FACILITIES UTILIZATION PLAN

Alameda-Contra Costa Transit District
Oakland, California

FINAL REPORT
VOLUME 1

Prepared By:

March, 2019

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ACKNOWLEDGMENTS

The WSP Team would like to thank the following AC Transit staff members that have participated in the development of the Facility Utilization Plan for their time and input which made possible the development of the information presented herein.

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Greg Harper ..... Director, Ward 2
Mark Williams ..... Director, Ward 4
Jeff Davis ..... Director, Ward 5 (prior to December, 2018)
Diane Shaw ..... Director, Ward 5 (December, 2018 -)
H. E. Christian Peeples ..... Director at Large
Joel B. Young ..... Director at Large

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ACKNOWLEDGMENTS

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GLOSSARY

The following abbreviations are used throughout the final report.

AC Transit ..... Alameda Contra-Costa Transit District
AC ..... Asphaltic Concrete
ADA ..... Americans With Disabilities Act
AHJ ..... Authority Having Jurisdiction
Artic ..... Articulated Bus (typically a 60-foot bus)
ATF ..... Automatic Transmission Fluid
BEB ..... Battery Electric Bus
CA ..... Compressed Air
CG ..... Chassis Grease
CMF ..... Central Maintenance Facility
CMU ..... Concrete Masonry Unit (concrete block)
D2 ..... Division 2 (Emeryville)
D3 ..... Division 3 (Richmond)
D4 ..... Division 4 (East Oakland)
D6 ..... Division 6 (Hayward)
DEF ..... Diesel Exhaust Fluid
EC ..... Engine Coolant (anti-freeze)
EO ..... Engine Oil
FCEB ..... Fuel Cell Electric Bus
FTA ..... Federal Transit Administration
GO ..... Gear Oil
HC ..... Handicapped
NRV ..... Non-Revenue Vehicle
OCC ..... Operations Control Center
OSHA ..... Occupational Safety and Health Administration
PV ..... Photo-Voltaic
Std ..... Standard Bus
TEC ..... Training and Education Center
ZEB ..... Zero Emission Bus

GLOSSARY

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EXECUTIVE SUMMARY

INTRODUCTION

Alameda Contra-Costa Transit District (AC Transit) is a public transit agency serving the western portions of Alameda and Contra Costa Counties. The District covers a 364-square mile area and offers over 150 routes with a fleet of 637 revenue vehicles, serving twenty-two (22) cities and five (5) counties. Over 2,000 employees work for AC Transit including over 1,300 bus operators; over 40 transportation supervision/administration staff; almost 400 maintenance workers and about 300 staff in other administrative or professional positions.

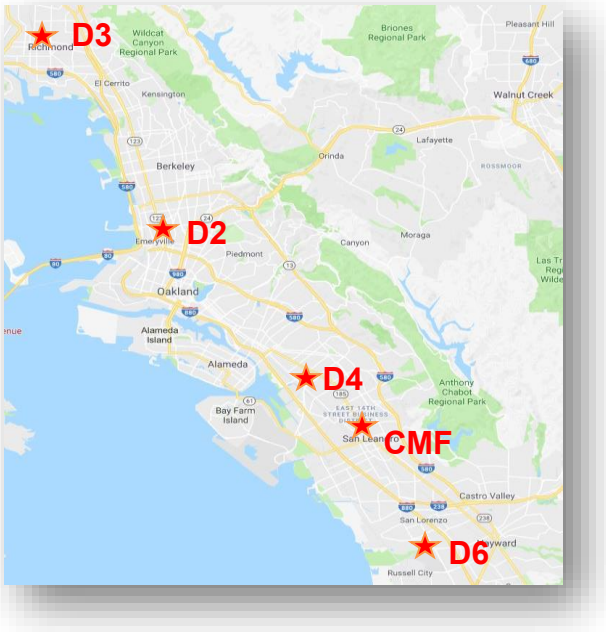
AC Transit provides these services from the following four operating divisions which are supported by the Central Maintenance Facility (CMF):

- Division 2 (D2) in Emeryville
- Division 3 (D3) in Richmond
- Division 4 (D4) in Oakland
- Division 6 (D6) in Hayward
- CMF in in Oakland

AC Transit service is supported by:

- Four operating divisions and a
- Central maintenance facility.

Exhibit ES.1: Existing AC Transit Facilities



To accommodate projected operational needs, address current deficiencies, and continue to provide safe, reliable transit service, AC Transit has teamed with WSP USA to develop a Facilities Utilization Plan to identify the District's operations and maintenance facility needs, provide a facility master plan that outlines a road map to meet near- and long-term needs, and provide a strategy for funding and financing that is coordinated with a detailed implementation plan.

Purpose of the Facilities Utilization Plan

- Evaluate condition and capacity of 4 Operating Divisions (D2, D3, D4, and D6) and CMF
- Develop long-range facilities utilization and implementation plan
- Develop funding and financing strategies
- Provide a facility master plan with flexibility to accommodate the unknown

EXECUTIVE SUMMARY

Challenges

As AC Transit operates over 150 routes with a fleet of 637 revenue vehicles daily, they face significant operational challenges as well as some uncertainties in its ridership growth in the future.

- All facilities, except D3, are more than 25 years old and in need of repair or replacement. Findings from visual inspections are documented in Appendix A (Existing Conditions Report) of the final report.
- All facilities, except D6, are operating at or beyond their capacity.

All facilities, except D3 are:

- Over 25 years old and need major upgrades / replacement

All facilities, except D6 are:

- Operating at or beyond their capacity

- Public transit agencies in California are likely to be mandated to have their fleets entirely emission-free by 2040. AC Transit operates a small number of Zero Emission Buses (ZEBs) and a few additional ZEBs are on order, however, most its fleets are diesel.
- The AC Transit fleet is diverse, with diesel, fuel-cell, diesel/electric hybrid, and battery/electric vehicles. AC Transit has 60-foot, 45-foot, 40-foot, 30-foot, and 26-foot coaches. In addition, double-decker buses were added to the fleet mix in 2018.
- The Bay Area's population is growing at a higher-than-anticipated rate (more than 90,000 between 2014 and 2015). It is crucial that AC Transit's operations and maintenance facilities can accommodate projected growth (demand), support provision of safe and reliable transit service, and be flexible enough to respond to changing technology and vehicle requirements. Plan Bay is projecting an increase in population and employment of 30 percent and 40 percent, respectively, through Year 2040.
- The size of the fleet could significantly change, depending on the following factors:
  - ✓ Regional Measure 3
  - ✓ MTC's Bay Bridge Forward Program
  - ✓ Long-term improvements from the Major Corridor Study
  - ✓ Land use changes from Plan Bay Area 2040
  - ✓ Change in mobility options (i.e. shared mobility transportation)
- The Facilities Utilization Plan must accommodate unknown changes in the future, including changes in technology and changes in travel behaviors due to popularity of Transportation Network Companies (TNCs)

Opportunities

Redevelopment of the facilities will present opportunities for modernizing the facilities to advance the agency's goals.

- AC Transit created a redevelopment plan for future facility needs by identifying funding options to support implementation strategies on its aging assets. Under this plan, AC Transit will be coordinating various plans and studies, including the Clean Corridor Plan, Transit Asset Management Plan, Zero Emission Bus Study, and Redevelopment Funding Options. The redevelopment plan creates an opportunity to address agency goals in creating a better working environment and improving efficiency.

Other Opportunities

- ✓ Accommodate additional Transbay buses
- ✓ Transition to 100% Zero Emission Buses (ZEBs)

- While a transition to ZEB will require AC Transit to initially invest in ZEBs and supporting infrastructure, this may provide long-term financial benefits as well as contributing to cleaner air.
- The existing facilities have underutilized or inefficient space usage. Redevelopment of operational divisions should result in more efficient use of space and improved work flow.

METHODOLOGY

The WSP Team approach for developing the AC Transit Facilities Utilization Plan was based on a clear understanding of the unique operating characteristics and functional requirements of transit operations. It is essential to the success of the project that stakeholders be involved throughout the process. A Technical Advisory Committee (TAC) was formed by AC Transit to provide direction and guidance to the planning team. In addition, the planning team met with over 40 stakeholders representing transportation, maintenance, planning, capital projects, real estate, capital planning and grants, budget, external affairs, Operations Control Center (OCC), materials, facility maintenance, training and education, print shop, environmental, and safety and security. The planning team also coordinated with the ZEB Study and the Seismic Facility Assessment that were being developed by others simultaneous to the Facilities Utilization Plan.

Active Involvement / Input:

- Executive Team
- Technical Advisory Committee
- Key Supervisory Staff
- ✓ Over 40 People!
- ✓ Over 50 Meetings!

Coordinated with:

- Zero Emission Bus Study
- Seismic Facility Assessment

EXECUTIVE SUMMARY

GOALS

Four key goals were identified for the Facilities Utilization Plan, with sub-goals as shown here.

1. **Improve Operational Efficiency and Safety**
    - Improve ability to meet future needs
    - Provide safer traffic flow during pull-in, pull-out, and the nightly service cycle
    - Provide flexibility among all facilities
    - Be resilient in times of emergency (earthquake and flooding)
2. **Create Better Work Environment**
3. **Plan Must Be Implementable Without Interrupting Service**
4. **Environmental, Social, and Financial Sustainability**
    - Meet 100% zero emissions bus requirements by 2040
    - Incorporate environmentally sustainable features into sites and buildings
    - Add value to surrounding community
    - Minimize operating cost
    - Improve cost effectiveness
    - Identify revenue generating opportunities where appropriate

KEY PROGRAM CRITERIA

The planning team worked closely with the Technical Advisory Committee and other key AC Transit staff stakeholders to develop criteria to be used in developing the space needs to accommodate the current and projected fleet size and mix. The key program criteria included the following.

- Based on industry standards + AC Transit specific standards
- Accommodate range of transit vehicle sizes
- Accommodate ZEB's (battery electric and fuel cell electric) in every repair bay
- Criteria developed for site and facilities as shown in Volume 1, Chapter 3

KEY RECOMMENDED CHANGES

The following are key changes recommended to be implemented in the Facilities Utilization Plan

General	Balance capacity of bus parking, maintenance, and fuel & wash
Bus Parking	Utilize 14-foot wide bus parking spaces
	Stack park buses (nose-to-tail) with 5-feet between buses *
	Provide dedicated down-line spaces equivalent to 10% of assigned fleet
	** Note that stack parking was successfully tested by AC Transit*
Maintenance	Provide air conditioning repair bays (1 per 100 buses) at each operating facility
	Provide body repair and paint bays to be at each facility
	Provide dedicated detail clean bays (1 per 32 buses) at each operating facility
	Provide a dedicated Facilities Maintenance shop per division plus one central shop
Fuel & Wash	Bus wash lanes to be 80 feet long plus 10 feet for air dryer

EXISTING FACIILTY CAPACITY ANALYSIS

The capacity of transit maintenance and operations facilities should take into consideration not only bus parking capacity, but also maintenance capacity, fuel and wash capacity, and employee parking capacity. For example, if 300 buses can be parked at the facility but only 100 buses can be fueled in an 8-hour shift, then the capacity of the facility is 100 buses, not 300 buses. AC Transit's four bus maintenance and operations facilities were evaluated to determine their actual capacity. Exhibit ES.2 summarizes the findings based on number of repair bays, number of fuel position, number of buses that can reasonably be parked on site in 14-foot wide parking lanes with buses stack parked nose-to-tail. The findings include:

- Number of maintenance bays currently limit capacity at D4 and D6
- Site size and configuration limit bus parking capacity at D3
- Employee parking not a limiting factor if structured parking can be considered
- Existing fuel & wash facilities not a limiting factor

Exhibit ES.2: Existing Facility Capacity

Facility	CAPACITY				Actual Buses Assigned (January, 2019)	Over / (Under) Capacity
	Maintenance	Fuel & Wash	Bus Parking (14' wide)	OVERALL		
D2 *	180	300	147	**147**	**171**	**24**
D3	130	300	90	**90**	**109**	**19**
D4	160	300	262	**160**	**202**	**42**
D6	170	300	200	**170**	**155**	**(15)**
Total	**640**	**1,200**	**699**	**567**	**637**	**70**
CMF	650			**650**	**637**	**(13)**

** D2 would be operating at capacity if bus parking spaces were at 12-feet wide.*

EXECUTIVE SUMMARY

FLEET PROJECTIONS AND DISTRIBUTION

The size of maintenance and operations facilities is directly related to the size and mix of the fleet assigned to each facility. AC Transit has developed two fleet growth scenarios for the next 30 years – high fleet growth and low fleet growth. The **low growth scenario** represents a fiscally constrained scenario where only known vehicle expansion is accommodated. The **high growth scenario** represents meeting the regional population and employment projections as well as delivering all Major Corridor enhancements. Both scenarios show that by 2040, the entire fleet will be zero emission buses utilizing either hydrogen fuel cell technology or electric bus technology. The high fleet growth scenario shows the fleet growing from 630 buses to 912 buses, representing almost 45% growth over the next 30 years. The low growth scenario shows the fleet growing from 630 buses to 674 buses, representing about 7% growth over the same period. The detailed breakdown of the projected fleets is shown in Volume 1, Chapter 1.

Fleet Projections

- Assume 100% ZEB by 2040 with flexibility to accommodate both battery electric buses and fuel cell electric buses
- Low Growth and High Growth Scenarios for next 30 years
- Accommodate different size buses including articulated and double deck buses

The fleet (based on the high growth scenario) is projected to be distributed as follows:

- North Area served by D3 (100 to 150 buses)
- Core Area served by D2 (250 to 300 buses) and D4 (450 to 500 buses)
- South Area served by D6 (170 buses)

The north and south areas are projected to have flat demand, while the core area is projected to have strong demand.

Fleet Distribution

The initial focus of the plan is in the core areas (D2 and D4) to maximize impact

SPACE PROGRAM SUMMARY

A detailed space program was developed based on project goals, responses to questionnaires and interviews with various stakeholders regarding the functional requirements and operating characteristics of the facilities, fleet size and mix projections, and key program criteria. Key findings were:

- Transportation and Maintenance Facility needs are similar to existing facilities for given fleet sizes, but with a more efficient layout
- The Training and Education Center (TEC) needs to be larger for both low and high growth scenarios.
- The needs for the Central Maintenance Facility and Warehouse may change as bus technology evolves.

The detailed space program is presented in Volume 1, Chapter 3 for Operating Divisions, the Central Maintenance Facility, Facility Maintenance, Training and Education, and Protective Services.

CONCEPTUAL LAYOUTS

(Note that larger versions of site plans shown in this section may be found in Volume 2.)

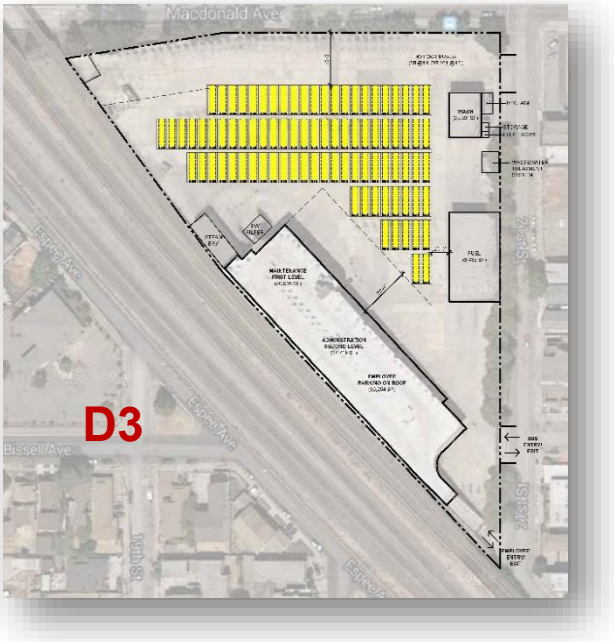
DIVISION 3 (Richmond)

Observations:

- Recently reopened with renovated maintenance, operations, fuel and wash facilities.
- Very tight site with difficult shape
- Workaround very difficult without closing facility
- Maximum capacity = 90 to 100 buses

Recommendation:

- Continue operations from existing D3, but change to stacked bus parking.
- Re-evaluate and define specific needs in 13 years (2031)



D3: Site Plan with Stacked Bus Parking

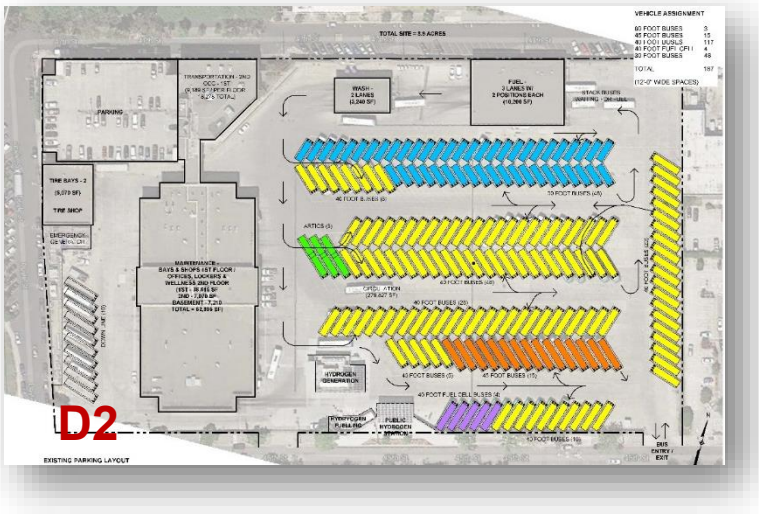
DIVISION 2 (Emeryville)

Observations:

- Very tight site
- Workaround very difficult without closing facility
- Maximum capacity = 147 buses
- Current fleet = 187 buses (27% over capacity)
- Fleet size is expected to increase in both low and high growth scenarios

Recommendation:

- Replace D2 on new site in Emeryville / Bay Bridge area



D3: Site Plan Showing Very Congested Conditions

EXECUTIVE SUMMARY

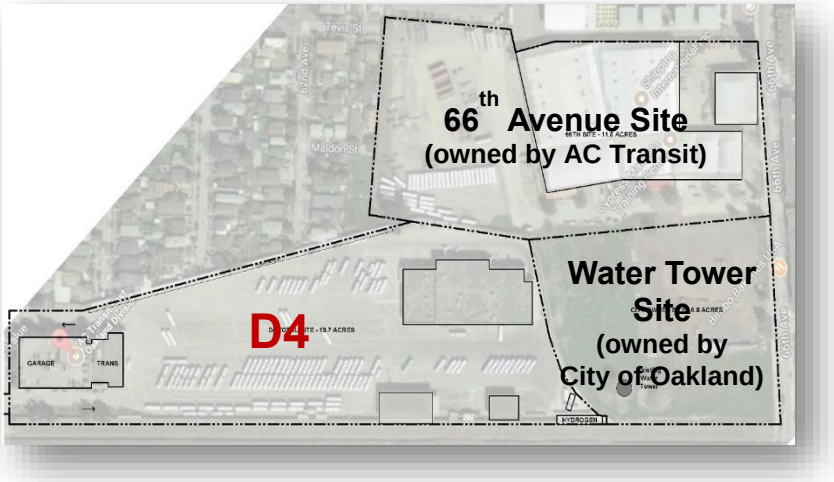
DIVISION 4 (East Oakland) + 66th AVENUE + WATER TOWER SITES

Observations:

- 66th Avenue site owned by AC Transit
- Water Tower site would allow additional expansion

Recommendation:

- Expand D4 to 250 to 300 buses using the 66th Avenue site.
- Acquire the Water Tower site for future expansion to accommodate 450 to 500 buses (see D4 / D5 Division)

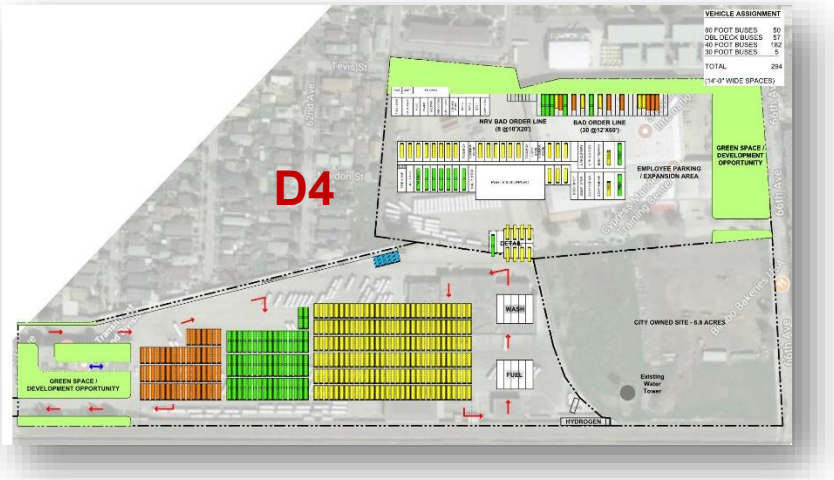


D4 and Adjacent Sites

DIVISION 4 (East Oakland)

Key Features:

- Use 66th Avenue site
- All new facilities
- Workaround relatively simple with new maintenance facility built on 66th Avenue site first
- Capacity = 250 to 300 buses
- Stacked bus parking (more efficient, safer, tested)



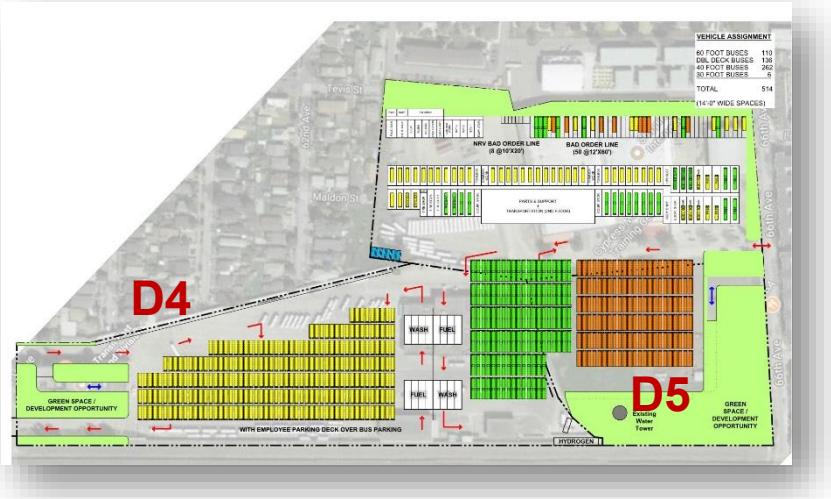
D4 Expanded to 250 to 300 Buses

- Preserves investment in existing fuel cell electric bus (FCEB) infrastructure
- Includes green space and development opportunities
- Includes central Facility Maintenance and new Non-Revenue Vehicle (NRV) Maintenance
- Employee parking on deck above bus parking (protects buses, accommodates BEB charging, photovoltaic panels possible)

DIVISION 4 / DIVISION 5

Key Features:

- Use 66th Avenue and Water Tower sites
- All new facilities
- Workaround relatively simple with new maintenance facility built on 66th Avenue site first
- Capacity = 450 to 500 buses
- Operate as separate Transportation divisions



D4 / D5 Expanded to 450 to 500 Buses

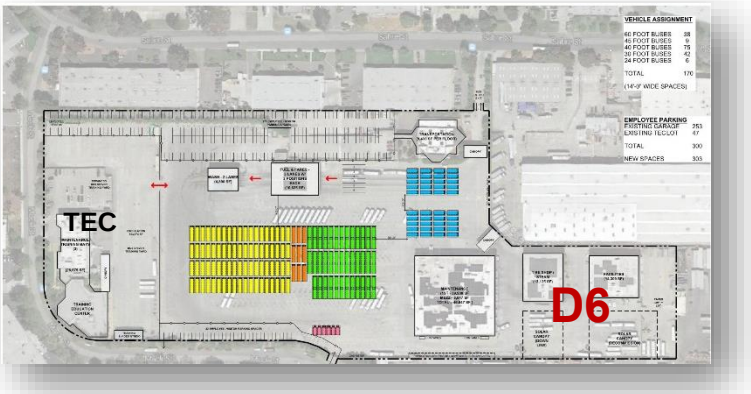
- Maintenance facility developed for D4 would be expanded to accommodate both D4 and D5.
- Stacked bus parking (more efficient, safer, tested)
- Preserves investment in existing FCEB infrastructure
- Includes green space and development opportunities
- Includes central Facility Maintenance and new NRV Maintenance
- Employee parking on decks above bus parking (protects buses, accommodates BEB charging, photovoltaic panels possible)

DIVISION 6 (Hayward) – Phase 1

Phased Upgrade of D6 Recommended

Key Features:

- Replace existing parking garage with surface parking lot pending results of independent AC Transit seismic safety assessment
- Reconfigure TEC training yard (more efficient)
- Stacked bus parking (more efficient, safer, tested)
- Capacity = 170 buses



D6 Phase 1 (Employee Parking)

EXECUTIVE SUMMARY

DIVISION 6 (Hayward) – Phase 2, Option A **TEC Must Move To Another Site**

Key Features:

- All new facilities
- All employee parking at grade (lower cost with no parking structure)
- Training and Education Center (TEC) must move to another site before redevelopment of this site

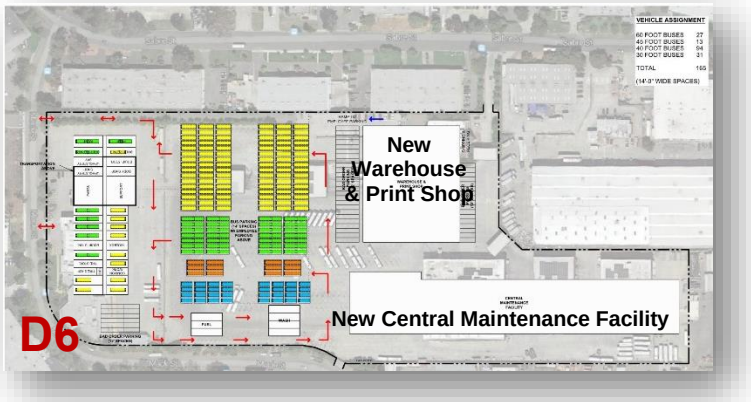
D6 Phase 2, Option A (all at grade)

- Stacked bus parking (more efficient, safer, tested)
- Transportation on second level above maintenance core
- Capacity = 170 buses
- Central Facility Maintenance relocated to D4
- Workaround relatively simple and surplus land available for other use or for sale.

