.1 *Severity Levels:*

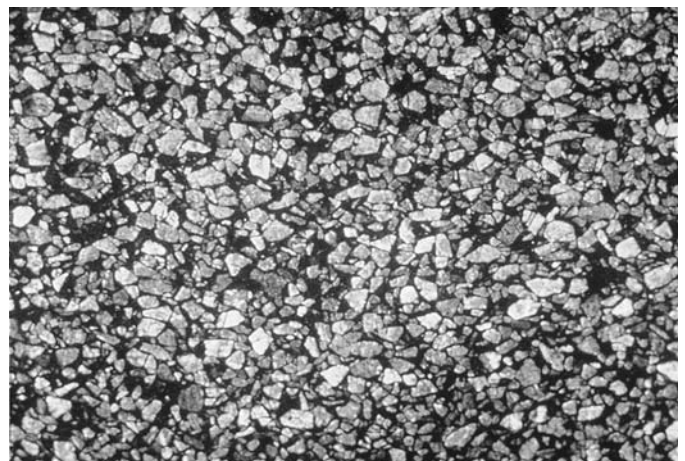


FIG. X1.34 Polished Aggregate

TABLE X1.1 Levels of Severity for Potholes

Maximum Depth of Pothole	Average Diameter (mm) (in.)		
	100 to 200 mm (4 to 8 in.)	200 to 450 mm (8 to 18 in.)	450 to 750 mm (18 to 30 in.)
13 to ≤25 mm (½ to 1 in.)	L	L	M
>25 and ≤50 mm (1 to 2 in.)	L	M	H
>50 mm (2 in.)	M	M	H



FIG. X1.35 Low-Severity Pothole



FIG. X1.36 Medium-Severity Pothole



FIG. X1.37 High-Severity Pothole



FIG. X1.38 Low-Severity Railroad Crossing



FIG. X1.39 Medium-Severity Railroad Crossing

X1.18.1.1 **L**—Railroad crossing causes low-severity ride quality (Fig. X1.38).

X1.18.1.2 **M**—Railroad crossing causes medium-severity ride quality (Fig. X1.39).

X1.18.1.3 **H**—Railroad crossing causes high-severity ride quality (Fig. X1.40).

X1.18.2 *How to Measure*—The area of the crossing is measured in square meters (square feet) of surface area. If the crossing does not affect ride quality, it should not be counted. Any large bump created by the tracks should be counted as part of the crossing.

RUTTING

X1.19 *Description*—A rut is a surface depression in the wheel paths. Pavement uplift may occur along the sides of the rut, but, in many instances, ruts are noticeable only after a



FIG. X1.40 High-Severity Railroad Crossing



FIG. X1.42 Medium-Severity Rutting

rainfall when the paths are filled with water. Rutting stems from a permanent deformation in any of the pavement layers or subgrades, usually caused by consolidated or lateral movement of the materials due to traffic load.

X1.19.1 Severity Levels (Mean Rut Depth):

X1.19.1.1 **L**—6 to 13 mm (¼ to ½ in.) (Fig. X1.41).

X1.19.1.2 **M**—>13 to 25 mm (>½ to 1 in.) (Fig. X1.42).

X1.19.1.3 **H**—>25 mm (>1 in.) (Fig. X1.43).

X1.19.2 How to Measure—Rutting is measured in square meters (square feet) of surface area, and its severity is determined by the mean depth of the rut (see X1.19.1.1-X1.19.1.3). The mean rut depth is calculated by laying a straight edge across the rut, measuring its depth, then using measurements taken along the length of the rut to compute its mean depth in millimeters.



FIG. X1.43 High-Severity Rutting

SHOVING

X1.20 Description:

X1.20.1 Shoving is a permanent, longitudinal displacement of a localized area of the pavement surface caused by traffic loading. When traffic pushes against the pavement, it produces a short, abrupt wave in the pavement surface. This distress

normally occurs only in unstable liquid asphalt mix (cutback or emulsion) pavements.

X1.20.2 Shoves also occur where asphalt pavements abut PCC pavements. The PCC pavements increase in length and push the asphalt pavement, causing the shoving.

X1.20.3 Severity Levels:

X1.20.3.1 **L**—Shove causes low-severity ride quality (Fig. X1.44).

X1.20.3.2 **M**—Shove causes medium-severity ride quality (Fig. X1.45).

X1.20.3.3 **H**—Shove causes high-severity ride quality (Fig. X1.46).

X1.20.4 How to Measure—Shoves are measured in square meters (feet) of surface area. Shoves occurring in patches are considered in rating the patch, not as a separate distress.

SLIPPAGE CRACKING

X1.21 Description—Slippage cracks are crescent or half-moon shaped cracks, usually transverse to the direction of travel. They are produced when braking or turning wheels cause the pavement surface to slide or deform. This distress usually occurs in overlaps when there is a poor bond between the surface and the next layer of the pavement structure.

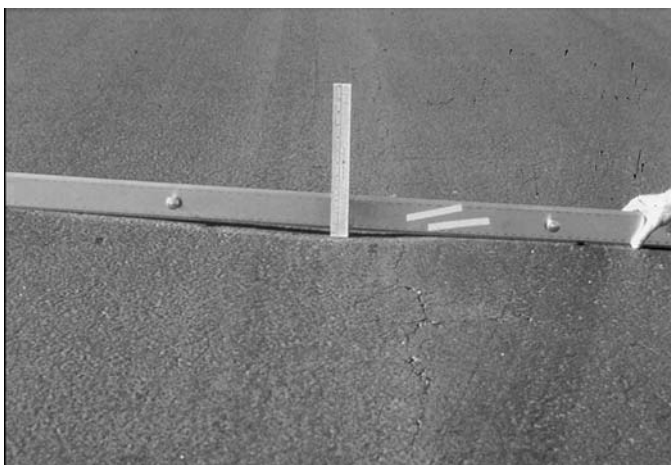


FIG. X1.41 Low-Severity Rutting



FIG. X1.44 Low-Severity Shoving



FIG. X1.47 Low-Severity Slippage Cracking



FIG. X1.45 Medium-Severity Shoving



FIG. X1.48 Medium-Severity Slippage Cracking

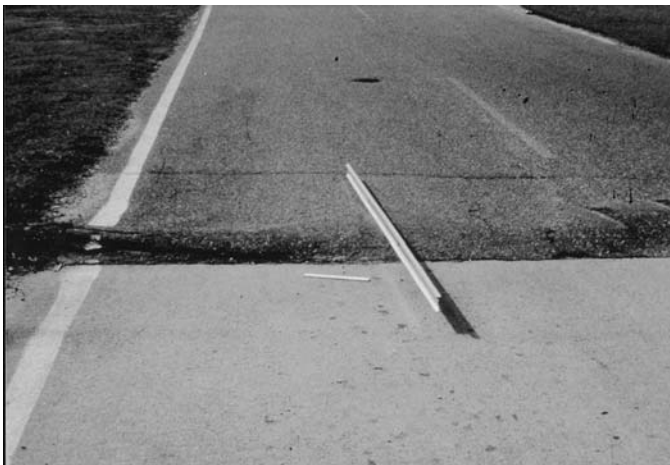


FIG. X1.46 High-Severity Shoving

1-1/2 in.); or the area around the crack is moderately spalled, or surrounded with secondary cracks.

X1.21.1.3 **H**—One of the following conditions exists (Fig. X1.49): the average crack width is > 40 mm (1-1/2 in.) or the area around the crack is broken into easily removed pieces.



FIG. X1.49 High-Severity Slippage Cracking

X1.21.1 *Severity Level:*

X1.21.1.1 **L**—Average crack width is < 10 mm (3/8 in.) (Fig. X1.47).

X1.21.1.2 **M**—One of the following conditions exists (Fig. X1.48): average crack width is ≥ 10 and < 40 mm ($\geq 3/8$ and <

X1.21.2 *How to Measure*—The area associated with a given slippage crack is measured in square meters (square feet) and rated according to the highest level of severity in the area.

SWELL

X1.22 *Description*—Swell is characterized by an upward bulge in the pavement’s surface, a long, gradual wave more than 3 m (10 ft) long (Fig. X1.50). Swelling can be accompanied by surface cracking. This distress usually is caused by frost action in the subgrade or by swelling soil.

X1.22.1 *Severity Level:*

X1.22.1.1 **L**—Swell causes low-severity ride quality. Low-severity swells are not always easy to see but can be detected by driving at the speed limit over the pavement section. An upward motion will occur at the swell if it is present.

X1.22.1.2 **M**—Swell causes medium-severity ride quality.

X1.22.1.3 **H**—Swell causes high-severity ride quality.

X1.22.2 *How to Measure*—The surface area of the swell is measured in square meters (square feet).

WEATHERING AND RAVELING

X1.23 *Description*—Weathering and raveling are the wearing away of the pavement surface due to a loss of asphalt or tar binder and dislodged aggregate particles. These distresses indicate that either the asphalt binder has hardened appreciably or that a poor-quality mixture is present. In addition, raveling may be caused by certain types of traffic, for example, tracked vehicles. Softening of the surface and dislodging of the aggregates due to oil spillage also are included under raveling.

X1.23.1 *Severity Levels:*

X1.23.1.1 **L**—Aggregate or binder has started to wear away. In some areas, the surface is starting to pit (Fig. X1.51). In the case of oil spillage, the oil stain can be seen, but the surface is hard and cannot be penetrated with a coin.

X1.23.1.2 **M**—Aggregate or binder has worn away. The surface texture is moderately rough and pitted (Fig. X1.52). In the case of oil spillage, the surface is soft and can be penetrated with a coin.

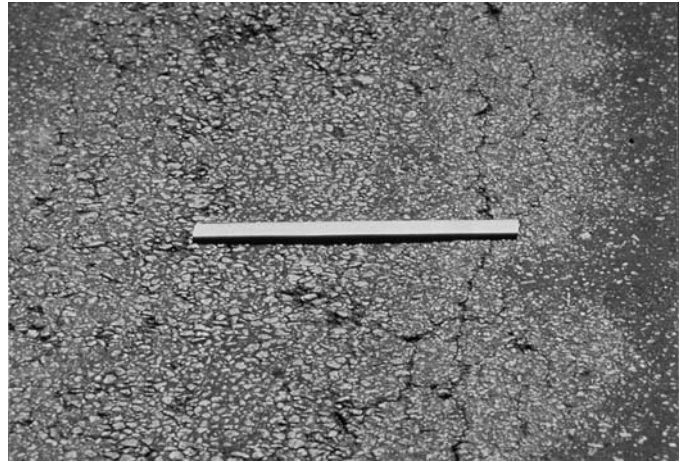


FIG. X1.51 Low-Severity Weathering and Raveling



FIG. X1.52 Medium-Severity Weathering and Raveling

X1.23.1.3 **H**—Aggregate or binder has been worn away considerably. The surface texture is very rough and severely pitted. The pitted areas are less than 10 mm (4 in.) in diameter and less than 13 mm (½ in.) deep (Fig. X1.53); pitted areas larger than this are counted as potholes. In the case of oil



FIG. X1.50 Example Swell. Severity level is based on ride quality criteria.



FIG. X1.53 High-Severity Weathering and Raveling

spillage, the asphalt binder has lost its binding effect and the aggregate has become loose.

X1.23.2 *How to Measure*—Weathering and raveling are measured in square meters (square feet) of surface area.

X2. DISTRESS IN JOINTED CONCRETE PAVEMENTS

X2.1 This Appendix lists alphabetically 19 distress types for jointed concrete pavements. Distress definitions apply to both plain and reinforced jointed concrete pavements, with the exception of linear cracking distress, which is defined separately for plain and reinforced jointed concrete.

X2.1.1 During the field condition surveys and validation of the PCI, several questions often are asked about the identification and counted method of some of the distresses. Answers to these questions are included under the heading “How to Count.” For convenience, however, the most frequently raised issues are addressed below.

X2.1.1.1 Faulting is counted only at joints. Faulting associated with cracks is not counted separately since it is incorporated into the severity-level definitions of cracks. Crack definitions are also used in defining corner breaks and divided slabs.

X2.1.1.2 Joint seal damage is not counted on a slab-by-slab basis. Instead, a severity level is assigned based on the overall condition of the joint seal in the area.

X2.1.1.3 Cracks in reinforced concrete slabs that are less than 1/8 in. wide are counted as shrinkage cracks. Shrinkage cracks should not be counted to determine if the slab is broken into four or more pieces.

X2.1.1.4 Low-severity scaling, that is, crazing, should only be counted if there is evidence that future scaling is likely to occur.

X2.1.2 The user should note that the items above are general issues and do not stand alone as inspection criteria. To measure each distress type properly, the inspector must be familiar with the individual distress criteria.

X2.2 *Ride Quality:*

X2.2.1 Ride quality must be evaluated in order to establish a severity level for the following distress types:

X2.2.1.1 Blowup/buckling.

X2.2.1.2 Railroad crossings.

X2.2.2 To determine the effect these distresses have on ride quality, the inspector should drive at the normal operating speed and use the following severity-level definitions of ride quality:

X2.2.2.1 **L**—Low. Vehicle vibrations, for example, from corrugation, are noticeable, but no reduction in speed is necessary for comfort or safety, or individual bumps or settlements, or both, cause the vehicle to bounce slightly but create little discomfort.

X2.2.2.2 **M**—Medium. Vehicle vibrations are significant and some reduction in speed is necessary for safety and comfort, or individual bumps or settlements cause the vehicle to bounce significantly, or both, creating some discomfort.

X2.2.2.3 **H**—High. Vehicle vibrations are so excessive that speed must be reduced considerably for safety and comfort, or individual bumps or settlements, or both, cause the vehicle to

bounce excessively, creating substantial discomfort, a safety hazard, or high potential vehicle damage, or a combination thereof.

X2.2.3 The inspector should drive at the posted speed in a sedan that is representative of cars typically seen in local traffic. Pavement sections near stop signs should be rated at a deceleration speed appropriate for the intersection.

BLOWUP/BUCKLING

X2.3 *Description*—Blowups or buckles occur in hot weather, usually at a transverse crack or joint that is not wide enough to permit slab expansion. The insufficient width usually is caused by infiltration of incompressible materials into the joint space. When expansion cannot relieve enough pressure, a localized upward movement of the slab edges (buckling) or shattering will occur in the vicinity of the joint. Blowups also can occur at utility cuts and drainage inlets.

X2.3.1 *Severity Levels:*

X2.3.1.1 **L**—Buckling or shattering causes low-severity ride quality (Fig. X2.1).

X2.3.1.2 **M**—Buckling or shattering causes medium-severity ride quality (Fig. X2.2).

X2.3.1.3 **H**—Buckling or shattering causes high-severity ride quality (Fig. X2.3).

X2.3.2 *How to Count*—At a crack, a blowup is counted as being in one slab; however, if the blowup occurs at a joint and affects two slabs, the distress should be recorded as occurring in two slabs. When a blowup renders the pavement impassable, it should be repaired immediately.

CORNER BREAK

X2.4 *Description*—A corner break is a crack that intersects the joints at a distance less than or equal to one-half the slab length on both sides, measured from the corner of the slab. For



FIG. X2.1 Low Severity Blowup/Buckling

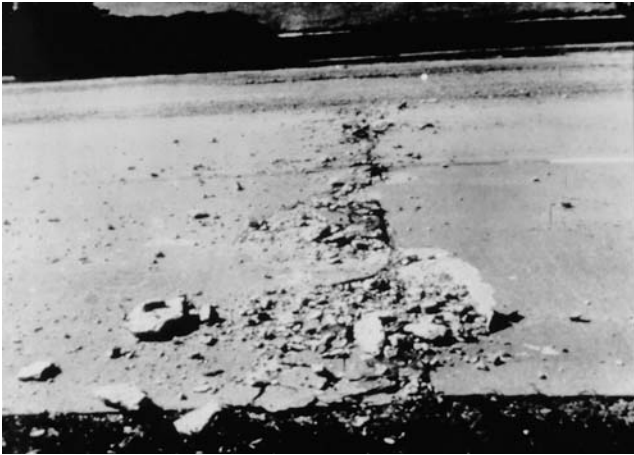


FIG. X2.2 Medium Severity Blowup/Buckling



FIG. X2.3 High-Severity Blowup/Buckling



FIG. X2.4 Low-Severity Corner Break

50 mm (2 in.) with faulting < 10 mm ($\frac{3}{8}$ in.), or a any filled crack with faulting < 10 mm ($\frac{3}{8}$ in.) (Fig. X2.5).

X2.4.1.3 **H**—Break is defined by a high-severity⁴ crack, or the area between the break and the joints, or both, is highly cracked. A high severity crack is a nonfilled crack >50 mm (2 in.) wide, or any filled or nonfilled crack with faulting >10 mm ($\frac{3}{8}$ in.) (Fig. X2.6).

X2.4.2 *How to Count*—Distressed slab is recorded as one slab if it:

X2.4.2.1 A single corner break.

X2.4.2.2 More than one break of a particular severity.

X2.4.2.3 Two or more breaks of different severities. For two or more breaks, the highest level of severity should be recorded. For example, a slab containing both low- and medium-severity corner breaks should be counted as one slab with a medium corner break.

example, a slab measuring 3.5 by 6.0 m (11.5 by 20.0 ft) that has a crack 1.5 m (5 ft) on one side and 3.5 m (11.5 ft) on the other side is not considered a corner break; it is a diagonal crack. However, a crack that intersects 0.5 m (4 ft) on one side and 2.5 m (8 ft) on the other is considered a corner break. A corner break differs from a corner spall in that the crack extends vertically through the entire slab thickness, whereas a corner spall intersects the joint at an angle. Load repetition combined with loss of support and curling stresses usually cause corner breaks.

X2.4.1 *Severity Levels*—

X2.4.1.1 **L**—Break is defined by a low-severity⁴ crack. A low severity crack is < 13 mm ($\frac{1}{2}$ in.), cracks of any width with satisfactory filler; no faulting. The area between the break and the joints is not cracked or may be lightly cracked (Fig. X2.4).

X2.4.1.2 **M**—Break is defined by a medium-severity⁴ crack, or the area between the break and the joints, or both, has a medium crack. A medium severity crack is a nonfilled crack > 13 mm and < 50 mm (> $\frac{1}{2}$ in. and < 2 in.), a nonfilled crack <



FIG. X2.5 Medium-Severity Corner Break

⁴ The above crack severity definitions are for nonreinforced slabs. For reinforced slabs, see *linear cracking*.



FIG. X2.6 High-Severity Corner Break



FIG. X2.7 Low-Severity Divided Slab

DIVIDED SLAB

X2.5 *Description*—Slab is divided by cracks into four or more pieces due to overloading, or inadequate support, or both. If all pieces or cracks are contained within a corner break, the distress is categorized as a severe corner break.

X2.5.1 *Severity Levels*—Table X2.1 lists severity levels for divided slabs. Examples are shown in Figs. X2.7-X2.9.

