



## **2.0 ALTERNATIVES CONSIDERED**

This chapter describes the development, screening, and selection of alternative maintenance facility sites for the operation of the Crenshaw/Los Angeles International Airport (LAX) Transit Corridor Project. This information supplements information about alternatives considered included in the Draft Environmental Impact Statement (DEIS)/Draft Environmental Impact Report (DEIR). This chapter also presents the capital, operating, and maintenance cost estimates for each of the proposed maintenance facility site alternatives. Other project elements remain the same as described in the DEIS/DEIR.

The No Build Alternative for the Crenshaw/LAX Transit Corridor Project was evaluated in the DEIS/DEIR and has not changed. For a complete description of the No Build Alternative, refer to Chapter 2 of the DEIS/DEIR for the Crenshaw/LAX Transit Corridor Project.

### **2.1 Development of Alternatives**

The identification of four maintenance site alternatives for this Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Impact Report (SDEIS/RDEIR) followed a four-step process: 1. Identification of potential sites, 2. Initial screening, 3. Secondary screening, and 4. Advanced screening and design refinement. Each of these steps is described below.

#### **2.1.1 Identification of Potential Sites**

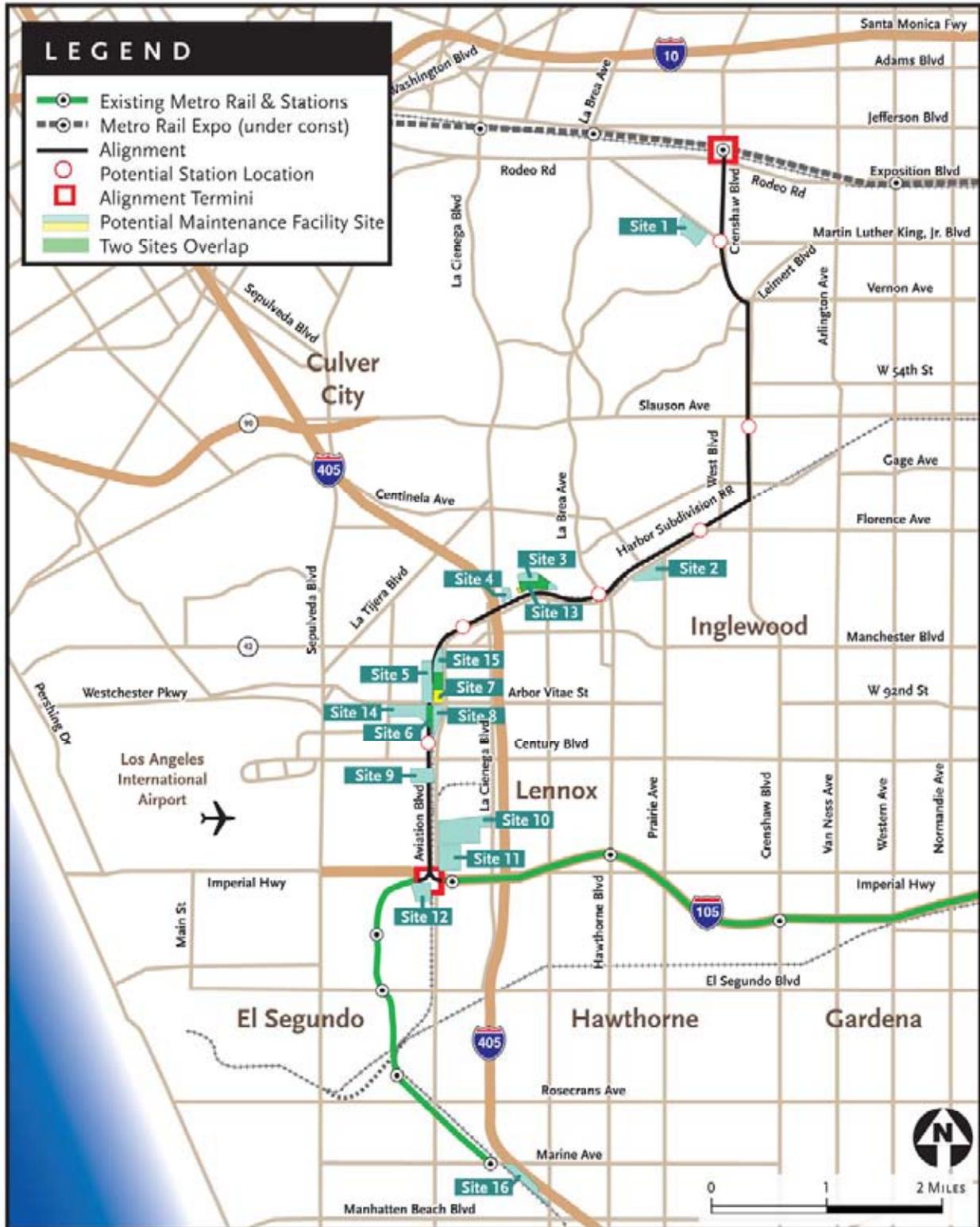
A public outreach meeting was held on February 24, 2010 to solicit community input on the identification of new potential maintenance facility sites. Concerned agencies and the public were presented with typical maintenance facility images and details. The site should include a maintenance building for daily servicing, preventive maintenance, repairs, and parts storage. The desirable characteristics of a typical maintenance site were identified at the meeting. The maintenance facility site should be 15 acres or more in size to allow for future expansion, rectangular in shape, and be located near the light rail line track alignment. The latter criterion minimizes right-of-way acquisition costs, operating costs and maximizes accessibility to the maintenance facility. The meeting attendees were given an opportunity to identify their suggestions for a maintenance facility site. Aerial maps were displayed in the meeting room, and meeting attendees placed markers on the maps to identify sites that should be considered. The markers used represented the size of potential sites. A set of 16 sites was developed, including sites suggested by the public, reconfiguration of some of these suggested sites (to meet size and shape requirements), and a review of the project corridor by the technical team. These initial sites are listed in Table 2-1 and are shown in Figure 2-1.