DIVISION 6 (Hayward) – Phase 2, Option B **TEC Must Move To Another Site**

Key Features:

- All new facilities
- TEC must move to another site before redevelopment of this site
- Stacked bus parking (more efficient, safer, tested)
- Transportation on second level above maintenance core



D6 Phase 2, Option B (with CMF and Warehouse)

- Capacity = 170 buses
- Central Facility Maintenance relocated to D4
- Employee parking on decks above bus parking (protects buses, accommodates BEB charging, photovoltaic panels possible)
- Determine if CMF needs to be relocated in 9 years (2027)
- Workaround significantly more difficult due to employee parking deck

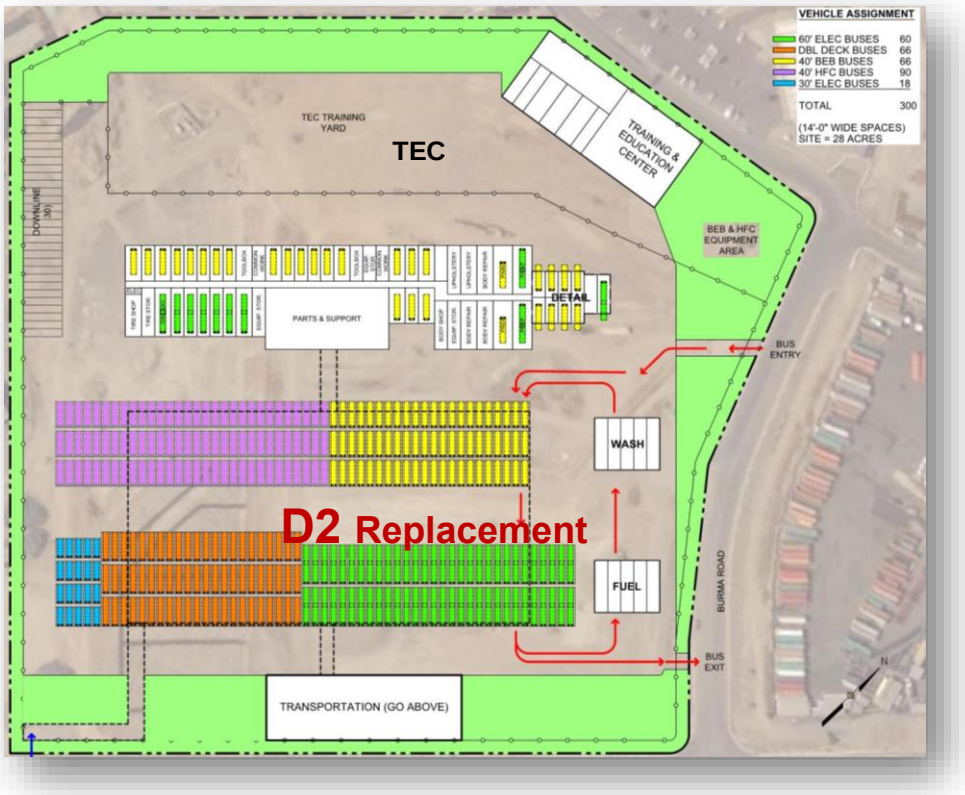
DIVISION 2 Replacement Concept

Key Features:

- Ideal site is 28 acres and centrally located
- Includes new TEC with properly sized training yard
- Stacked bus parking (more efficient, safer, tested)
- Capacity = 250 to 300 buses
- Employee parking on decks above bus parking (protects buses, accommodates BEB charging, photovoltaic panels possible)
- New site, so workaround not required. This facility would be operational before the existing D2 would be available for sale.
- Considered multiple sites, however, they quickly became unavailable
- New General Office (4 floors) could be located above Transportation

Recommendation:

- AC Transit should position itself to allow quick action on an appropriate site when it becomes available.



D2 Replacement Concept

EXECUTIVE SUMMARY

IMPLEMENTATION PLAN

The implementation plan shown in Exhibit ES.3 indicates the proposed start, finish, and duration (in months) for the following activities for each facility: secure funding, consultant selection, environmental process (if any), design / permit / bid and award, demolition (if necessary), and construction / commissioning / move-in. The implementation plan:

- Assumes Design – Bid – Build project delivery method
- Could accelerate schedule if design-build or developer build-to-suit is used
- No construction until the East Bay Bus Rapid Transit project is complete (end of 2019)
- 19-year program through 2037

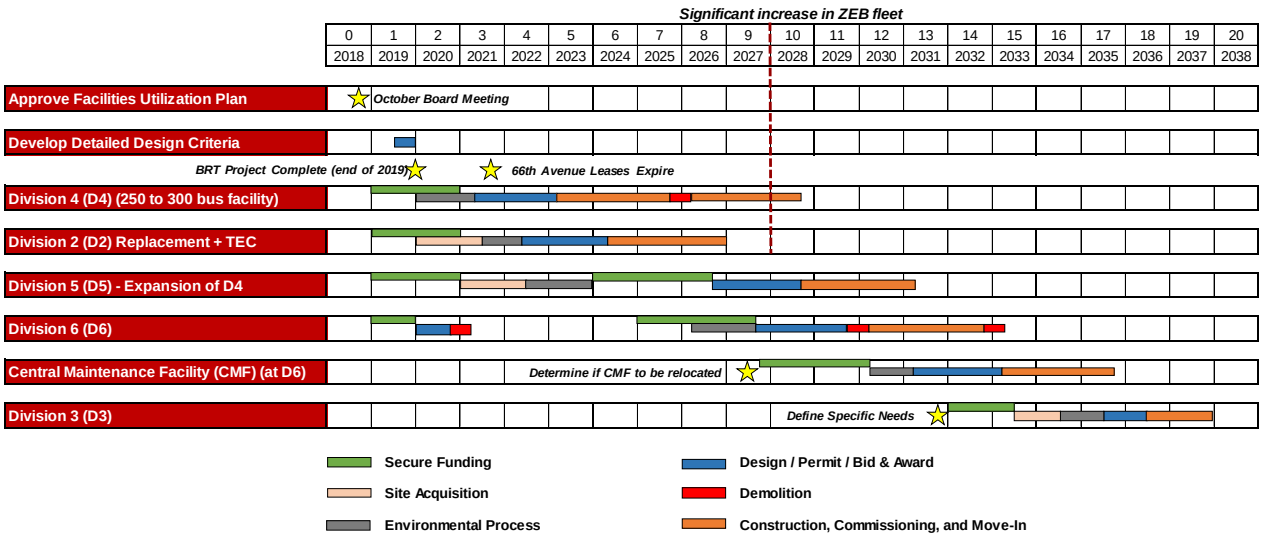
Note the red dashed line between 2027 and 2028 indicates when a significant increase in ZEB is anticipated based on the projections developed in the ZEB Bus Study, which is based on the fleet being 100% ZEB by 2040. The implementation plan shows the D4 expansion and D2 replacement being essentially complete by that time, which will accommodate the projected ZEB fleet.

Implementation Plan Implications

The primary implications of the implementation plan shown in Exhibit ES.3 are that AC Transit needs to:

- Begin securing funding immediately
- Determine project delivery method(s) to be used
- Acquire water tower site + site for D2 replacement as soon as possible
- Determine how to staff (in-house versus program manager)
- Determine CMF + Warehouse needs by 2027 (in 9 years)
- Determine D3 needs by 2031 (in 13 years)

Exhibit ES.3: Implementation Plan



PROJECT COST ESTIMATE

An estimate of probable construction and project cost was developed for each facility based on the conceptual layouts, space program, and criteria.

The project cost includes construction, ZEB infrastructure, site acquisition, design and other soft cost, and escalation. A description of each of the components of the estimate listed below, along with the assumptions and exclusions, is provided in Volume 1, Chapter 6.

- Sitework & Paving
- Demolition
- New Building Construction
- Photo-Voltaic Panels
- ZEB Fueling Equipment
- Equipment & Furnishings
- Security
- IT and Communications
- Land Acquisition ($45 per square foot)
- GC General Conditions (10%) + Fee (8%)
- Contingencies, including design (25%), construction (10%), and owner (10%)
- Soft Cost (50%)
- Escalation (3% per year based on the implementation plan)

Exhibit ES.4 shows the total estimated project cost by site. The total cost, including replacement of the GO, is over $2.3 billion.

Exhibit ES.4: Project Cost Estimate By Site

	Construction $	Soft Cost$	Land Acquisition	Escalation	Total	Move-In
D4 (300 bus)	$ 225,772,239	$ 102,623,745		$ 78,100,711	$ 406,496,695	2025 / 2028
D2 Replacement + TEC (300 buses)	$ 241,327,770	$ 109,694,441	$ 49,000,000	$ 76,230,659	$ 476,252,870	2026
D5 (Expansion of D4 to 500 buses)	$ 191,702,378	$ 87,137,445	$ 13,328,000	$ 110,239,838	$ 402,407,661	2031
D6 - Phase 1 (Demo Garage + New Surface Parking)	$ 7,659,699	$ 3,481,682		$ 764,900	$ 11,906,281	2021
D6 - Phase 2 (165 buses)	$ 139,058,965	$ 63,208,621		$ 90,312,141	$ 292,579,727	2033
D6 - Phase 3 (CMF + Warehouse)	$ 113,247,010	$ 51,475,914		$ 93,388,724	$ 258,111,648	2035
D3 Replacement (150 buses)	$ 111,764,336	$ 50,801,971	$ 31,360,000	$ 127,436,008	$ 321,362,315	2037
General Office (GO)	$ 79,902,076	$ 36,319,126		$ 24,251,466	$ 140,472,668	2026 with D2 Replacement
TOTAL	$ 1,110,434,474	$ 504,742,945	$ 93,688,000	$ 600,724,447	$ 2,309,589,866	

The estimate was based on unit costs that are consistent with similar facilities developed recently in California.

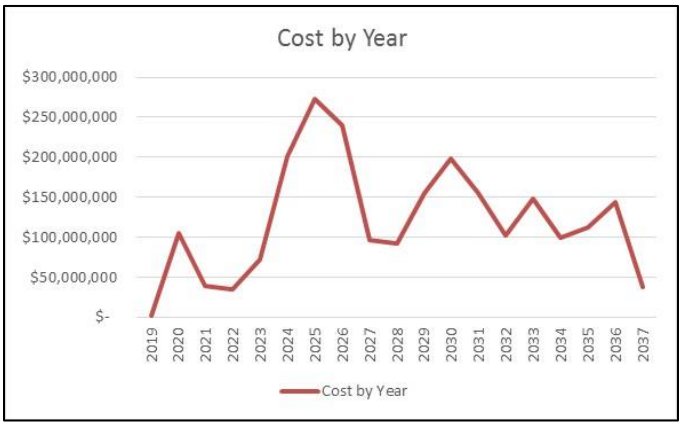
EXECUTIVE SUMMARY

FUNDING

The total cost of the plan over the next 19 years is over $2.3 billion, which is an average of approximately $121.6 million per year. Exhibit ES.5 shows the estimated funds (including escalation) needed each year in tabular and graphic format. Note that $180.94 million is needed over the next four years including $62.4 million for land acquisition (the water tower site adjacent to D4 and a new site of approximately 28 acres for a D2 replacement facility).

Year	TOTAL
2019	$ 1,593,837
2020	$ 105,124,430
2021	$ 38,902,498
2022	$ 35,323,636
2023	$ 72,074,059
2024	$ 201,559,664
2025	$ 273,023,932
2026	$ 240,522,214
2027	$ 96,880,772
2028	$ 92,480,983
2029	$ 155,140,761
2030	$ 198,106,044
2031	$ 154,919,270
2032	$ 102,961,112
2033	$ 148,680,953
2034	$ 99,321,199
2035	$ 111,712,258
2036	$ 144,144,925
2037	$ 37,117,318
TOTAL	$ 2,309,589,866

Exhibit ES.5: Estimated Funds Needed Per Year



$180.94M needed in next 4 years (2019- 2022) (including $62.4M for land acquisition)

Funding Opportunities

Funding Availability Versus Need

- FY19 Proposed Funding Available *(on a competitive basis)* — $12.45 billion
- AC Transit Need (2019 – 2022) — $180.94 million

Due to the uncertain nature of transit funding over a 19-year timeframe, AC Transit will need to constantly monitor funding and financing opportunities and coordinate with federal, state, and local sources. For example, a review of currently proposed FY19 funding levels shows approximately $12.5 billion available on a competitive basis.

Leverage District's Properties (for local match or sell/lease back)

Another source of funds could come from the sale of existing property as it becomes available. The implementation plan assumes that the Newark Warehouse will be available in 2019, D2 may be available in 2027, the CMF may be available in 2036, D3 may be available in 2037. In addition, if the General Office (GO) is relocated, it could be available for sale. Proceeds from the sale of property may be used as local match in grant applications, however, the value of Federal Transit Administration's (FTA's) interest in the sold property must be coordinated with FTA.

Another alternative would be to sell the property and lease it back for a specified period of time. This could provide cash immediately for investing in land or for use as local match in grant applications, however, this would impact operating cost with the addition of a lease.

PROJECT DELIVERY METHODS

Transit agencies in the United States have several project delivery methods available for design and construction of maintenance and operations facilities. Four methods, all of which have statutory authorization in Oakland, California, were identified and are fully discussed in Volume 1, Chapter 8.

The following are recommended project delivery methods to be used in development of the facilities scheduled for the next ten years. Beyond these projects, the project delivery method to be used should be evaluated based on experience with the initial projects and the in-house expertise at AC Transit at the time.

1. **Develop Detailed Design Criteria**
   During development of the Facilities Utilization Plan, specific criteria were identified and used to develop the detailed space program. A detailed design criteria document should be developed to guide design teams as they prepare detailed designs for each facility. The detailed design criteria can be used in any project delivery method and should be developed as soon as possible (in 2019).

2. **Division 4 should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk (CMR)** for the following reasons:
   - The implementation plan does not indicate a need to accelerate the schedule. Schedule acceleration is one of the primary reasons for using Design-Build (DB). If schedule is not an issue, there is no need to relinquish some design control inherent with DB.
   - AC Transit is familiar with DBB and CMR requires similar management expertise.
   - These methods maintain AC Transit's control of the design.
   - Using CMR will involve the contractor during design, which may help with coordination of workaround planning.

3. **Division 2 Replacement should consider utilizing Developer Led Design-Build if:**
   - The selected site is owned by the developer or the developer has a long-term lease on the site (note that AC Transit has had difficulty identifying sites for acquisition, so this may be an alternative that must be considered) and,
   - The developer will not sell the site.

4. **Division 2 Replacement should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk if the site is acquired by AC Transit (i.e. not owned or leased by a developer)**, for the same reasons listed above for Division 4, except workaround planning is not anticipated.

5. **Division 5 should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk (CMR)** for the same reasons listed above for Division 4.

EXECUTIVE SUMMARY

RECOMMENDATIONS AND NEXT STEPS

Recommendations:

1. Redevelop and expand D4 utilizing the AC Transit owned 66th Avenue site to accommodate 250 to 300 buses.
2. Replace D2 with a new facility on a new site with at least 28 acres to accommodate 250 to 300 buses. (Note that finding a new site has been a challenge. AC Transit may also consider long-term leasing in addition to purchasing a site.)
3. Relocate the Training and Education Center (TEC) to the site of the new D2 facility.
4. If fleet growth indicates the need for additional capacity, develop D5 adjacent to D4 (on the Water Tower Site) to accommodate up to 250 buses.
5. Redevelop D6 to accommodate 170 buses.
6. Per the implementation plan, in 9 years (2027), identify the needs of the Central Maintenance Facility (CMF) and determine if the CMF needs to be relocated.
7. Per the implementation plan, in 13 years (2031), define specific needs of D3 and determine if a new site is needed to accommodate a fleet larger than 100 buses.
8. Identify an internal "champion" for the Facilities Utilization Plan who will have responsibility for overseeing the implementation of the plan and periodic review of the plan.
9. Periodically review the Facilities Utilization Plan and update it as necessary to reflect changing conditions and priorities.
10. Begin implementation of the Facilities Utilization Plan as outlined under "Next Steps".

Next Steps:

The following are the next steps for implementation of the Facilities Utilization Plan.

- Board approval of the Facilities Utilization Report (February 2019)
- Establish ZEB fleet mix (battery electric versus fuel cell electric) to be accommodated
- Develop design criteria document for a typical operating division to guide development of facilities
- Conduct a traffic study on Seminary Avenue and 66th Avenue and surrounding intersections to determine if off-site improvements are needed at D4.
- Begin implementation as soon as possible
  - ✓ Secure funding
  - ✓ Acquire property (site for D2 replacement and eventually the water tower site)
  - ✓ Environmental (if necessary)
  - ✓ Determine project delivery method to be used for each project
  - ✓ Determine how to staff for projects (in-house versus program manager)
  - ✓ Design & construction

CHAPTER 1: INTRODUCTION

BACKGROUND

Alameda Contr-Costa Transit District (AC Transit) is a public transit agency serving the western portions of Alameda and Contra Costa Counties. The District covers a 364-square mile area and offers over 150 routes with a fleet of 637 revenue vehicles, serving twenty-two (22) cities and five (5) counties. Over 2,000 employees work for AC Transit including over 1,300 bus operators; over 40 transportation supervision/administration staff; almost 400 maintenance workers and about 300 staff in other administrative or professional positions.

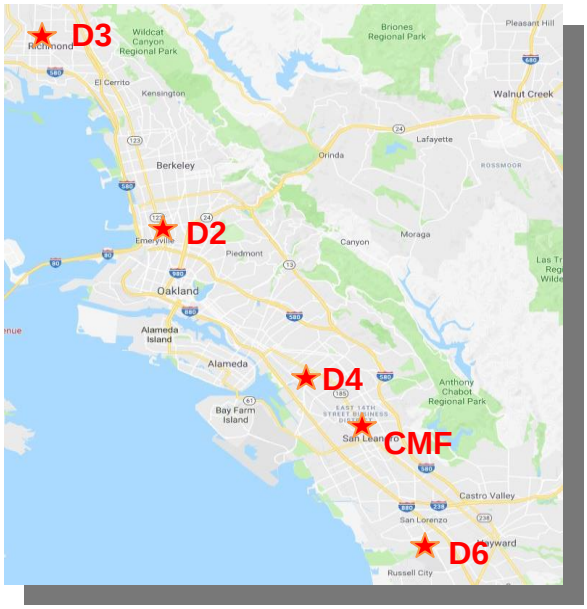
AC Transit provides these services from the following four operating divisions which are supported by the Central Maintenance Facility (CMF):

- Division 2 (D2) in Emeryville
- Division 3 (D3) in Richmond
- Division 4 (D4) in Oakland
- Division 6 (D6) in Hayward
- CMF in in Oakland

AC Transit service is supported by:

- Four operating divisions and a
- Central maintenance facility.

Exhibit 1.1: Existing AC Transit Facilities



To accommodate projected operational needs, address current deficiencies, and continue to provide safe, reliable transit service, AC Transit has teamed with WSP USA to develop a Facilities Utilization Plan to identify the District's operations and maintenance facility needs, provide a facility master plan that outlines a road map to meet near- and long-term needs, and provide a strategy for funding and financing that is coordinated with a detailed implementation plan.

Purpose of the Facilities Utilization Plan

- Evaluate condition and capacity of 4 Operating Divisions (D2, D3, D4, and D6) and CMF
- Develop long-range facilities utilization and implementation plan
- Develop funding and financing strategies
- Provide a facility master plan with flexibility to accommodate the unknown

INTRODUCTION

Challenges

As AC Transit operates over 150 routes with a fleet of 637 revenue vehicles daily, they face significant operational challenges as well as some uncertainties in its ridership growth in the future.

- All facilities, except D3, are more than 25 years old and in need of repair or replacement. Findings from visual inspections are documented in Volume 3, Appendix A (Existing Conditions Report) of the final report.
- All facilities, except D6, are operating at or beyond their capacity.

All facilities, except D3 are:

- Over 25 years old and need major upgrades / replacement

All facilities, except D6 are:

- Operating at or beyond their capacity

- The California Aire Resources Board (CARB) enacted the Innovative Clean Transit (ICT) rule in December, 2018, mandating public transit agencies in California to have their fleets entirely emission-free by 2040. AC Transit operates a small number of Zero Emission Buses (ZEBs) and a few additional ZEBs are on order, however, most its fleets are diesel.
- The AC Transit fleet is diverse, with diesel, fuel-cell electric, diesel/electric hybrid, and battery electric vehicles. In addition, double-decker buses were added to the fleet mix in 2018.
- The Bay Area's population is growing at a higher-than-anticipated rate (more than 90,000 between 2014 and 2015). It is crucial that AC Transit's operations and maintenance facilities can accommodate projected growth (demand), support provision of safe and reliable transit service, and be flexible enough to respond to changing technology and vehicle requirements. Plan Bay Area is projecting an increase in population and employment of 30 percent and 40 percent, respectively, through Year 2040.
- The size of the fleet could significantly change, depending on the following factors:
  - ✓ Regional Measure 3
  - ✓ MTC's Bay Bridge Forward Program
  - ✓ Long-term improvements from the Major Corridor Study
  - ✓ Land use changes from Plan Bay Area 2040
- The Facilities Utilization Plan must accommodate unknown changes in the future, including changes in technology and changes in travel behaviors due to popularity of Transportation Network Companies (TNCs)

Opportunities

Redevelopment of the facilities will present opportunities for modernizing the facilities to advance the agency's goals.