X2.5.2 *How to Count*—If the divided slab is medium- or high-severity, no other distress is counted for that slab.

DURABILITY (“D”) CRACKING

X2.6 *Description*—“D” cracking is caused by freeze-thaw expansion of the large aggregate, which, over time, gradually breaks down the concrete. This distress usually appears as a pattern of cracks running parallel and close to a joint or linear crack. Since the concrete becomes saturated near joints and cracks, a dark-colored deposit can usually be found around fine “D” cracks. This type of distress may eventually lead to disintegration of the entire slab.

X2.6.1 *Severity Levels:*

X2.6.1.1 *L*—“D” cracks cover less than 15 % of slab area. Most of the cracks are tight, but a few pieces may be loose and or missing (Fig. X2.10).

X2.6.1.2 *M*—One of the following conditions exists (Fig. X2.11): “D” cracks cover less than 15 % of the area and most of the pieces are loose and or missing, or “D” cracks cover more than 15 % of the area. Most of the cracks are tight, but a few pieces may be loose and or missing.

X2.6.1.3 *H*—“D” cracks cover more than 15 % of the area and most of the pieces have come out or could be removed easily (Fig. X2.12).



FIG. X2.8 Medium-Severity Divided Slab



FIG. X2.9 High-Severity Divided Slab

TABLE X2.1 Levels of Severity for Faulting

Severity Level	Difference of Elevation
L	>3 and <10 mm (>1/8 and <3/8 in.)
M	>10 and <20 mm (>3/8 and <3/4 in.)
H	>20 mm (>3/4 in.)

X2.6.2 *How to Count*—When the distress is located and rated at one severity, it is counted as one slab. If more than one severity level exists, the slab is counted as having the higher severity distress. For example, if low and medium “D” cracking are on the same slab, the slab is counted as medium-severity cracking only.

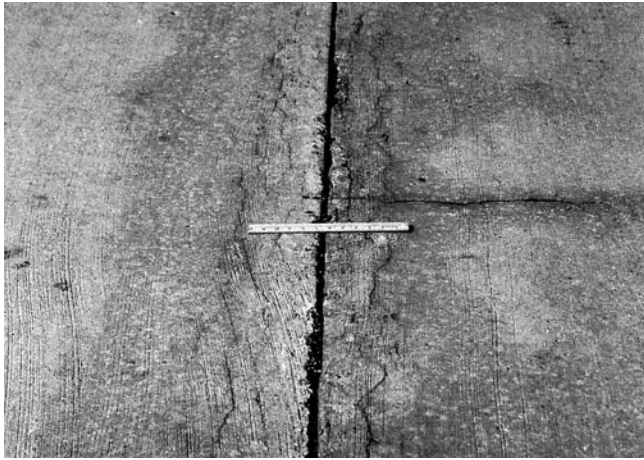


FIG. X2.10 Low-Severity Durability Cracking



FIG. X2.11 Medium-Severity Durability Cracking



FIG. X2.12 High-Severity Durability Cracking

FAULTING

X2.7 Description:

X2.7.1 Faulting is the difference in elevation across a joint.

Some common causes of faulting are as follows:

X2.7.1.1 Settlement because of soft foundation.

X2.7.1.2 Pumping or eroding of material from under the slab.

X2.7.1.3 Curling of the slab edges due to temperature and moisture changes.

X2.7.2 *Severity Levels*—Severity levels are defined by the difference in elevation across the joint as indicated in Table X2.2. Figs. X2.13-X2.15 show examples of the different severity levels.

X2.7.3 *How to Count*—Faulting across a joint is counted as one slab. Only affected slabs are counted. Faults across a crack are not counted as distress but are considered when defining crack severity.

JOINT SEAL DAMAGE

X2.8 Description:

X2.8.1 Joint seal damage is any condition that enables soil or rocks to accumulate in the joints or allows significant water infiltration. Accumulation of incompressible materials prevents the slab from expanding and may result in buckling, shattering, or spalling. A pliable joint filler bonded to the edges of the slabs protects the joints from material accumulation and prevents water from seeping down and softening the foundation supporting the slab. Typical types of joint seal damage are as follows:

X2.8.1.1 Stripping of joint sealant.

X2.8.1.2 Extrusion of joint sealant.

X2.8.1.3 Weed growth.

X2.8.1.4 Hardening of the filler (oxidation).

X2.8.1.5 Loss of bond to the slab edges.

X2.8.1.6 Lack or absence of sealant in the joint.

X2.8.2 Severity Levels:

X2.8.2.1 **L**—Joint sealant is in generally good condition throughout section (Fig. X2.16). Sealant is performing well, with only minor damage (see X2.8.1.1-X2.8.1.6). Joint seal damage is at low severity if a few of the joints have sealer, which has debonded from, but is still in contact with, the joint edge. This condition exists if a knife blade can be inserted between sealer and joint face without resistance.

X2.8.2.2 **M**—Joint sealant is in generally fair condition over the entire section, with one or more of the above types of damage occurring to a moderate degree. Sealant needs replacement within two years (Fig. X2.17). Joint seal damage is at medium severity if a few of the joints have any of the following conditions: joint sealer is in place, but water access is possible through visible openings no more than 3 mm (1/8 in.) wide. If a knife blade cannot be inserted easily between sealer and joint face, this condition does not exist; pumping debris are evident at the joint; joint sealer is oxidized and “lifeless” but pliable (like a rope), and generally fills the joint opening; or, vegetation in the joint is obvious but does not obscure the joint opening.

TABLE X2.2 Levels of Severity for Punchouts

Severity of the Majority of Cracks	Number of Pieces		
	2 to 3	4 to 5	>5
L	L	L	M
M	L	M	H
H	M	H	H



FIG. X2.13 Low-Severity Faulting



FIG. X2.16 Low-Severity Joint Seal Damage



FIG. X2.14 Medium-Severity Faulting

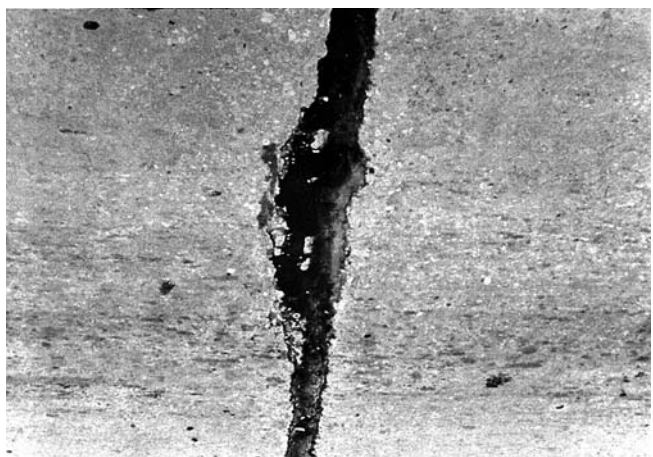


FIG. X2.17 Medium-Severity Joint Seal Damage



FIG. X2.15 High-Severity Faulting



FIG. X2.18 High-Severity Joint Seal Damage

X2.8.2.3 **H**—Joint sealant is in generally poor condition over the entire section, with one or more of the above types of damage occurring to a severe degree. Sealant needs immediate replacement (Fig. X2.18). Joint seal damage is at high severity if 10 % or more of the joint sealer exceeds limiting criteria listed above or if 10 % or more of sealer is missing.

X2.8.3 *How to Count*—Joint seal damage is not counted on a slab-by-slab basis but is rated based on the overall condition of the sealant over the entire area.

LANE/SHOULDER DROP-OFF

X2.9 *Description*—Lane/shoulder drop-off is the difference

between the settlement or erosion of the shoulder and the pavement travel-lane edge. The elevation difference can be a safety hazard, and it also can cause increased water infiltration.

X2.9.1 Severity Levels:

X2.9.1.1 **L**—The difference between the pavement edge and shoulder is >25 and ≤50 mm (>1 and ≤2 in.) (Fig. X2.19).

X2.9.1.2 **M**—The difference in elevation is >50 and ≤100 mm (>2 and ≤4 in.) (Fig. X2.20).

X2.9.1.3 **H**—The difference in elevation is >100 mm (>4 in.) (Fig. X2.21).

X2.9.2 *How to Count*—The mean lane/shoulder drop-off is computed by averaging the maximum and minimum drop along the slab. Each slab exhibiting distress is measured separately and counted as one slab with the appropriate severity level.

**LINEAR CRACKING
(Longitudinal, Transverse, and Diagonal Cracks)**

X2.10 *Description*—These cracks, which divide the slab into two or three pieces, usually are caused by a combination of repeated traffic loading, thermal gradient curling, and repeated moisture loading. (Slabs divided into four or more pieces are counted as divided slabs.) Hairline cracks that are only a few feet long and do not extend across the entire slab, are counted as shrinkage cracks.

X2.10.1 Severity Levels (Nonreinforced Slabs):

X2.10.1.1 **L**—Nonfilled⁴ cracks ≤ 13 mm (≤ ½ in.) or filled cracks of any width with the filler in satisfactory condition. No faulting exists (Fig. X2.22).

X2.10.1.2 **M**—One of the following conditions exists: non-filled crack with a width >13 and ≤50 mm (>½ and ≤ 2 in.); nonfilled crack of any width ≤ 50 mm (2 in.) with faulting of <10 mm (⅜ in.), or filled crack of any width with faulting <10 mm (⅜ in.) (Fig. X2.23).

X2.10.1.3 **H**—One of the following conditions exists: non-filled crack with a width >50 mm (2 in.), or filled or nonfilled crack of any width with faulting >10 mm (⅜ in.) (Fig. X2.24).

X2.10.2 Reinforced Slabs:

X2.10.2.1 **L**—Nonfilled cracks ≥ 3 and < 25 mm (≥ ⅛ and < 1 in.) wide; filled crack of any width with the filler in satisfactory condition. No faulting exists.

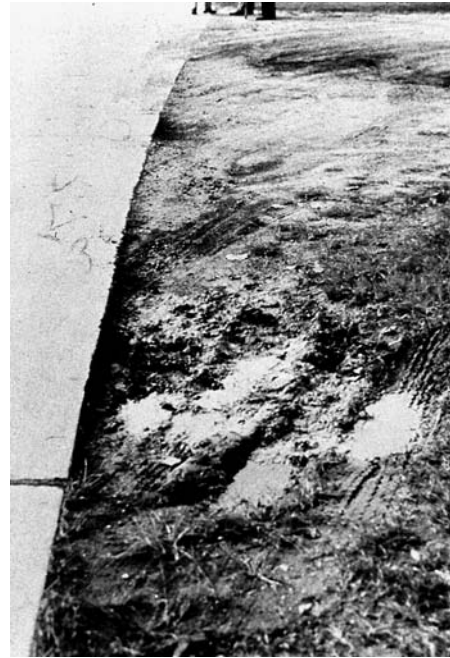


FIG. X2.20 Medium-Severity Lane/Shoulder Drop-Off



FIG. X2.21 High-Severity Lane/Shoulder Drop-Off



FIG. X2.19 Low-Severity Lane/Shoulder Drop-Off

X2.10.2.2 **M**—One of the following conditions exists: non-filled cracks with a width ≥ 25 and < 75 mm (≥ 1 and < 3 in.) and no faulting; nonfilled crack of any width ≤ 75 mm (3 in.) with ≤ 10 mm (⅜ in.) of faulting, or filled crack of any width with ≤ 10 mm (⅜ in.) faulting.

X2.10.2.3 **H**—Once of the following conditions exists: nonfilled crack >75 mm (3 in.) wide, or filled or nonfilled crack of any width with faulting >10 mm (⅜ in.).

X2.10.3 *How to Count*—Once the severity has been identified, the distress is recorded as one slab. If two medium severity cracks are within one slab, the slab is counted as



FIG. X2.22 Low-Severity Linear Cracking



FIG. X2.24 High-Severity Linear Cracking



FIG. X2.23 Medium-Severity Linear Cracking

having one high-severity crack. Slabs divided into four or more pieces are counted as divided slabs. In reinforced slabs, cracks <math>< 3\text{ mm}</math> ($\frac{1}{8}$ in.) wide are counted as shrinkage cracks. Slabs longer than 9 m (29.5 ft) are divided into approximately equal length “slabs” having imaginary joints assumed to be in perfect condition.

PATCHING, LARGE (MORE THAN 0.5 M² [5.5 FT²]) AND UTILITY CUTS

X2.11 *Description*—A patch is an area where the original pavement has been removed and replaced by filler material. A utility cut is a patch that has replaced the original pavement to allow the installation or maintenance of underground utilities. The severity levels of a utility cut are assessed according to the same criteria as large patching.

X2.11.1 *Severity Levels:*

X2.11.1.1 **L**—Patch is functioning well, with little or no deterioration (Fig. X2.25).

X2.11.1.2 **M**—Patch is moderately deteriorated, or moderate spalling can be seen around the edges, or both. Patch material can be dislodged with considerable effort (Fig. X2.26).

X2.11.1.3 **H**—Patch is badly deteriorated. The extent of the deterioration warrants replacement (Fig. X2.27).

X2.11.2 *How to Count*—If a single slab has one or more patches with the same severity level, it is counted as one slab containing that distress. If a single slab has more than one severity level, it is counted as one slab with the higher severity level.

PATCHING, SMALL (LESS THAN 0.5 M² [5.5 FT²])

X2.12 *Description*—A patch is an area where the original pavement has been removed and replaced by a filler material.

X2.12.1 *Severity Levels:*

X2.12.1.1 **L**—Patch is functioning well with little or no deterioration (Fig. X2.28).

X2.12.1.2 **M**—Patch is moderately deteriorated. Patch material can be dislodged with considerable effort (Fig. X2.29).



FIG. X2.25 Low-Severity Patching, Large and Utility Cuts



FIG. X2.26 Medium-Severity Patching, Large and Utility Cuts

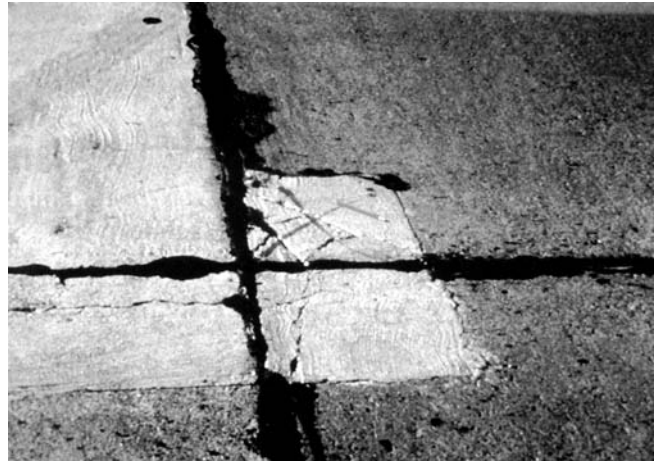


FIG. X2.29 Medium-Severity Patching, Small



FIG. X2.27 High-Severity Patching, Large and Utility Cuts



FIG. X2.30 High-Severity Patching, Small



FIG. X2.28 Low-Severity Patching, Small

POLISHED AGGREGATE

X2.13 *Description*—This distress is caused by repeated traffic applications. Polished aggregate is present when close examination of a pavement reveals that the portion of aggregate extending above the asphalt is either very small, or there are no rough or angular aggregate particles to provide good skid resistance.

X2.13.1 *Severity Levels*—No degrees of severity are defined; however, the degree of polishing should be significant before it is included in the condition survey and rated as a defect (Fig. X2.31).

X2.13.2 *How to Count*—A slab with polished aggregate is counted as one slab.

POPOUTS

X2.14 *Description*—A popout is a small piece of pavement that breaks loose from the surface due to freeze-thaw action, combined with expansive aggregates. Popouts usually range in diameter from approximately 25 to 100 mm (1 to 4 in.) and in depth from 13 to 50 mm (½ to 2 in.).

X2.14.1 *Severity Levels*—No degrees of severity are defined for popouts; however, popouts must be extensive before

X2.12.1.3 **H**—Patch is badly deteriorated. The extent of deterioration warrants replacement (Fig. X2.30).

X2.12.2 *How to Count*—If a single slab has one or more patches with the same severity level, it is counted as one slab containing that distress. If a single slab has more than one severity level, it is counted as one slab with the higher severity level.

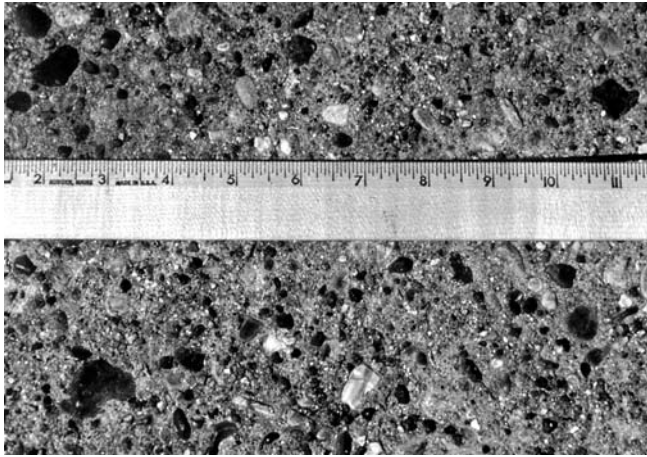


FIG. X2.31 Polished Aggregate

they are counted as a distress. Average popout density must exceed approximately three popouts/m² over the entire slab area (Fig. X2.32).

X2.14.2 *How to Count*—The density of the distress must be measured. If there is any doubt that the average is greater than three popouts per square yard, at least three random 1 m² (11 ft²) areas should be checked. When the average is greater than this density, the slab should be counted.

PUMPING

X2.15 *Description*—Pumping is the ejection of material from the slab foundation through joints or cracks. This is caused by deflection of the slab with passing loads. As a load moves across the joint between the slabs, water is first forced under the leading slab, and then forced back under the trailing slab. This action erodes and eventually removes soil particles resulting in progressive loss of pavement support. Pumping can be identified by surface stains and evidence of base or subgrade material on the pavement close to joints or cracks. Pumping near joints is caused by poor joint sealer and indicates loss of support; repeated loading eventually will produce cracks. Pumping also can occur along the slab edge causing loss of support.



FIG. X2.32 Popouts

X2.15.1 *Severity Levels*—No degrees of severity are defined. It is enough to indicate that pumping exists (Fig. X2.33 and Fig. X2.34).

X2.15.2 *How to Count*—One pumping joint between two slabs is counted as two slabs; however, if the remaining joints around the slab are also pumping, one slab is added per additional pumping joint.

PUNCHOUT

X2.16 *Description*—This distress is a localized area of the slab that is broken into pieces. The punchout can take many different shapes and forms, but it is usually defined by a crack and a joint. The distance between the joint and the crack or two closely spaced cracks is ≤ 1.5 m (5 ft) wide. This distress is caused by heavy repeated loads, inadequate slab thickness, loss of foundation support, or a localized concrete construction deficiency, for example, honeycombing.