**Table 2-1. List of Initial Sites Identified for the Proposed Maintenance Facility**

#	Site Name	Size (acres)	Jurisdiction	Nearest Street Boundaries (north, east, south, west)	Land Uses
1	King/Marlton	22.0	Los Angeles	Martin Luther King Jr Blvd., Marlton Ave., Rosalia Dr., Buckingham Rd.	Commercial Redevelopment
2	Florence/Prairie	20.2	Inglewood	Florence Ave., Prairie Ave, Grace Ave., Hillcrest Blvd.	Institutional
3	Florence/Cedar	24.1	Inglewood	Oak St., Eucalyptus Ave., Harbor Subdivision, Oak St.	Industrial/ Institutional
4	Florence/Oak	5.1	Inglewood	Industrial Ave., Oak St., Harbor Subdivision, Hyde Park Blvd	Industrial
5	Manchester/Portal	28.4	Los Angeles	Manchester Blvd., Harbor Subdivision, Arbor Vitae St., Bellanca Ave.	Industrial/ Commercial
6	Arbor Vitae/Bellanca	7.3	Los Angeles	Arbor Vitae St., Harbor Subdivision, 96th St., Bellanca Ave.	Industrial
7	Manchester/Aviation	14.9	Los Angeles	Manchester Blvd., Aviation Blvd., Arbor Vitae St., Harbor Subdivision	Industrial
8	Arbor Vitae/Aviation	9.9	Los Angeles	Arbor Vitae St., Aviation Blvd., 98th St., Harbor Subdivision	Industrial
9	Century/Aviation	16.2	Los Angeles	Arbor Vitae St., La Cienega Blvd., Century Blvd., Aviation Blvd.	Residential/ Commercial/ Vacant
10	111th/Aviation	58.7	Los Angeles	104th St., La Cienega Blvd., 111th St., Aviation Blvd.	Commercial/ Industrial
11	Imperial/Aviation	29.8	Los Angeles	111th St., Hindry Ave., Imperial Hwy., Aviation Blvd.	Vacant
12	116th/Aviation	16.5	Los Angeles	116th St., Harbor Subdivision, 118th St., Douglas St.	Industrial
13	Florence/Cedar (#3 reconfigured)	14.3	Inglewood	Oak St., Eucalyptus Ave., Harbor Subdivision, Oak St.	Industrial
14	Arbor Vitae/Bellanca (#6 extended west)	30.5	Los Angeles	Arbor Vitae St., Harbor Subdivision, 96th St., Airport Blvd.	Industrial/ Commercial/ Residential
15	Manchester/Aviation (#7 reconfigured)	24.7	Inglewood	Manchester Blvd., Aviation Blvd., Arbor Vitae St., Harbor Subdivision	Industrial/ Commercial/ Vacant
16	Marine/I-405	18.6	Los Angeles	Marine Ave., I-405, Inglewood Ave., Harbor Subdivision	Planned Commercial Development

Source: TAHA, 2010.

Figure 2-1. Location of Initial Sites Identified for the Proposed Maintenance Facility



CRENSHAW/LAX TRANSIT CORRIDOR PROJECT

### 2.1.2 Initial Screening

After the identification of initial sites, a screening process was initiated that considered the following evaluation criteria:

- Minimize Impacts to Residential Areas
- Minimize Potential Noise Impacts
- Compatible with Adjacent Land Uses and Adopted Plans
- Minimize Displacement
- Construction Cost Effectiveness
- Accessibility of Site to Workers
- Minimize Traffic Disruption
- Accessibility to LRT Tracks
- Adequate Size and Shape
- Minimize Impacts to Other Transportation Facilities
- Minimize Impacts to the LRT System
- Ease of Land Acquisition

These evaluation criteria were used to eliminate unacceptable sites. Table 2-2 identifies the evaluation criteria and resulting evaluation used to screen the 16 initial sites. During this screening, eight of the 16 sites were identified as having fatal flaws and were eliminated from further consideration. The eight maintenance facility sites that were advanced as a result of this screening included the following:

- Site #1 – King/Marlton
- Site #5 – Manchester/Portal
- Site #11 – Imperial/Aviation
- Site #12 – 116th/Aviation
- Site #13 – Florence/Cedar Reconfigured
- Site #14 – Arbor Vitae/Bellanca Reconfigured
- Site #15 – Manchester/Aviation Reconfigured
- Site #16 – Marine/I-405

### 2.1.3 Secondary Screening

The eight remaining maintenance facility sites underwent a secondary screening process to identify potential alternative sites to be evaluated in this SDEIS/RDEIR. The eight sites were evaluated based on their relative performance against the evaluation criteria identified in Table 2-2. The project team also considered additional engineering analysis and guidance from the Project's Technical Advisory Committee.

**Table 2-2. Evaluation of Maintenance Facility Sites**

Potential Site Name	Minimize Impacts to Residential Areas	Minimize Potential Noise Impacts	Compatible with Adjacent Land Uses and Adopted Plans	Minimize Displacement	Construction Cost Effectiveness	Accessibility of Site to Workers	Minimize Traffic Disruption	Accessibility to LRT Tracks	Adequate Size and Shape	Minimize Impacts to Other Transportation Facilities	Minimize Impact to the LRT System	Ease of Land Acquisition	Overall Average Rating /a/
1: King/Marlton	○	○	○	◐	○	●	●	○	●	●	◐	○	○
2: Florence/Prairie	○	○	○	◐	●	●	●	○	●	◐	●	○	◐
3: Florence/Cedar	●	●	○	◐	◐	●	●	●	◐	●	●	○	◐
4: Florence/Oak	●	●	○	○	●	●	●	●	◐	●	●	○	◐
5: Manchester/Portal	◐	◐	◐	◐	●	●	●	●	●	●	●	◐	●
6: Arbor Vitae/Bellanca	●	●	●	◐	●	●	●	●	◐	●	◐	◐	◐
7: Manchester/Aviation	●	●	●	◐	◐	●	●	◐	◐	◐	●	◐	◐
8: Arbor Vitae/Aviation	◐	◐	○	◐	◐	●	●	◐	◐	◐	●	◐	◐
9: Century/Aviation	◐	◐	◐	●	◐	◐	●	○	●	◐	●	○	◐
10: 111th/Aviation	●	●	◐	●	○	●	●	○	●	○	●	○	◐
11: Imperial/Aviation	●	●	◐	●	○	●	●	○	●	○	●	◐	●
12: 116th/Aviation	◐	◐	○	◐	◐	○	●	○	○	○	●	○	○
13: Florence/Cedar Reconfigured	●	●	●	◐	◐	●	●	●	◐	●	●	◐	●
14: Arbor Vitae/Bellanca Reconfigured	●	●	◐	◐	●	●	●	●	●	●	◐	◐	●
15: Manchester/Aviation Reconfigured	●	●	●	◐	◐	●	●	◐	●	○	●	◐	●
16: Marine/I-405	●	●	●	●	◐	●	●	◐	●	○	◐	◐	●

Key: ● Best    ◐ Fair    ○ Poor    ◐ Fatal Flaw

/a/Last column is average rating for all categories. A fatal flaw only has to occur in one category and results in a constraint so severe, that no matter how highly ranked the site is, it cannot advance forward as a feasible alternative. Refer to Section 2.1.4 for a discussion how the six sites with best overall rating and no fatal flaws were narrowed to four.