Other Opportunities

- ✓ Accommodate additional Transbay buses
- ✓ Transition to 100% Zero Emission Buses (ZEBs)

- AC Transit created a redevelopment plan for future facility needs by identifying funding options to support implementation strategies on its aging assets. Under this plan, AC Transit will be coordinating various plans and studies, including the Clean Corridor Plan, Transit Asset Management Plan, Zero Emission Bus Study, and Redevelopment Funding Options. The redevelopment plan creates an opportunity to address agency goals in creating a better working environment and improving efficiency.
- While a transition to ZEB will require AC Transit to initially invest in ZEBs and supporting infrastructure, this may provide long-term financial benefits as well as contributing to cleaner air.
- The existing facilities have underutilized or inefficient space usage. Redevelopment of operational divisions should result in more efficient use of space and improved work flow.

METHODOLOGY

Active Involvement / Input:

- Executive Team
- Technical Advisory Team
- Key Supervisory Staff
- ✓ Over 40 People!
- ✓ Over 50 Meetings!

Coordinated with:

- Zero Emission Bus Study
- Seismic Facility Assessment

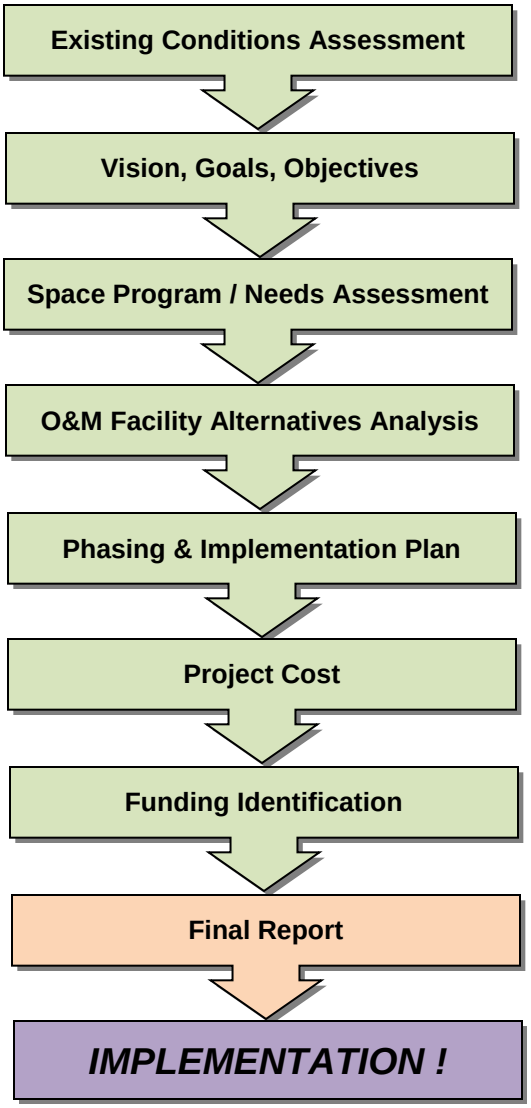
The WSP Team approach for developing the AC Transit Facilities Utilization Plan was based on a clear understanding of the unique operating characteristics and functional requirements of transit operations. It is essential to the success of the project that stakeholders be involved throughout the process. A Technical Advisory Committee (TAC) was formed by AC Transit to provide direction and guidance to the planning team. In addition, the planning team met with over 40 stakeholders representing transportation, maintenance, planning, capital projects, real estate, capital planning and grants, budget, external affairs, Operations Control Center (OCC), materials, facility maintenance, training and education, print shop, environmental, and safety and security. The planning team also coordinated with the ZEB Study and the Seismic Facility Assessment that were being developed by others simultaneous to the Facilities Utilization Plan.

The Facilities Utilization Plan is a master plan that provides a framework for AC Transit operations and maintenance facility development over the next 30 years. A good master plan must be flexible to respond to changes in the future. Ideally, the master plan should be reviewed and updated on a regular basis and be coordinated with capital project budgeting cycles.

INTRODUCTION

Exhibit 1.2 illustrates the process for developing the plan. The Planning Team developed the Existing Conditions Assessment and Vision, Goals, Objectives, Space Program / Needs Assessment, Phasing / Implementation / Cost / Funding reports and solicited input from TAC members and Executive Team at key milestones illustrated in Exhibit 1.2. The final report incorporates these drafts along with comments received from AC Transit staff reviews.

Exhibit 1.2: Process For Developing The Plan



GOALS

The Planning Team met with the Technical Advisory Committee (TAC) on August 25, 2017 for a kick-off meeting and again on October 2, 2017 to identify the vision for AC Transit and the goals for the Facility Utilization Plan. A questionnaire was developed after the kick-off meeting to get additional feedback from the TAC members.

Vision

While a formal vision for the next 30 years has not been established by AC Transit, TAC members suggested that:

- AC Transit will be the primary provider of local mobility for residents and workers in the East Bay and provide transbay options to supplement and support BART service.
- AC Transit will provide safe, clean, sustainable, and reliable service.

Goals

Four key goals were identified for the Facilities Utilization Plan, with sub-goals as shown here.

1. **Improve Operational Efficiency and Safety**
    - Improve ability to meet future needs
    - Provide safer traffic flow during pull-in, pull-out, and the nightly service cycle
    - Provide flexibility among all facilities
    - Be resilient in times of emergency (earthquake and flooding)
2. **Create Better Work Environment**
3. **Plan Must Be Implementable Without Interrupting Service**
4. **Environmental, Social, and Financial Sustainability**
    - Meet 100% zero emissions bus requirements by 2040
    - Incorporate environmentally sustainable features into sites and buildings
    - Add value to surrounding community
    - Minimize operating cost
    - Improve cost effectiveness
    - Identify revenue generating opportunities where appropriate

CURRENT FLEET

Exhibit 1.3 details AC Transit's Current Fleet Distribution (as of August, 2017). Note that on row 24, the fleet distribution as of January, 2019 is shown. AC Transit has shifted buses between divisions since the project was initiated. While this may cause marginal differences in the assessments, it does not impact the overall results or the recommendations set forth herein.

Exhibit 1.3: Current Fleet Distribution (as of August, 2017)

	A	B	C	D	E	F	G	H	I	J	K
1							Distribution				
2	**Length**	**Fuel**	**Series**	**Series Range**	**Make**	**Year**	**D2**	**D3**	**D4**	**D6**	**Total**
3	40	Diesel	1000	1004 - 1110	Van Hool	2003	32	12	47		**91**
4	40	Diesel	1200	1201 - 1225	Van Hool	2008	4			21	**25**
5	40	Diesel	1200	1226 - 1227	Van Hool	2009				2	**2**
6	40	Diesel	1300	1301 - 1365	Gillig	2012	32		33		**65**
7	40	Diesel	1400	1401 - 1468	Gillig	2014			27	41	**68**
8	40	Diesel	1500	1501 - 1555	Gillig	2016	15	23	17		**55**
9	40	Diesel	1550	1556 - 1580	Gillig	2016	25				**25**
10	40	Diesel	1580	1581 - 1590	Gillig	2017	2				**2**
11	40	Diesel	2000	2001 - 2056	Van Hool	2003	3		25		**28**
12	40	Diesel	2100	2101 -2110	Van Hool	2006				10	**10**
13	40	Diesel	2150	2151 - 2165	Van Hool	2006				14	**14**
14	40	Diesel	2190	2191 - 2199	Van Hool	2009				9	**9**
15	40	Diesel	2200	2201 - 2223	New Flyer	2013			18	5	**23**
16	40	Diesel	3500	3501 - 3510	El Dorado	2014			4	6	**10**
17	40	Diesel	Fc	0004 - 0016	Van Hool	2010	4		9		**13**
18	40	Diesel	5000	5001 - 5051	Van Hool	2006	26			25	**51**
19	40	Diesel	5100	5101 - 5139	Van Hool	2009	22			17	**39**
20	40	Diesel	6000	6000 - 6040	MCI	2000			7		**7**
21	40	Diesel	6000	6041 - 6079	MCI	2002	15	12	3	9	**39**
22	40	Diesel	6100	6101 - 6154	Gillig	2014	7	14	22	11	**54**
23				**Total (August, 2017)**			**187**	**61**	**212**	**170**	**630**
24				**Total (January, 2019) (Note 1)**			**171**	**109**	**202**	**155**	**637**

Note 1: *Total (January, 2019) for D3 includes 10 double decker buses*
Totals (January, 2019) for each Division are used in calculations for capacity shown on Exhibits ES.2 and 2.2.

FLEET PROJECTIONS AND DISTRIBUTION

The size of maintenance and operations facilities is directly related to the size and mix of the fleet assigned to each facility. AC Transit has developed two fleet growth scenarios for the next 30 years – high fleet growth and low fleet growth. Both scenarios show that by 2040, the entire fleet will be zero emission buses utilizing either hydrogen fuel cell technology or electric bus technology. The high fleet growth scenario shows the fleet growing from 630 buses to 912 buses, representing almost 45% growth over the next 30 years. The low growth scenario shows the fleet growing from 630 buses to 674 buses, representing about 7% growth over the same period. The detailed breakdown of the projected fleets is shown in Volume 1, Chapter 1.

Fleet Projections

- Assume 100% ZEB by 2040 with flexibility to accommodate both battery electric buses and fuel cell electric buses
- Low Growth and High Growth Scenarios for next 30 years
- Accommodate different size buses including articulated and double deck buses

The basis for the low growth and high growth scenarios is shown below. Exhibit 1.4 shows the two fleet growth projections.

Low Growth Scenario (674 buses)

- Fiscally constrained
- Year 2040 regional population and employment projections not met
- Ridership on Major Corridors remains strong, but ridership on local routes may decline or grow slowly
- Transbay ridership remains strong
- Ridership growth is accommodated using larger buses

High Growth Scenario (912 buses)

- Year 2040 regional population and employment projections are met
- All Major Corridor enhancements are realized
- 2040 ridership will grow steadily along major corridors while local and crosstown routes show slower growth
- Significant growth in Transbay ridership
- Ridership growth is accommodated using a combination of larger buses and more peak buses

The fleet (based on the high growth scenario) is projected to be distributed as follows:

- North Area served by D3 (100 to 150 buses)
- Core Area served by D2 (250 to 300 buses) and D4 (450 to 500 buses)
- South Area served by D6 (170 buses)

The north and south areas are projected to have flat demand, while the core area is projected to have strong demand.

Fleet Distribution

The initial focus of the plan is in the core areas (D2 and D4) to maximize impact

Exhibit 1.4: Fleet Growth Scenarios

High Fleet Growth

								5 years					10 years	15 years	20 years			25 years	30 years
	Coach Type	Fuel	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	2037	2040	2042	2047
1	30-foot	D	90	90	52	51	39	37	37	37	37	37	37	37	0	0	0	0
2	40-foot	D	362	335	373	373	385	400	406	412	418	418	418	255	45	0	0	0
3	40-foot	H	25	29	29	29	29	29	29	29	29	29	29	0	0	0	0	0
4	40-foot	E	0	5	5	5	5	5	5	5	5	20	31	100	166	202	202	202
5	40-foot	FC	13	23	23	23	23	23	23	23	23	23	23	125	250	271	271	271
6	42.5-foot double decker	D	0	15	25	25	25	25	52	52	52	52	52	27	27	0	0	0
7	42.5-foot double decker	E	0	0	0	0	0	0	0	0	0	0	0	100	180	207	207	207
8	45-foot	D	46	36	26	27	27	27	0	0	0	0	0	0	0	0	0	0
9	60-foot	D	84	80	80	80	80	80	77	73	73	59	59	0	0	0	0	0
10	60-foot (BRT)	H	0	27	27	27	27	27	27	27	27	27	27	27	0	0	0	0
11	60-foot	E	0	0	0	0	0	0	0	0	0	0	0	64	127	180	180	180
12	60-foot	FC	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
13	Cut-away (< 26-foot)	D	10	10	10	10	10	10	15	15	15	15	15	0	0	0	0	0
14	Cut-away (< 26-foot)	E	0	0	0	0	0	0	0	0	0	0	0	30	44	52	52	52
15	**TOTAL**		**630**	**651**	**651**	**651**	**651**	**664**	**672**	**674**	**680**	**681**	**692**	**765**	**839**	**912**	**912**	**912**
16	% growth over 2017			3.3%	3.3%	3.3%	3.3%	5.4%	6.7%	7.0%	7.9%	8.1%	9.8%	21.4%	33.2%	44.8%	44.8%	44.8%

Low Fleet Growth

								5 years					10 years	15 years	20 years			25 years	30 years
	Coach Type	Fuel	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	2037	2040	2042	2047
17	30-foot	D	90	90	52	51	39	37	37	37	37	37	37	37	0	0	0	0
18	40-foot	D	362	335	373	373	385	400	412	412	417	382	357	292	52	0	0	0
19	40-foot	H	25	29	29	29	29	29	29	29	29	29	29	0	0	0	0	0
20	40-foot	E	0	5	5	5	5	5	5	5	5	30	50	110	151	151	151	151
21	40-foot	FC	13	23	23	23	23	23	23	23	23	23	23	23	202	202	202	202
22	42.5-foot double decker	D	0	15	25	25	25	25	25	25	25	25	0	0	0	0	0	0
23	42.5-foot double decker	E	0	0	0	0	0	0	27	27	27	46	76	95	120	148	148	148
24	45-foot	D	46	36	26	27	27	27	0	0	0	0	0	0	0	0	0	0
25	60-foot	D	84	80	80	80	80	80	68	68	68	59	59	0	0	0	0	0
26	60-foot (BRT)	H	0	27	27	27	27	27	27	27	27	27	27	0	0	0	0	0
27	60-foot	E	0	0	0	0	0	0	0	0	0	0	0	87	110	134	134	134
28	60-foot	FC	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
29	Cut-away (< 26-foot)	D	10	10	10	10	10	10	10	10	15	15	15	0	0	0	0	0
30	Cut-away (< 26-foot)	E	0	0	0	0	0	0	0	0	0	0	0	30	39	39	39	39
31	**TOTAL**		**630**	**651**	**651**	**651**	**651**	**664**	**664**	**664**	**674**	**674**	**674**	**674**	**674**	**674**	**674**	**674**
32	% growth over 2017			3.3%	3.3%	3.3%	3.3%	5.4%	5.4%	5.4%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
33	High - Low		0	0	0	0	0	0	8	10	6	7	18	91	165	238	238	238

34 ***Fuel types: D = Diesel E = Electric FC = Fuel Cell H = Diesel-Electric Hybrid***

Technology Neutral Plan

While the Plan assumed that AC Transit will operate certain percentage of battery electric buses (BEBs) and fuel cell electric buses (FCEBs) for a purpose of cost estimating, the Plan is technology neutral (i.e. the Plan will accommodate diesel and any zero emission bus techniology). One of the Plan goals is providing flexibility and supporting all fleet types. The Plan, as shown in Exhibit 1.5, will accommodate all bus technologies in four key areas – bus parking, maintenance, fuel and wash, and infrastructure. The design phase for each Division redevelopment project will determine specific design and cost estimates after the District selects ZEB technologies and fleet mix. As discussed in Section 9, Next Steps, establishing ZEB fleet mix is one of the first tasks after approval of the Final Report. This will allow redevelopment design of D4 to reflect AC Transit's ZEB fleet mix.

Per the California Air Resources Board (CARB) enacted the Innovative Clean Transit (ICT) rule, AC Transit is required to submit a ZEB Rollout Plan that has been approved by their governing board by July 1, 2020. Thus, AC Transit will have more accurate fleet mix projection during the D4 redevelopment design phase.

Note that the Plan also provides flexibility to accommodate a range of vehicle sizes including 26-foot, 30-foot, 40-foot, 45-foot, and 60-foot and double deck buses.

Exhibit 1.5: All Bus Technologies Accommodated

Flexible Plan Accommodates All Bus Technologies	
Key Area	Brief Discussion
Bus Parking	Bus footprints are essentially the same regardless of bus technology (i.e. parking spaces and bus circulation is the same across technologies). All bus parking spaces are planned to be 14-feet wide, which will accommodate a) exercising wheelchair ramps in-place during required pre-trip inspections; b) BEB charging stations, if necessary, and c) columns to support employee parking deck above bus parking.
Maintenance	The Plan recommends eventual replacement of all maintenance facilities. New maintenance facilities are planned to accommodate any bus technology in any repair bay.
Fuel and Wash	Regardless of bus technology, the bus interior must be cleaned every day on every bus. This is accomplished in the fuel lanes and the Plan includes the number of fuel lanes required to accommodate a 6 to 7-minute dwell time for interior cleaning of each bus.
Infrastructure	The Plan includes space to accommodate bus technology infrastructure whether it is battery electric bus (transformers, switchgear, etc.), fuel cell electric bus (hydrogen storage, compressors, etc.), or diesel (fuel storage tanks). Changing bus technologies assumptions would change cost estimates. However, the change would represent a small portion of the overall facility redevelopment cost.

Non-Revenue Vehicle (NRV) Fleet

The NRV fleet data included in Exhibits 1.6 and 1.7 is based on the fleet information provided by AC Transit on October 17, 2017.

Exhibit 1.6: NRV Fleet by Location

LOCATION	TOTAL NRV's	% of NRV FLEET
Division 2	13	9%
Division 3	7	6%
Division 4	11	8%
Division 6	12	9%
Central Maintenance Facility (CMF)	49	35%
Operations Control Center (OCC)	23	16%
General Office (GO)	23	16%
Training & Education Center (TEC)	2	1%
TOTAL	**140**	**100%**

Exhibit 1.7: NRV Fleet by Type

NRV TYPE	TOTAL	% of NRV FLEET
CAR/SEDAN	75	54%
VAN	23	16%
TRUCK	42	30%
TOTAL	**140**	**100%**


TRANSIT

EXISTING FACILITY OVERVIEW

During the weeks of September 11, 2017 and October 2, 2017 the WSP team performed site visits and documented the existing conditions of the following AC Transit facilities as well as confirmed the information collected during AC Transit's previous facility studies.

This section contains a brief overview of the following AC Transit facilities:

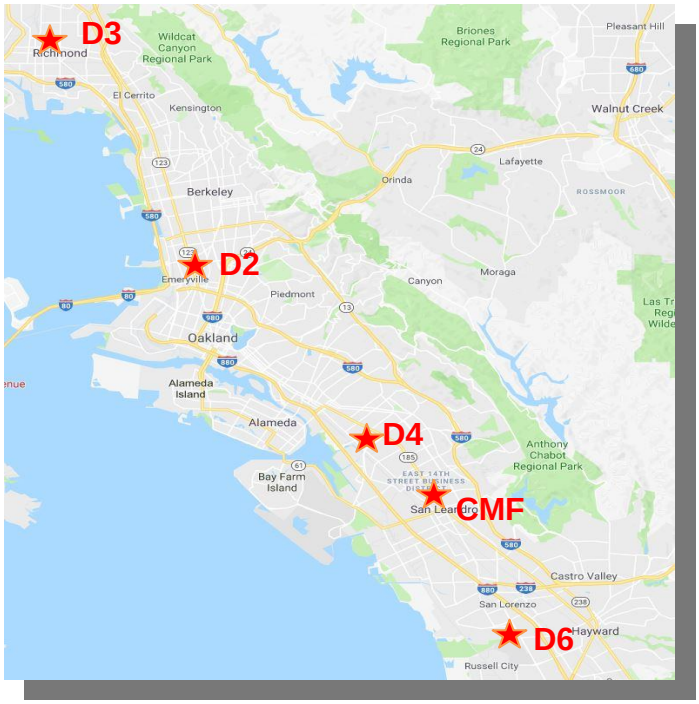
- Division 2: Emeryville (D2)
- Division 3: Richmond (D3)
- Division 4: East Oakland (D4)
- Division 6: Hayward (D6)
- Central Maintenance Facility (CMF)

Exhibit 2.1 shows the location of the AC Transit facilities addressed in this report.

Further detail is provided on the condition of each facility in *Volume 3: Appendix A – Existing Conditions Report*.

Existing site and floor plans for the facilities are present in *Volume 2: Drawings*.

Exhibit 2.1: AC Transit Facilities



EXISTING CONDITIONS

EXISTING FACILTY CAPACITY ANALYSIS

The capacity of modern transit facilities is typically based on four key criteria:

- Maintenance
- Fuel & Wash
- Bus Parking
- Employee Parking

Each of AC Transit's operating divisions and the central maintenance facility (CMF) were evaluated based on the criteria presented in Chapter 3 for the areas above. Exhibit 2.2 summarizes the findings based on number of repair bays, number of fuel position, number of buses that can reasonably be parked on site in 14-foot wide parking lanes with buses stack parked nose-to-tail.

The findings include:

- Number of maintenance bays currently limit capacity at D4 and D6
- Existing fuel & wash facilities not a limiting factor
- Site size and configuration limit bus parking capacity at D3
- Employee parking not a limiting factor if structured parking can be considered

Exhibit 2.2: Existing Facility Capacity

Facility	CAPACITY				Actual Buses Assigned (January, 2019)	Over / (Under) Capacity
	Maintenance	Fuel & Wash	Bus Parking (14' wide)	OVERALL		
D2 *	180	300	147	**147**	**171**	**24**
D3	130	300	90	**90**	**109**	**19**
D4	160	300	262	**160**	**202**	**42**
D6	170	300	200	**170**	**155**	**(15)**
Total	**640**	**1,200**	**699**	**567**	**637**	**70**
CMF	650			**650**	**637**	**(13)**

** D2 would be operating at capacity if bus parking spaces were at 12-feet wide.*

STORAGE TANKS

There are underground storage tanks (UST's) and above ground storage tanks (AST's) at each division and the CMF for the storage of various fluids including diesel, unleaded gas, motor oil, automatic transmission fluid (ATF), antifreeze, used oil, and used antifreeze. AC Transit keeps records on these tanks as required. Due to the following assumptions, the condition assessment does not address these storage tanks.

- All buses will eventually be zero emission buses and diesel, unleaded gas, and diesel exhaust fluid (DEF) will not be needed in the future.
- Replacement of and/or provision for underground tanks is not included in the Facility Utilization Plan.
- All lubricant storage (engine oil, ATF, antifreeze, used oil, used antifreeze) will be in new above ground storage tanks or drums.