X2.16.1 *Severity Levels*—Table X2.2 lists the severity levels for punchouts, and Figs. X2.35-X2.37 show examples.

X2.16.2 *How to Count*—If a slab contains more than one punchout or a punchout and a crack, it is counted as shattered.

RAILROAD CROSSING

X2.17 *Description*—Railroad crossing distress is characterized by depressions or bumps around the tracks.

X2.17.1 *Severity Levels:*

X2.17.1.1 **L**—Railroad crossing causes low-severity ride quality (Fig. X2.38).

X2.17.1.2 **M**—Railroad crossing causes medium-severity ride quality (Fig. X2.39).

X2.17.1.3 **H**—Railroad crossing causes high-severity ride quality (Fig. X2.40).



FIG. X2.33 Pumping



FIG. X2.34 Pumping



FIG. X2.36 Medium-Severity Punchout



FIG. X2.35 Low-Severity Punchout



FIG. X2.37 High-Severity Punchout



FIG. X2.38 Low-Severity Railroad Crossing

X2.17.2 *How to Count*—The number of slabs crossed by the railroad tracks is counted. Any large bump created by the tracks should be counted as part of the crossing.

SCALING, MAP CRACKING, AND CRAZING

X2.18 *Description*—Map cracking or crazing refers to a network of shallow, fine, or hairline cracks that extend only through the upper surface of the concrete. The cracks tend to intersect at angles of 120°. Map cracking or crazing usually is caused by concrete over-finishing and may lead to surface scaling, which is the breakdown of the slab surface to a depth of approximately 6 to 13 mm (¼ to ½ in.). Scaling also may be caused by deicing salts, improper construction, freeze-thaw cycles and poor aggregate. The type of scaling defined here is not caused by “D” cracking. If scaling is caused by “D” cracking, it should be counted under that distress only.

X2.18.1 *Severity Levels:*

X2.18.1.1 **L**—Crazing or map cracking exists over most of the slab area; the surface is in good condition, with only minor scaling present (Fig. X2.41).

X2.18.1.2 **M**—Slab is scaled but less than 15 % of the slab is affected (Fig. X2.42).

X2.18.1.3 **H**—Slab is scaled over more than 15 % of its area (Fig. X2.43).



FIG. X2.39 Medium-Severity Railroad Crossing

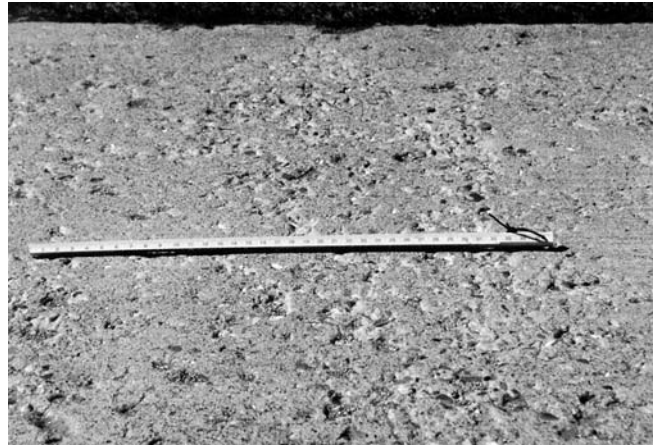


FIG. X2.42 Medium-Severity Scaling, Map Cracking, and Cracking



FIG. X2.40 High-Severity Railroad Crossing

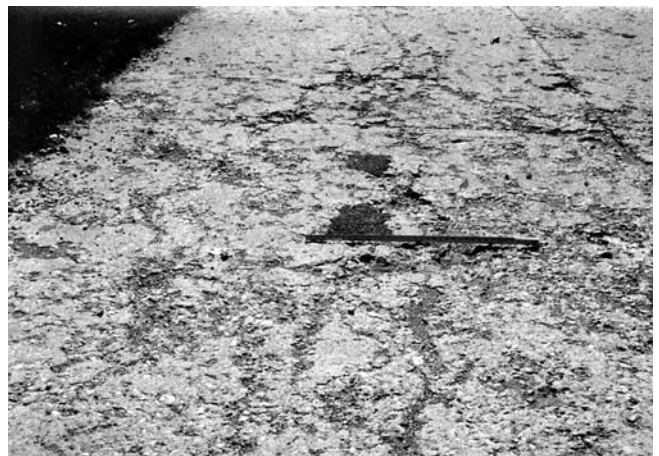


FIG. X2.43 High-Severity Scaling, Map Cracking, and Cracking



FIG. X2.41 Low-Severity Scaling, Map Cracking, and Cracking

X2.18.2 *How to Count*—A scaled slab is counted as one slab. Low-severity crazing only should be counted if the potential for scaling appears to be imminent or a few small pieces come out.

SHRINKAGE CRACKS

X2.19 *Description*—Shrinkage cracks are hairline cracks

that usually are less than 2-m long and do not extend across the entire slab. They are formed during the setting and curing of the concrete and usually do not extend through the depth of the slab.

X2.19.1 *Severity Levels*—No degrees of severity are defined. It is enough to indicate that shrinkage cracks are present (Fig. X2.44).



FIG. X2.44 Shrinkage Cracks

X2.19.2 *How to Count*—If any shrinkage cracks exist on a particular slab, the slab is counted as one slab with shrinkage cracks.

SPALLING, CORNER

X2.20 *Description*—Corner spalling is the breakdown of the slab within approximately 0.5 m (1.5 ft) of the corner. A corner spall differs from a corner break in that the spall usually angles downward to intersect the joint, whereas a break extends vertically through the slab corner. Spalls less than 130 mm (5 in.) from the crack to the corner on both sides should not be counted.

X2.20.1 *Severity Levels*—Table X2.3 lists the levels of severity for corner spalling. Figs. X2.45-X2.47 show examples. Corner spalling with an area of less than 650 cm² (10 in.²) from the crack to the corner on both sides should not be counted.

X2.20.2 *How to Count*—If one or more corner spalls with the same severity level are in a slab, the slab is counted as one slab with corner spalling. If more than one severity level occurs, it is counted as one slab with the higher severity level.

SPALLING, JOINT

X2.21 *Description:*

X2.21.1 *Joint spalling* is the breakdown of the slab edges within 0.5 m (1.5 ft) of the joint. A joint spall usually does not extend vertically through the slab, but intersects the joint at an angle. Spalling results from:

X2.21.1.1 Excessive stresses at the joint caused by traffic loading or by infiltration of incompressible materials.

X2.21.1.2 Weak concrete at the joint caused by overworking.

X2.21.1.3 Water accumulation in the joint and freeze-thaw action.

X2.21.2 *Severity Levels*—Table X2.4 and Figs. X2.48-X2.50 show the severity levels of joint spalling. A frayed joint where the concrete has been worn away along the entire joint is rated as low severity.

X2.21.3 *How to Count*—If spall is along the edge of one slab, it is counted as one slab with joint spalling. If spalling is on more than one edge of the same slab, the edge having the highest severity is counted and recorded as one slab. Joint spalling also can occur along the edges of two adjacent slabs.

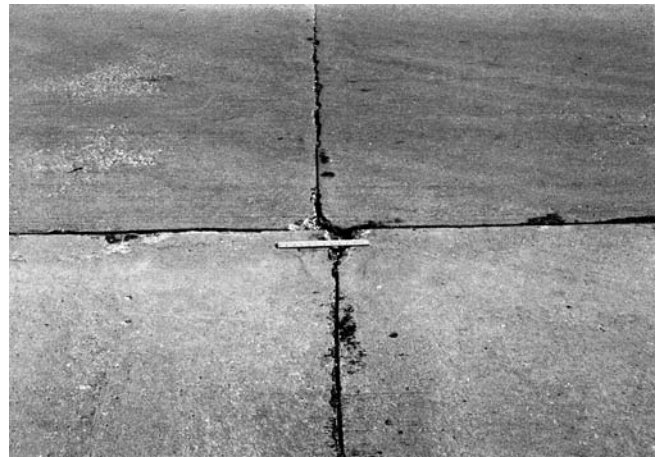


FIG. X2.45 Low-Severity Spalling, Corner



FIG. X2.46 Medium-Severity Spalling, Corner

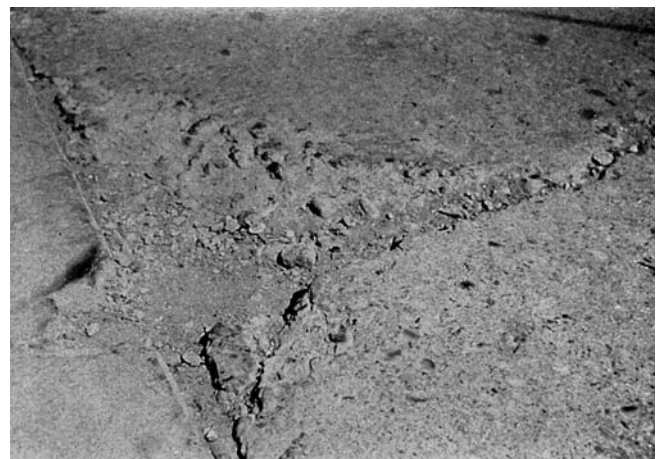


FIG. X2.47 High-Severity Spalling, Corner

TABLE X2.3 Levels of Severity for Corner Spalling

Depth of Spall	Dimensions of Sides of Spall	
	130 × 130 mm to 300 × 300 mm (5 × 5 in.) to (12 × 12 in.)	300 × 300 mm (>12 × 12 in.)
<25 mm (1 in.)	L	L
>25 to 50 mm (1 to 2 in.)	L	M
>50 mm (2 in.)	M	H

If this is the case, each slab is counted as having joint spalling.

TABLE X2.4 Levels of Severity for Joint Spalling

Spall Pieces	Width of Spall	Length of Spall	
		<0.5 m (1.5 ft)	>0.5 m (1.5 ft)
Tight—cannot be removed easily (maybe a few pieces missing.)	<100 mm (4 in.)	L	L
	>100 mm	L	L
Loose—can be removed and some pieces are missing; if most or all pieces are missing, spall is shallow, less than 25 mm (1 in.).	<100 mm	L	M
	>100 mm	L	M
Missing—most or all pieces have been removed.	<100 mm	L	M
	>100 mm	M	H

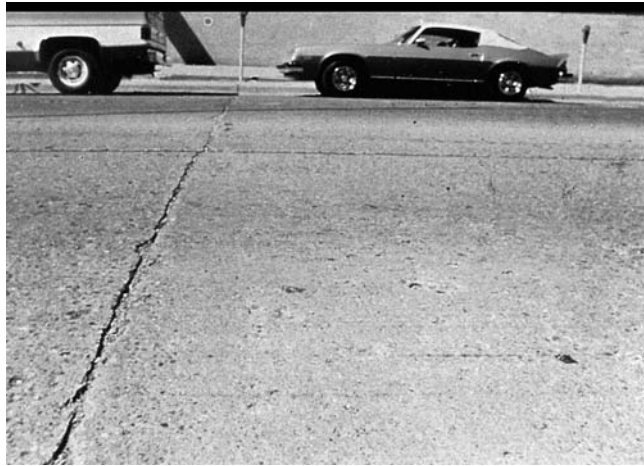


FIG. X2.48 Low-Severity Spalling, Joint



FIG. X2.49 Medium-Severity Spalling, Joint

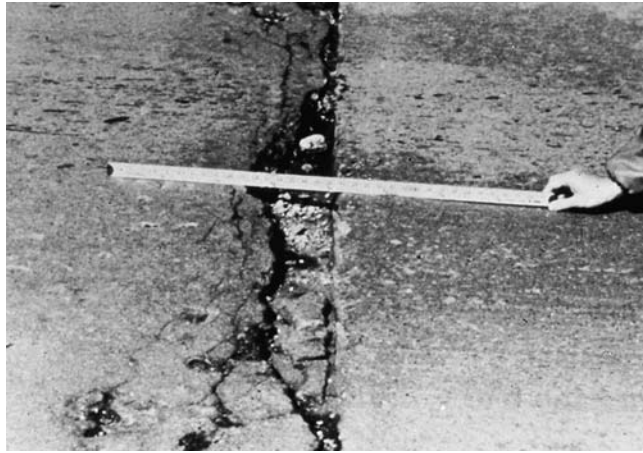


FIG. X2.50 High-Severity Spalling, Joint

X3. DEDUCT VALUE CURVES FOR ASPHALT

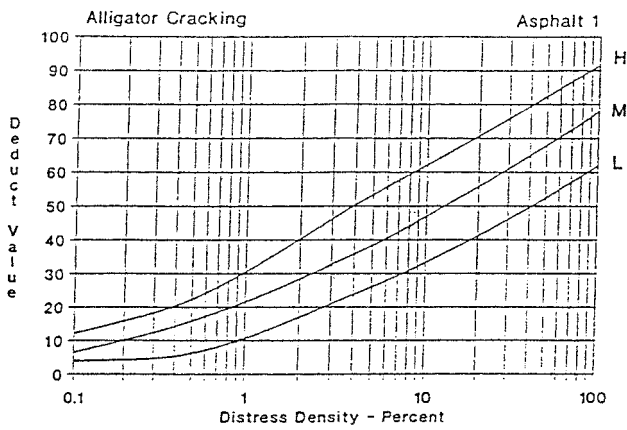


FIG. X3.1 Alligator Cracking

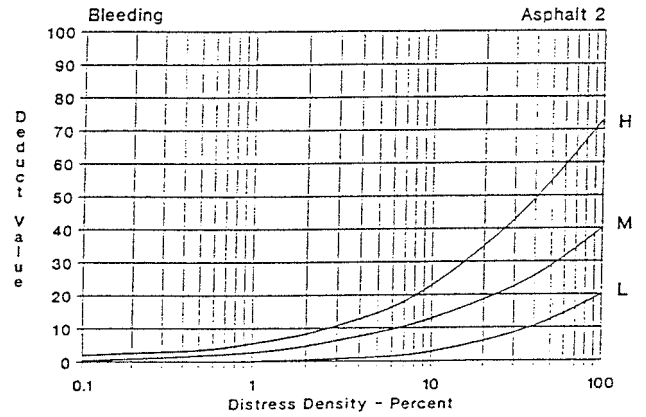


FIG. X3.2 Bleeding

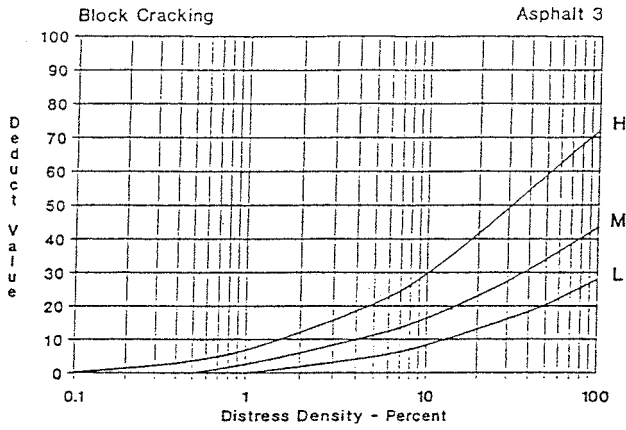


FIG. X3.3 Block Cracking

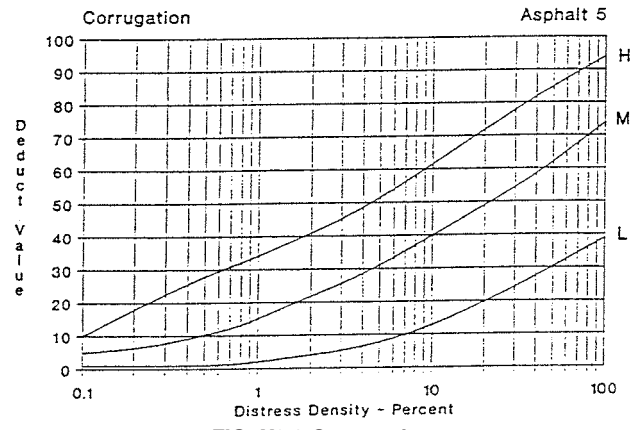


FIG. X3.6 Corrugation

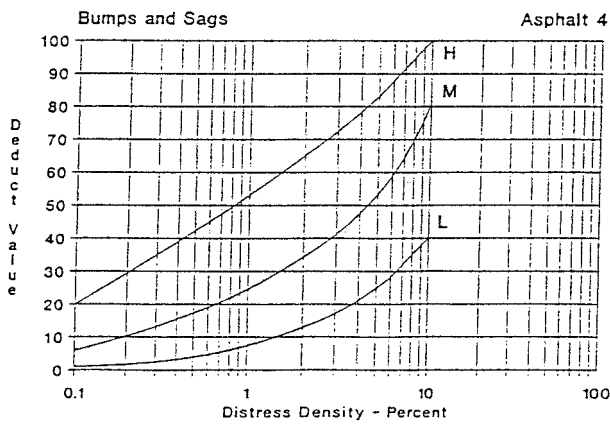


FIG. X3.4 Bumps and Sags

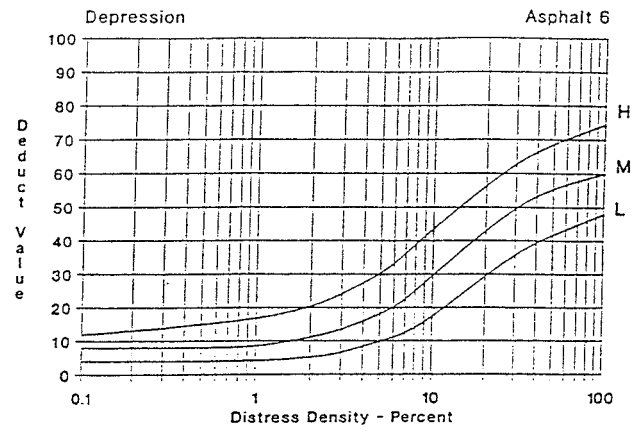


FIG. X3.7 Depression

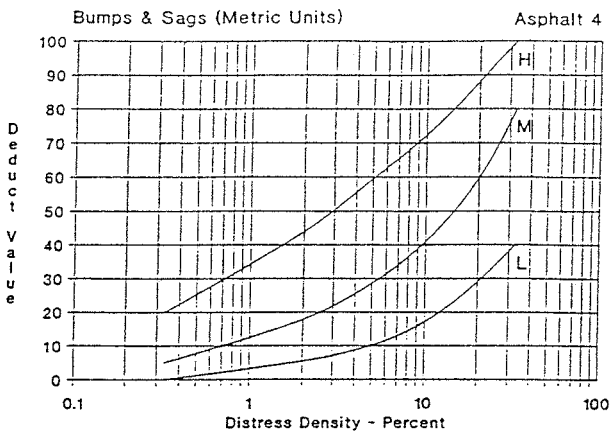


FIG. X3.5 Bumps and Sags (Metric units)