Sites #1 and #12 were removed based on their poor overall summary ranking, as shown in the evaluation matrix. Sites #13 and #16 were also removed based on engineering constraints relative to the remaining alternatives. As a result, the four sites advanced to detailed evaluation included: Site #5 – Manchester/Portal; Site #11 – Imperial/Aviation; Site #14 – Arbor Vitae/Bellanca; and Site #15 – Manchester/Aviation.

#### 2.1.4 Advanced Screening and Design Refinement

The four remaining maintenance facility sites underwent an advanced screening process to identify the alternative sites to be evaluated in this SDEIS/RDEIR. The advanced screening on the four sites specifically looked at potential economic effects. Consideration of economic effects took into account the following factors:

- Right-of-way acquisition costs
- Connection Costs
- Displacement of jobs/residents and difficulty of relocating existing businesses

This screening process included individual meetings with key property owners and tenants to characterize the existing conditions and potential constraints that would be involved with relocation. The project team also conducted additional engineering analysis to compare the total costs of implementing each of the proposed alternatives.

Metro completed an update to the Rail Fleet Management Plan in 2010. The results of the advanced screening and the Rail Fleet Management Plan Update (*Rail Fleet Management Plan Revision 2*) determined that a maintenance facility site could operate with a base capacity of 45 LRVs based on a frequent two-car operation and eventually 70 LRVs based on three-car operation. Based on these revised capacity requirements, it was determined that smaller sites could be considered that were originally identified.

The sites that underwent advanced screening were reconfigured for smaller footprints to limit the extent of the initial calculated costs. The reconfiguration of Site #5 – Manchester/Portal did not provide significant cost reduction or lessen the number of jobs that would be displaced, so this site was removed from consideration. Metro Operations also determined that the location of Site #11 – Imperial/Aviation would severely impair the operational efficiency of both the Crenshaw/LAX Line and Metro Green Line because of its proximity to the Metro Green Line junction, since two lines are planned to operate along this segment. It would be difficult for trains to insert trains from this site to revenue service without a disruption to service. This site also required an underground tunnel connection to access the site at an estimated cost of 90-100 million dollars. For these reasons, Site #11 – Imperial/Aviation was also removed for consideration.

The reconfiguration of Site #14 – Arbor Vitae/Bellanca to a smaller footprint was able to substantially reduce right-of-way acquisition costs and employment loss. Therefore, this site was carried forward for full evaluation into the SDEIS/RDEIR.

The reconfiguration of Site #15 – Manchester/Aviation to a smaller footprint was also able to reduce right-of-way costs and employment loss. Because this site initially had one of the lowest estimated right-of-way acquisition costs and employment loss, this site was also carried forward for full evaluation into the SDEIS/RDEIR.