DIVISION 2 - EMERYVILLE

Location: 1177 47th Street, Emeryville, CA 94608

Current Fleet Size (as of August, 2017):

- Diesel 60 foot Artics 3
- Diesel 45 foot Buses 15
- Diesel 40 foot Buses 117
- Hydrogen 40 foot Buses 4
- Diesel 30 foot Buses 48

ROUTES SERVED (as of August, 2017):

7, 12, 18, 19, 29, 33, 36, 51B, 52, 65, 67, 72, 72M, 72R, 79, 80, 81, 88, 96, 376, 399, 604, 605, 606, 680, 802, 851, B, BSD, BSN, C, CB, E, F, J, M, P

Functions at Facility:

- Operations/Transportation
- Maintenance
- Running Repair (lifts)
- Preventive Maintenance (PM) (pits)
- Tire Repair
- Body Repair and Paint
- Upholstery Repair
- Fuel and Wash
- Fare Vault Pull
- Central Dispatch
- Hydrogen Generation and Fueling
- Parts Storage
- Facility Maintenance Offices and Archives
- Transportation and Maintenance Archives

QUANTITIES:

Running Repair Bays	8 (5 std, 3 artic)
PM Bays	4 (2 std, 2 artic)
Body Repair Bays	2 (std)
Paint Booth	1
Fuel (Positions)	6
Wash Lanes	2
Chassis Wash Bays	1 (artic)
Hydrogen Fuel Positions	1
Tire Bays	2
Chassis Dyno Bay	1
Hydrogen Bus Bay	1

EXISTING CONDITIONS

Key Issues Identified (Division 2):

- Seismic / structural issues are being evaluated independently by AC Transit in maintenance, transportation, and employee parking structures.
- Over capacity for existing maintenance bays.
- Hydrogen Generation System and dispenser placement is disruptive to traffic flow in the yard.
- Pavement cracking around perimeter of Maintenance Building due to settlement.
- The pavement over the underground tank farm is extremely uneven.
- Hazardous material storage area in the yard is not covered.
- Maintenance Building walls, ceilings and floors are generally in poor condition.
- Moderate cracking of concrete masonry unit (CMU) walls and double "T" roofs / ceilings. Should be reviewed by structural engineer.
- The main electrical service (2,000 amps at 277/480V) for the facility is fed from an underground PG&E transformer, to the main switchgear room in the lowest basement level of the Maintenance Building. The equipment is old and in need of replacement. The room is subject to flooding, creating a dangerous situation.
- Most electrical panels in the facility are old and in bad shape. Transformers hung in the maintenance areas do not have proper code clearance in front of them. Seismic bracing is required on these transformers as well.
- Existing paint booth is inoperable and not sized for artic buses.
- See Volume 3, Appendix A for full Existing Conditions Report.

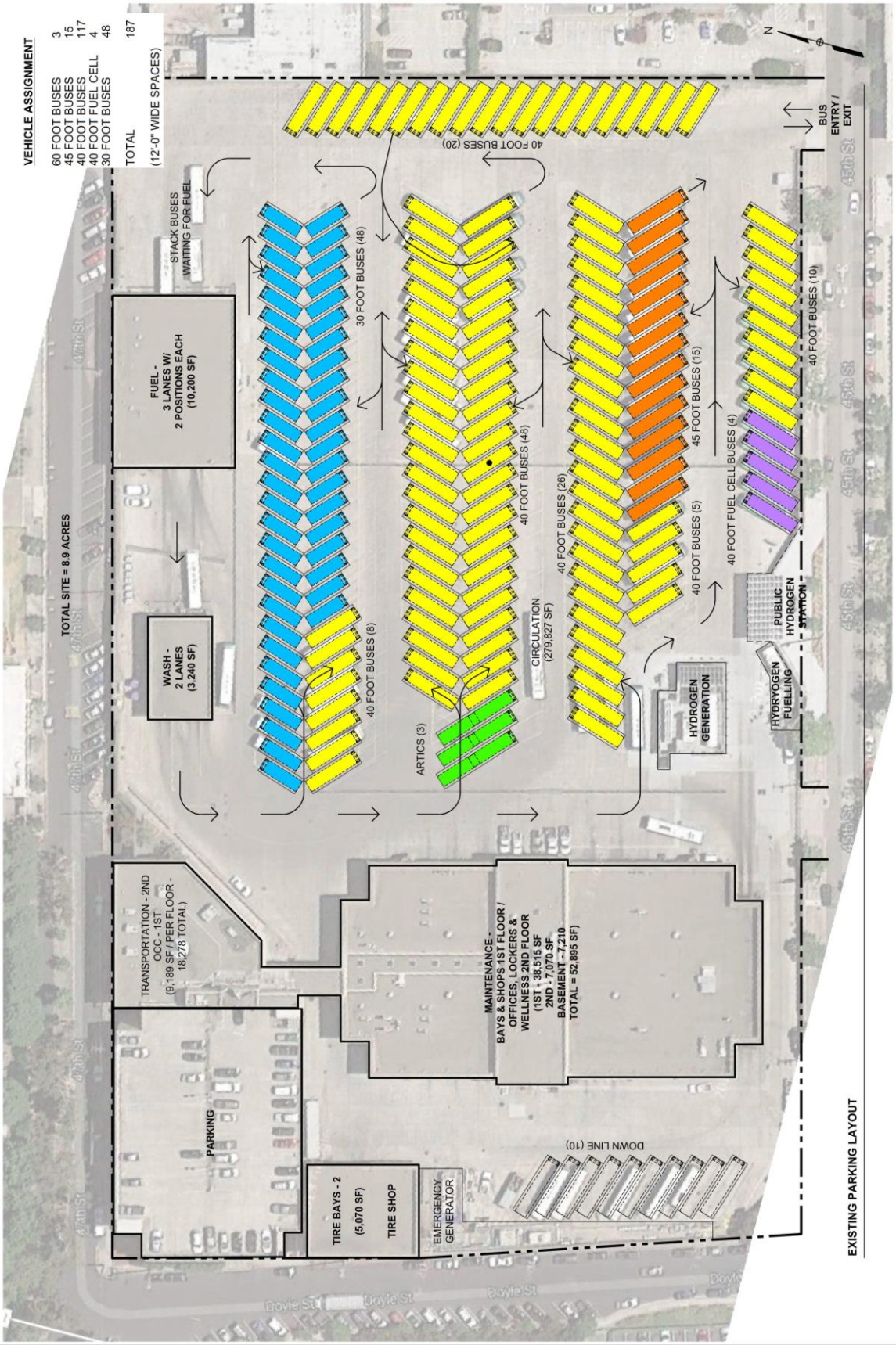
Hydrogen Fueling Infrastructure Investment (Division 2 and Division 4):

The chart below shows the investment AC Transit has made in hydrogen fueling infrastructure.

	Years	Emeryville (D2)	Seminary (D4)
Fueling Stations	2005 - 2015	$10.3 million	$14.3 million
Fueling Station Uprades	2016 - 2019	$3.2 million	
Total		**$13.5 million**	**$14.3 million**

Estimated Useful Life	**Varies by system component**

EXHIBIT 2.3: D2 EXISTING SITE PLAN



EXISTING CONDITIONS

DIVISION 3 - RICHMOND

Location: 2016 MacDonald Ave, Richmond, CA 94801

Current Fleet Size (as of August, 2017):

- Diesel 60 foot Artics 0
- Diesel 45 foot Buses 12
- Diesel 40 foot Buses 49
- Diesel 30 foot Buses 0

ROUTES SERVED (as of August, 2017):

70, 71, 74, 76, 607, 667, 668, 669, 671, 672, 675, 676, 679, 681, 684, FS, G, H, L, LA, LC, Z

Functions at Facility:

- Operations/Transportation
- Maintenance
- Running Repair (lifts)
- Preventive Maintenance (PM) (pits)
- Tire Repair
- Body Repair and Paint
- Upholstery Repair
- Fuel and Wash
- Fare Vault Pull
- Parts Storage
- Facility Maintenance Offices and Archives
- Transportation and Maintenance Archives

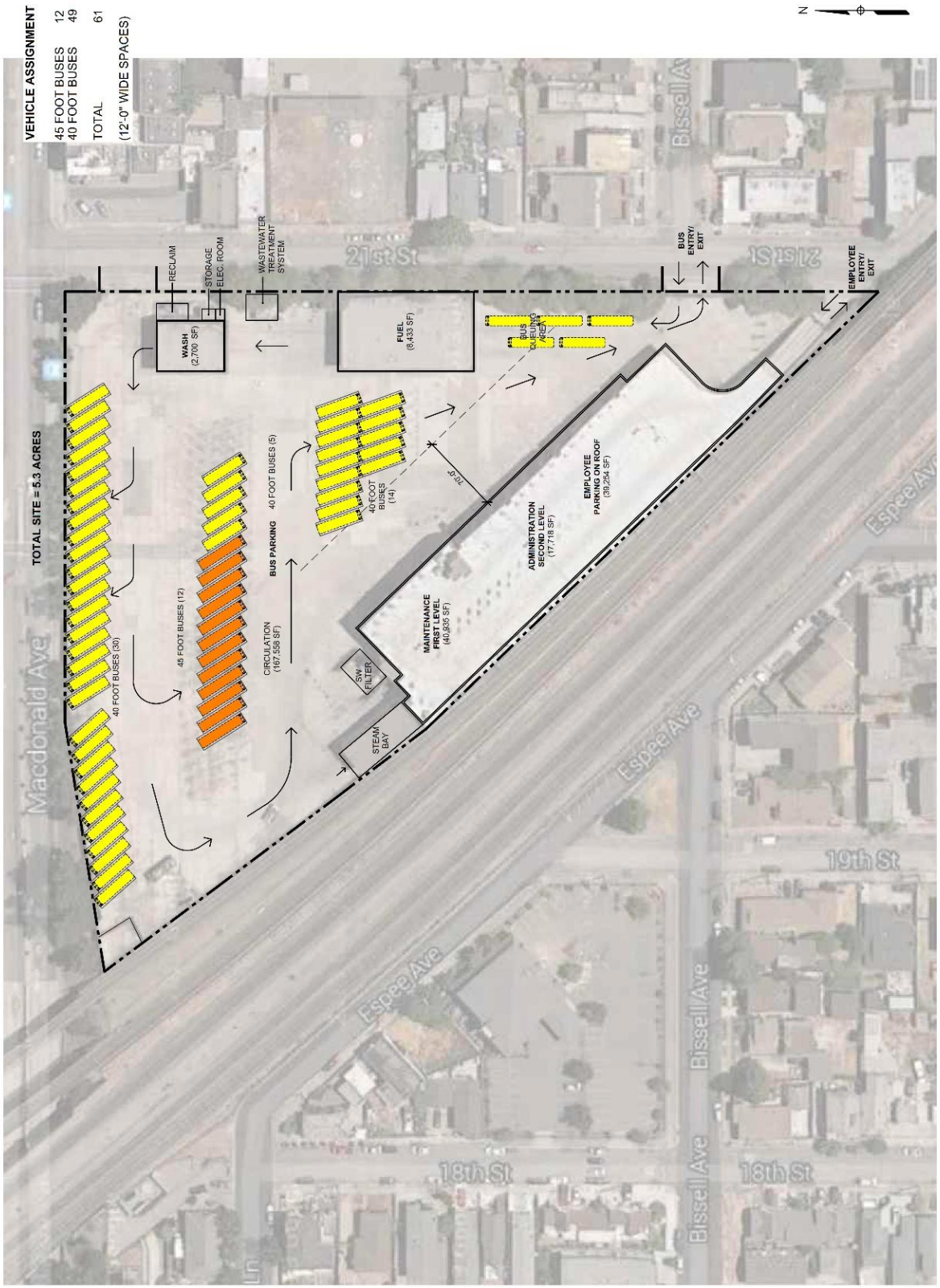
QUANTITIES:

Running Repair Bays	7 (6 std, 1 artic)
PM Bays	3 (3 std, 1 artic)
Body Repair Bays	1 (artic)
Paint Booth	1 (std)
Fuel (Positions)	4
Wash Lanes	2
Chassis Wash Bays	1 (artic)
Hydrogen Fuel Positions	0
Tire Bays	1 (artic)
Chassis Dyno Bay	1 (artic)
Hydrogen Bus Bay	0

Key Issues Identified:

- Site is severely constrained for bus parking expansion.
- Cover over hazardous waste containment area located at northwest corner of site is too small and allows wind-blown rain to enter containment area.
- All inground lifts (Bays 5, 6, 7, 8, 9, 11, 13, and 15) are not in use. Portable lifts are used.
- Floor drains have been disabled in the maintenance pits.
- No spill containment is present in the battery room.
- Underside of exposed corrugated roof deck and structure on Fuel Building require re-painting / corrosion control.
- Water collects under canopy that houses the Novachem system.
- There are no drains at the bus wash exit to carry off water from exiting buses.
- Drag-out of water from bus wash is an issue for storm drains.
- See Volume 3, Appendix A for full Existing Conditions Report.

EXHIBIT 2.4: D3 EXISTING SITE PLAN



EXISTING CONDITIONS

DIVISION 4 – EAST OAKLAND

Location: 1100 Seminary Ave, Oakland, CA 94621

Current Fleet Size (as of August, 2017):

- Diesel 60 foot Artics 43
- Diesel 45 foot Buses 10
- Diesel 40 foot Buses 146
- Hydrogen 40 foot Buses 9
- Diesel 24 foot Buses 6

ROUTES SERVED (as of August, 2017):

14, 20, 21, 39, 40, 45, 46, 46L, 47, 51A, 54, 57, 62, 73, 90, 98, 314, 339, 356, 611, 617, 631, 638, 642, 646, 648, 649, 650, 652, 653, 654, 655, 657, 658, 660, 662, 663, 677, 682, 687, 688, 696, 800, 805, 840, NL, NX, NX1, NX2, NX3, NX4, NXC, O, OX, V, W.

Functions at Facility:

- Operations/Transportation
- Maintenance
- Hydrogen Vehicle Maintenance
- Running Repair (lifts)
- Preventive Maintenance (PM) (pits)
- Tire Repair
- Body Repair and Paint
- Upholstery Repair
- Fuel and Wash
- Fare Vault Pull
- Parts Storage
- Facility Maintenance Shop
- Facility Maintenance Offices and Archives
- Transportation and Maintenance Archives

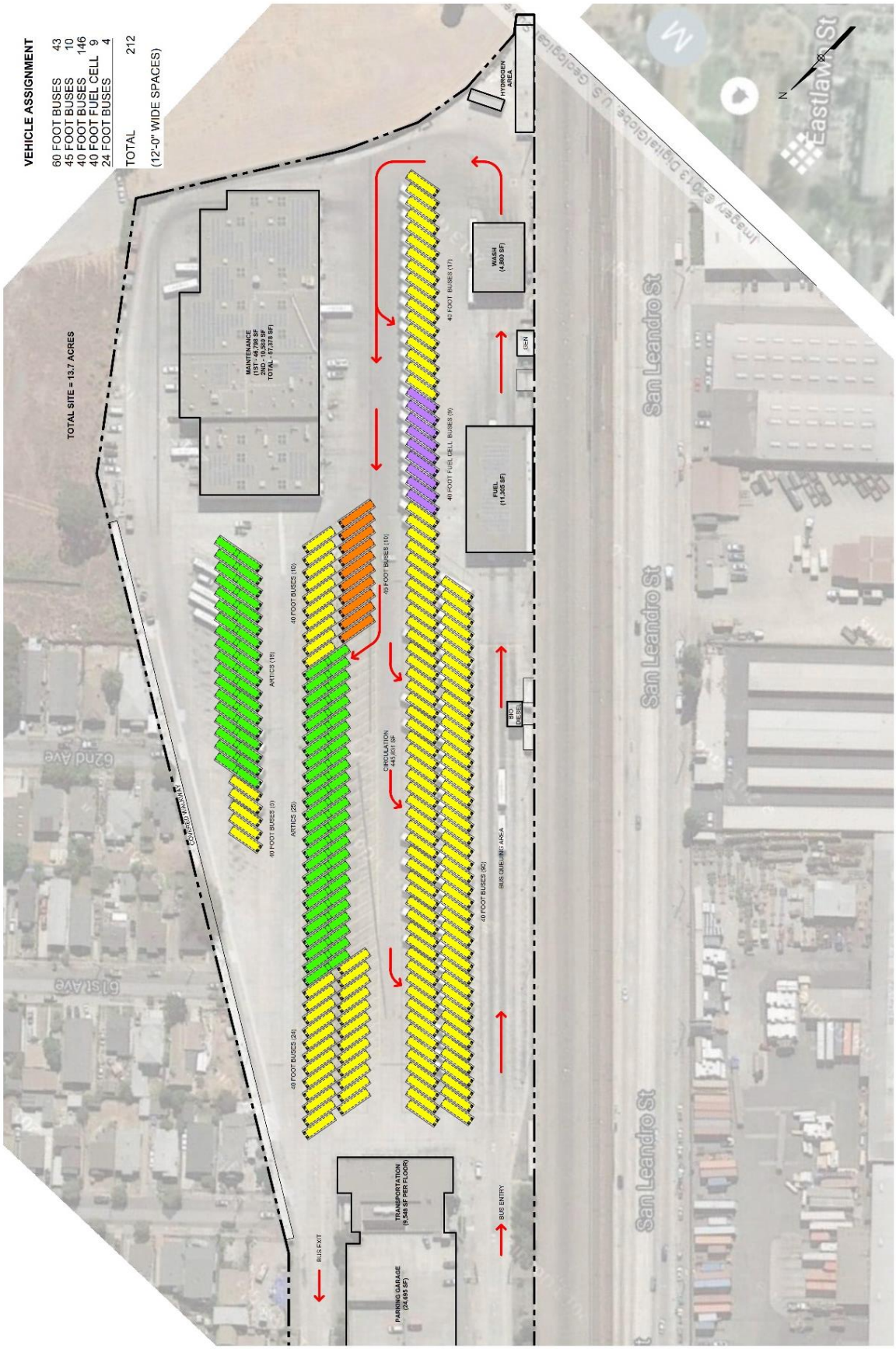
QUANTITIES:

Running Repair Bays	6 (3 std, 3 artic)
PM Bays	4 (2 std, 2 artic)
Body Repair Bays	3 (2 std, 1 artic)
Paint Booth	1 (artic)
Fuel (Positions)	6
Wash Lanes	2
Hydrogen Fuel Positions	2
Chassis Wash Bays	1 (artic)
Hydrogen Service Bays	2 (1 std, 1 artic)
Tire Bays	2 (1 std, 1 artic)
Chassis Dyno Bay	1 (artic)

Key Issues Identified:

- This site does not have any storm water treatment facilities and high groundwater table causes seepage into some of the maintenance pits in the maintenance building.
- Hazardous material storage area is not covered.
- Several photo-voltaic panels (PV) panels are damaged and weeds are growing between panels.
- Existing paint booth and drop table are non-operational.
- Several skylights leak in Transportation Building.
- One of the exterior columns of the Transportation Building, adjacent to parking is significantly damaged.
- Some cracking of slabs and walls throughout Parking Garage.
- Water infiltration of CMU cavity wall is causing significant efflorescence and corrosion (rust) of steel elements in Parking Garage.
- See Volume 3, Appendix A for full Existing Conditions Report.

EXHIBIT 2.5: D4 EXISTING SITE PLAN



EXISTING CONDITIONS

DIVISION 6 – HAYWARD

Location: 1758 Sabre St., Hayward, CA 94545

Current Fleet Size (as of August, 2017):

- Diesel 60 foot Artics 38
- Diesel 45 foot Buses 9
- Diesel 40 foot Buses 75
- Diesel 30 foot Buses 42
- Diesel 24 foot Buses 6

ROUTES SERVED (as of August 2017):

1, 10, 22, 32, 37, 48, 60, 75, 83, 85, 86, 89, 93, 94, 95, 97, 99, 200, 210, 212, 215, 216, 217, 232, 239, 251, 386, 448, 475, 620, 621, 623, 624, 625, 626, 628, 629, 801, M, S, SB, U

Functions at Facility:

- Operations/Transportation
- Maintenance
- Running Repair (lifts)
- Preventive Maintenance (PM) (pits and lifts)
- Tire Repair
- Body Repair and Paint
- Upholstery Repair
- Fuel and Wash
- Fare Vault Pull
- Parts Storage
- Facility Maintenance Building
- Facility Maintenance Offices and Archives
- Transportation and Maintenance Archives
- Training and Education Center

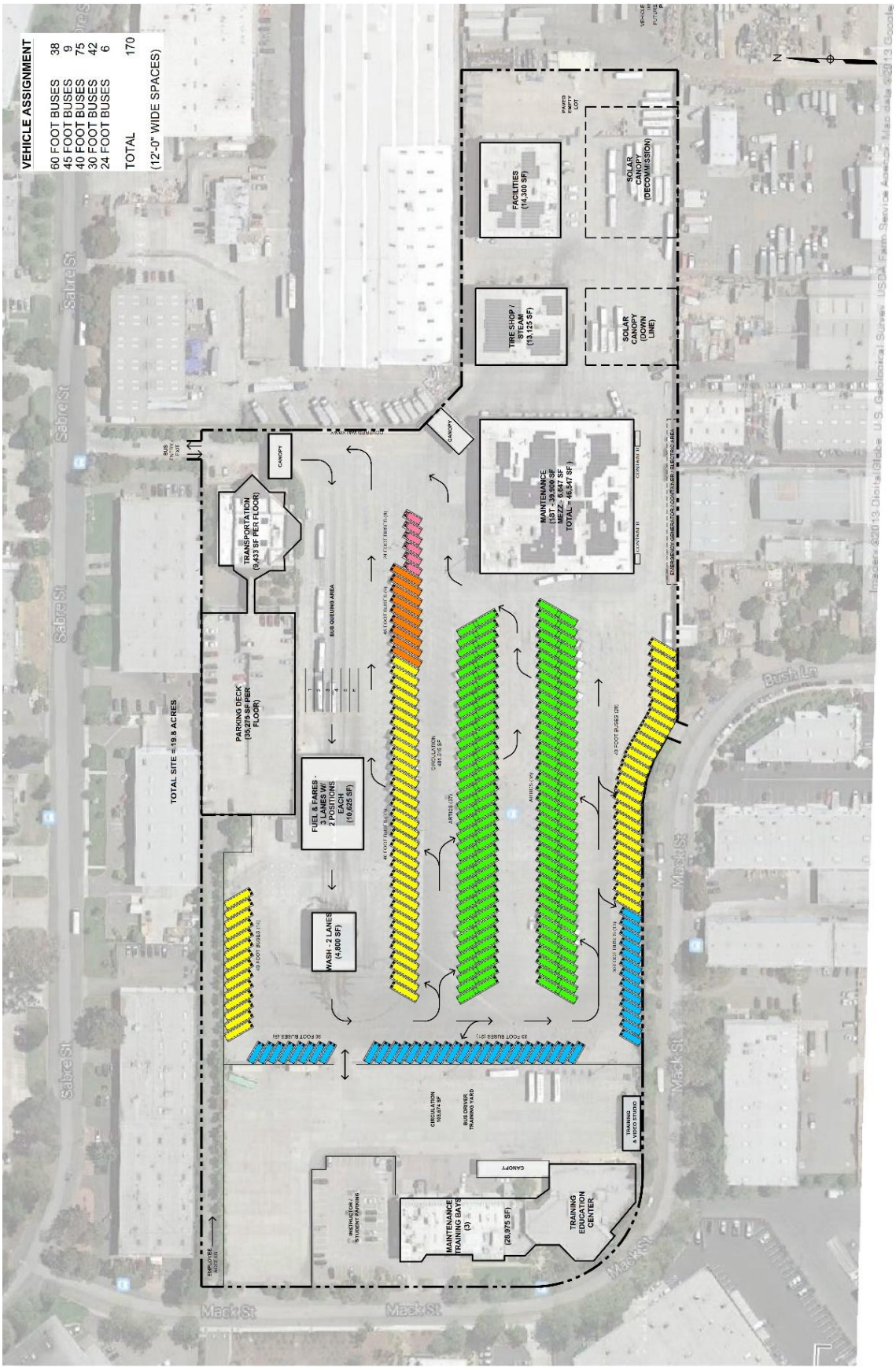
QUANTITIES:

Running Repair Bays	8 (2 std, 6 artic)
PM Bays	6 (4 std, 2 artic)
Body Repair Bays	3 (2 std, 1 artic)
Paint Booth	1 (artic)
Fuel (Positions)	6
Wash Lanes	2
Chassis Wash Bays	1 (artic)
Tire Bays	2 (1 std, 1 artic)
Chassis Dyno Bay	1 (artic)

Key Issues Identified:

- Seismic / structural issues are being evaluated independently by AC Transit in maintenance, transportation, and employee parking structures.
- Majority of inground lifts are not working and portable lifts are currently in use.
- Drop tables in body repair and paint have been locked out.
- Storage systems in parts storeroom are not efficient and are underutilized.
- The equipment in the main electrical room adjacent to the Fuel Building is old and in need of replacement. The main service is 1,600 amps at 277/480 volts. This feeds the entire complex.
- Fuel lane drainage is inadequate.
- Major rusting issues are present on the Fuel Building and Wash Building structures.
- Issues with vehicle speed and visibility at corners in the Parking Garage.
- See Volume 3, Appendix A for full Existing Conditions Report.