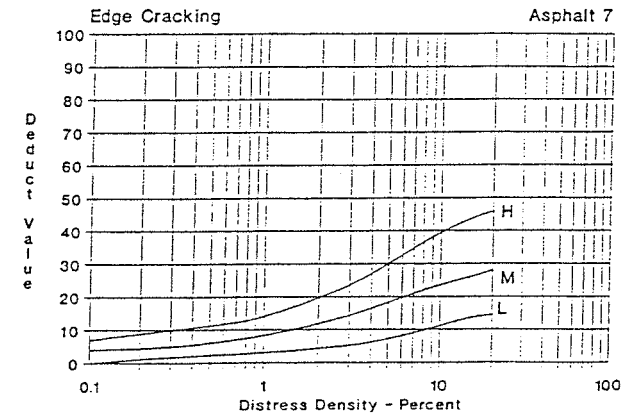


FIG. X3.8 Edge Cracking

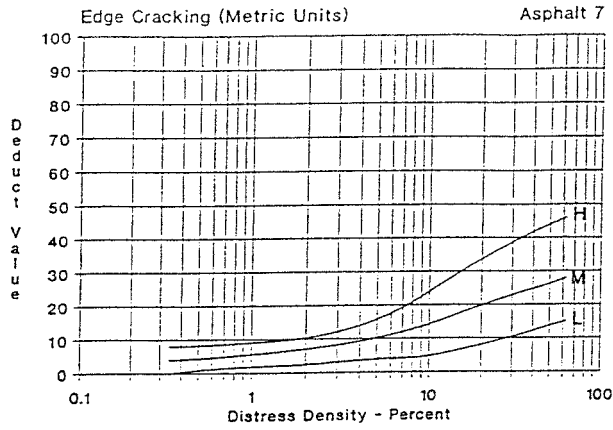


FIG. X3.9 Edge Cracking (metric units)

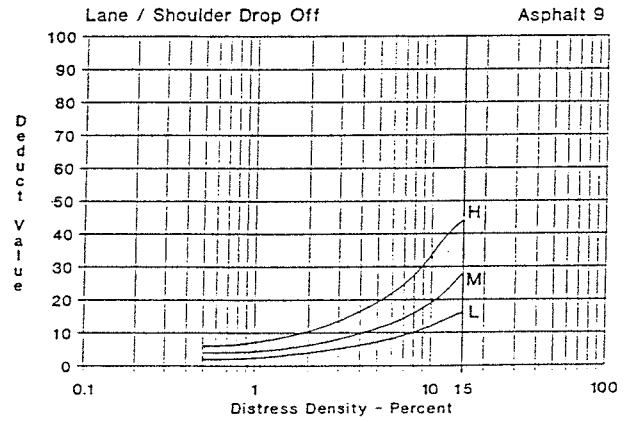


FIG. X3.12 Lane/Shoulder Drop-Off

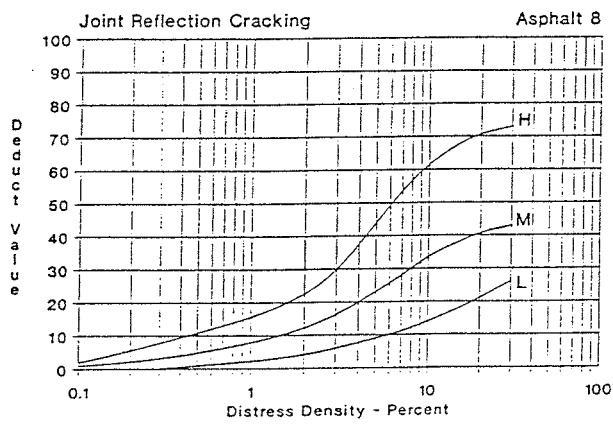


FIG. X3.10 Joint Reflection Cracking

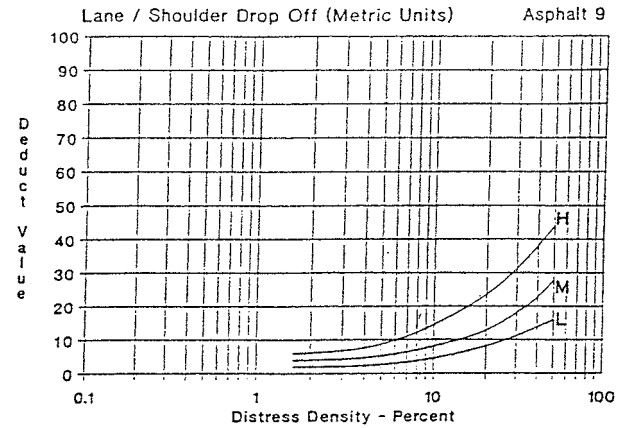


FIG. X3.13 Lane/Shoulder Drop-Off (metric units)

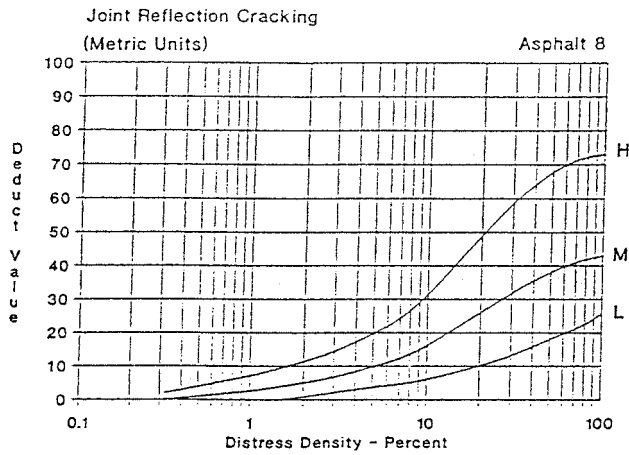


FIG. X3.11 Joint Reflection Cracking (metric units)

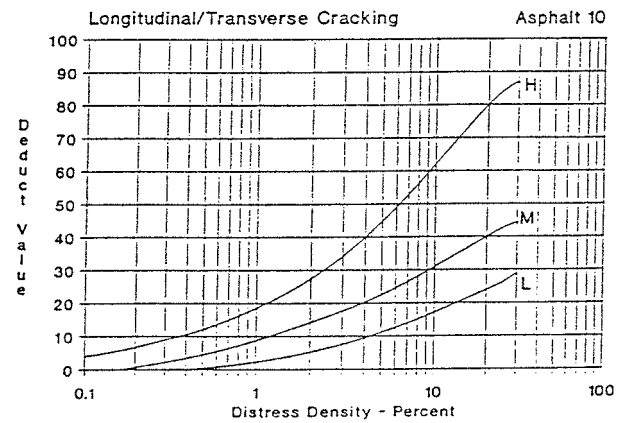


FIG. X3.14 Longitudinal/Transverse Cracking

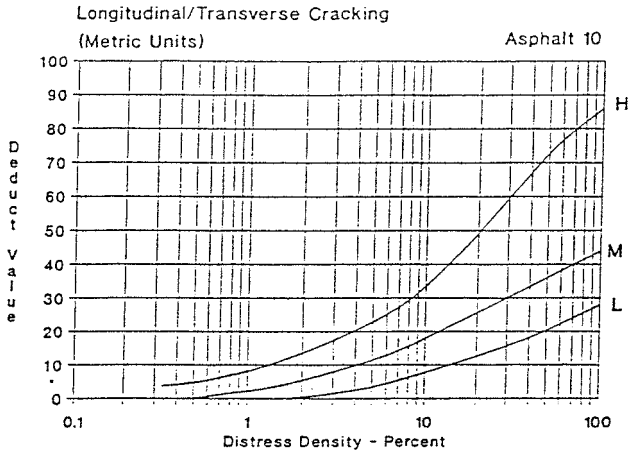


FIG. X3.15 Longitudinal/Transverse Cracking (metric units)

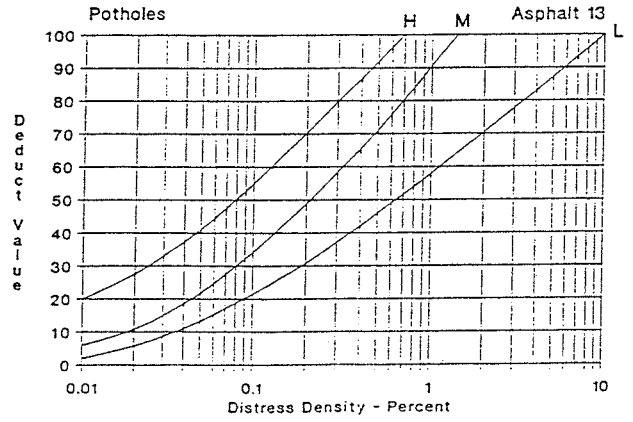


FIG. X3.18 Potholes

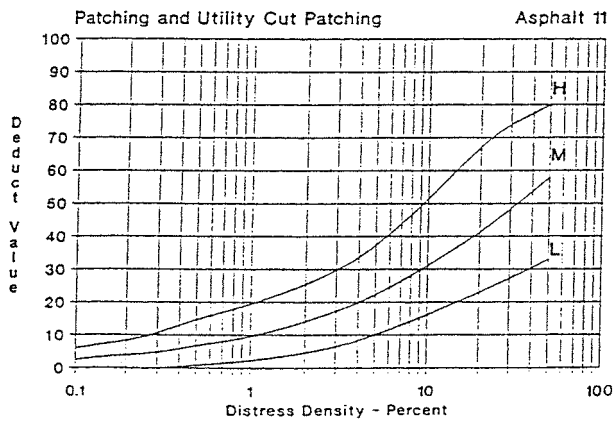


FIG. X3.16 Patching and Utility Cut Patching

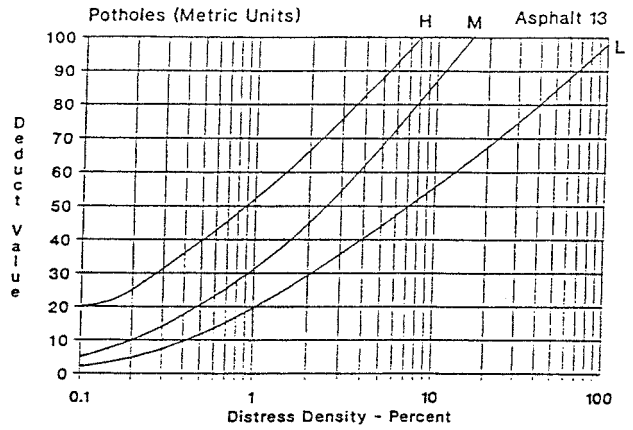


FIG. X3.19 Potholes (metric units)

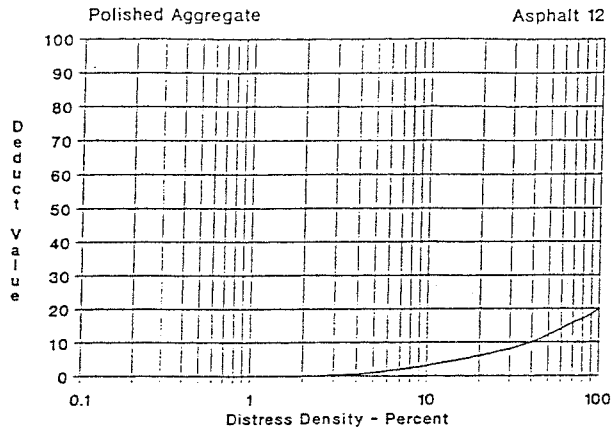


FIG. X3.17 Polished Aggregate

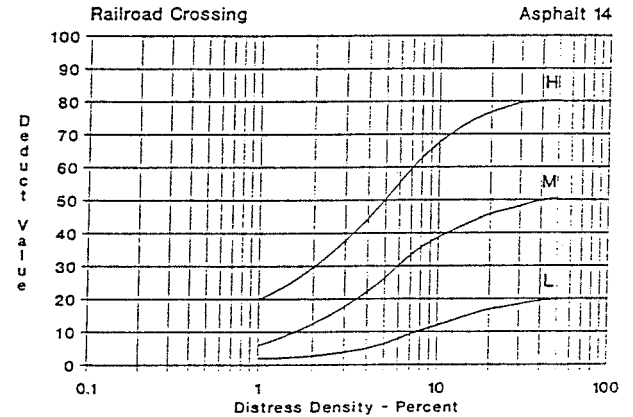


FIG. X3.20 Railroad Crossing

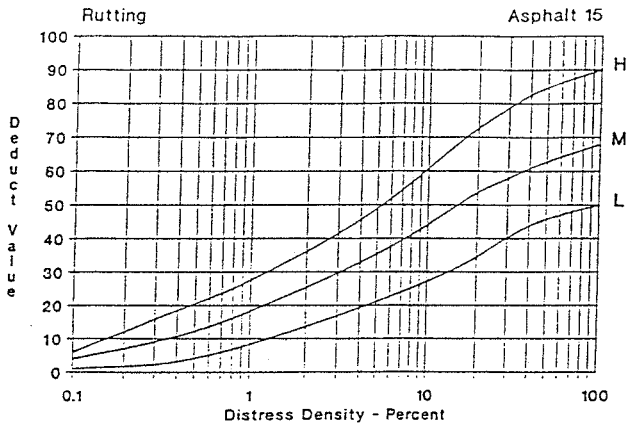


FIG. X3.21 Rutting

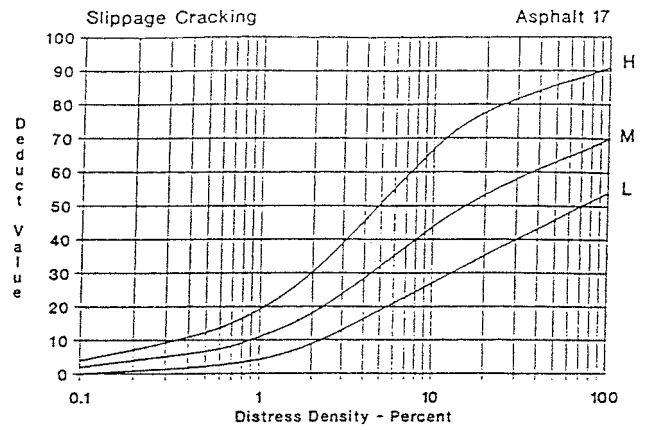


FIG. X3.23 Slippage Cracking

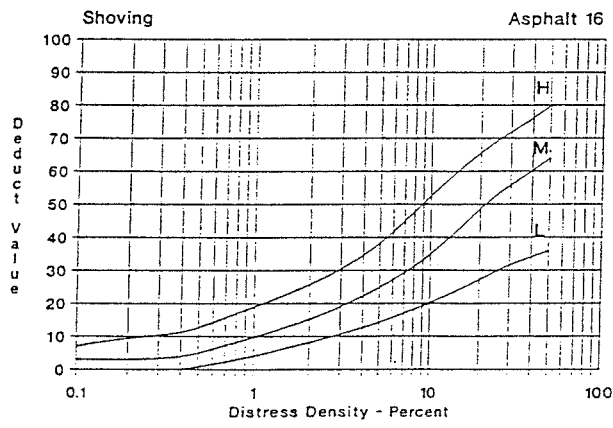


FIG. X3.22 Shoving

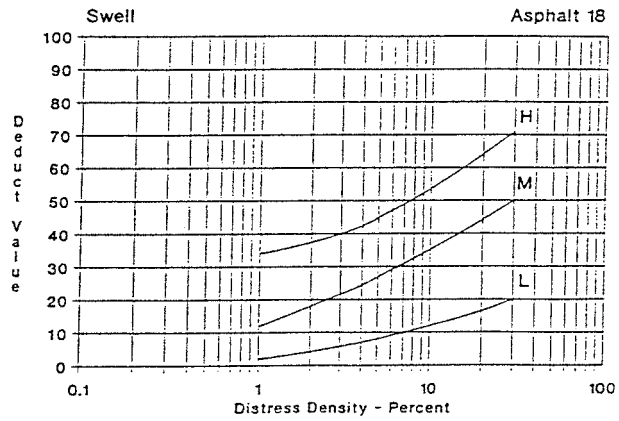


FIG. X3.24 Swell

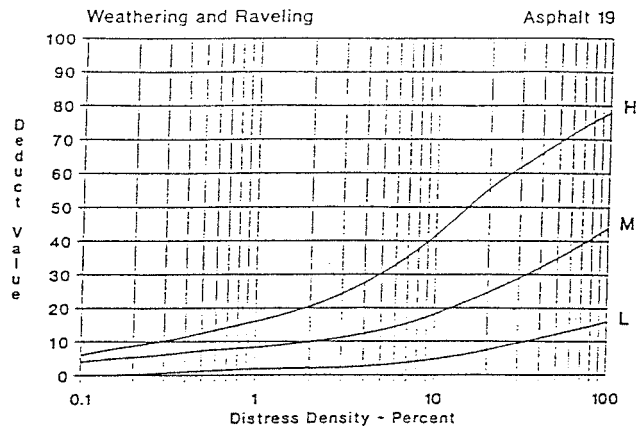


FIG. X3.25 Weathering and Raveling

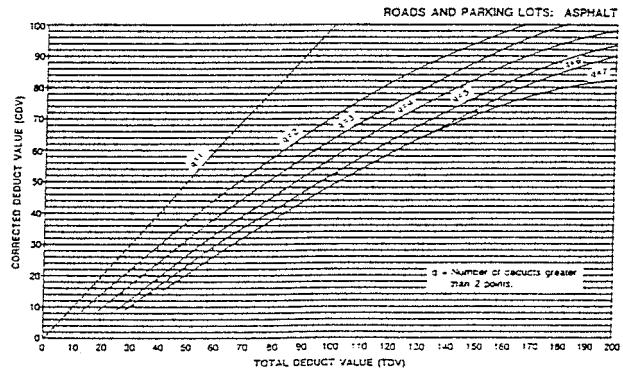


FIG. X3.26 Total Deduct Value

X4. DEDUCT VALUE CURVES FOR CONCRETE

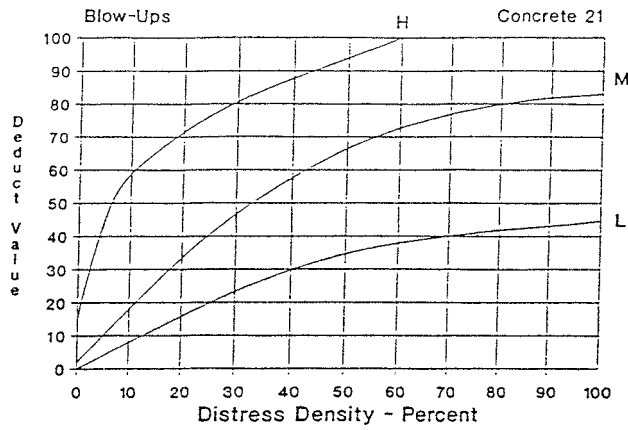


FIG. X4.1 Blowups

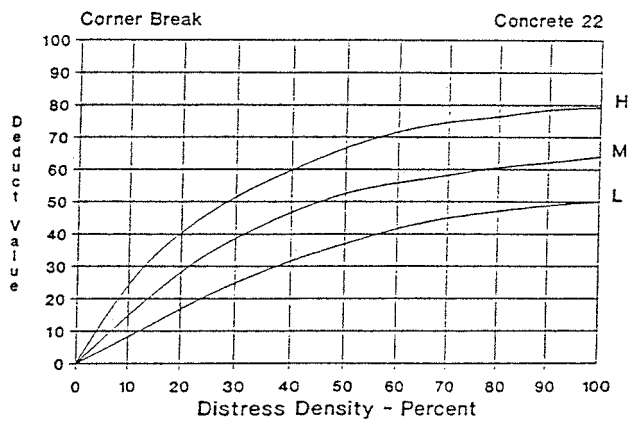


FIG. X4.2 Corner Break

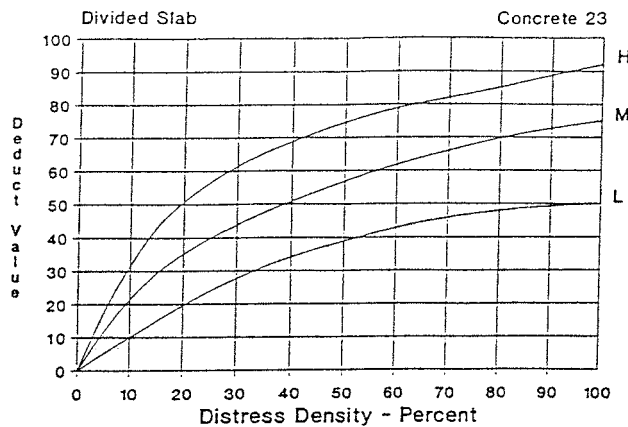


FIG. X4.3 Divided Slab

REFERENCES

- (1) PAVER Asphalt Distress Manual, US Army Construction Engineering Laboratories, TR 97/104, June 1997.
- (2) PAVER Asphalt Distress Manual, US Army Construction Engineering Laboratories, TR 97/105, June 1997.
- (3) Carey, W.N., Jr. and Irick, P.E., "The Pavement Serviceability-Performance Concept," *HRB Bulletin* 250, 1960.
- (4) Sayers, M. W., Gillespie, T. D., and Queiroz, C. A. V., "The International Road Roughness Experiment: Establishing Correlation and a Calibration Standard for Measurements," World Bank Technical Paper No. 45, the International Bank for Reconstruction and Development/the World Bank, Washington, DC, 1986.