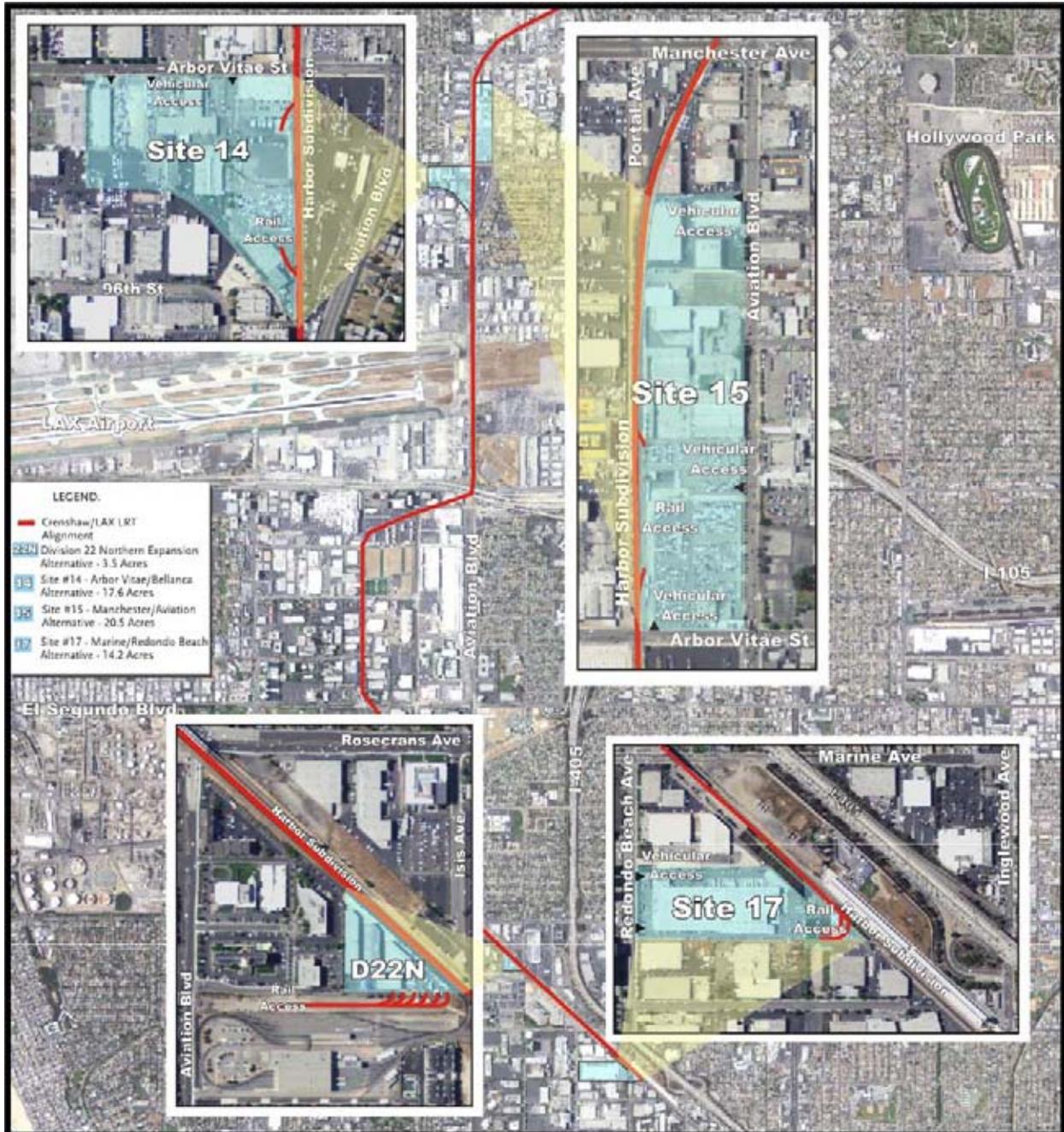


The reduction in capacity requirements allowed Metro to revisit the initial sites that were eliminated related to size/engineering constraints. Based on the revised footprint, Metro concluded that Site #16 – Marine/I-405 could operate as a satellite facility with improvements made to the existing Metro Green Line Division 22 facility (Division 22). It would operate as a satellite because it would still not be large enough to contain all of the required routine maintenance services, office/shop space, and parking requirements. A satellite facility operates in conjunction with an existing facility with functions divided between the existing and new sites. For satellite facilities, the additional room needed for these services would be accommodated through onsite improvements to the existing Division 22. The two facilities would then work in tandem to meet the light rail maintenance requirements for the Metro Green Line and the Crenshaw/LAX Line. The improvements to the existing Division 22 would be included as part of the satellite alternative. The reconfiguration of Sites #14 – Arbor Vitae/Bellanca and #15 – Manchester/Aviation would still be large enough to operate all of the maintenance services required for the Crenshaw/LAX Line and could operate independently as a “standalone” facility, which would not require any additional improvements to the existing Division 22.

Subsequent meetings with the City of Redondo Beach revealed though, that Site #16 was planned for two hotels with construction to begin at the end of 2010 or the beginning of 2011. Preliminary cost estimates for right-of-way acquisition, impacts to construction and City of Redondo Beach sentiment that site acquisition would result in lengthy delay led Metro to remove this site from further consideration. However, an additional site, Site #17 – Marine/Redondo, was identified for consideration. Because of its smaller size and proximity to the existing Division 22, this site would also function as a satellite facility with improvements made to the Division 22 facility. This site underwent advanced screening and although two of the existing businesses have a substantial number of employees, it was anticipated that the acquisition costs and their relocation would be substantially less than the sites previously identified. As a result, Site #17– Marine/Redondo Beach was also included for full evaluation in the SDEIS/RDEIR.

Metro Operations determined that the expansion of services for existing Metro Green Line Division 22 maintenance facility (Division 22) on-site could result in an adjacent site that could provide additional storage tracks on the adjacent parcel to the north of the Division 22 Maintenance Facility, which is currently a public storage facility. These additional tracks would provide additional capacity to the existing Division 22. The additional tracks could provide enough storage to meet the opening day capacity needed for the Crenshaw/LAX Line, but there would not be enough room on the existing Division 22 for the expansion of facilities to support the additional maintenance services that would be required for the opening day requirements of the Crenshaw/LAX Line. The additional capacity that could be provided with expansion of maintenance services to the existing Division 22 could provide service for 16 additional LRVs to serve the Crenshaw/LAX Line. This would not meet the planned opening day requirements and would require a reconfiguration of the existing Metro Green Line operating plan to provide a service that could approach opening day requirements. While this site would not meet all of the objectives of the site selection process, its low cost, proximity, and ease of acquisition merited its inclusion as an alternative that provides the most maintenance service with the expansion of existing infrastructure. Figure 2-2 shows the locations of the four revised sites that emerged from the advanced screening process.

Figure 2-2. Location of Sites Identified for the Proposed Maintenance Facility



## 2.2 Maintenance Site Alternatives Considered in this SDEIS/RDEIR

Four maintenance facility site alternatives were advanced from screening and are described below.

**Site #14 – Arbor Vitae/Bellanca Alternative.** This site is approximately 17.6 acres and is located in the City of Los Angeles. The site contains industrial uses, Dollar Car Rental, Avis Car Rental administrative offices, Barthco International, and Gourmet Trading Company. The site is bounded by Arbor Vitae Street to the north, Neutrogena Corporation to the west, and Bellanca Avenue to the east. The site would be accessed by rail through an at-grade connection at the southeastern end of the site and by vehicles at three entrances along Arbor Vitae Street. This site would service 45 LRVs, contain 40 parking spaces, and have an additional expansion capability of 25 LRVs. Figure 2-3 through Figure 2-6 show the aerial view, existing vacant land on the northwest corner of the site, existing rental car facility on site, and detailed site layout for the Site #14 - Arbor Vitae/Bellanca Alternative, respectively.