EXHIBIT 2.6: D6 EXISTING SITE PLAN



EXISTING CONDITIONS

CENTRAL MAINTENANCE FACILITY (CMF) AND WAREHOUSE

Location: 10626 E 14th Street, Oakland, CA 94545

Current Fleet Size:

- NA

ROUTES SERVED:

Not Applicable

Functions at Facility:

- Heavy Repair Bays
- Diagnostic and Inspection Bays
- NRV Maintenance
- Body Repair and Paint
- Component Repair / Unit Rebuild
- Machine Shop
- Upholstery Repair
- Fuel and Wash
- Central Warehouse Parts Storage
- Facility Maintenance
- Facility Maintenance Offices
- Transportation and Maintenance Archives
- Administrative Offices
- Print Shop

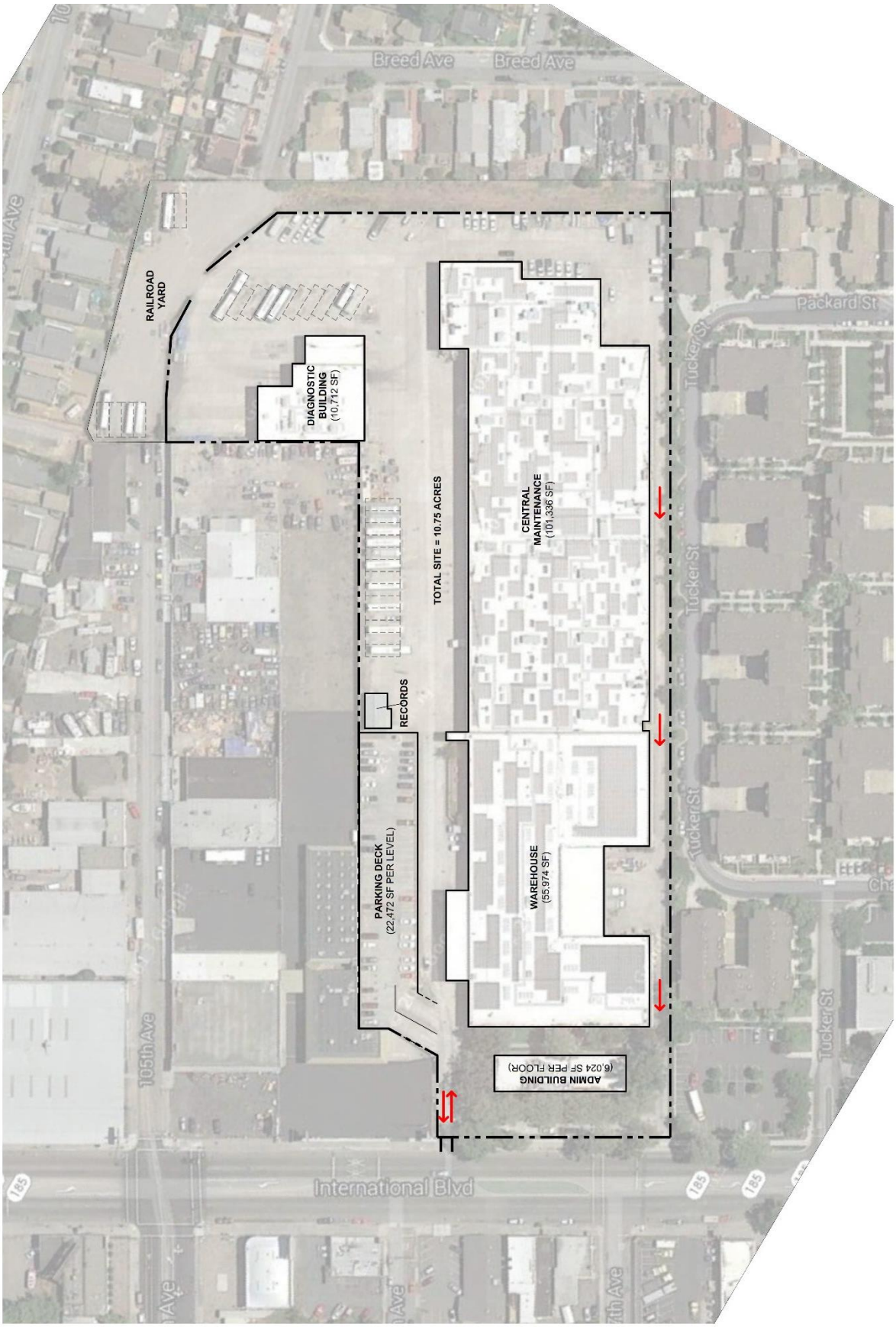
QUANTITIES:

Heavy Repair Bays	10 (7 std, 3 artic)
Body Repair Bays	7 (5 std, 2 artic)
Paint Booth	2 (artic)
Fuel (Positions)	1
Wash Lanes	1
Chassis Wash Bays	1 (artic)
Diagnostic Bays	4 (std)
NRV Bays	3

Key Issues Identified:

- Concrete paving in bus areas is experiencing some localized cracking at the edges of the concrete slab. Patching efforts have been unsuccessful. A pavement survey should be performed.
- This site does not have any permanent stormwater treatment facilities. Flo Gard catch basin inserts are being used to catch debris. However, these inserts do not filter out hydrocarbons such as oil. Some of the perimeter catch basins also have a sock-type filter around their grates.
- Hazardous material storage area is not covered.
- Wash system is not currently operational and water reclamation system has been removed.
- See Volume 3, Appendix A for full Existing Conditions Report.

EXHIBIT 2.7: CMF EXISTING SITE PLAN



EXISTING CONDITIONS

POTENTIAL SITE EXPANSION

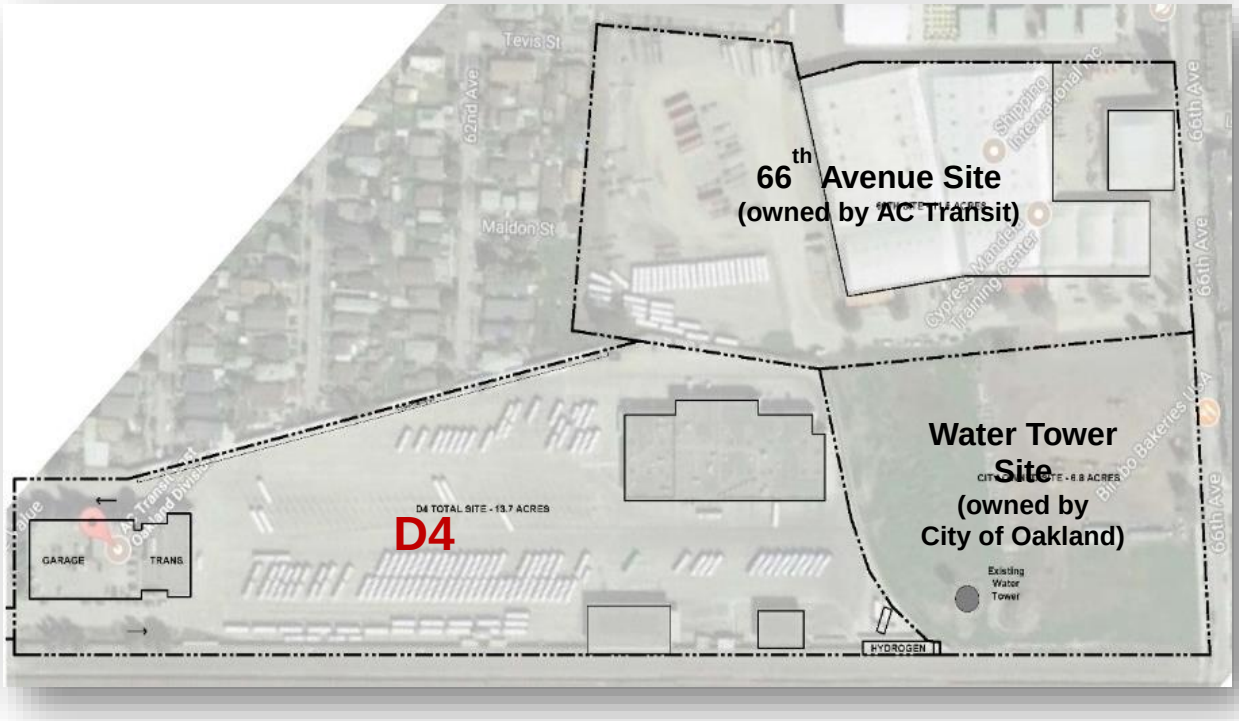
AC Transit owns all divisions. Adjacent property is not readily available for expansion at D2, D3, D6, or the CMF. At D4, however, there are two adjacent parcels that are candidates for expansion as shown in Exhibit 2.8.

Division 4 is currently on a 13.7-acre site with access only from Seminary Avenue.

AC Transit owns an adjacent 11.5-acre site, known as the 66th Avenue site, with access from 66th Avenue. This site has several buildings that are currently leased to various entities. These leases expire in 2021. This site is ideal for expanding Division 4.

The City of Oakland owns an adjacent 6.8-acre site, known as the Water Tower site, with access from 66th Avenue. This site would also be ideal for expanding Division 4.

Exhibit 2.8: D4 and Adjacent Sites




TRANSIT

PROGRAM CRITERIA

The following general criteria were developed, based on discussions with the AC Transit staff and the expertise of the study team, to guide the facility space programming. Note that the purpose of these criteria is to provide adequate space in the master plan. Actual layouts will be refined during design.

Division Size

1. Industry standards generally show the ideal fleet size at each division to be 200 to 250 buses, however this may vary.

Adjacencies

2. Each department will have at least one dedicated meeting space and a coffee counter.
3. Restrooms will be provided for men, women, and gender neutral at each facility.
4. Chassis wash is ideally located adjacent to the bus wash lanes so that all wet areas are co-located, thus simplifying drainage requirements.

Employee Parking

5. Employee parking spaces will be provided for all on-site staff. AC Transit may want to consider reducing this to account for use of alternate forms of transportation.
6. Employee and visitor parking spaces are shown as 10 feet by 20 feet in the program for master planning purposes. Note that this will provide for handicap spaces and landscaping and walkways. Actual parking dimensions must meet authorities having jurisdiction (AHJ) requirements.

Bus Parking

7. All bus parking will be designed with 14-foot wide spaces to allow for wheelchair ramp testing while parked. This will also accommodate electric charging stations in the future.
8. A dedicated “down line” is shown in the program to accommodate vehicles waiting for maintenance. The number of down line spaces typically equates to ten percent (10%) of the fleet assigned to the facility.
9. Whether any portion of bus parking is to be canopy covered will be determined in the future.

Maintenance

10. Maintenance of AC Transit non-revenue vehicles (NRV’s) will be done at the CMF.
11. Body repair and paint facilities will be provided at each maintenance facility
12. Additional criteria are shown in the matrix in Exhibit 3.1 on the following pages.

Exhibit 3.1: General Criteria

(1) Unobstructed vertical clearance (in feet). *Not including bridge cranes, ductwork, lighting, structural, or roof.*

GENERAL CRITERIA

#	Space Name	Dimensions	Area	Ht. (1)	Ratio	Remarks
1	**Repair Bays**					
2	**Preventive Maintenance (Std.)**	20 x 55	1,100	19	1 per 50 buses	Length of vehicle + 5' in front + 10' at rear for workspace
3	**Preventive Maintenance (Artic)**	20 x 75	1,500	19	1 per 50 buses	Add 5 feet to width if bay is next to wall
4	**Running Repair (Std.)**	20 x 55	1,100	19	1 per 20 buses	Length of vehicle + 5' in front + 10' at rear for workspace
5	**Running Repair (Artic)**	20 x 75	1,500	19	1 per 20 buses	Add 5 feet to width if bay is next to wall
6	**Heavy Repair Bay (Std.)**	20 x 55	1,100	19	1 per 65 buses	Length of vehicle + 5' in front + 10' at rear for workspace
7	**Heavy Repair Bay (Artic)**	20 x 75	1,500	19	1 per 65 buses	Add 5 feet to width if bay is next to wall
8	**AC Repair Bay (Std.)**	20 x 55	1,100	19	1 per 100 buses	Length of vehicle + 5' in front + 10' at rear for workspace
9	**AC Repair Bay (Artic)**	20 x 75	1,500	19	1 per 100 buses	Add 5 feet to width if bay is next to wall
10	**Tire Repair Bay (Std.)**	20 x 55	1,100	19	1 per 150 buses	Length of vehicle + 5' in front + 10' at rear for workspace
11	**Tire Repair Bay (Artic)**	20 x 75	1,500	19	1 per 150 buses	Add 5 feet to width if bay is next to wall
12	**Repair Bay Orientation**					
13	**True Drive Through**	Overhead door at each end of bay. Requires bus drive lane on each end. Absolutely ideal from a maintenance perspective, but rarely possible due to cost and space constraints.				
14	**Back-in / Pull-out**	Most typical configuration in the transit industry, even for articulated buses. Allows 10-foot work area behind bus to be accessed by forklift aisle that is shared with either another repair bay or support space (i.e. shops and/or parts storeroom). Provides for better sight lines for supervision. **This configuration is assumed in the space program.**				
15	**Pull-in / Back-out**	Places 10-foot work area behind bus at overhead door, with poor sight lines for supervision. Note that a majority of work is at the back of the bus. This configuration also increases distance to parts storeroom and other support functions.				
16	**Repair Bays Circulation (pedestrian and forklift)**					
17	**10-foot forklift circulation aisle at engine end of repair bay.**					
18	**5-foot pedestrian circulation aisle along side of each repair bay located adjacent to a wall.**					

19 ***** See separate Bus Circulation Criteria***

Exhibit 3.1: General Criteria (continued)

GENERAL CRITERIA

(1) Unobstructed vertical clearance (in feet). *Not including bridge cranes, ductwork, lighting, structural, or roof.*

	Space Name	Dimensions	Area	Ht. (1)	Ratio	Remarks
20	**Body Repair & Paint**					
21	**Body Repair (Std.)**	20 x 55	1,100	19	1 per 100 buses	Length of vehicle + 5' in front + 10' at rear for workspace Add 5 feet to width if bay is next to wall
22	**Body Repair (Artic)**	20 x 75	1,500	19	1 per 100 buses	
23	**Paint Booth (Std.)**	30 x 60	1,800	19	1 per 200 buses (250 at CMF)	Length = length of bus + 10' on each end. Width allows for downdraft booth.
24	**Paint Booth (Artic)**	30 x 80	2,400	19	1 per 200 buses (250 at CMF)	
25	**Paint Prep Bay (Std.)**	30 x 55	1,650	19	1 per paint booth *(in-line with paint booth)*	Length of vehicle + 5' in front + 10' at rear for workspace Add 5 feet to width if bay is next to wall
26	**Paint Prep Bay (Artic)**	30 x 75	2,250	19	1 per paint booth *(in-line with paint booth)*	
27	**Specialty Bays**					
28	**Chassis Wash (Std.)**	25 x 55	1,375	19	1 per facility	Length of vehicle + 5' in front + 10' at rear for workspace 25-foot width due to bay having walls on both sides.
29	**Chassis Wash (Artic)**	25 x 75	1,875	19	1 per facility	

Exhibit 3.1: General Criteria (continued)

GENERAL CRITERIA

(1) Unobstructed vertical clearance (in feet). *Not including bridge cranes, ductwork, lighting, structural, or roof.*

	Space Name	Dimensions	Area	Ht. (1)	Ratio	Remarks
30	**Fuel & Wash**					
31	**Fueling Position**	20 x 75	1,500	16	1 per 75 buses	Assuming a 6 to 7 minute dwell time, 75 buses can be serviced in an 8-hour shift. This includes fueling, fluid check, interior clean, and vault pull.
32	**Bus Washer**	20 x 80	1,600	16	1 per 75 buses	Assuming every bus is washed every day and there is no merging space available between fuel position and bus washer.
33					1 per 150 buses	Assuming every bus is washed every day and there is at least 90 to 100 feet between fuel position and bus washer for merging. **This is the criteria used in the space program plus 10 feet in the length to accommodate an air dryer.**
34	**Detailed Clean Position (Std.)**	20 x 55	1,100	16	1 per 32 buses	To accommodate detailed cleaning of every bus at 5,000 mile intervals for approximately 8 hours per bus. Typically on one shift.
35	**Detailed Clean Position (Artic)**	20 x 75	1,500	16	1 per 32 buses	

36 ***** See separate Bus Circulation Criteria***

Exhibit 3.1: General Criteria (continued)

GENERAL CRITERIA

(1) Unobstructed vertical clearance (in feet). *Not including bridge cranes, ductwork, lighting, structural, or roof.*

	Space Name	Dimensions	Area	Ht. (1)	Ratio	Remarks
37	**Bus & Paratransit Parking**					
38	**Width**					
39	14'-0" wide if drivers (operators) are required to exercise wheelchair lifts or ramps as part of the pre-trip inspection. This width also will accommodate electric bus charging stations and column placement between buses in the bus parking area (if a canopy cover or parking deck is provided over bus parking). ***This is the criteria used in the proposed program.***					
40	12'-0" wide is industry standard (if wheelchair lifts or ramps are not exercised in the bus parking area).					
41	**Length**					
42	Length of vehicle + 5-feet at engine end of vehicle (rear for transit buses)					
43	Typically standardize bus parking for 40-foot and 60-foot vehicles to provide flexibility.					
44	**Height**					
45	14-foot unobstructed vertical clearance to accommodate tallest legal vehicle on the road (i.e. 13'-6" tall).					

Exhibit 3.1: General Criteria (continued)

GENERAL CRITERIA

(1) Unobstructed vertical clearance (in feet). *Not including bridge cranes, ductwork, lighting, structural, or roof.*

	Space Name	Dimensions	Area	Ht. (1)	Ratio	Remarks
46	**Bus Circulation ****					
47	Minimum 65-foot wide drive aisle will accommodate a 90 degree rolling turn for buses of all lengths (30', 40', 45', and 60').					
48	Ideally provide wider drive aisle (70-foot to 80-foot) for access to maintenance bays, fuel positions, and bus washers, to accommodate a 90 degree rolling turn and protective bollards.					
49	Provide periodic By-Pass Lane parallel to direction of buses that is 20-feet wide. Assume one By-Pass Lane on each side of bus parking. Coordinate with AHJ for location.					
50	Bus Circulation Factor is dependent on bus parking configuration. ***The bus circulation factor used in bus parking in the proposed space program is 75%, which assumes stack parking (nose to tail).***					
51	***** Applies anywhere buses are circulating (into or from repairing bays, bus parking, fuel & wash, etc.)***					
52	**Circulation Allocation (not including Bus Circulation)**				**All include pedestrian circulation + wall thickness + structure.** ***Does not include vertical circulation (ramps, stairs, elevators).***	
53	Office Space, Employee Facilities, Shared Facilities				30%	
54	Shop & Workspace, Body Repair & Paint				20%	Includes forklift circulation aisle
55	Parts Storeroom, Fuel & Wash				10%	

SPACE PROGRAM

The Preliminary Space Program presented in this chapter was developed based on AC Transit staff responses to a programming questionnaire developed by WSP, interviews with various stakeholders regarding the functional requirements and operating characteristics of the facilities, and the criteria presented in the previous pages.

The space requirements shown for each function are net usable area. A grossing factor is applied to the total net usable area to arrive at a gross square footage requirement. The factor includes circulation, mechanical and electrical chases, structure, width of walls, stairs, and elevators.

The program begins with a summary (pages 3.9 through 3.11) followed by a detailed program for the following functions:

- Typical Operating Facility (Divisions) (Exhibit 3.2)
- Central Maintenance Facility (Exhibit 3.3)

  Note that space for the CMF must be reviewed (about 2027) after gaining more experience with zero emission bus maintenance requirements to confirm space needs
- Facility Maintenance (Central) (Exhibit 3.4)
- Training and Education (Exhibit 3.5)
- Protective Services (Exhibit 3.6)

The space program provides key information on staffing and space requirements to be used in the development of facility alternatives to meet the current and long-term needs for AC Transit maintenance and operations facilities. The program for the operating facilities shows the projected space requirements for facilities to support fleets of 100, 150, 200, 250, 300, and 400 buses. The programs for the central maintenance facility, facility maintenance (central), training and education, and protective services show the space requirements to support the projected low growth scenario (674 buses) and the high growth scenario (912 buses) for 30 years (2047).

The requirements for zero emission bus (ZEB) supporting infrastructure are included in the detailed space program and have been coordinated with the ZEB Bus Study.

Note that the recommended space program for the divisions is only slightly different from the current square footage in relation to the number of buses at the division. The plan recommends more efficient use of space.