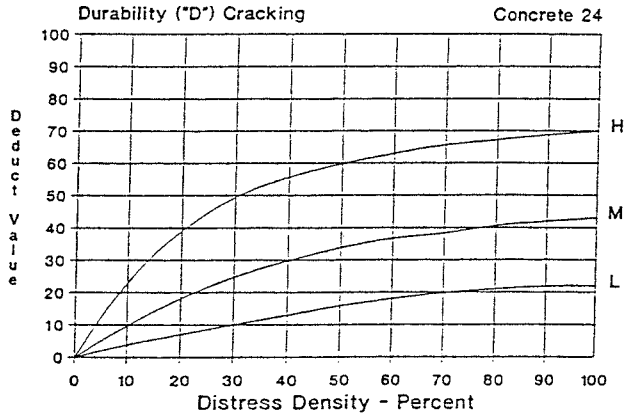


FIG. X4.4 Durability ("D") Cracking

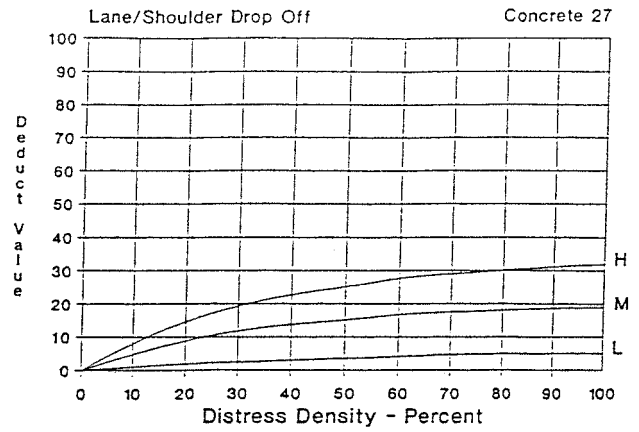


FIG. X4.7 Lane/Shoulder Drop-Off

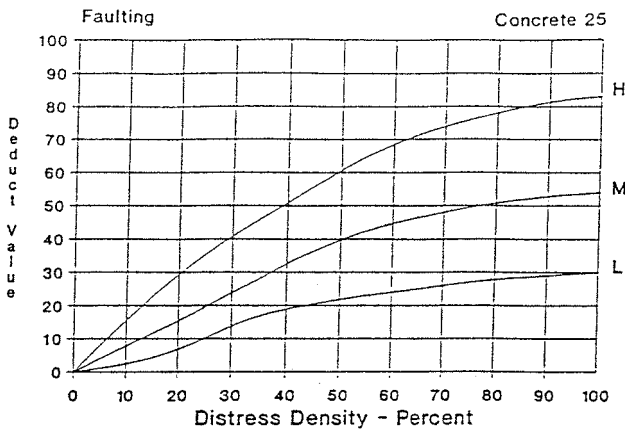


FIG. X4.5 Faulting

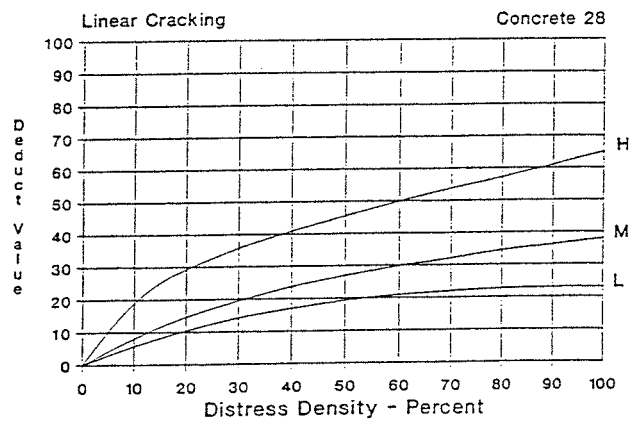


FIG. X4.8 Linear Cracking

Joint Seal Damage Concrete 26

Joint seal damage is not rated by density. The severity of the distress is determined by the sealant's overall condition for a particular sample unit.

The deduct values for the three levels of severity are:

LOW	2 points
MEDIUM	4 points
HIGH	8 points

FIG. X4.6 Rigid Pavement Deduct Values, Distress 26, joint seal damage

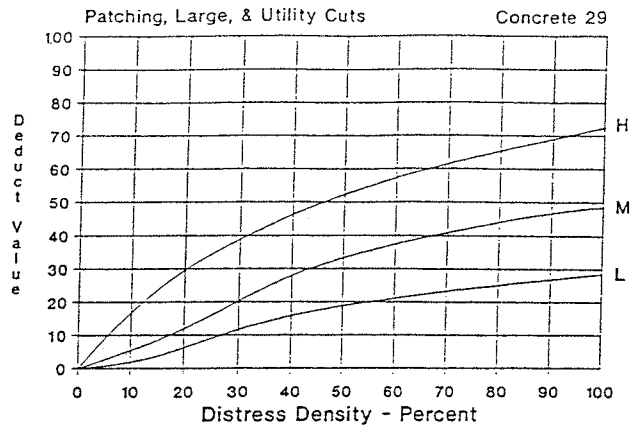
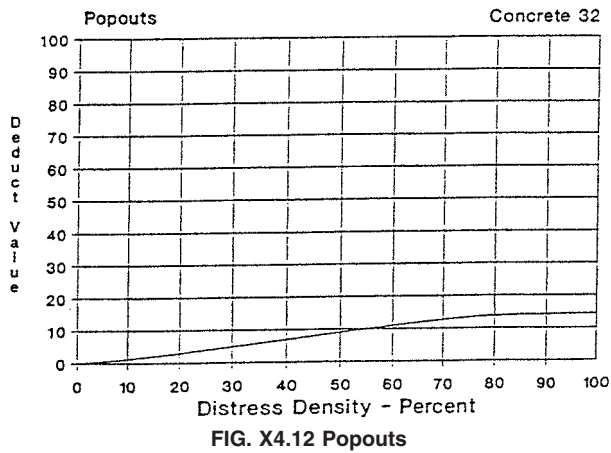
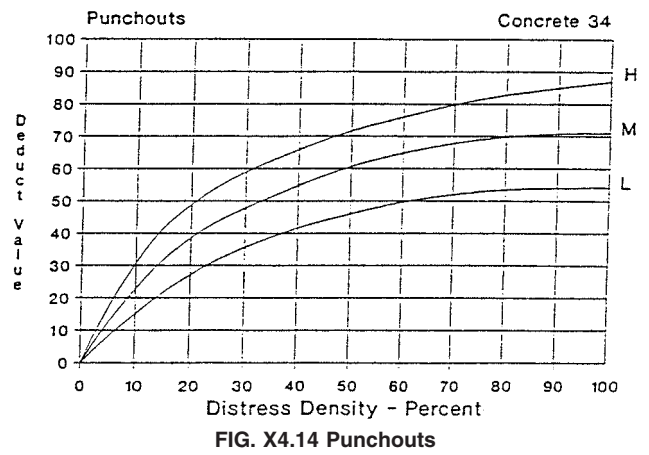
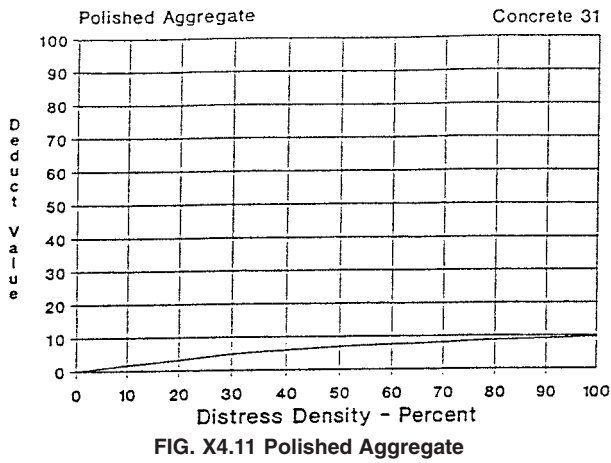
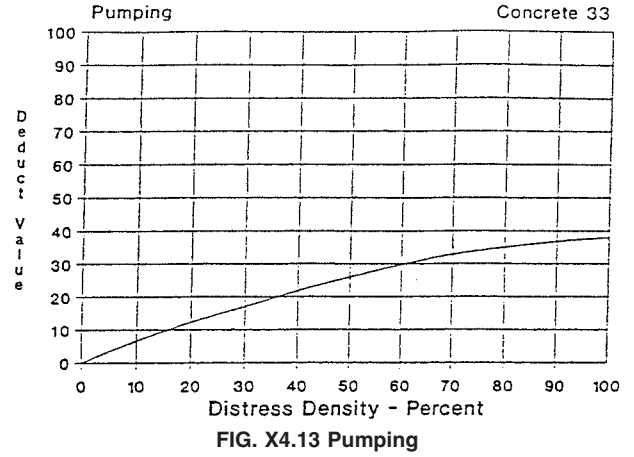
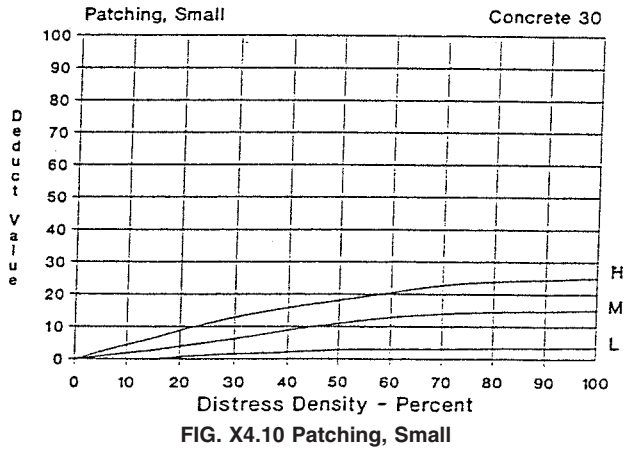


FIG. X4.9 Patching, Large, and Utility Cuts



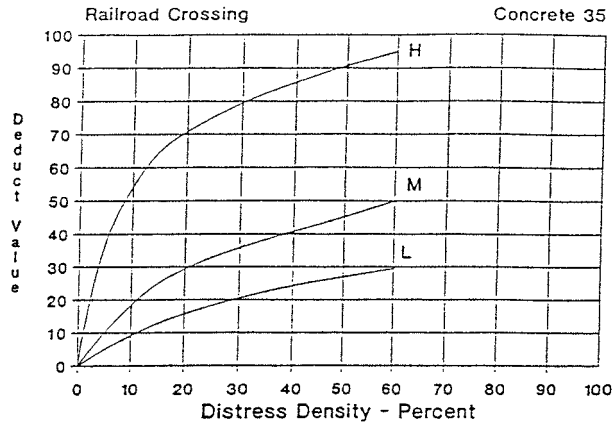


FIG. X4.15 Railroad Crossing

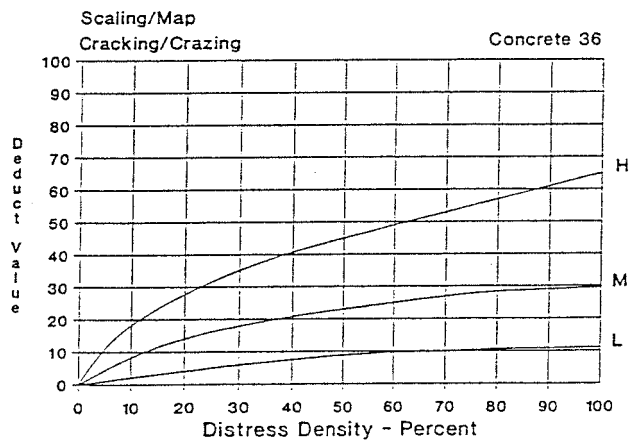


FIG. X4.16 Scaling/Map Cracking/Crazing

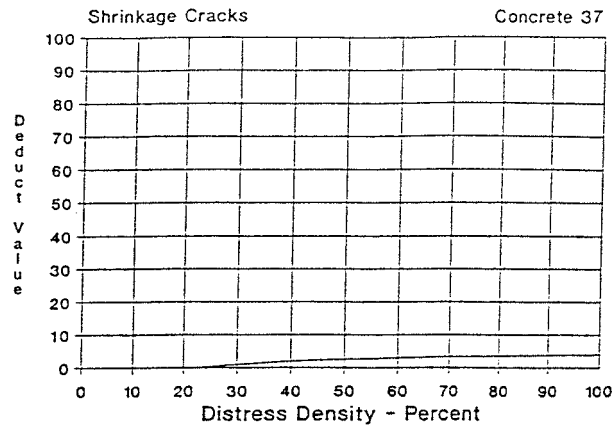


FIG. X4.17 Shrinkage Cracks

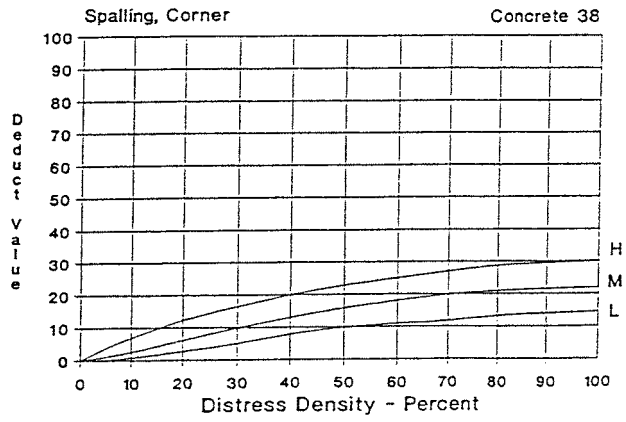


FIG. X4.18 Spalling, Corner

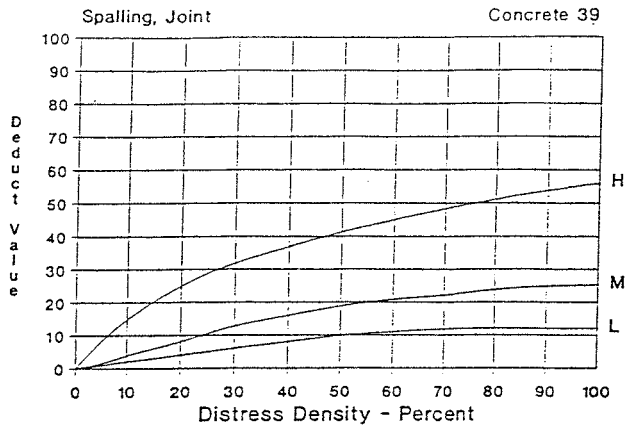
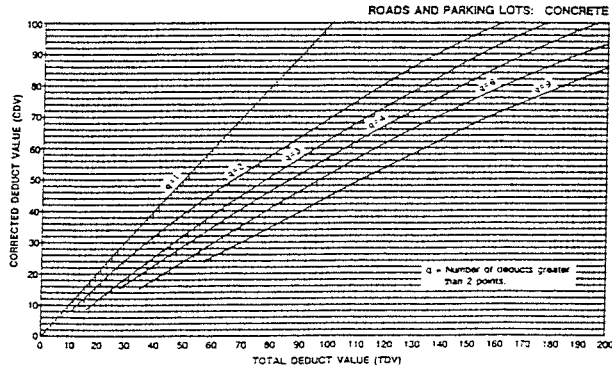


FIG. X4.19 Spalling, Joint



Corrected deduct values for jointed concrete pavement.