**Figure 2-3. Aerial of Site #14 - Arbor Vitae/Bellanca**



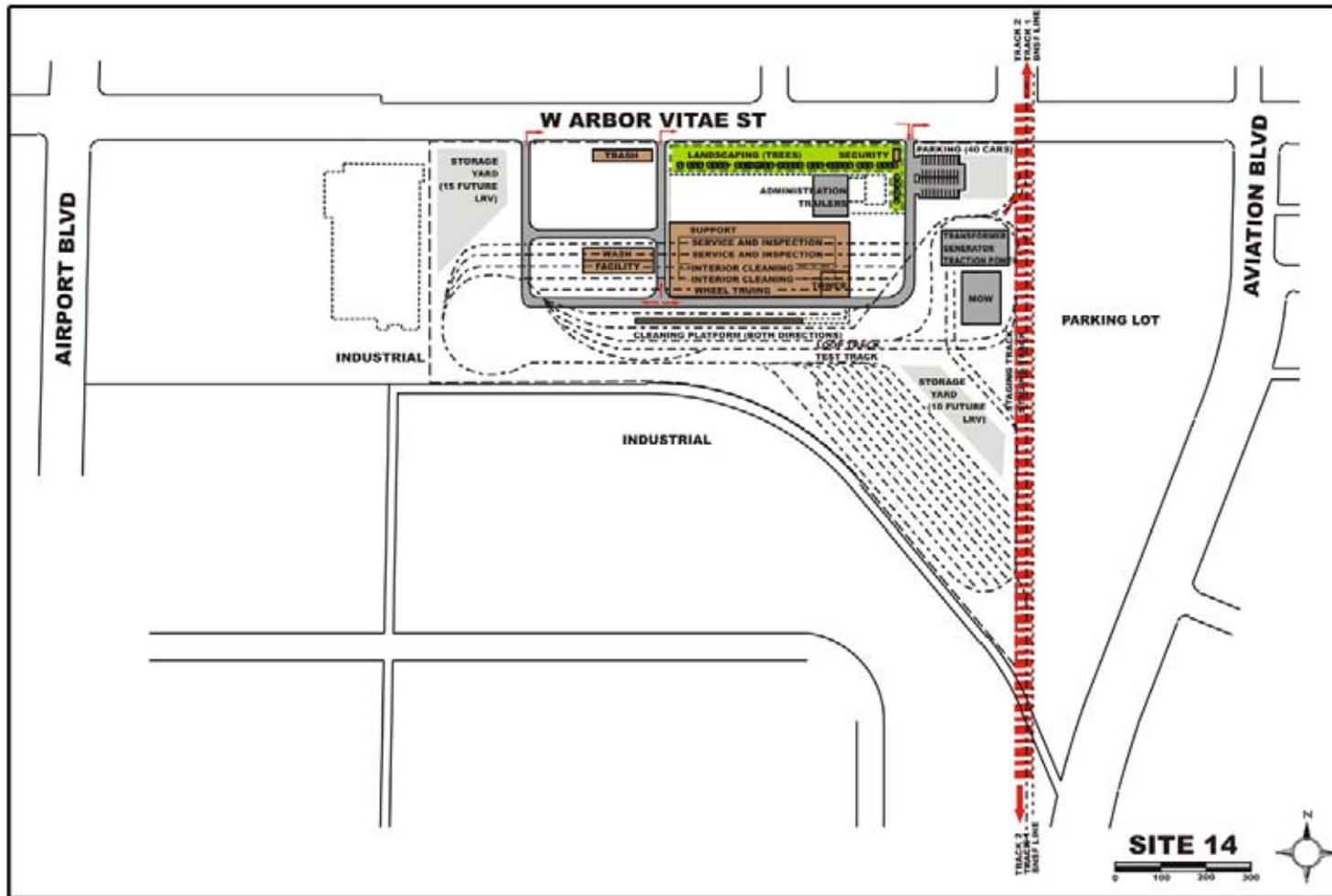
**Figure 2-4. Existing Uses on NE Corner of Site #14**



**Figure 2-5. Existing Car Rental Facility on in the middle of Site #14**



Figure 2-6. Site #14 - Arbor Vitae/Bellanca Alternative Site Plan





**Site #15 – Manchester/Aviation Alternative.** The Site #15 - Manchester/Aviation Alternative is approximately 20.5 acres and is located in the City of Inglewood. The site contains industrial uses, including National/Alamo Car Rental, Crimson Technical College, and an industrial park. There is a commercial use (gas station) located on the southern end of the project site. The site is bounded by Aviation Boulevard to the east, Portal Avenue to the west, Arbor Vitae Street to the south, and LA Car Guy to the north. The site would be accessed by rail through two at-grade connections on the southern end of the site and by vehicles at one entrance along Arbor Vitae Street and two entrances along Aviation Boulevard. This site would service 45 LRVs, contain 40 parking spaces, and have an additional expansion capability of 25 LRVs. Figure 2-7 through Figure 2-10 show the aerial view, existing uses on the southern end of the site, and the detailed site layout for the Site #15 - Manchester/Aviation Alternative, respectively.