Recommended Space Program

- ✓ Similar to existing square footage at each division in relation to the number of buses at the division.
- ✓ More efficient use of space

SPACE PROGRAM

Exhibit 3.2: Typical Operating Facility

(see Volume 3, Appendix B for detail)

	100 Buses	150 Buses	200 Buses	250 Buses	300 Buses	400 Buses
OPERATING FACILITY STAFFING SUMMARY						
Transportation (including Drivers)	227	338	446	555	675	892
Bus Maintenance	34	47	59	72	92	115
Body Repair & Paint	4	6	8	10	12	17
Parts Storeroom	5	5	6	6	8	8
Fuel & Wash	13	19	25	31	38	50
Facility Maintenance (Division)	7	8	11	11	17	22
Security	1	1	2	2	4	4
Total	**291**	**424**	**557**	**687**	**846**	**1,108**
OPERATING FACILITY SPACE PROGRAM SUMMARY						
Building Area	79,148	92,255	107,032	125,569	152,490	185,318
Parking	200,760	292,545	385,580	477,425	580,020	761,640
Subtotal Buildings + Parking	**279,908**	**384,800**	**492,612**	**602,994**	**732,510**	**946,958**
Site Circulation	139,954	192,400	246,306	301,497	366,255	473,479
Stormwater Management	13,995	19,240	24,631	30,150	36,626	47,348
Landscaping & Setbacks	27,991	38,480	49,261	60,299	73,251	94,696
TOTAL SITE AREA* **SF**	**461,848**	**634,920**	**812,810**	**994,940**	**1,208,642**	**1,562,481**
acres	**10.60**	**14.58**	**18.66**	**22.84**	**27.75**	**35.87**

** Assuming all on one level*

Exhibit 3.3: Central Maintenance Facility

(see Volume 3, Appendix B for detail)

		2047 Low Growth	2047 High Growth
1	**CMF STAFFING SUMMARY**		
2	Maintenance Administration	5	5
3	CMF Administration	3	3
4	Heavy Maintenance	22	30
5	Component Rebuild	33	38
6	Body Repair & Paint	17	21
7	NRV Repair	4	6
8	Warehouse (incl. Purchasing & Inventory Control)	26	32
9	Print Shop	6	6
10	Facility Maintenance (Division)	7	7
11	Security	2	2
12	**Total**	**125**	**150**
13	**CMF SPACE PROGRAM SUMMARY**		
14	Building Area **	178,017	210,012
15	Parking	142,640	184,910
16	**Subtotal Buildings + Parking**	**320,657**	**394,922**
17	Site Circulation	160,329	197,461
18	Stormwater Management	16,033	19,746
19	Landscaping & Setbacks	32,066	39,492
20	**TOTAL SITE AREA* SF**	**529,085**	**651,621**
21	**acres**	**12.15**	**14.96**

22 ** Assuming all on one level*

23 *** Existing buildings = 175,000 SF*

Exhibit 3.4: Facility Maintenance (Central)

(see Volume 3, Appendix B for detail)

		2047 Low Growth	2047 High Growth
1	**FACILITY MAINTENANCE (CENTRAL) STAFFING SUMMARY**		
2	Facility Maintenance (Central)	5	5
3	Pole Crew	2	2
4	**Total**	**7**	**7**
5	**FACILITY MAINT. (CENTRAL) SPACE PROGRAM SUMMARY**		
6	Building Area	15,594	15,594
7	Parking	32,400	37,200
8	**Subtotal Buildings + Parking**	**47,994**	**52,794**
9	Site Circulation	11,999	13,199
10	Stormwater Management	2,400	2,640
11	Landscaping & Setbacks	4,799	5,279
12	**TOTAL SITE AREA* SF**	**67,192**	**73,912**
13	**acres**	**1.54**	**1.70**

14 ** Assuming all on one level*

Exhibit 3.5: Training and Education

(see Volume 3, Appendix B for detail)

		2047 Low Growth	2047 High Growth
1	**TRAINING & EDUCATION STAFFING SUMMARY**		
2	Training and Education	22	31
3	Tech Services	5	7
4	Security	1	1
5	**Total**	**28**	**39**
6	**TRAINING & EDUCATION SPACE PROGRAM SUMMARY**		
7	Building Area	36,023	36,177
8	Parking & Training Yard	163,960	168,360
9	**Subtotal Buildings + Parking**	**199,983**	**204,537**
10	Site Circulation	19,998	20,454
11	Stormwater Management	9,999	10,227
12	Landscaping & Setbacks	19,998	20,454
13	**TOTAL SITE AREA* SF**	**249,978**	**255,672**
14	**acres**	**5.74**	**5.87**
15	** Assuming all on one level*		

Exhibit 3.6: Protective Services

(see Volume 3, Appendix B for detail) for detail)

		2047 Low Growth	2047 High Growth
1	**PROTECTIVE SERVICES STAFFING SUMMARY**		
2	Protective Services	32	43
3	**Total**	**32**	**43**
4	**PROTECTIVE SERVICES SPACE PROGRAM SUMMARY**		
5	Building Area	5,473	5,733
6	Parking & Training Yard	27,200	35,600
7	**Subtotal Buildings + Parking**	**32,673**	**41,333**
8	Site Circulation	8,168	10,333
9	Stormwater Management	1,634	2,067
10	Landscaping & Setbacks	3,267	4,133
11	**TOTAL SITE AREA* SF**	**45,742**	**57,866**
12	**acres**	**1.05**	**1.33**
13	** Assuming all on one level*		


TRANSIT

FACILITY ALTERNATIVES

To develop a Facilities Utilization Plan that meets AC Transit's short and long-term needs, the planning team worked closely with the AC Transit staff to develop and evaluate several facility alternatives. Alternatives were developed based on the following (each documented in previous chapters of this report as shown):

- **Goals for the plan** (Volume 1: Chapter 1)
- **Current conditions and capacities of existing facilities** (Volume 2: Chapter 2 and Volume 3: Appendix A)
  - ✓ D3 was recently modernized and reopened and can support up to 100 buses.
  - ✓ D2 is operating over capacity and needs to be replaced.
  - ✓ D4 is operating over capacity and could be expanded by utilizing adjacent AC Transit owned property.
  - ✓ D6 has plenty of property to support its current fleet, but the facilities on-site need to be modernized or replaced.
  - ✓ The CMF and Warehouse will support the fleet for about the next ten years. Actual maintenance requirements for zero emission buses may impact the space requirements of these facilities, so these requirements should be re-evaluated in eight to nine years.
  - ✓ The TEC (currently co-located with D6) needs to expand to meet increased training requirements due to use of zero emission buses, employee attrition, and fleet growth. Instruction spaces (classrooms and vehicle bays) are not adequate to meet demand.

The TEC needs to be relocated to allow redevelopment of D6.

- **Fleet projections through 2047** (Volume 1: Chapter 1)
  - ✓ The current fleet of 630 buses is projected to grow to 674 buses (low growth scenario) and as high as 912 buses (high growth scenario). The Facilities Utilization Plan must accommodate both the low and high growth scenarios to meet the goals, including being implementable without interrupting service.
  - ✓ In addition, the plan needs to accommodate 100% zero emission buses by 2040 with flexibility to accommodate both battery electric buses and fuel cell electric buses. The Facilities Utilization Plan team coordinated with the ZEB Study team.
- **Space program requirements** (Volume 1: Chapter 3 and Volume 3: Appendix B
  - ✓ The space program shows the site and facility requirements for supporting the projected fleet.
  - ✓ The space program confirms that the existing facilities were properly sized for their intended fleet at the time, but need to be upgraded to support the projected fleet and meet the stated goals to improve operational efficiency and safety, create a better working environment, and be sustainable environmentally, socially, and financially.

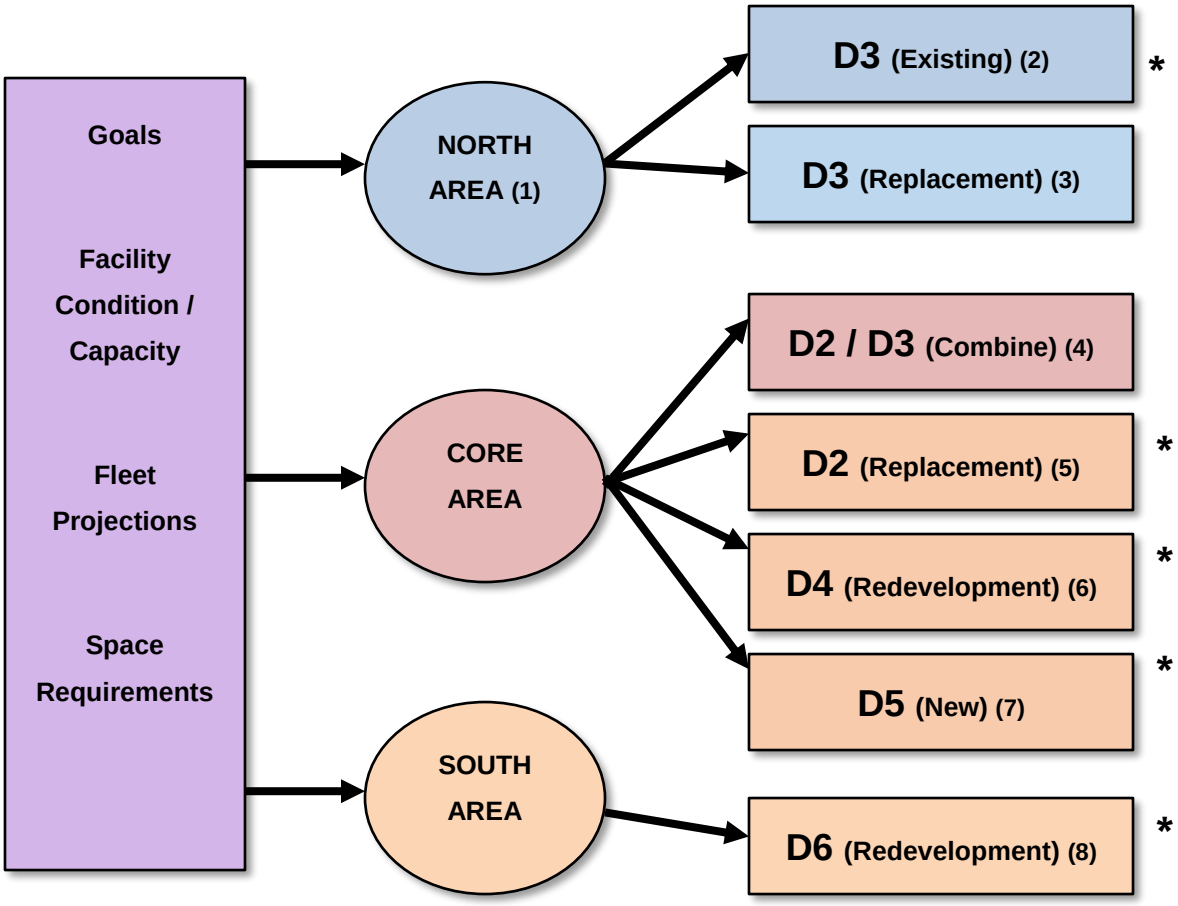
FACILITY UTILIZATION

Fleet distribution was also an important consideration to minimize deadhead cost. The AC Transit planning staff evaluated the fleet growth scenarios and projected the likely distribution of the fleet. Exhibit 4.1 shows the projected distribution of the fleet based on the high fleet growth scenario. Note that demand in the north area (served by D3) and the south area (served by D6) remain relatively flat. The core area (served by D2 and D4) is projected to have strong demand. The initial focus of the plan is in the core area to maximize impact.

Exhibit 4.1: Project Fleet Distribution

The planning team worked closely with the TAC (including the AC Transit Real Estate Manager) and other key AC Transit staff to develop a range of facility alternatives. These alternatives were reviewed and evaluated to determine the most appropriate alternatives to advance for further development. Exhibit 4.2 illustrates the process used to develop and evaluate the alternatives.

Exhibit 4.2: Facility Alternatives Process



* = Initial Recommendation

(1) Evaluate needs in 2030 /2031

(2) Existing will accommodate up to 100 buses

(3) Replace if fleet served grows beyond 100 buses or in response to other considerations. Current fleet projections indicate that the existing D3 facility will accommodate the fleet for at least 15 years.

(4) A site was identified for this option, but is no longer available. This option could be considered if an appropriate site can be acquired to accommodate 250 to 300 buses. This may require a new D5.

(5) To accommodate 250 to 300 buses plus the Training and Education Center (TEC)

(6) Utilizing AC Transit owned 66th Avenue site to accommodate 250 to 300 buses

(7) Utilizing the Water Tower site adjacent to D4 to accommodate 250 buses. Only for high fleet growth.

(8) Relocate the TEC to D2 Replacement site and redevelop to accommodate 170 buses (with or without the Central Maintenance Facility and Warehouse)

FACILITY UTILIZATION

Exhibit 4.3 shows the fleet size and mix for various facility alternatives that were identified to support the projected high growth scenario fleet. Note that the low growth scenario fleet projections can be accommodated through phased implementation of various alternatives.

Division 2 (D2) could have some overlap with D3 and D4, however in this exhibit, D2 is shown under the north area alternatives because one alternative would be to combine D2 and D3 on a new site. If these divisions are combined (Alternative N3), then D4 would need to be redeveloped and a new D5 would need to be developed (Alternative C2).

The recommendation is to develop Alternatives N1, C2, and S1 with D4 being initially redeveloped into the adjacent AC Transit owned site known as the 66th Avenue site. The new D5 would be developed if the water tower site can be acquired and if actual fleet expansion warrants the additional capacity. D3 would be replaced if actual fleet expansion warrants the additional capacity.

Exhibit 4.3 Facility Alternatives

BEB = Battery Electric Bus *FCEB = Fuel Cell Electric Bus*

Bus Type	Projected Fleet 2047	NORTH AREA ALTERNATIVES					CENTRAL AREA ALTERNATIVES			SOUTH AREA
		Alternate N1		Alternate N2		Alternate N3	Alternate C1		Alternate C2	Alternate S1
		D3 (Existing)	D2 (Replacement)	D3 (Replacement)	D2 (Replacement)	Combine D2/D3	D4 + 66 (Redevelop)	New Site	D4 /D5	D6 (Redevelop)
40-foot BEB	202	50	70	34	54	67	78	21	112	40
40-foot FCEB	271	0	80	45	75	90	104	29	150	54
42.5-foot double decker	207	15	105	30	90	62	57	79	136	13
60-foot BEB	180	36	22	36	22	42	50	64	110	27
Cut-away BEB (<26-foot)	52	0	14	3	11	10	5	1	6	31
TOTAL	912	101	291	148	252	271	294	194	514	165
Projected Number of Buses per Area		392		400		271	488		514	165+
						With C2				

Conceptual site layouts for the alternatives are presented on the following pages along with a brief description of each alternative. Please also refer to the Executive Summary for additional information about the preferred alternative layouts. Note that larger versions of site plans shown in this section may be found in Volume 2.

While not part of the Facility Utilization Plan scope, AC Transit's Executive Team asked that consideration be given to relocating the General Office (GO), potentially collocating it with an operating division. AC Transit projected the GO would need 120,000 square feet and employee parking for up to 500 vehicles. If the GO is relocated to an operating division, it appears to be most feasible at a replacement facility for D2.

DIVISION 2 (Emeryville)

Recommended Action: All alternatives recommend replacing the Division 2 site and facilities based on the following Key Deficiencies:

RECOMMENDATION:

Replace D2 on a new site with approximately 28 acres.

Key Deficiencies

- Division 2 is currently operating a fleet at approximately 44% higher than its designed facility capacity supports.
- Congestion on the site and the condition of the on-site structures do not facilitate cost effective renovation or expansion.
- The space on the site is insufficient for workaround plans and phasing to allow for operations to continue uninterrupted while large scale construction occurs on the site.

Alternatives N1 and N2: D2 Replacement
(on new site for about 300 buses with TEC)

(See Exhibits 4.4 and 4.5)

- Continue operations at D2 while pursuing a new property to replace D2 facilities and operations to serve an ultimate fleet of 300 buses.
- Continue operations at the existing Training and Education Center (TEC) until the new D2 site is developed.
- The site could be a candidate for relocation of the General Office (GO), which would be on four floors located above Transportation.
- Employee parking would be on a parking deck above bus parking. If the GO is located on this site, an additional parking level would be needed.
- The 28-acre site shown is in the Port area bounded by Maritime Street and Burma Road. While this site may no longer be available, the layout serves as a "test fit" of the space program and confirmed the site size required and the impact of site configuration / geometry.

N1 Fleet Size & Mix at D2:	
40-foot BEB	70
40-foot FCEB	80
42.5-foot BEB	105
60-foot BEB	22
Cut-Away BEB	14
TOTAL	**291**

N2 Fleet Size & Mix at D2:	
40-foot BEB	54
40-foot FCEB	75
42.5-foot BEB	90
60-foot BEB	22
Cut-Away BEB	11
TOTAL	**252**

Alternative N3: Combined D2 / D3
(on new site for about 300 buses)

(See Exhibit 4.6)

- Continue operations at D2 and D3 while pursuing a new property to combine both divisions on one site to serve a fleet of 300 buses.
- Employee parking shown at grade, but could be on a deck over bus parking if the site was more constrained.
- This alternative requires Central Alternative C2.
- The 24.5-acre site shown is owned by the UC Regents located on Regatta Boulevard. While this site is no longer available, the layout serves as a "test fit" of the space program and confirmed the site size required and the impact of site configuration / geometry.

N3 Fleet Size & Mix at D2/D3:	
40-foot BEB	67
40-foot FCEB	90
42.5-foot BEB	62
60-foot BEB	42
Cut-Away BEB	10
TOTAL	**271**

Exhibit 4.4: D2 Replacement (Alternatives N1 and N2 – Ground Level)

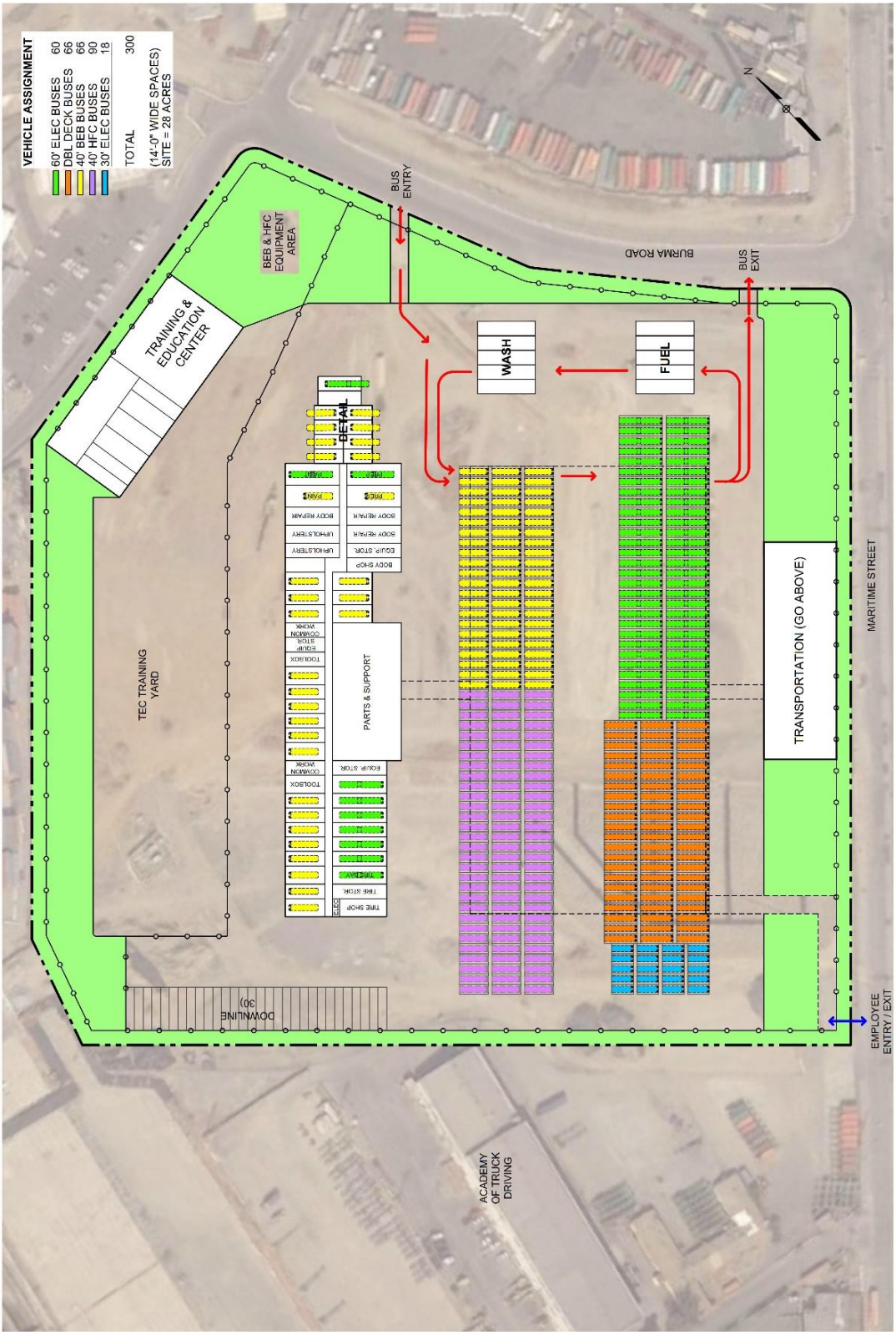
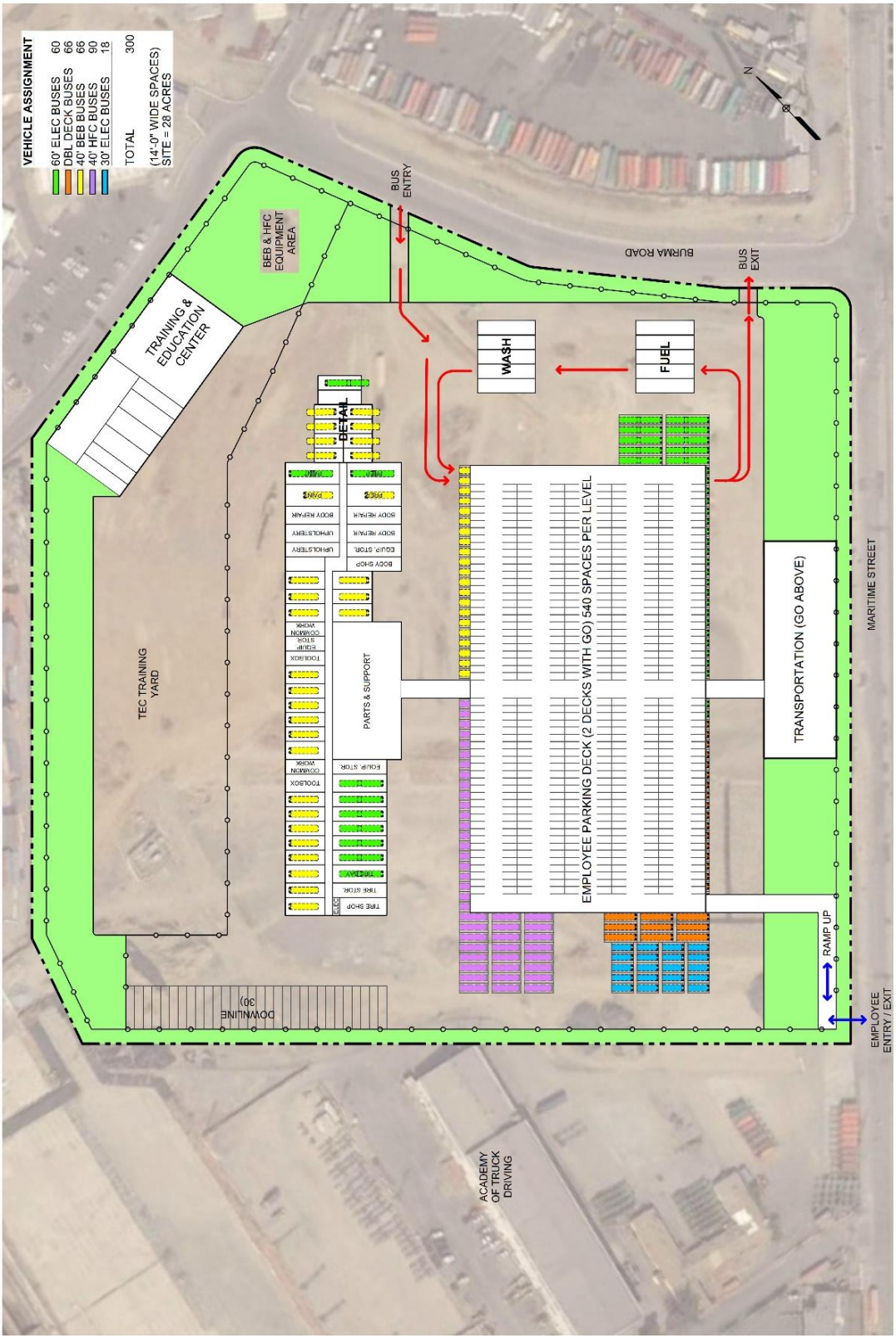
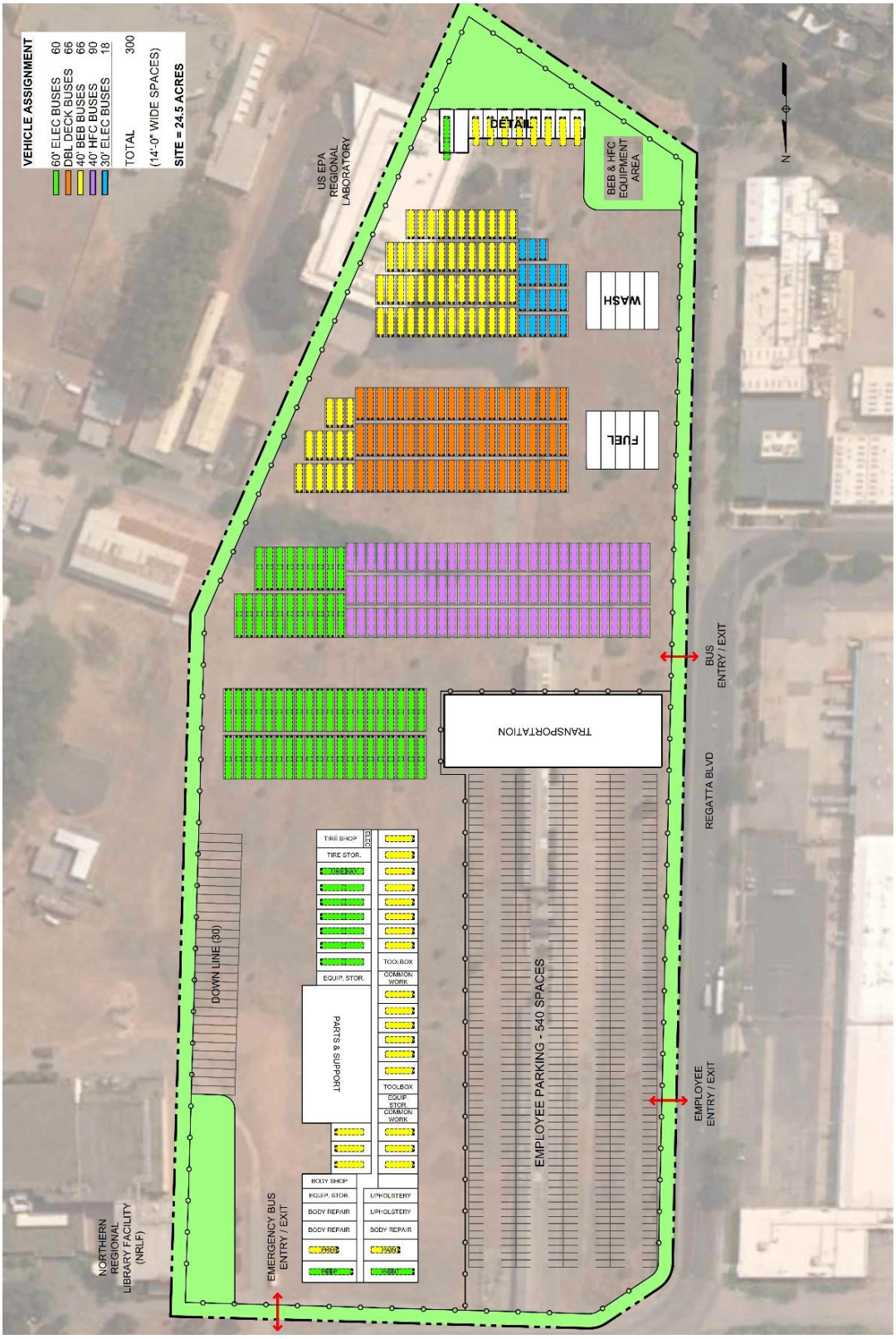


Exhibit 4.5: D2 Replacement (Alternatives N1 and N2 – Upper Level)



FACILITY UTILIZATION

Exhibit 4.6: Combine D2 /D3 (Alternative N3 – Ground Level)



DIVISION 3 (Richmond)

Recommended Action: Division 3 can continue while increasing its fleet to its maximum capacity of 101 vehicles

RECOMMENDATION:

Continue to operate D3 while increasing its fleet.