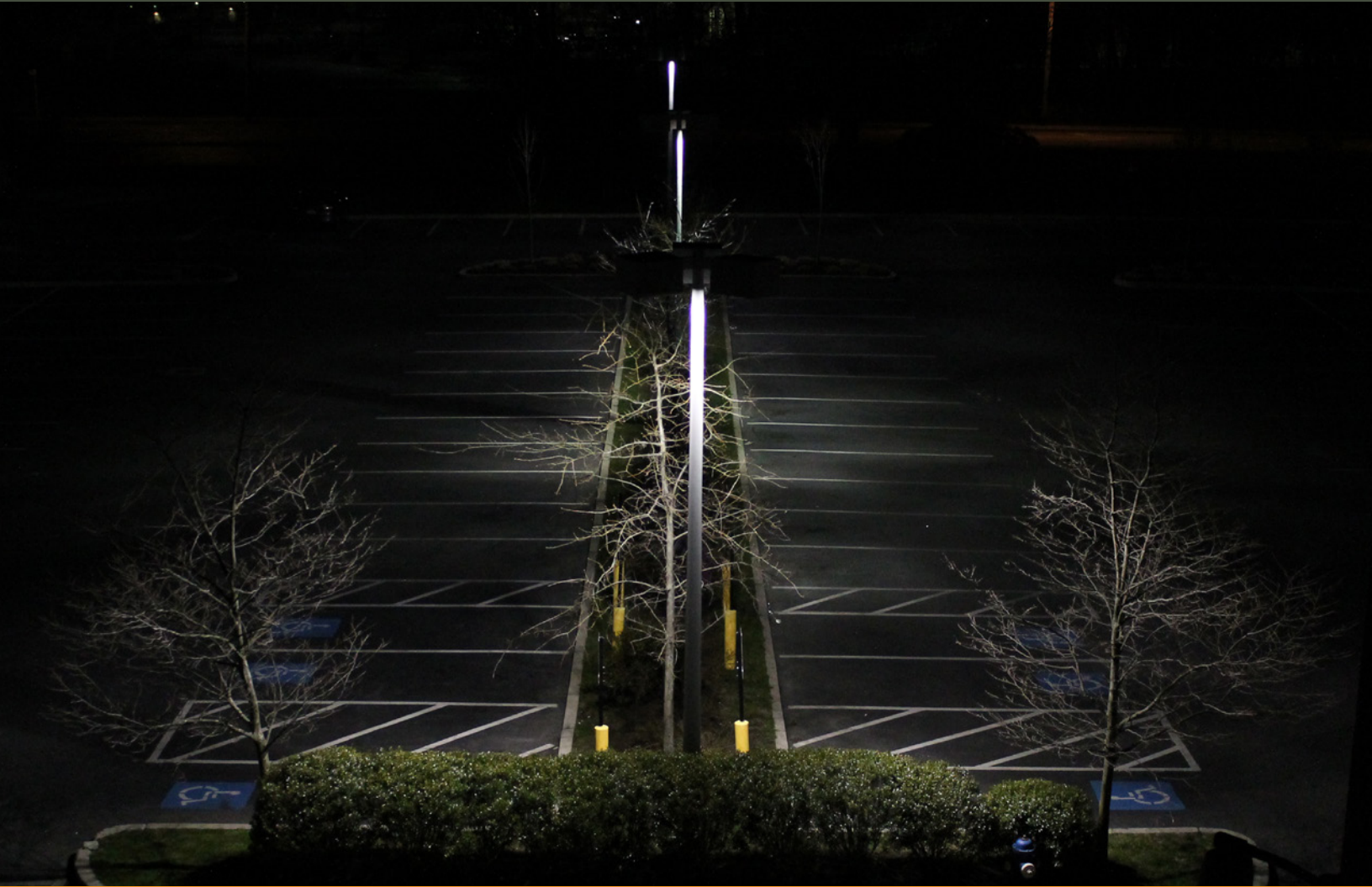
FIG. X4.20 Corrected Deduct Values for Jointed Concrete Pavement

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).

APPENDIX C ILLUMINATION



GUIDE TO FEMP-DESIGNATED PARKING LOT LIGHTING

FOR FEDERAL AGENCIES

TABLE OF CONTENTS

1	INTRODUCTION <ul style="list-style-type: none">• FEMP-DESIGNATED PRODUCTS• ENERGY EFFICIENCY METRICS
3	DESIGN PROCESS <ul style="list-style-type: none">• STEP-BY-STEP OVERVIEW
6	COMPONENTS OF THE DESIGN <ul style="list-style-type: none">• DESIGN CONSIDERATIONS• LIGHTING DESIGN CONSIDERATIONS• LUMINAIRE DISTRIBUTION• COLOR QUALITIES• LIGHT SPECTRUM
13	PARKING LOT LIGHTING DESIGN <ul style="list-style-type: none">• DESIGN SCENARIO OVERVIEW• DESIGN SCENARIO - GENERAL LUMINAIRE• DESIGN SCENARIO - FEMP-DESIGNATED LUMINAIRE
17	LIGHTING CONTROLS SAVE ENERGY <ul style="list-style-type: none">• STATIC CONTROLS• MULTI-LEVEL CONTROLS
20	COST-EFFECTIVENESS
21	RESOURCES

INTRODUCTION

Legislation and the Federal Acquisition Regulations (FAR) require federal agencies to specify and buy ENERGY STAR® qualified products or, in categories not included in the ENERGY STAR program, products that meet or exceed efficiency requirements designated by the Federal Energy Management Program (FEMP). Agencies that follow requirements to buy efficient products can realize substantial operating cost savings and reduce pollution. As the world's largest consumer, the federal government can help lead the entire U.S. market to achieve greater energy efficiency while saving taxpayer dollars.

FEMP provides acquisition guidance and federal efficiency requirements across a variety of product categories, including outdoor pole-arm-mounted area and roadway luminaires, which are a FEMP-designated product category. Federal laws and executive orders mandate that agencies meet these efficiency requirements in all procurement and acquisition actions that are not specifically exempted by law.

The purpose of this guide is to explain in greater detail the FEMP-designated outdoor pole/arm-mounted area and roadway product category, to show how the equipment can be used to maximize total energy efficiency (using the metrics defined below), and to provide an estimate of the cost effectiveness of using FEMP-designated products.

ENERGY EFFICIENCY METRICS

There are different energy efficiency metrics. Although there are several metrics to describe energy efficiency, here we consider three lighting-specific metrics: efficiency (very simple), efficacy (simple), and lighting power density (complex). This guide primarily focuses on efficacy, and demonstrates how efficacy incorporated with other elements can reduce power densities.

Efficiency

Efficiency is a measure of how effectively a device converts input into output. Luminaire efficiency (LE) is the light leaving the luminaire divided by the light generated by the bare lamp (light bulb) when operated outside of the luminaire. Because both values (the light leaving the luminaire and the light generated by the light source[s]) have the same unit, luminaire efficiency is therefore a unitless ratio.

Efficacy

Efficacy is the capacity to produce an effect. In lighting, efficacy is measured in lumens per watt (lm/W, also abbreviated LPW). Efficacy can apply to light sources or luminaires. The greater the efficacy, the more light is generated for the same watts. Most people are familiar with this metric related to vehicles; for example, a car that gets 30 miles per gallon is more efficacious than a car that gets 25 miles per gallon.

FEMP's designated product for lighting focuses on luminaire efficacy and uses the term luminaire efficacy rating (LER). The following page explains how to calculate the LER as well as the relationship between luminaire efficiency and luminaire efficacy.

A key note regarding efficacy is that it counts the emitted lumens irrespective of the direction in which they are emitted, or the usefulness of those lumens. A luminaire can have a lower LER but do a better job of distributing light to an identified task.

Lighting Power Density

Lighting power density (LPD) is the total input power (*i.e.*, including the driver or ballast) multiplied by the total number of luminaires divided by the area in which the equipment is installed. Many energy codes use this metric; however, it does not actually focus on *energy*. Energy is power multiplied by time, so it is important to distinguish between power (watts) and energy (watt-hours). Lighting power density calculations do not indicate any energy savings as a result of the use of lighting controls.

FEMP-DESIGNATED PRODUCTS

As of September 2013, there are FEMP-designated products for lamps (light bulbs), ballasts, interior fluorescent luminaires, industrial high-bay luminaires, and many exterior luminaires. The metric for luminaires is the LER. The following provides the LER value for parking lot luminaires (classified within FEMP as outdoor pole/arm-mounted area and roadway luminaires) as well as helpful calculations.

FEMP REQUIREMENTS FOR PARKING LOT LUMINAIRES

Outdoor pole/arm-mounted area and roadway luminaires must have an LER of 65 to be FEMP-designated (as of the date of this publication; the most current value as well as FEMP-designated products can be found at [Covered Product Category: Exterior Lighting](#)). The following explains how to calculate LER for conventional light sources such as fluorescent, metal halide, and induction lighting, as well as light-emitting diode (LED) luminaires.

$$\text{LER} = \frac{\text{total light leaving the luminaire}}{\text{input power}}$$

Conventional Luminaires

Conventional luminaires (non-LED) can use different combinations of lamps, ballasts, and optics; often requiring LER to be calculated. If an LER is not available, buyers may estimate the LER using this formula:

$$\text{LER} = \frac{\text{luminaire efficiency} \times \text{lamp lumens}}{\text{lamp+ballast input watts}}$$

LE x lamp lumens, and lamp+ballast (system) input watts are typically found in manufacturers' product catalogs and photometric reports.

The LER formula may be used with generally available component performance data to determine the minimum performance of other components. For example, known values may be used to calculate the lowest LE necessary to meet an LER requirement:

A 200-watt high-pressure sodium (HPS) lamp produces 22,000 initial lumens with 230 lamp+ballast input watts. What LE is necessary to meet the minimum required LER of 65?

$$\text{LE} = \frac{\text{LER} \times \text{lamp+ballast input watts}}{\text{lamp lumens}} = \frac{65 \text{ lm/W} \times 230 \text{ W}}{22,000 \text{ lumens}} = 0.68$$

Therefore, for a minimum required LER of 65, a fixture combined with the lamp and ballast values provided must have an LE of at least 68%.

LED Luminaires

LED luminaires are available in different combinations, but their values are reported for the complete luminaire, not the light source by itself. The complete LED housing includes the fixture, light source (or lamp), and driver (similar to a fluorescent ballast). If an LER is not available, buyers may calculate the LER for LED luminaires using this formula:

$$\text{LER} = \frac{\text{luminaire light output (lumens)}}{\text{input power (watts)}}$$

DESIGN PROCESS

The rest of this document will explain options for energy efficient lighting in parking lots using FEMP-designated luminaires and features accounting for both lighting quality and energy efficiency. Selecting energy efficient equipment, such as FEMP-designated equipment, is the first step in energy efficient parking lot lighting. This section address a step-by-step process from surveying the site to installation. Key points of the following design process section include:

1. Developing an inventory of equipment
2. Determining lighting quality and quantity needs
3. Incorporating lighting controls
4. Addressing cost effectiveness in the process



STEP 1: CONDUCT COMPLETE INVENTORY

Consider all lighting opportunities and list the luminaires that you want to replace, and ask why you want to replace them. Is energy the only issue? If this is a retrofit, be sure to collect information on each luminaire that you want to replace (e.g., lamp type(s), mounting height of luminaires, general lighting information). Please note, entrances to the parking lot and areas near the building may use different luminaire types than basic parking areas.

STEP 2: CONSIDER LIGHT QUANTITY AND QUALITY

The lighting for a parking lot is dependent upon the type of building or site that it supports as well as the surrounding area of the site. A parking lot at a national park should not have the same lighting requirements as a secure federal facility. [The Illuminating Engineering Society of North America \(IES\) recommends](#) light levels for basic parking lots and higher light levels for parking facilities where enhanced security is required. More light does not equal better quality. Most security cameras are rated for both very low and very high light levels, but are limited by contrast ranges. Therefore, uniform lighting will aid in viewing images on the camera as well as those physically in the parking lot.

Lighting uniformity on the pavement surface must also be considered for safe vehicle and pedestrian interaction. Too much contrast between bright and darker areas makes it more difficult to see people and vehicles in the darker areas. The use of luminaires that distribute light evenly on the parking surface and lighting layouts with appropriate spacing, are crucial to the lighting design. Consequently, one-for-one replacement may not be an option when specific light levels and uniformity ratios are targeted. Factors such as trees and other elements on the site may affect the lighting design. You can refer to IES resources or your local lighting professional for assistance. Contact the [International Association of Lighting Designers](#) and/or the [IES](#) to locate lighting professionals.

STEP 3: CONSIDER CONTROLS FOR ADDITIONAL SAVINGS

Most parking lots are lighted for [13+ hours per day](#); lighting controls can be used to save energy at times of infrequent use. Parking lots are often empty during certain periods at night; using controls to reduce the lighting during these periods will help save energy. Consider circuiting the luminaires on the site so certain luminaires can be either reduced in output or turned off during periods of inactivity. For example, luminaires along the perimeter could be reduced to direct users to park closer to the building during evening operation hours. Light levels can be reduced by switching off every other luminaire or selecting bi-level operation as a feature at the time of installation. To maximize energy savings potential and user satisfaction, luminaire selection, lighting controls, and installation have to be considered during the design phase and not as an afterthought.

STEP 4: SOLICIT BIDS

After selecting the right technology for your parking lot, and specifying the appropriate lighting systems and layout to deliver lighting quality and quantity, a request for proposal can be prepared. (See resources at the end of this guide for information about selecting the right technology.)

STEP 5: COST-EFFECTIVENESS

Once you have pricing and cost inputs from several sources, you can evaluate the cost-effectiveness including simple payback period, return on investment, life-cycle cost analysis, and savings-to-investment ratio. This will allow you to make the appropriate final decision. [Free calculators](#) and life-cycle cost analysis tools are [offered by FEMP](#) and by various product manufacturers and utility programs. Example cost-effectiveness calculations are provided at the end of this guide.

STEP 6: PURCHASE AND INSTALL

Clearly identify required specifications and warranties in your purchase order or contract. Most parking lot lighting systems will not require commissioning unless controls are involved. If controls are involved, be sure to identify who is responsible for commissioning before signing the purchase order. Lastly, remember to file for any utility incentives within the required period of time after project completion.



Figure 1. A pole and luminaires being removed and replaced with new equipment.

CONSTRUCTION TIP

Parking lot retrofits can be done in increments, assuming that the existing pole locations will be reused. The costs of trenching to provide power to the poles, foundation for the poles, and the poles themselves can often exceed the cost of the luminaires. If possible, reuse the pole location and even the poles to save money in a retrofit.

COMPONENTS OF THE DESIGN

There are many components that have to be considered before the design process can occur. The parking lot design coupled with the features of the luminaire (distribution, color, etc.) and how the luminaires are placed around the lot all affect the energy usage of the lighting system. Significant components of the design section include:

1. The effects of the design of the lot including materials or canopies
2. How light levels and color qualities affect the design and energy usage
3. A review of different luminaire distributions
4. Consider light spectrum for given exterior application



DESIGN CONSIDERATIONS

The energy used to light a parking lot is not only affected by the luminaire(s) selected, but also by the design of the parking lot. Factors such as materials used to construct the parking lot surface can affect lighting in the lot. Considerations made during the lighting design process addressing horizontal and vertical surfaces affect the energy usage and lighting in the lot. Additionally, solar canopies can provide on-site energy and open up new lighting opportunities, both of which save energy.

Material Selection

Although materials in a parking lot can affect the lighting, they are not always factored into the lighting or energy calculations. Many sites incorporate trees and other vegetation into the lighting design. When doing so, it is important to not only coordinate luminaire placement with the tree locations, but also to account for future growth of the tree canopy or trees. It is also important to remember that deciduous trees will have different amounts of foliage depending on the time of year. Both the foliage and the tree itself can obscure the light and potentially waste energy (see Figure 2).

Lighting Vertical Surfaces

Parking lot luminaires do a good job of lighting the horizontal parking surface. However, the parking surface is not visible to drivers entering the parking lot or from some parts of the parking lot. Consider lighting vertical elements—signage, architectural/sculptural pieces, solid landscape features, or the façades of the building itself. Lighting vertical elements and the façade makes the site more visually interesting, provides a destination for users of the parking lot, and makes the site feel brighter compared to sites that only light horizontal surfaces.

Solar Canopies

A growing trend in parking lots is to install solar canopies over a portion of the parking lot. A solar canopy creates covered parking for vehicles, and the top side of the canopy incorporates a photovoltaic (PV) panel. Therefore, in addition to sheltering users of the parking facility from rain and snow, the canopy can create on-site renewable energy to power parts of the adjacent buildings or even charge electric vehicles. The solar canopy also offers a lighting opportunity, providing a mounting location that is easily accessible from a ladder or a small lift (see Figure 3). Also, the lower mounting height means that a lower output (and thus lower power) luminaire is needed because the light is closer to the parking surface. As of July 2013, [Tucson International Airport](#) is in the process of installing a solar canopy to cover the parking lot in front of the main terminal. Solar canopies are not limited to the Southwest (though the climate is ideal for the canopies); they are in fact being installed across the country, including in the Northeast, and by both commercial and municipal organizations.



Figure 2. Tree foliage can block light from luminaires.



Figure 3. A parking lot recently retrofitted with covered parking. The covering incorporates PV panels that supply renewable energy to the site. Luminaires are mounted to the support structure for the PV panels.

LIGHTING DESIGN CONSIDERATIONS

Lighting a parking lot involves more than just using high-efficiency equipment. Multiple choices need to be made regarding the lighting and the desired results, including:

- a. *Luminaire distribution* – the direction and intensity of the light leaving the luminaire. Page 9 of this document characterizes different typical distributions and how they affect the lighting design.
- b. *Color qualities* – the color of the lighting and how things appear in the space matters as much as the amount and types of lighting in the space. Page 11 addresses basic color qualities of lighting.
- c. *Luminaire Layout* – where the efficient equipment is placed is as important as how it is used.
- d. *Desired results* – most lighting recommendations or requirements start with illuminance. This is the amount of light falling on a horizontal or vertical surface (lumens per square foot or square meter). The metric used to measure illuminance in the U.S. is the footcandle (fc), which is one lumen per square foot. The corresponding metric system unit is one lux (lx), which is one lumen per square meter. One footcandle is approximately equal to 10 lux.

The current guidance from the IES, which is referenced by most federal design requirements (including the military Unified Facilities Criteria), is RP-20-98. It is expected that RP-20 will be updated in the near future.

RP-20-98 recommends a minimum illuminance (horizontal and vertical) for different conditions in the parking lots. In addition to the minimum values, RP-20 also recommends uniformity ratios. RP-20 focuses on the ratio of maximum to minimum illuminance values and tries to limit extreme ranges of illuminance values. Table 1 provides the current IES lighting recommendations, although these may change in the next iteration of RP-20. RP-20 also provides guidelines for taking lighting measurements and what factors (e.g., shadowing, light loss factors) that should be included in the calculations.

Table 1. RP-20-98 Parking Lot Illuminance Recommendations.

	Basic ¹	Enhanced Security ²
Minimum Horizontal Illuminance	0.2 fc	0.5 fc
Uniformity Ratio, Maximum to Minimum	20:1	15:1
Minimum Vertical Illuminance	0.1 fc	0.25 fc

¹For typical conditions. During periods of non-use, the illuminance of certain parking facilities may be turned off or reduced to conserve energy. If reduced lighting is to be used only for property security, it is desirable that the minimum horizontal illuminance value be at least 0.1 fc.

²If personal security or vandalism is a likely and/or severe problem, a significant increase of the Basic level may be appropriate.

RP-20-98 recommends that additional analyses of a subset of points be computed (see RP-20 for more information). In addition, for preliminary design RP-20-98 recommends an average horizontal illuminance value of 1 fc (basic) or 2.5 fc (enhanced security) be calculated. Regarding preliminary design, RP-20-98 states that a 5:1 average-to-minimum ratio is the first step toward directing the design to achieve the maximum to minimum ratios presented in Table 1. Computer software allows for computing average, maximum, and minimum values and even a specified range of values. The scenarios in this FEMP guide show the percent of calculation points between 1 and 5 fc. If the design is for average overall illuminance of 1 fc, the higher the percentage of points in the range between 1–5 fc means that this design intent is being achieved and the average is not being skewed by any extreme values. Ideally, more than 80% of the points will be in the desired range.