**Figure 2-7. Aerial of Site #15 - Manchester/Aviation**



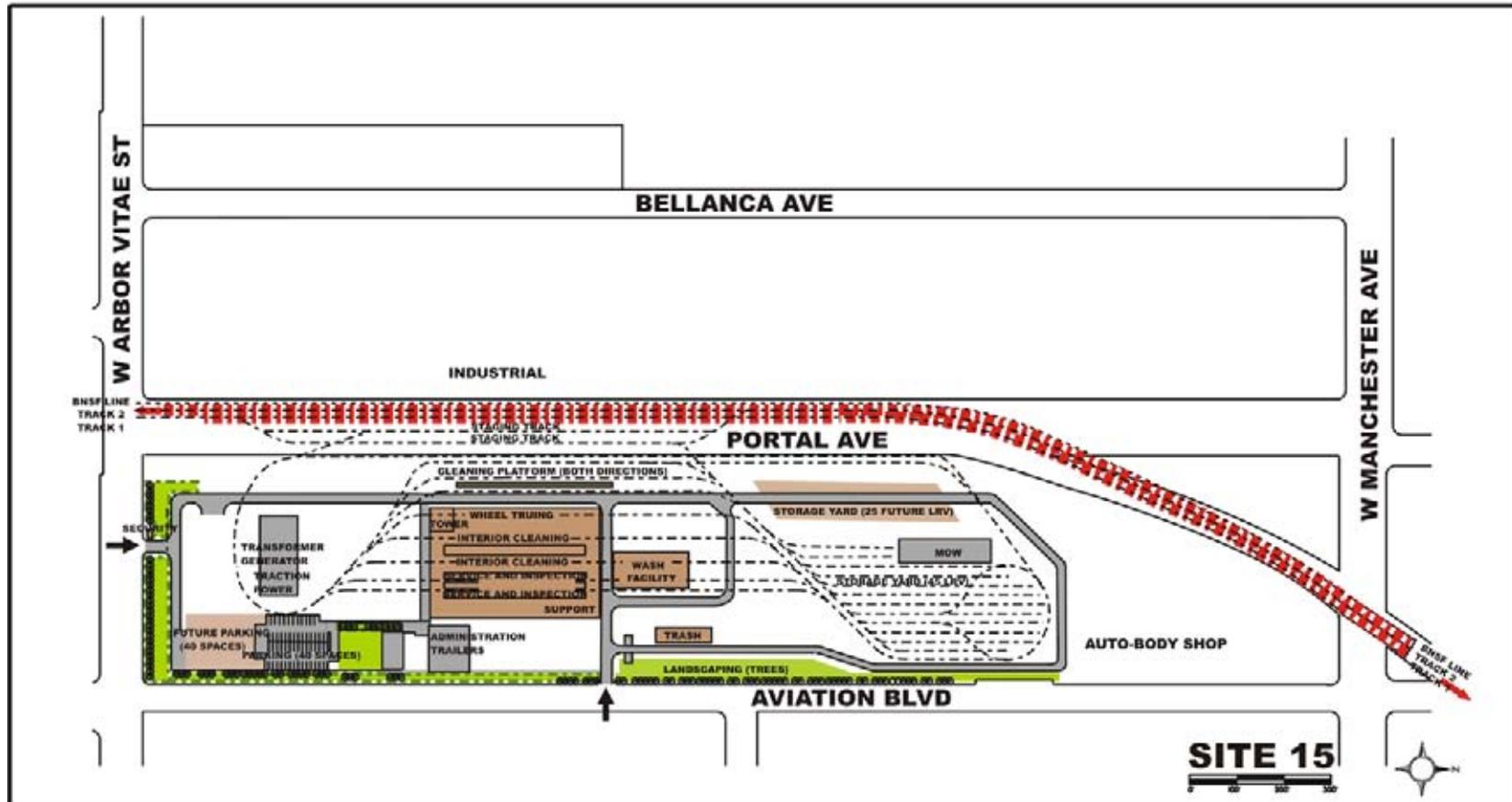
**Figure 2-8. Existing auxiliary car rental parking on southern end of Site #15 -**



**Figure 2-9. View of Crimson Technical Aviation College in the middle of Site #15 -**



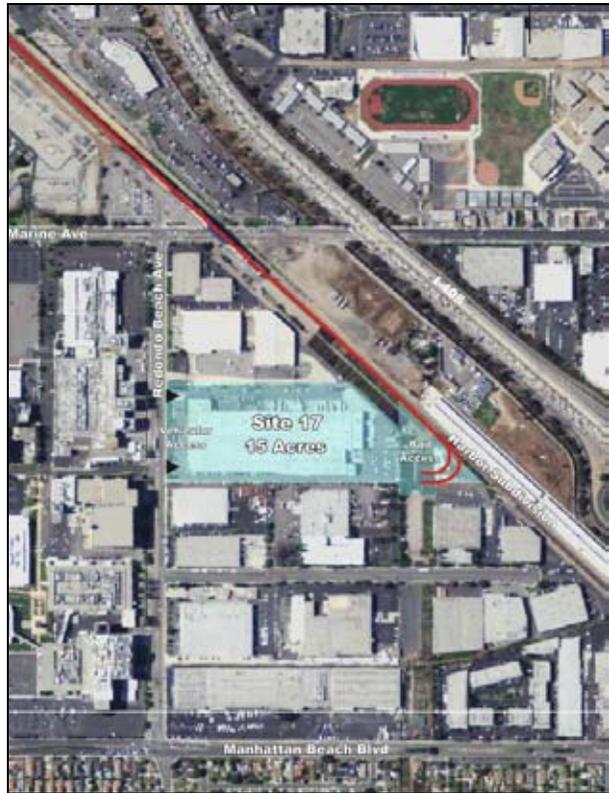
Figure 2-10. Site #15 - Manchester/Aviation Alternative Site Plan





**Site #17 – Marine/Redondo Beach Alternative.** The Site #17 - Marine/Redondo Beach Alternative is approximately 14.2 acres and is located in the City of Redondo Beach. The site contains industrial uses including a large warehouse, a freight delivery company and a sports accessory business. There is also a nursery that operates underneath the utility lines. The site is bounded by Redondo Beach Avenue to the west, the Harbor Subdivision to the east, and industrial warehouses to the north and south. The site would be accessed by rail through two at-grade connections on the southeastern end of the site and by vehicles at two entrances along Redondo Beach Avenue. This alternative includes an access track that would make an aerial connection at the existing Metro Green Line Marine Station and would travel south along the railroad right-of-way and go beneath the existing utility lines. This site is not large enough to contain all of the required facilities and parking and would operate as a satellite facility to the existing Division 22. Consideration of this alternative would include the additional improvements to the existing Division 22. This site would service 42-45 LRVs, contain 20 parking spaces, and have an additional expansion capability of 26 LRVs. It can operate with 20 parking spaces since some functions are shared with Division 22. Figure 2-11 through Figure 2-14 show the aerial view, existing industrial uses on the western end of the site, view of on-site industrial uses, and the detailed site layout for the Site #17 – Marine/Redondo Beach Alternative, respectively.