(Alternative N1)

Key Deficiencies

- Division 3's site is severely limited and can serve a maximum of about 100 buses.
- There are no possible expansion scenarios for the existing site.
- Hydrogen generation not possible on site due to space constraints.

Alternative N1: Existing D3
(for about 100 buses)

(See Exhibit 4.7)

- Continue operations at existing D3.
- Expand fleet serviced up to 100 vehicles, which requires transitioning to stacked parking.
- Employee parking could be an issue with the current roof top providing only 111 spaces and 185 spaces would be needed to support a fleet of 100 buses.

N1 Fleet Size & Mix at D3:	
40-foot BEB	50
40-foot FCEB	0
42.5-foot BEB	15
60-foot BEB	36
Cut-Away BEB	0
TOTAL	**101**

Alternative N2: Replacement D3
(on new site for about 150 buses)

(See Exhibit 4.8)

- Continue operations at D3 while pursuing a new property in the northern service region to replace D3 facilities and operations to serve a fleet of about 150 buses.
- Employee parking: 263 spaces – decked if required by site size.
- The 15.6-acre site shown is owned by the UC Regents located on Regatta Boulevard. While this site is no longer available, the layout serves as a "test fit" of the space program and confirmed the site size required and the impact of site configuration / geometry.

N2 Fleet Size & Mix at D3:	
40-foot BEB	34
40-foot FCEB	45
42.5-foot BEB	30
60-foot BEB	36
Cut-Away BEB	3
TOTAL	**148**

Alternative N3: Combined D2 / D3
(on new site for about 300 buses)

(See Exhibit 4.6)

- Continue operations at D2 and D3 while pursuing a new property to combine both divisions on one site to serve a fleet of 300 buses.
- Employee parking shown at grade, but could be on a deck over bus parking if the site was more constrained.
- This alternative may require Alternative C2.
- The 24.5-acre site shown is owned by the UC Regents located on Regatta Boulevard. While this site is no longer available, the layout serves as a "test fit" of the space program and confirmed the site size required and the impact of site configuration / geometry.

N3 Fleet Size & Mix at D2/D3:	
40-foot BEB	67
40-foot FCEB	90
42.5-foot BEB	62
60-foot BEB	42
Cut-Away BEB	10
TOTAL	**271**

Exhibit 4.7: Existing D3 (Alternative N1 – Ground Level)

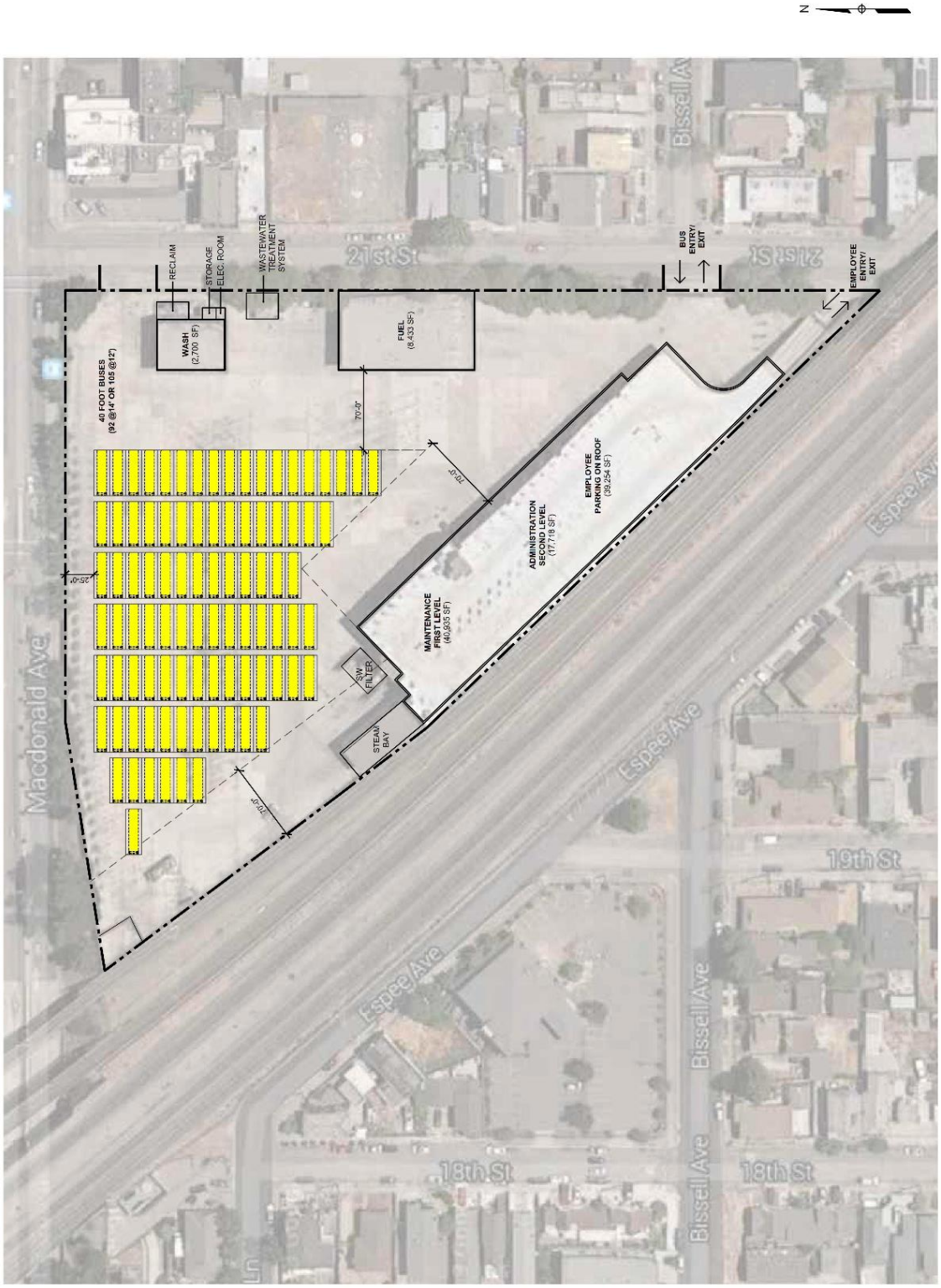
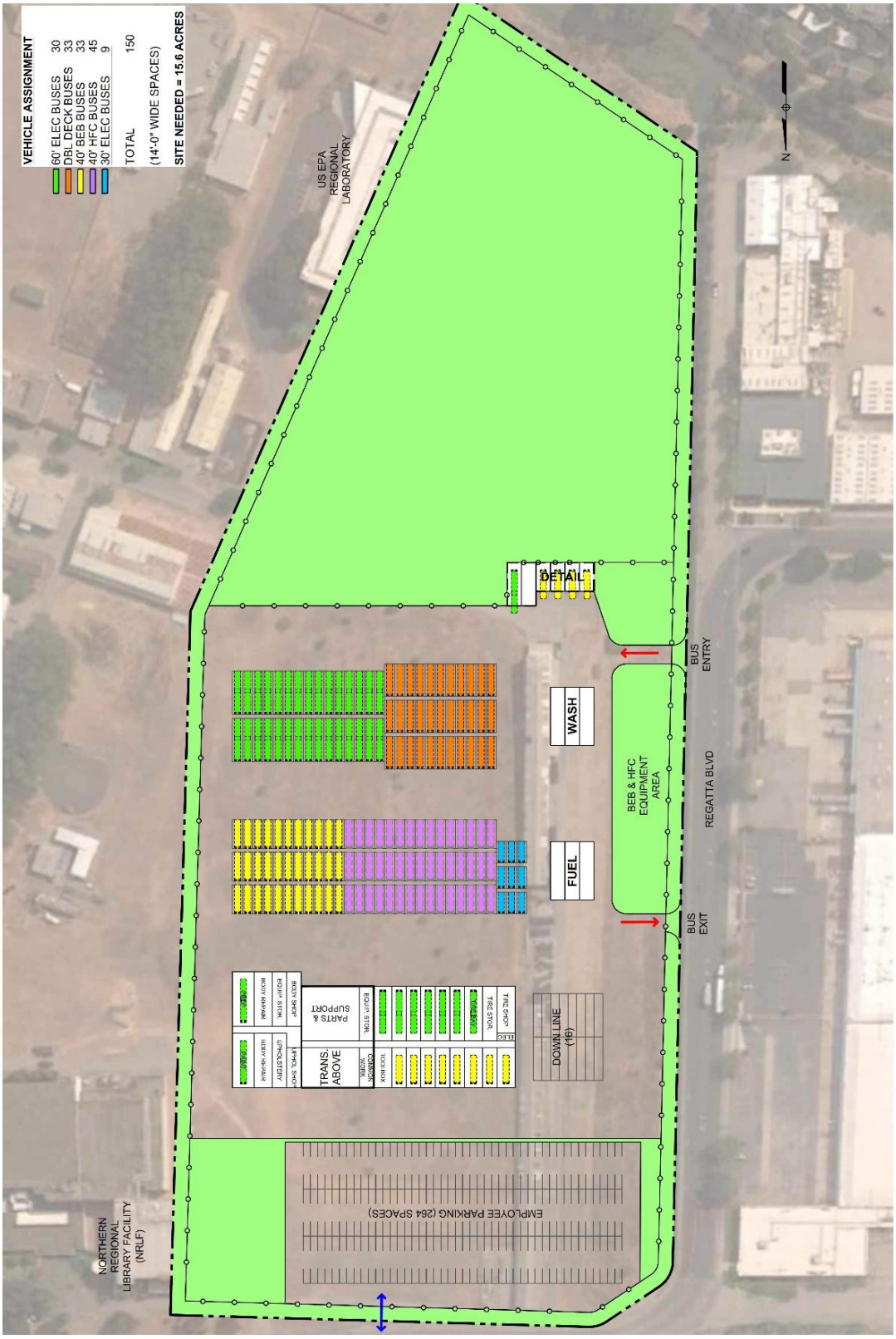


Exhibit 4.8: D3 Replacement (Alternative N2 – Ground Level)



FACILITY UTILIZATION

DIVISION 4 (East Oakland)

Recommended Action: Division 4 should remain operational in place as a replacement facility is built on the AC Transit owned 66th Avenue site. If it is possible to acquire the Water Tower Site, a new Division 5 could be developed. A shared Maintenance Facility could be built to serve both D4 and D5 on adjacent sites:

RECOMMENDATION:

Replace existing D4 facilities, expanding onto the 66th Avenue site.

Develop D5 if the water tower site can be acquired.

Key Deficiencies

- Division 4 maintenance is operating over capacity and needs to be replaced.
- The size of the site makes expanding operations impossible without the addition of adjacent parcels. The 66th Avenue (owned by AC Transit) would allow expansion to 300 buses and acquisition of the water tower site would allow development of another division (D5) for a total of 500 buses between D4 and D5.
- Adjacent streets will need to be tested for increased bus and employee traffic.

Alternative C1: D4 Redevelopment
(for about 300 buses with expansion on 66th Avenue site)

(See Exhibits 4.9 and 4.10)

- Develop new maintenance facilities on the 66th Avenue site with no interruption to current D4 operations.
- Demolish existing maintenance building at D4 and transition to new facilities on 66th Avenue site.
- Develop new fuel and wash bays in new orientation as shown (in area vacated with demolition of the existing maintenance building.
- Build an employee parking deck and transportation building over bus parking.
- Demolish existing employee parking garage and transportation building and transition to new facilities.
- Employee parking with 522 spaces on a parking deck above bus parking.

C1 Fleet Size & Mix at D4+66:	
40-foot BEB	78
40-foot FCEB	104
42.5-foot BEB	57
60-foot BEB	50
Cut-Away BEB	5
TOTAL	**294**

Alternative C2: D4 Redevelopment / New D5 Facility
(for 514 buses with expansion on 66th Avenue and Water Tower sites)

(See Exhibits 4.11 and 4.12)

- D4 and D5 could be developed simultaneously, however, this would require acquisition of the water tower site. The following assumes that D4 is expanded first as described in Alternative C1.
- Expand the maintenance facility with transportation facility on second level to accommodate D5.
- Expand the fuel and wash facilities to accommodate the D5 fleet.
- Develop the Water Tower site with bus parking and a new employee parking deck above bus parking

C2 Fleet Size & Mix at D4/D5:	
40-foot BEB	112
40-foot FCEB	150
42.5-foot BEB	136
60-foot BEB	110
Cut-Away BEB	6
TOTAL	**514**

Exhibit 4.9: D4 Redevelopment (Alternative C1 – Ground Level)

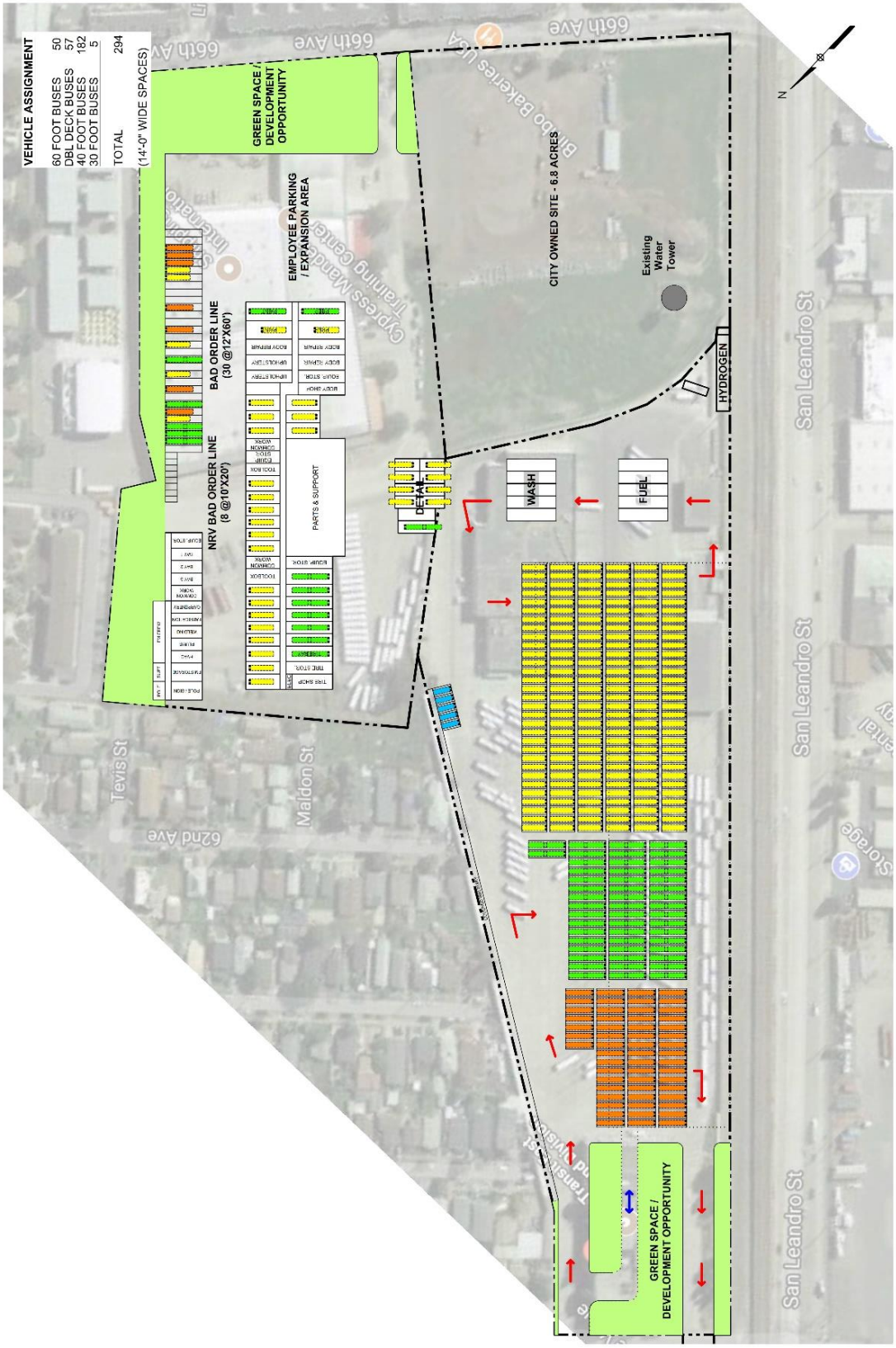


Exhibit 4.10: D4 Redevelopment (Alternative C1 – Upper Level)

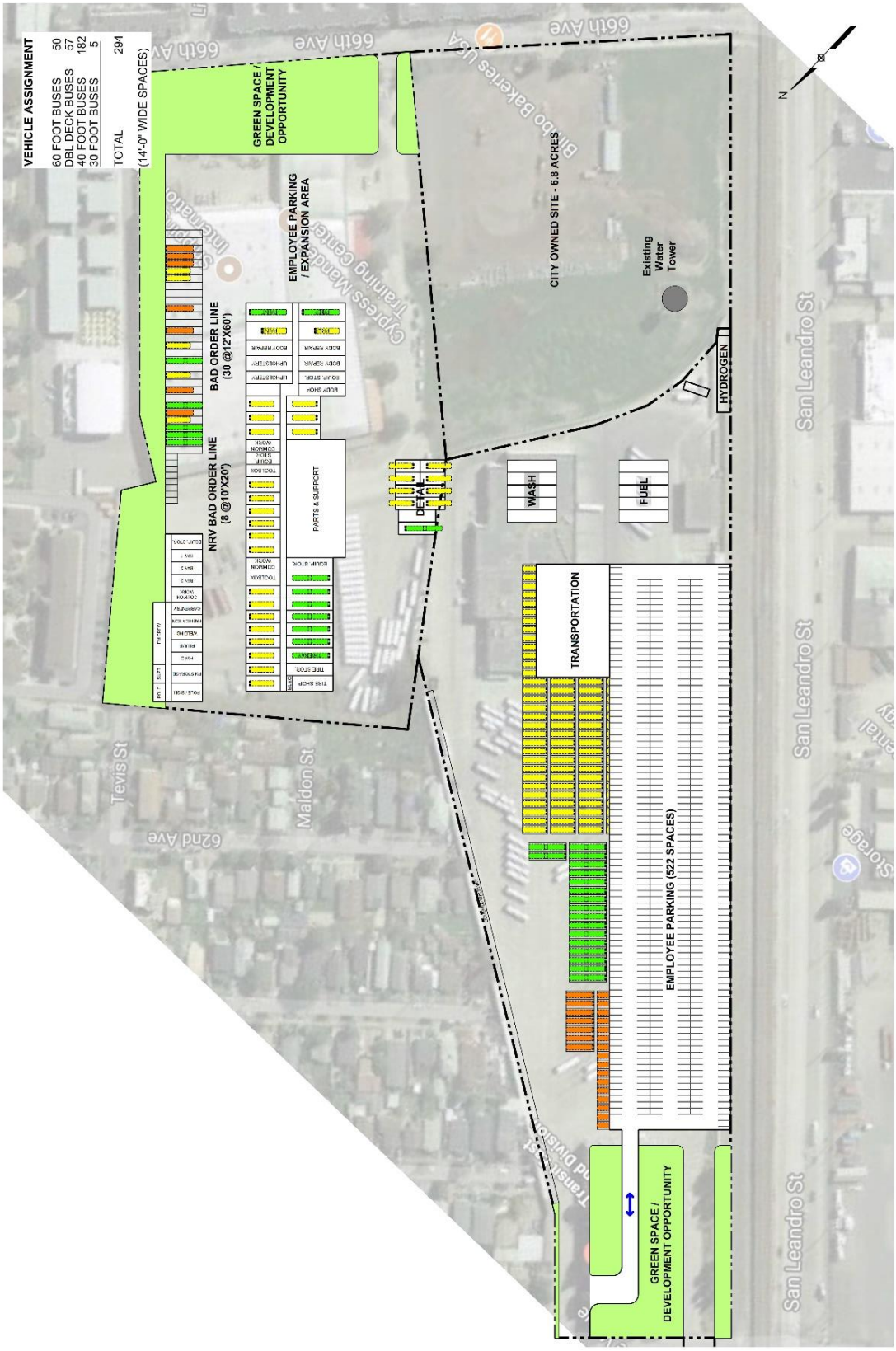
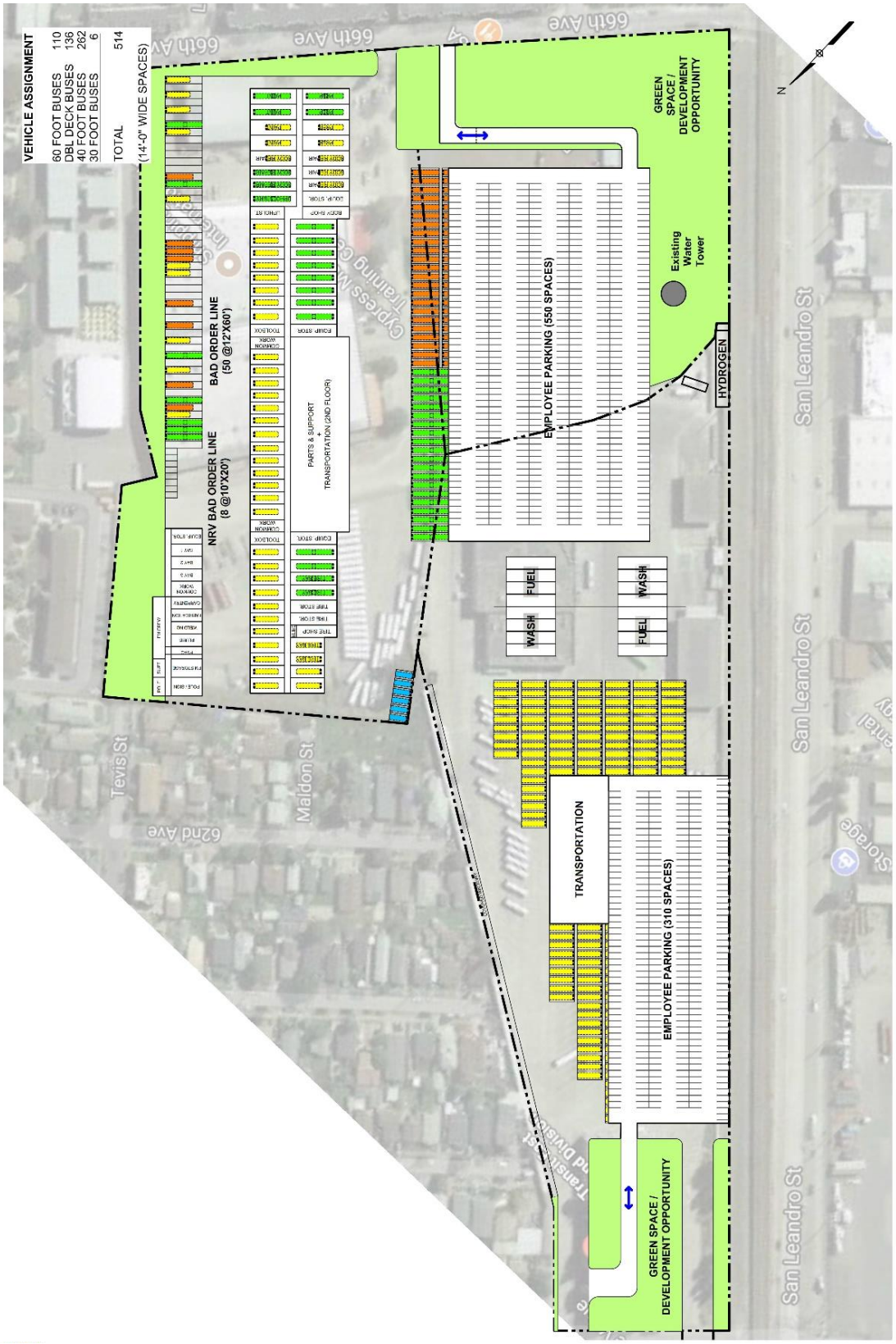