LUMINAIRE DISTRIBUTION

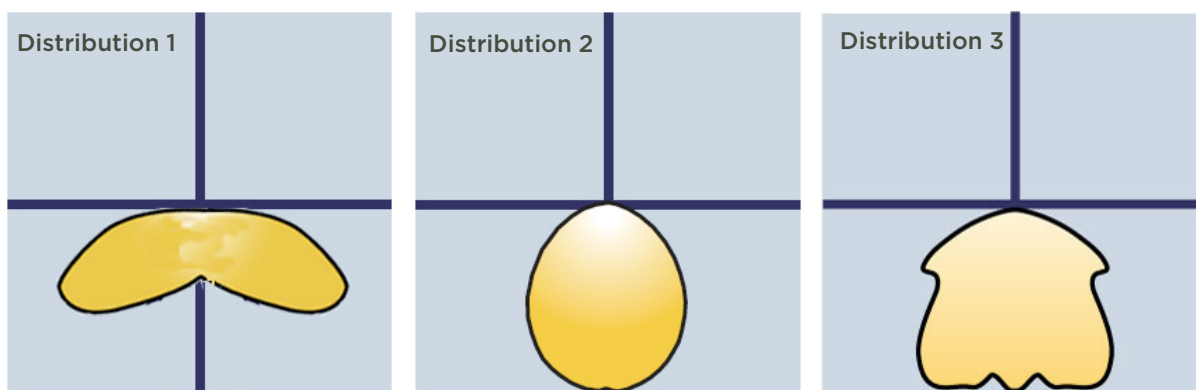
The minimum FEMP-designated luminaire efficacy rating is only one aspect of energy efficient design. Distribution can be more important than the LER of a luminaire. FEMP does not state a minimum requirement or characterize distribution because the necessary luminaire distribution is affected by the design of the space, the desired lighting results, glare control, and desired lighting aesthetics. Photometric distribution is like a building fastener—screws work in some places and rivets are better in others.

A photometric distribution illustrates how much light intensity is leaving the luminaire and in which directions. In distribution 1 - 3 (shown below), the intersection of the crosshairs is the center of the luminaire, with the bottom vertical line being below the luminaire and the top vertical line being above the luminaire. The intensity in a specific direction is proportional to the length of the ray from the crosshairs to the outline of the pattern. The following describes three typical distributions for parking lot luminaires and discusses the characteristics of each. These are *sample* distributions and should not be confused with the parking and roadway distributions known as “Type 1, Type 2, Type 3, Type 4, or Type 5” (also written as Type I, II, III, IV, or V).

Distribution 1: This distribution is sometimes called a “batwing” distribution (common in parking lots)—which means that more light is emitted at wide angles than directly below the luminaire. This allows for a wider spacing between luminaires and more uniform lighting on the ground surface.

Distribution 2: This is a “cosine distribution”—the highest intensity of distribution is directly below the luminaire. This distribution can be effective in meeting an average requirement for illuminance, but might prevent the lighting system from meeting the required or desired lighting uniformity. New manufacturers to lighting sometimes design cosine distributions. Variations of broad batwing (distribution 1) are more effective in parking lots.

Distribution 3: Manufacturers are experimenting with distribution type 3 which is somewhere between a batwing and a cosine distribution. However, because parking lot luminaires tend to be mounted 20’ or more above the ground and 100’ or more apart, wider distributions are ideal. In some applications this distribution can be effective, but it should be only used in select situations.



LUMINAIRE DISTRIBUTION

Luminaire distribution includes both general characterizations as well as the specific directions in which the light is leaving the luminaire. The previous page focused on the distribution and this page focuses on the luminaire classifications and shielding.

Cutoff

For the last 50 years, outdoor lighting has been characterized using variations of four cutoff classifications based on luminous intensity: 1. noncutoff, 2. semi-cutoff, 3. cutoff, and 4. full cutoff. Starting early in the 21st century, the lighting industry recognized the need for a classification system that focused on more than just intensity and focused on elements of the distribution in discrete ranges of angles from the luminaire. The IES officially rescinded the “cutoff” classifications and replaced them with the Luminaire Classification System (LCS)—although it is common to find various legacy cutoff requirements.

Luminaire Classification System

The IES adopted the Luminaire Classification System in 2007 and revised the classification in 2011 (see TM-15-11 for more information). Rather than using “cutoff” terms, LCS focuses on the BUG values: backlight, uplight, and glare. The distribution of the luminaire is dissected into different categories. Each category receives a value based on the maximum lumens emitted in the different subzones. For example, a luminaire could have BUG values of B2-U0-G2.

For each application, determine what is important:

Backlight – for some applications (e.g., poles in center of parking lot), the B values are less important. However, if the site is near a nature preserve, the B values of the perimeter luminaires are very important.

Uplight – only in a handful of applications does uplight provide useful light. This is light leaving the luminaire primarily above the luminaire; therefore, the light is not directed to the roadway or parking surface. However, uplight may be less of a concern in some select applications, such as urban downtown areas.

Glare – this value is very subjective, and a luminaire with a lower G value does not necessarily produce less glare than a luminaire with a higher G value. G-values correspond better to the glare perceived by the driver than the glare perceived by the pedestrian in a parking area, and therefore the G ratings have limited usefulness.

Luminaire Shielding

Shielding, often known as “house-side shields,” can be installed on luminaires to block certain light leaving the luminaire to prevent light trespass and reduce glare. Figures 4 and 5 show shields of different sizes installed on sites. Both of these shields reduce overall luminaire efficiency and in both cases at least one aspect of the shield is not necessary because an adjacent area does not need to be shielded from light. The designer should anticipate where light needs to be shielded from neighboring properties, and to use internal shields designed for the luminaire for best optical control and appearance.



Figure 4. Even a modest shield can absorb a significant amount of the light from the luminaire and drastically reduce the luminaire efficiency.



Figure 5. A floodlight had to be added to supplement the light absorbed by the shield mounted on the parking lot luminaire.

CORRELATED COLOR TEMPERATURE

Correlated color temperature (CCT) is used to describe the color appearance of a light source. The value is expressed in kelvins (K). A warm light source has a CCT of less than roughly 3500 K. A neutral light source has a CCT in the 3500 to 4500 K range. Cool light sources have CCTs greater than 4500 K (see Figure 6).

CCT is not a performance metric: a higher number is not better. Instead, it is a metric that describes the warmth or coolness of the light appearance. CCT is a function of light source chemistry and physics. In some cases, CCTs affect light source efficacy. For example, HPS lamps tend to have CCTs around 2100 K. There are 2800 K HPS lamps, but they are less efficacious than the 2100 K versions. Conversely, phosphor-converted LEDs are typically more efficacious when the CCT is greater than 4500 K.

COLOR RENDERING INDEX

Color rendering index (CRI) is used to describe the color accuracy of a light source. It should be noted that CRI only describes one aspect of color. A CRI of 60 or less indicates poor color rendering, 60–70 moderate, 70–80 good, 80–90 very good, and 90+ excellent. Recent research and discussion in the lighting industry has focused on the limitations of CRI. Other metrics have been proposed, but CRI is still the default metric for color rendering in the lighting industry.

CRI is a performance metric where the higher the number, the better. Color discrimination is necessary in a parking lot to help identify clothing, faces, license plates, and vehicles. However, fine color discrimination is not necessary. For some light sources, there can be an increased cost or slight reduction in efficacy for better CRI. A CRI greater than 70 is usually sufficient for the lighting in a parking lot.

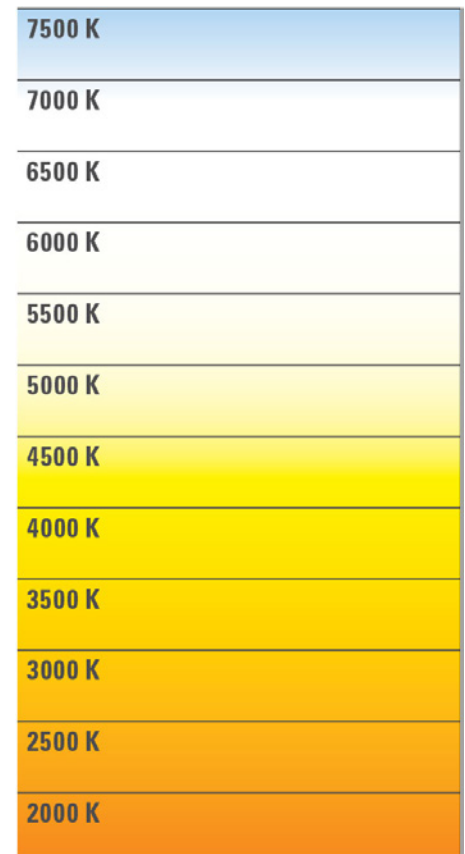


Figure 6. Visual depiction of CCT values shows low CCT values are considered “warm” and high CCT values are considered “cool.”

MORE INFORMATION

For more information about these color characteristics, review [DOE's fact sheet on color quality](#). The document was produced for solid-state lighting, but the information is applicable to other technologies.



Figure 7. Narrow spectrum source lighting a parking lot.



Figure 8. Broad spectrum (“white”) source lighting a parking lot.

LIGHT SPECTRUM

Correlated color temperature and color rendering index only describe certain aspects of the color quality and do not characterize the light source spectrum. Light sources can be grouped into either narrow spectrum or broad spectrum sources—this characterizes the amount of energy the light source emits across the visible spectrum. Narrow spectrum sources include low pressure sodium (very narrow, actually monochromatic) and high pressure sodium (narrow). Narrow spectrum sources are typically not considered “white light sources” because of the limited energy emitted by the light source (see Figure 7). Broad spectrum sources include induction, most types of LED luminaires, metal halide, and even mercury vapor. These sources are often characterized as “white” light sources because they emit energy (not in equal portions, nor continuously) across the visible spectrum (see Figure 8).

Lumens, units of light output, are calculated based on the spectrum of the light source. The lumens used to calculate the luminaire efficacy rating for the luminaires are based on photopic lumens. Photopic lumens are based on the cones (one type of photoreceptor) in the eye that are active when there is a significant amount of light (some people refer to this as “daytime” vision). There are two other visual states, scotopic (only the rods are active, extremely low light) and mesopic (rods and cones are active; between scotopic and photopic).

In recent years, research has focused on mesopic vision which is typically the operating state of the eye when a parking lot is in use at night. As a result, many different terms (some developed by marketing departments) have been used in the lighting industry to characterize light sources—these terms include: scotopic lumens, mesopic lumens, S/P ratios, pupil lumens, design lumens, lumen effectiveness multipliers, etc.

Light sources are photometered (measured) in photopic lumens. Current IES exterior recommendations are based on photopic lumens. Light spectrum can affect perceived brightness and enhance off-axis visual acuity (rods, there are no cones in the periphery of the eye). Therefore, the IES has been developing additional guidance about mesopic lighting—consult IES TM-12-12, the IES Lighting Handbook 10th edition, and the current IES recommended practices for the specific application for the latest guidance. It is also recommended to check the governing guidance for the specific federal agency regarding the type of lumens and/or spectral effects that can be factored into any lighting calculations.

In addition to using efficient equipment and utilizing an efficient design, some energy savings might be possible via factoring in light spectrum. However, the light spectrum can affect the flora and fauna near the site. Remember to consider the desired CRI and CCT if the light spectrum is going to be a key part of the energy savings strategy. Glare can be increased as well from certain elements of the visible spectrum. If the light spectrum is going to be an energy savings strategy, incorporate a lighting professional into the process and plan for a mock up in the field so that the potential new lighting can be observed before it is actually installed site wide.

PARKING LOT LIGHTING DESIGN

There is no one way to design the lighting for a parking lot. This section presents a representative parking lot with lighting designs using the same luminaire layout and spacing to show the different results from two different luminaires, one meeting the FEMP-designated requirements and another not meeting the FEMP requirements. Significant components of the following parking lot lighting design section include:

1. How color qualities and other features affect the design of the space
2. How distribution and luminaire efficacy affect the lighting values
3. How luminaire layout and efficacy affect overall energy usage





Figure 9(a). Site photo.



Figure 9(b). View from parking lot.



Figure 9(c). Luminaire.



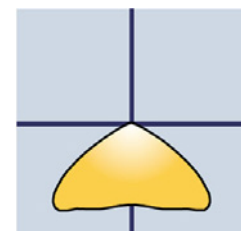
Figure 9(d). Drive aisle.

DESIGN SCENARIO OVERVIEW

The photos above depict a parking lot where two different luminaires (a general luminaire and an alternate FEMP-designated luminaire) are used. These luminaires are compared on the following pages.

- Luminaire Basics:
- luminaire lumens
 - input watts & LER

The distribution to the right is an example of the vertical light pattern from the existing luminaire in this parking lot. As previously stated, LER helps ensure that the luminaire is efficient, but the distribution ensures that the luminaire (and ideally the design) is effective. The following design scenarios compare luminaires with different LER values and distributions, but with the same lighting layout.



Areas with greater potential pedestrian-vehicle conflicts should have higher light levels. Examples include places where people are walking from the building to the parking lot or crosswalks in the parking lot – see photos above. Computer calculation software can render images of the space, as well as calculate the illuminance values on the parking and walking surfaces. Software can examine many metrics about lighting quantity as well as quality. The lighting information to the right is provided as sample metrics and is most applicable to parking lots.

- Lighting Information:
- Average fc
 - Maximum fc
 - Minimum fc
 - Average:Minimum
 - Maximum:Minimum
 - % of points 1-5 fc

Lighting power density is the metric used by most energy codes. LPD can be calculated by hand or by using simple spreadsheets, web tools, or lighting software.

- Lighting Power Density:
- LPD

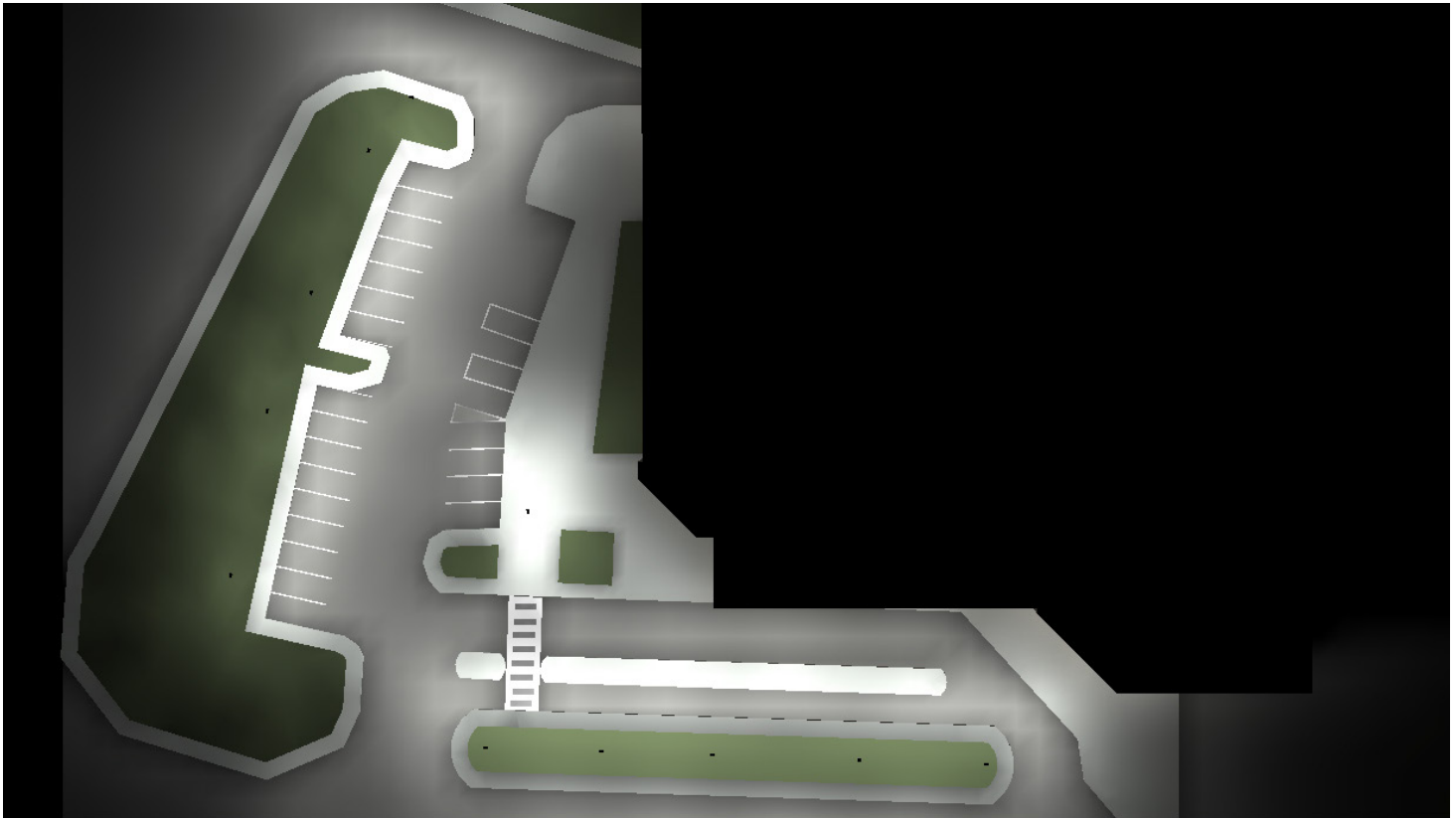


Figure 10. Plan view - (computer rendering).

DESIGN SCENARIO - GENERAL LUMINAIRE

This general (non FEMP-designated) luminaire uses a 250 W pulse-start metal halide lamp that draws 288 W together with the ballast. The CCT is in the 3500–4500 K range, with a CRI in the 70s. The LER is 51 lm/W.

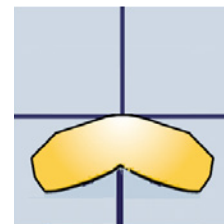
The light distribution plot shows that the luminaire produces a batwing pattern. The commonly used batwing distribution is common in parking lot luminaires.

The design with this luminaire meets the minimum illuminance of the RP-20-98 recommendation, but the average illuminance is high. Calculated metrics for uniformity (maximum:minimum) exceed the RP-20-98 recommendation of 20:1. However, the portion of points calculated between 1–5 fc is 76%, which means the uniformity is only fair (compared to good or great). Calculations represent the initial values and do not include light loss factors (LLF). LLF should be included and determined by the site.

The calculated LPD for this design is lower than what some energy codes prescribe. LPDs between 0.10–0.15 W per square foot (W/sf) are common for existing installations and as well as many new installations.