**Figure 2-11. Aerial of Site #17 - Marine/Redondo Beach**



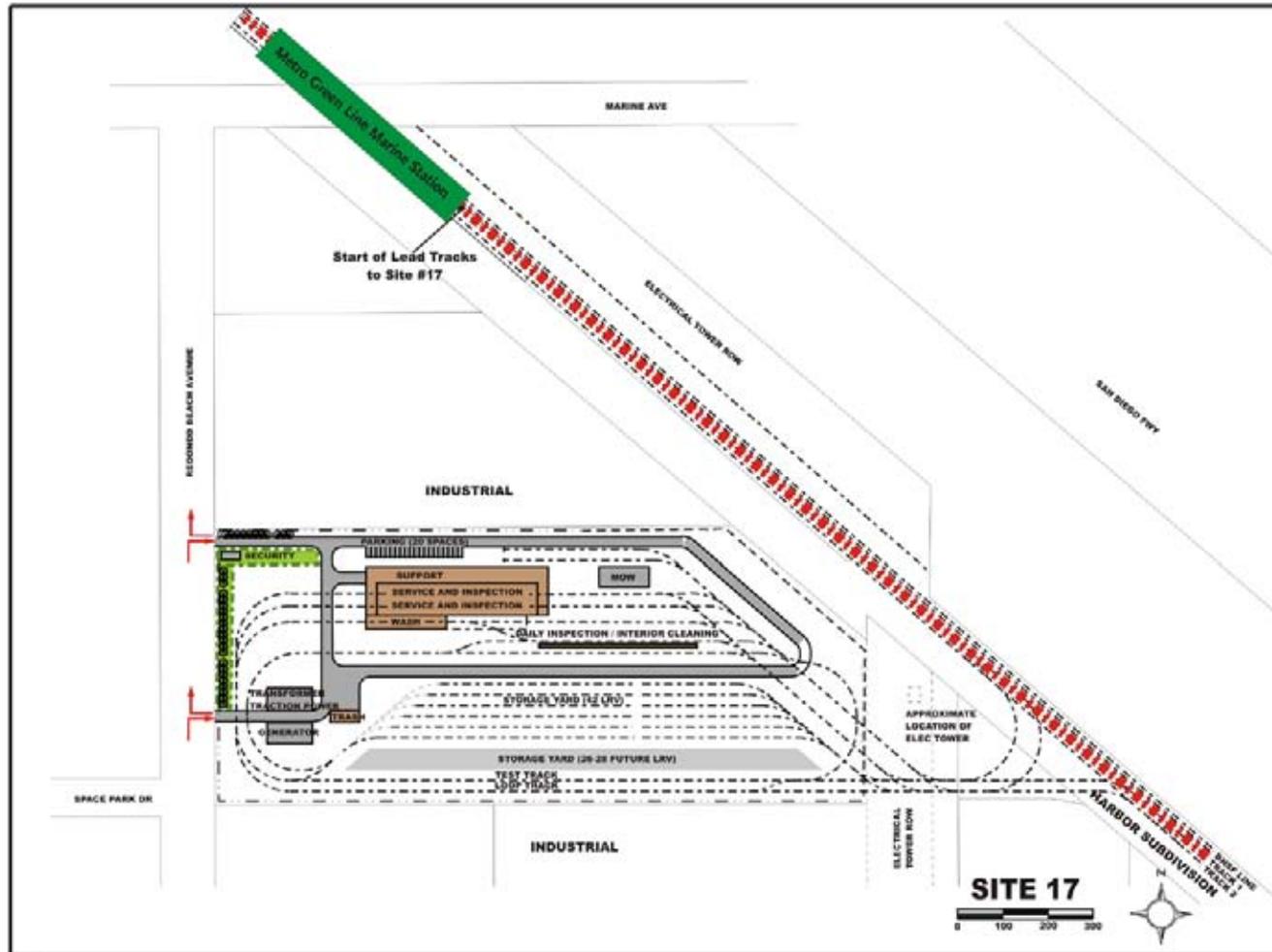
**Figure 2-12. View of existing industrial uses along Redondo Beach Avenue**



**Figure 2-13. View of industrial warehouse on Site #17**



Figure 2-14. Site #17 - Marine/Redondo Beach Alternative Site Plan





**Division 22 Northern Expansion Alternative.** The Division 22 Northern (D22N) Expansion Alternative is approximately 3.5 acres in size and is located in the City of Hawthorne. The existing land use is industrial, and contains a public storage facility. The site is bounded by the existing Division 22 Green Line Maintenance Facility to the south, the Harbor Subdivision to the east and north, and is adjacent to a professional office buildings to the west. This site is only large enough to contain storage tracks and the remaining facilities and parking would have to be located on the existing Division 22. Therefore, this site would have to operate as a satellite to the existing Division 22. The site would only be

accessed by rail from the existing Division 22 Maintenance Facility to the south across the Southern California Edison utility lines (one of the primary power transmission trunk lines). Access to this site would require multiple crossings under the existing utility lines. Consideration of this alternative would include the additional improvements to the existing Division 22. This site would service 16 LRVs, contain no parking spaces, and have no additional expansion capability. Figure 2-15 through Figure 2-17 show an aerial view, existing use on-site, and the site layout for the D22N Expansion Alternative, respectively.