Luminaire Basics:

- 14,725 luminaire lumens
- 288 W input watts - LER: 51



Lighting Information:

- Average: 7.4 fc
- Maximum: 10.5 fc
- Minimum: 0.3 fc
- Average:Minimum: 12:1
- Maximum:Minimum: 35:1
- % of points 1–5 fc: 76%

Lighting Power Density:

- LPD: 0.13 W/sf

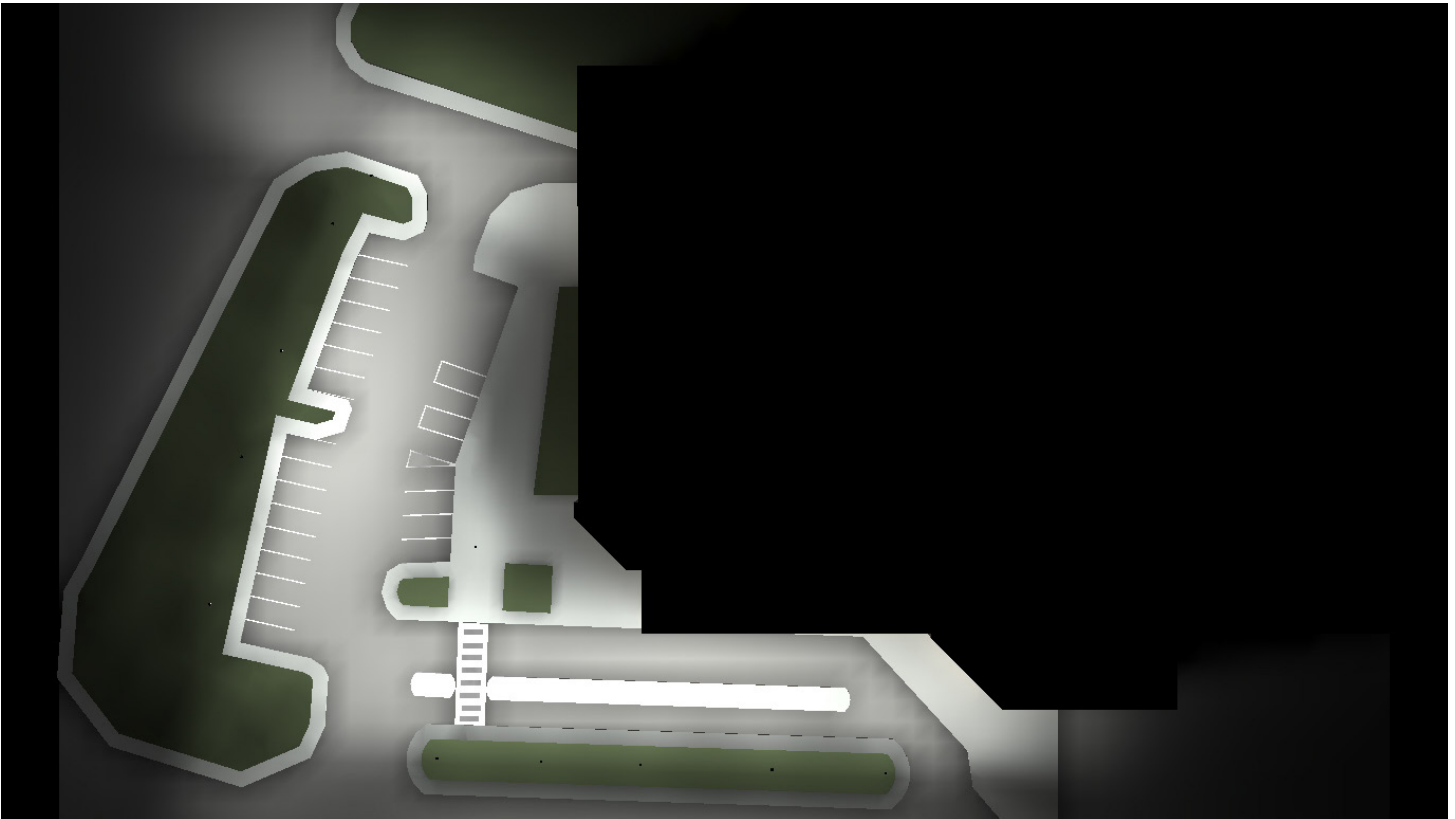


Figure 11. Plan view - (computer rendering).

DESIGN SCENARIO - FEMP-DESIGNATED LUMINAIRE

The FEMP-designated luminaire has color qualities of 4000 CCT and a CRI in the 70s. The LER is 73 lm/W. It should be noted that this luminaire emits 27% fewer lumen than the general (non FEMP-designated) luminaire in this example.

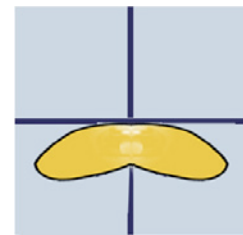
This distribution for this luminaire does not emit any uplight, and is slightly wider than the general luminaire example. The lower lumen output of 10,758 lumens leads to lower illuminance values, and the slightly wider distribution leads to better uniformity.

This design has a similar minimum illuminance value as the general luminaire design. This design does meet the RP-20 maximum/minimum uniformity requirement of 20:1. In addition, this design has more calculated measurement points in the range between 1-5 fc. LER is an important characteristic, but make sure that the luminaire provides sufficient lumens to meet the targeted light levels. Calculations represent the initial values and do not include LLF. LLF should be included and determined per site.

The LER is roughly 43% higher than the LER for the general luminaire design. However, the LPD is 46% lower because the selected distribution allows for a luminaire optimization, saving additional energy while providing a suitable amount of lighting and quality.

Luminaire Basics:

- 10,758 luminaire lumens
- 147 W input watts - LER: 73



Lighting Information:

- Average: 3.4 fc
- Maximum: 5.6 fc
- Minimum: 0.4 fc
- Average:Minimum: 9:1
- Maximum:Minimum: 14:1
- % of points 1-5 fc: 95%

Lighting Power Density:

- LPD: 0.07 W/sf

LIGHTING CONTROLS SAVE ENERGY

Installing energy efficient equipment is one step towards an energy efficient design – a good compliment are lighting controls. Energy is power multiplied by time; controls can either reduce the time or power components of the equation. Ideally it is best to install controls at the same time as installing any new or replacement equipment because the electrician is already on site. Controls are emerging in parking lots because of new technologies that can yield significant energy savings on top of the efficient luminaires. Significant components of the following lighting controls section include:

1. Types of controls that can be used in parking lots
2. Factors to consider when selecting lighting controls for parking lot
3. Recommendations to maximize energy savings



STATIC CONTROLS

Currently, most parking lot lighting controls are static. The controls turn on the luminaires—the luminaires operate at one output level and then turn off. Typical static lighting controls consist of photocells and astronomical timeclocks or combinations of the two controls.

Photosensor

Photosensors include the entire control device including the housing, the optics, electronics and the photocell. In exterior applications, the photosensor is typically mounted to the luminaire or in some cases close to a small group of luminaires. The sensor detects insufficient or sufficient daylight and turns the luminaire on or off respectively.

One of the disadvantages of this control technology is that climatic changes (e.g., significant cloud cover or snow) can create a false positive and trigger the photosensor to turn on the luminaire during the day, even when there is sufficient daylight. This is a condition known as “day burning” which wastes energy (see Figure 12 for an example). Day burning can also be a result of the materials in the photocell itself. The materials in the photocell can change over time and become less sensitive meaning that the photosensor turns on the luminaire earlier in the evening and off later in the morning.

Another disadvantage of photosensors is that the devices can have a short life compared to the luminaire. If using this control device, specify a high-life photosensor so that any monetary savings generated by installing a low maintenance luminaire are not negated by having to replace the photosensor.



Figure 12. “Dayburners” operating in the middle of the day.

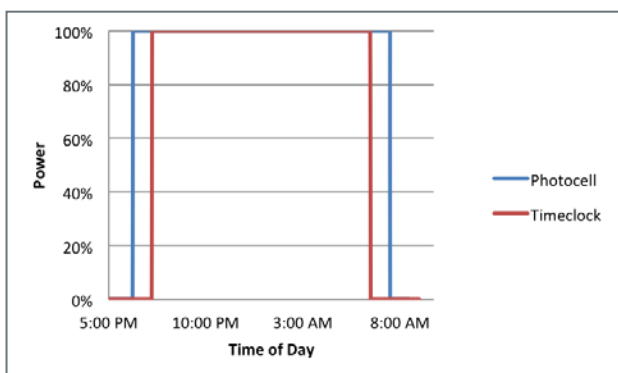


Figure 13. Comparison of operation of luminaires via photocell and timeclock.

Astronomical Timeclocks

An astronomical timeclock can adjust the on and off times of the luminaire with the change in seasons and for daylight savings time. The advantage of timeclocks is that dayburning does not occur because timeclocks are not affected by the available daylight. Furthermore, timeclocks can more precisely control both turn on and off operation. In some cases, time-based savings can be 15% or more than with a simple photosensor. Figure 13 compares the on/off times of a luminaire controlled by a timeclock with those of a luminaire controlled by a photosensor.

MULTI-LEVEL CONTROLS

Rather than turning on the luminaires at sunset and turning them off at dawn, multi-level (typically bi-level; two output levels) controls can be used—meaning that the lighting can be in different operating states in the middle of the night.

When selecting bi-level operation, the low output setting needs to be determined. Typically, lighting designs (justifiably) provide more light than is required when the parking lot is expected to be occupied. In the low output setting, the luminaire output can be set to what is just absolutely necessary. Figure 14 shows a multi-level operation where the luminaire is only reducing the power by one-third. This example is a 30% energy savings compared to photosensor-only operation. Figure 15 shows a multi-level operation where the luminaire is reducing the power by two-thirds. In this example, the savings are 44% compared to the photosensor operation.

Fixed Response

Through timeclocks (and even a combination photosensor and timeclock), the lighting can be reduced during a predetermined period in the night. The reduction can be achieved via two methods: selective switching of the luminaires or bi-level operation of the luminaires. In selective switching, every other or specific luminaires are turned off while the others remain operating. This can be an effective strategy, but requires careful coordination in the design and selection of the luminaires that will remain operating.

Bi-level operation is another option in which a certain amount of luminaire output is reduced at a predetermined time. This strategy allows the lighting coverage to remain the same; however, it reduces energy savings. This strategy requires a lighting technology that allows for bi-level operation and either additional wiring or a control signal to direct the luminaire to the low output setting.

Dynamic Response

Occupancy sensors, a proven interior lighting control, are now being developed for parking lot applications. This is an emerging lighting control technology that has promise, once the remaining technological hurdles are addressed. The advantage of a dynamic response is that it allows for more energy savings compared with turning to low operation at a certain time. Figure 16 is an example of the output of a parking lot luminaire controlled by an occupancy sensor. The luminaire goes into the low setting (in this case 50% power reduction) and only increases when stragglers from the building or security patrols enter the parking lot.

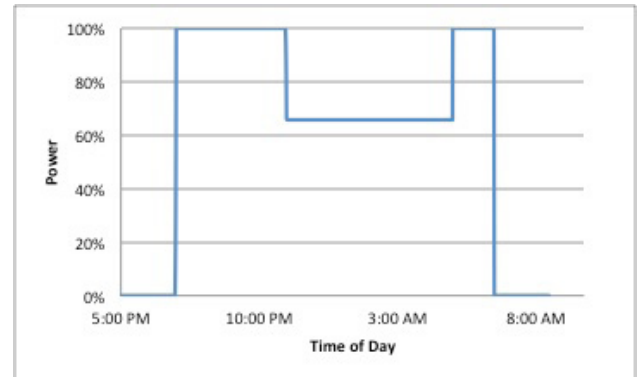


Figure 14. Bi-level operation with static power reduction of 33% in low setting.

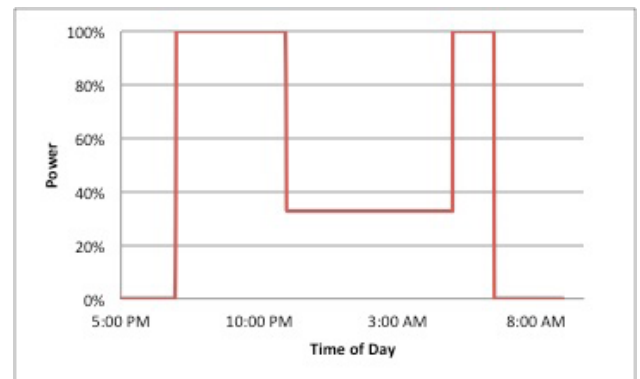


Figure 15. Bi-level operation with static power reduction of 66% in low setting.

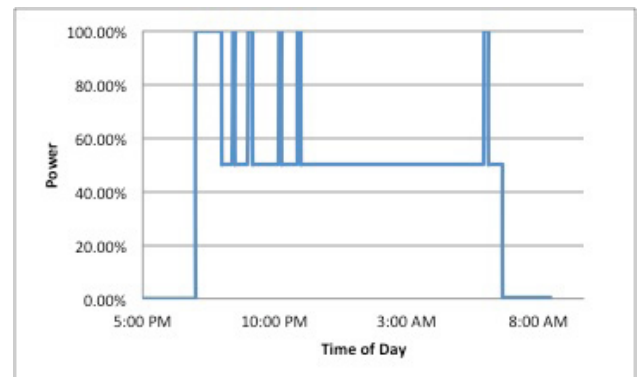


Figure 16. Bi-level operation via occupancy sensors with power reduction of 50% in low setting.

COST-EFFECTIVENESS

An efficient product option is cost-effective relative to a base model when the cost savings (energy and maintenance) exceed any incremental costs, including installation over a comparable functional lifetime. Federal purchasers may assume that products meeting FEMP-designated efficiency requirements are life-cycle cost-effective if the net savings are positive. An example is provided in Table 2, comparing a base model to a luminaire that meets the FEMP requirements. Here, because the luminaire meeting the FEMP requirement's first cost (lamp cost + luminaire price) is less than the "Lifetime Operational Cost Savings" from Table 2, the product is cost-effective. Users wishing to determine cost-effectiveness for their applications may do so using the example provided in Table 2.

Products meeting FEMP-designated efficiency requirements may not be life-cycle cost-effective when energy rates are below the federal average or in certain low-use applications. For most applications, purchasers will find that energy-efficient products have the lowest life-cycle cost. In high-use applications or when energy rates are above the federal average, purchasers may save more if they specify products that exceed the federal minimum efficiency requirements. Table 2 is an example, and values will vary by site.

Table 2. Lifetime Savings for Efficient Parking Lot Luminaires

Cost-Effectiveness Example		
Performance	Base Model	Required Level (minimum LER 65)
	Pulse-Start Metal Fixture	LED Fixture
Luminaire Efficacy Rating (LER)	62	73
Luminaire Output	14,725 lumens	10,758 lumens
Power Input	288 watts	147 watts
Light Source Life ¹	15,000 hours	100,000 hours
Lamp Cost ² (a)	\$54	---
Luminaire Price ² (b)	\$396	\$1,448
Annual Energy Use ³ (c)	1,261 kWh	644 kWh
Annual Energy Cost ⁴ (d)	\$128	\$65
Lifetime Energy Cost ⁵ (e)	\$2,020	\$1,031
Lifetime Replacement Cost - Lamp (f = a x 6.8 ⁶)	\$221	-
Lifetime Replacement Cost - Labor ⁷ (g)	\$266	-
Total Lifetime Costs ⁸ (b+e+f+g)	\$2,903	\$2,478 ⁹
Lifetime Cost Savings (Base Model - Required Level)	-	\$425
Lifetime Operational Costs Savings [Base (e+f+g) - Required (e+f+g)]		\$1,118

¹ Life value is per manufacturer's data. LED luminaire life encompasses many elements, but this manufacturer claims 100,000 hours for the LEDs (L87).

² Prices for real products from www.gsaadvantage.com (last accessed April 15, 2013).

³ Assumes 12 hour x 365 day operation and does not assume the use of lighting controls.

⁴ Assumes an electricity rate of \$0.10/kWh; substitute your rate as required. Future electricity price are based on federal guidelines and forecasts effective from April 2012 to March 2013.

⁵ For this analysis, the lifetime is 23 years. This was calculated by dividing the longest life system (100,000 hours) by 4,380 (12 hours x 365 days).

⁶ Discount rates are the reasons this value does not equal \$54 x 6.8

⁷ Assumes an electrical worker spending a set amount of time to replace the lamps in the luminaire. In this case, labor is the sum of the discounted value of the labor and associated equipment costs (e.g., truck lift) to replace a lamp. The assumed labor cost is \$65 per hour. Substitute with your data as required.

⁸ A real discount rate of 3.0% is based on federal guidelines effective from April 2012 to March 2013.

⁹ Discount rate and future costs are the reasons this value does not equal \$1,448 + \$1,031.

RESOURCES

The following are resources from the U.S. Department of Energy (or supported by DOE) that specifically focus on parking lots. DOE also offers general and specific information about lighting.

Lighting, Development, Adoption, and Compliance Guide

This 2012 guide, starting on page 24, provides guidance on complying with energy codes for parking lots and includes important information on lighting controls.

http://www.energycodes.gov/sites/default/files/documents/Lighting_Resource_Guide.pdf

Use of Occupancy Sensors in LED Parking Lot and Garage Applications: Early Experiences

Occupancy sensors in parking lots are an emerging controls option, but are gaining interest. This 2012 report from the DOE GATEWAY Program highlights both the success and challenges experienced with occupancy sensors in these environments.

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/2012_gateway_sensors.pdf

Exterior Lighting Guide for Federal Agencies

This 2010 guide for federal agencies provides tips for evaluating light sources, performing lighting audits, and pairing lamps with lighting controls. It focuses on exterior applications.

http://cltc.ucdavis.edu/images/documents/publications_reports/DOE_FEMP_Exterior_Lighting_Guide.pdf

LED Provides Effective and Efficient Parking Area Lighting at the NAVFAC Engineering Service Center

This 2010 case study of an LED demonstration resulted in 74% energy savings compared to the existing HPS system. Uniformity was greatly improved with LED luminaires compared to the existing high pressure sodium luminaires. The case study discusses spectral effects – see “nighttime illuminance” in the case study which provides additional context to the spectral effects discussion in this guide.

http://www1.eere.energy.gov/femp/pdfs/etcs_ledparking.pdf

CBEA LED Site Lighting Specification

This LED site lighting performance specification is intended to provide adequate illumination in parking lots, and save energy by reducing the installed power density of equipment below code as well as using controls to further reduce energy use.

http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/cbea_led_site_lighting_spec.pdf



The Department of Energy's Federal Energy Management Program's (FEMP) mission is to facilitate the Federal government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship.

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy

For more information contact:
EERE INformation Center
1-877-EERE-INF (1-877-337-3463)

FEMP
Federal Energy Management Program

WWW.FEMP.ENERGY.GOV

MARCH 2013 | PNNL-SA-95911