Figure 2-15. Aerial of D22N Expansion

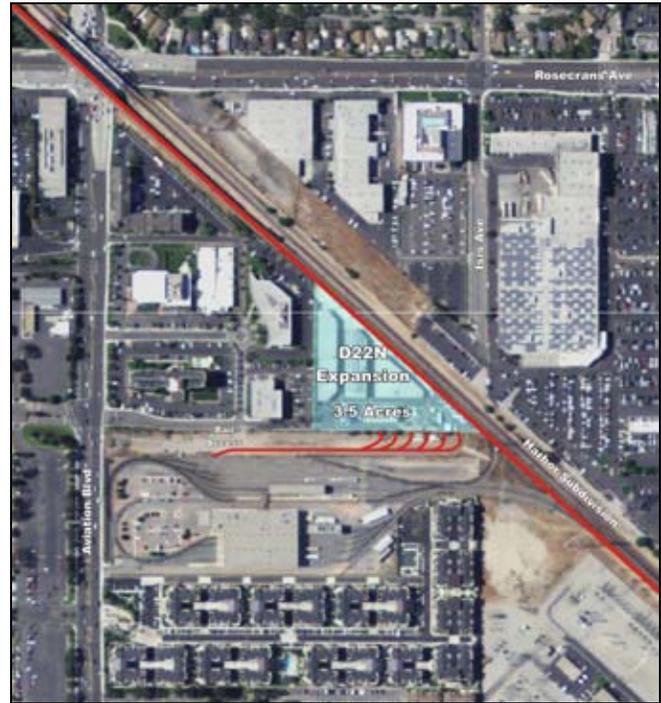
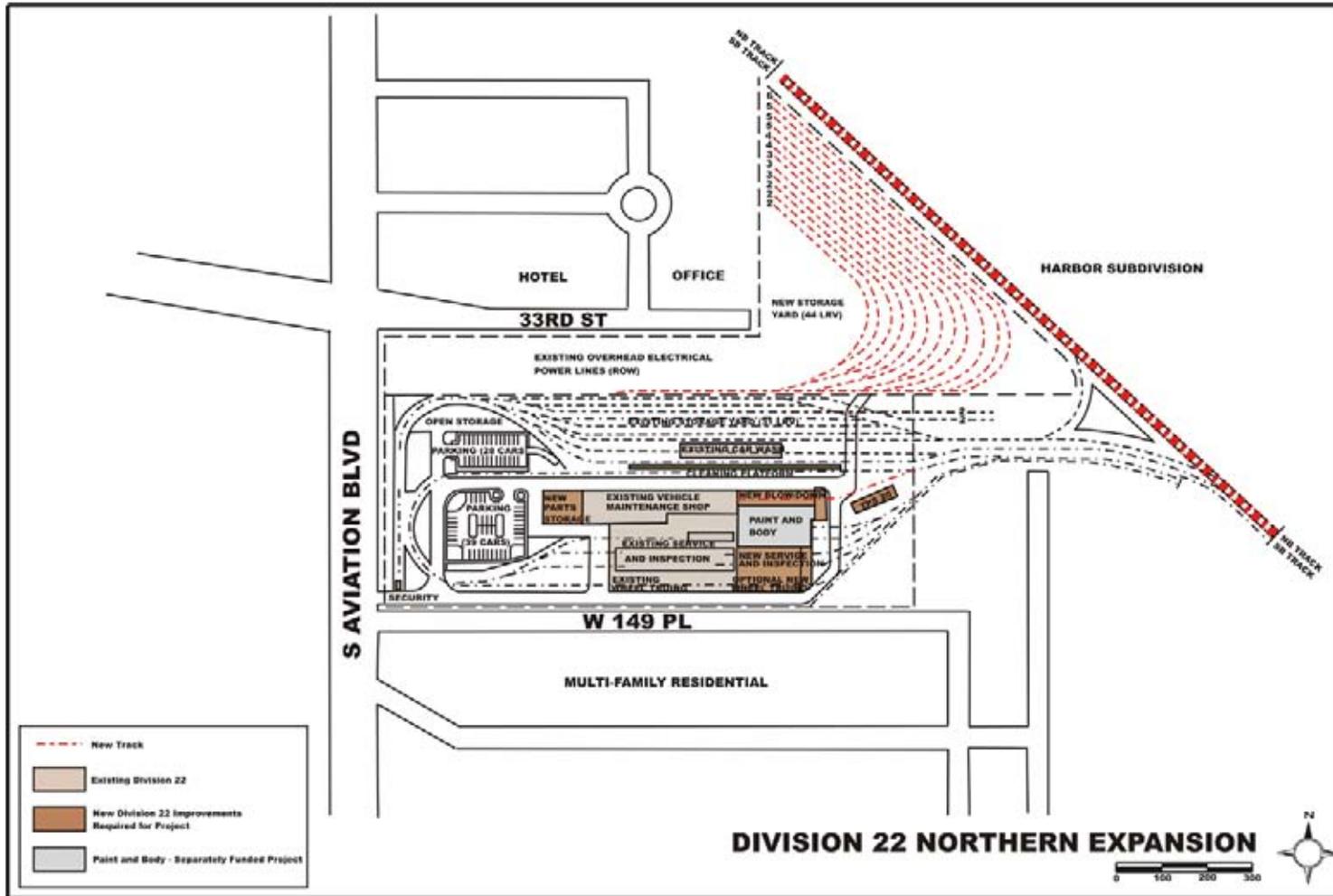


Figure 2-16. Existing Use on D22N Expansion



Figure 2-17. D22N Expansion Alternative Site Plan



## 2.3 Comparison of Alternatives

To compare the sites, an analysis of the four alternatives was performed that included an assessment of operations, property acquisition needs, and a preliminary evaluation of relative costs. Table 2-3 presents a general comparison of the alternatives selected for further evaluation. This table compares each of the alternatives on a number of functional issues including: size, potential capacity, expansion potential, employee and visitor parking capacity, and connection to the light rail track alignment. Other comparison issues address land use compatibility including existing land uses and zoning. Land use impacts compare nearest noise-sensitive land use, displacement of existing businesses and employees, and displacement of existing residents. Acquisition, connection and construction costs for each of the alternative sites are also presented.

**Table 2-3. Comparison of Proposed Alternatives**

Characteristic	D22N	Site #14	Site #15	Site #17
	Satellite Facility	Stand-Alone Facility	Stand-Alone Facility	Satellite Facility
Size (acres)	3.5	17.6	20.5	14.2
Capacity (Base LRVs)	16	45	45	42-45
Expansion Potential (Additional LRVs)	0	25	25	26
Total Potential Capacity	16	70	70	70
Employee and Visitor Parking (cars)	0	40	40	20
Connection Type	Split (dual access in each direction)	Split(dual access in each direction)	Split with two way access aerial viaduct over existing rail track	Split (dual access in each direction) with connecting track south of Marine Ave
Existing Land Uses	Industrial	Industrial	Industrial/ Institutional/ Commercial	Industrial
Existing Zoning	M2-1(Light Industrial)	M2-1 (Light Industrial)	M-1(Industrial)	I-1 (Industrial)
Local Jurisdiction	Hawthorne	Los Angeles	Inglewood	Redondo Beach
Nearest Sensitive Land Use	Residential (150 ft)	Residences (280 ft)	School (250 ft)	School (1,000 ft)
Vehicular Access Points	Aviation Blvd (existing).	Arbor Vitae St (3)	Aviation Blvd (2) Arbor Vitae St (1)	Aviation Blvd (2)
Existing Employees/b/	5	390	158	400
Businesses Displaced	1	4	11	2
Residents Displaced	0	0	0	0
Special Right-of-Way Conditions	Requires several crossings underneath SCE trunk utility line	--	--	Requires one crossing underneath secondary utility lines
Total Cost	116.6M	302.9M	325.8M	222.1M

/a/D22N may accommodate additional storage, excluding maintenance capability) for 28 LRVs

/b/Employment estimates determined from interviews with property owners and tenants and industrial employee rates ranging from 300 to 1,000 square foot per employee depending on the type of use.

/c/Costs (\$ millions) include the expansion of the on-site existing facilities at Division 22, which is required to operate as a satellite facility. On-site improvements to the existing Division 22 include additional track, building space for service and inspection, and additional ancillary facilities including utility lines, TPPS, and parking.

Source: TAHA, 2010.

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