Exhibit 4.11: D4 Redevelopment / New D5 (Alternative C2 – Ground Level)

Exhibit 4.12: D4 Redevelopment / New D5 (Alternative C2 – Upper Level)



DIVISION 6 (Hayward)

Recommended Action: The Division 6 site should remain operational while new facilities for maintenance and operations are constructed in a phased manner that allows for service to continue from the site uninterrupted. Alternative S1 is to be developed in phases. Two options were developed for the second phase.

RECOMMENDATION:

Phased replacement of existing D6 facilities with new facilities on the existing site.

Key Deficiencies

- AC Transit is conducting an independent seismic safety assessment of the existing employee parking garage. Pending the results of that assessment, the garage may need to be demolished and the employee parking accommodated elsewhere.
- The location of the existing maintenance facilities makes phasing for continuous operations difficult unless the Training and Education Center (TEC) is moved to a different site. Note that the TEC is proposed to be located at the site with the D2 replacement facility. An option was explored that kept the TEC in place, but this was discarded due to the extremely difficult phasing required that would significantly impact on-going operations during construction

Alternative S1: D6 Redevelopment – Phase 1

(See Exhibit 4.13)

- Replace the existing parking garage with surface parking lot pending results of seismic safety assessment. This parking would accommodate all employees on-site, including TEC employees and visitors.
- Reconfigure TEC training yard to more efficient layout.
- Change to stacked bus parking as shown for more efficient and safer layout

S1 Fleet Size & Mix at D6:	
40-foot BEB	40
40-foot FCEB	54
42.5-foot BEB	13
60-foot BEB	27
Cut-Away BEB	31
TOTAL	**165**

Alternative S1: D6 Redevelopment – Phase 2, Option A

(See Exhibit 4.14)

- Relocate TEC to new site with replacement for D2 and demolish the existing TEC building.
- Construct new at-grade employee parking lot and new maintenance facility with transportation on the second level in the area vacated by the TEC.
- Construct new fuel and wash facilities as shown.
- Relocate Central Facility Maintenance to D4.
- Demolish all existing D6 buildings and reconfigure bus parking as shown.

Alternative S1: D6 Redevelopment – Phase 2, Option B (with CMF and Warehouse)

(See Exhibits 4.15 and 4.16)

- Relocate TEC to new site with replacement for D2 and demolish the existing TEC building.
- Construct new maintenance facility with transportation on the second level in the area vacated by the TEC.
- Construct new fuel and wash facilities and demolish existing fuel and wash when the new facilities are operational.
- Construct new bus parking area and employee parking deck over bus parking.
- Demolish all remaining existing D6 buildings and construct new Central Maintenance Facility (CMF) and Warehouse.

FACILITY UTILIZATION

Exhibit 4.13: D6 Redevelopment (Alternative S1 – Phase 1)

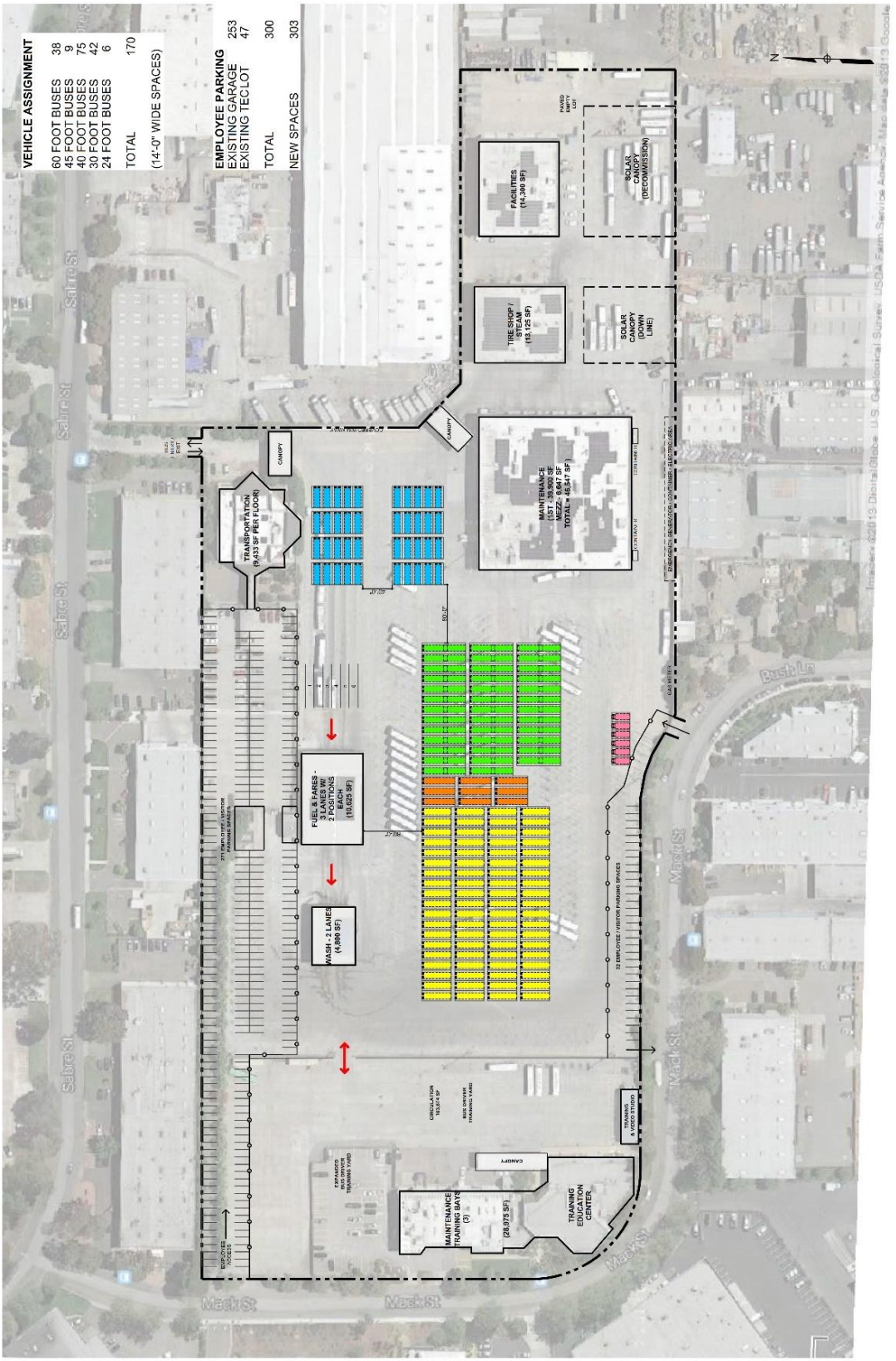


Exhibit 4.14: D6 Redevelopment (Alternative S1 – Phase 2, Option A – Ground Level)

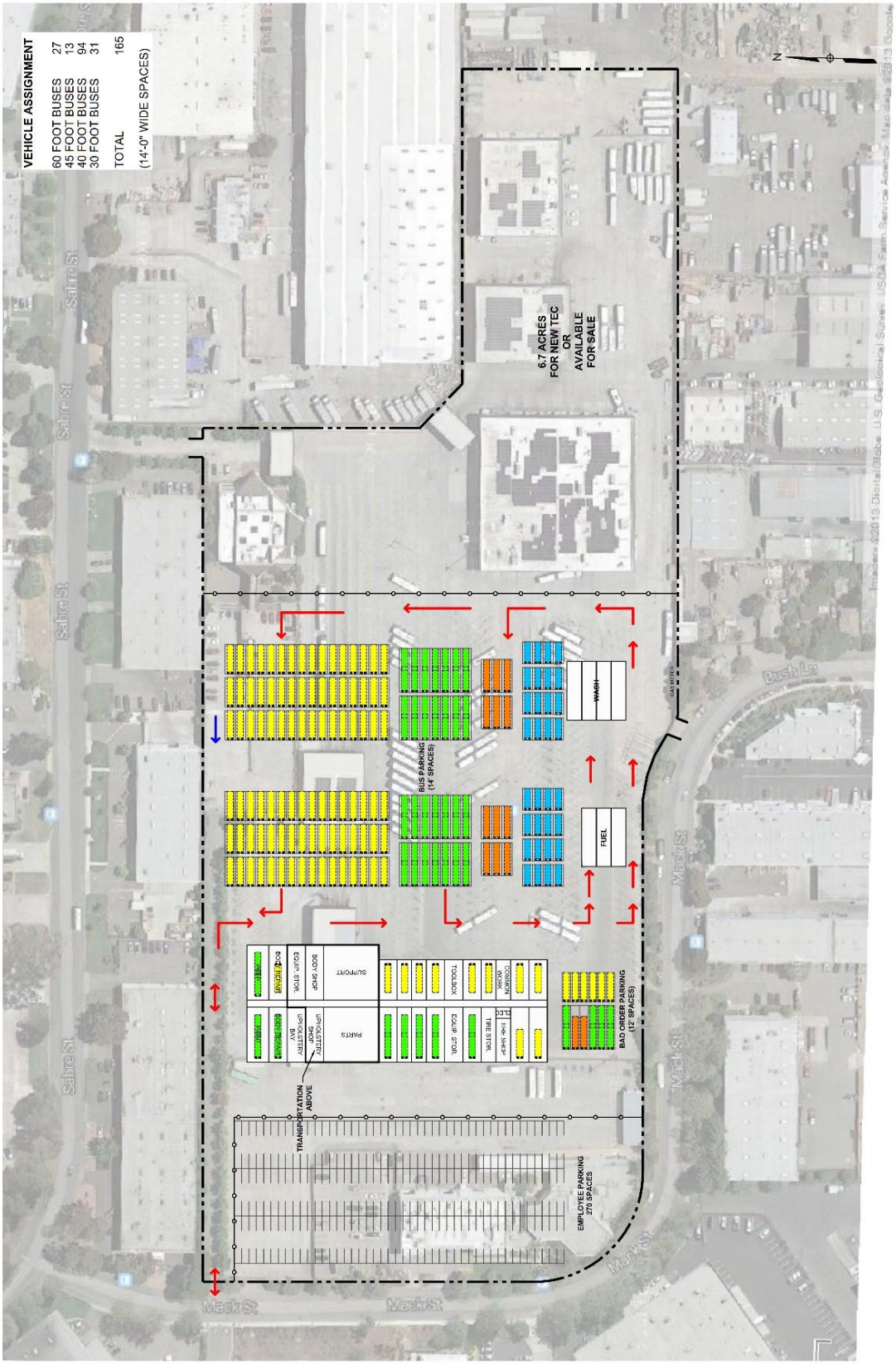


Exhibit 4.15: D6 Redevelopment (Alternative S1 – Phase 2, Option B – Ground Level)

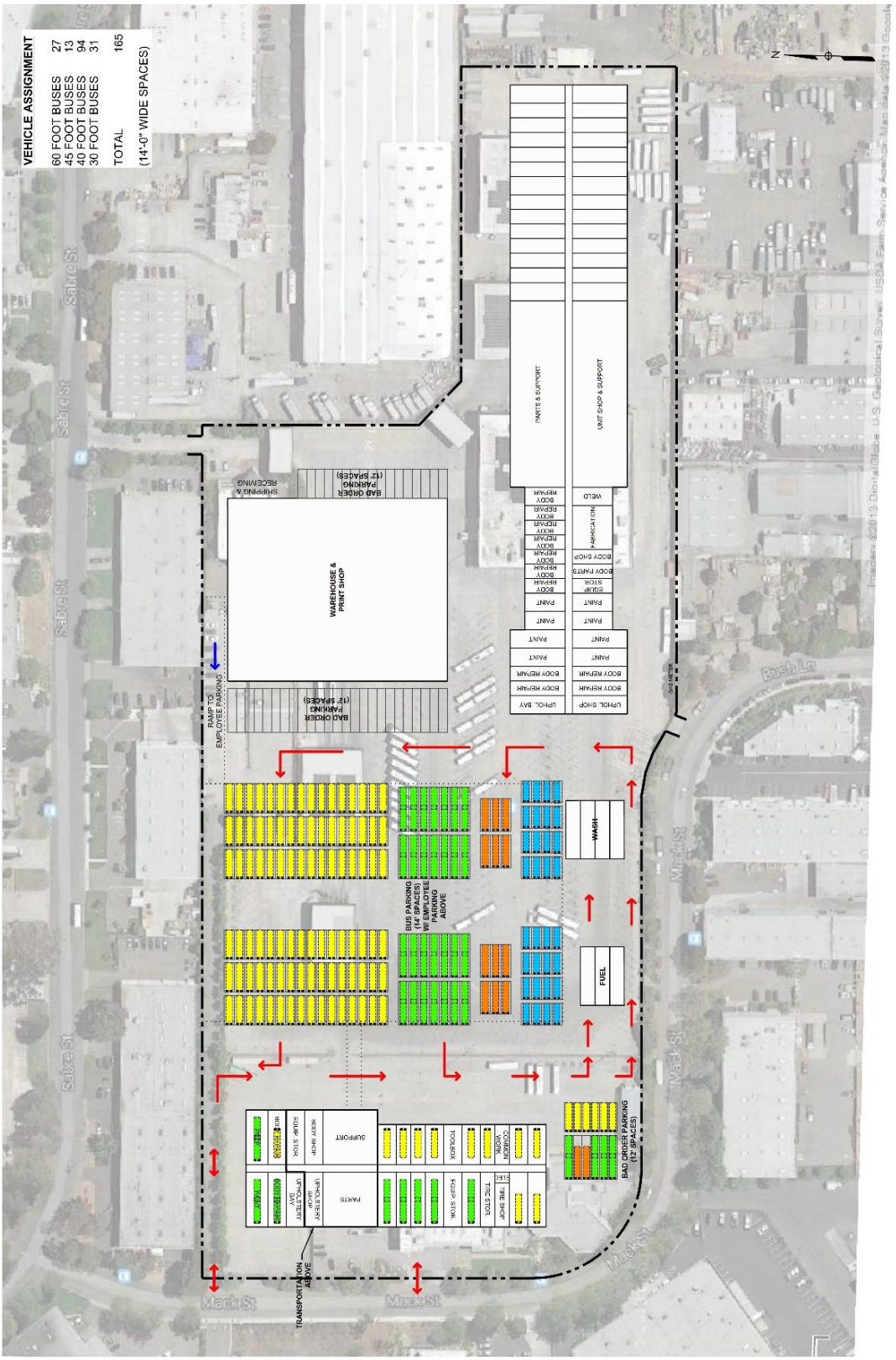
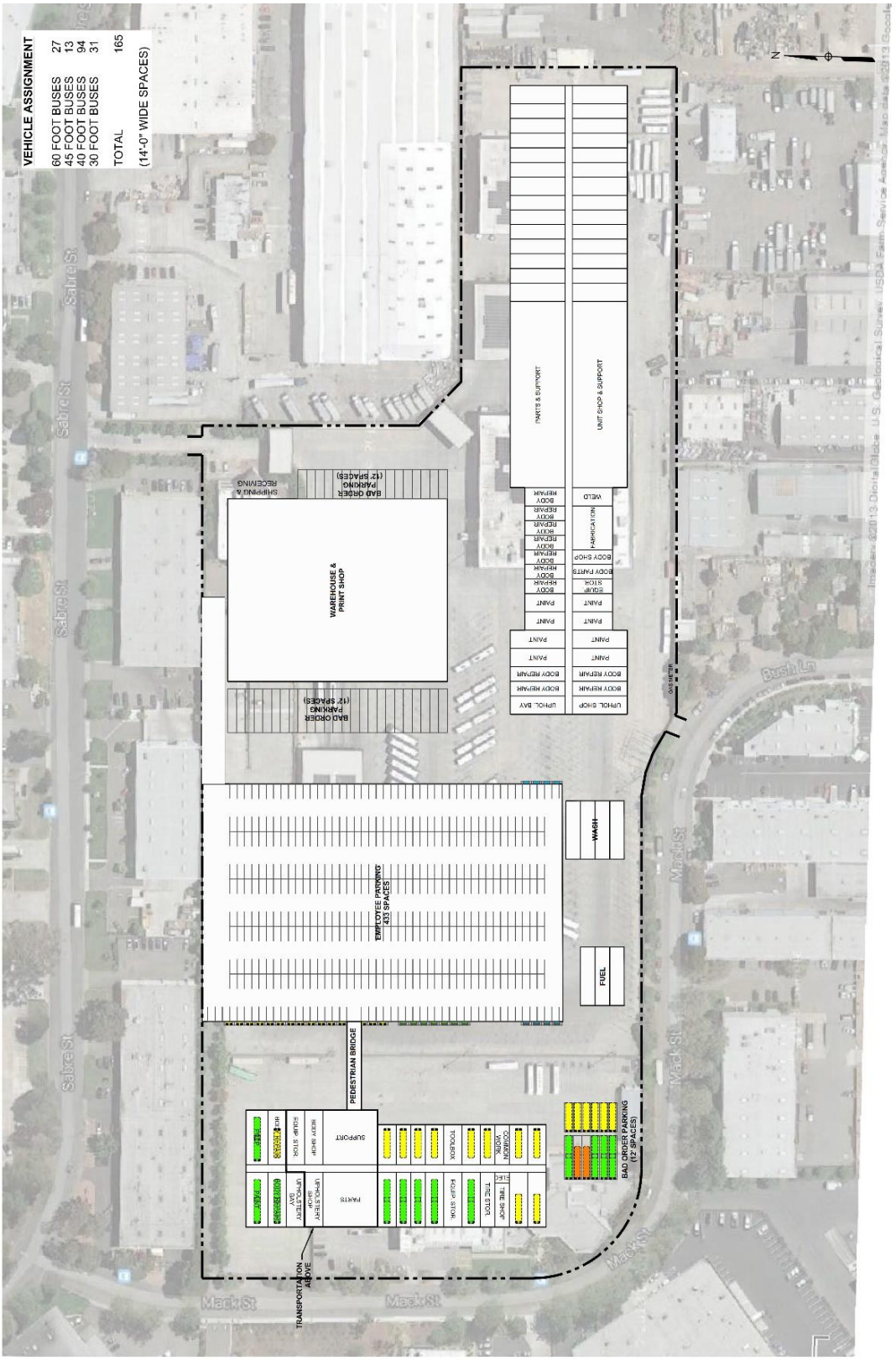


Exhibit 4.16: D6 Redevelopment (Alternative S1 – Phase 2, Option B – Upper Level)



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TRANSIT

IMPLEMENTATION

One of the key goals set for the Facilities Utilization Plan was that the plan had to be implementable without interrupting service. The implementation plan set forth in this section will allow AC Transit to meet that goal. A phasing strategy, as discussed herein, was developed to guide the implementation plan.

PHASING STRATEGY

The strategy for phasing facility development takes into consideration the following factors:

- Availability of land
- Location of facilities in relation to existing and projected transit service
- Fleet growth projections (high and low growth projections developed by AC Transit)
- Condition of current facilities
- Ease of development
- Impact on operational flexibility

The following is a brief discussion of each facility in relation to the phasing strategy. The facilities are addressed in relative order of recommended development.

Division 4 (D4)

D4 currently has an assigned fleet of 212 buses, but the existing maintenance capacity is only 130 buses. AC Transit owns an adjacent 11.5 acre site to the west, known as the 66th Avenue site. This site has several facilities that are being leased with the last lease expiring in October, 2021. The lessees have been notified that their leases will not be renewed. D4 is centrally located in the service area, so operating additional buses from this site would likely reduce deadhead cost. Since site acquisition is not required and leases expire in a reasonable time, this site is ideal for an initial project to increase capacity to 300 buses. This would accommodate the projected low growth fleet projections.

Division 2 (D2)

The condition of D2 dictates that it needs to be replaced as soon as possible. With an assigned fleet of 187 buses, D2 could be replaced by developing D5 (adjacent to D4) or a new D2 division. Since the beginning of 2018, AC Transit has found it difficult to find a site of approximately 25 to 28 acres for a replacement of D2 and the Training and Education Center (TEC). (Note that the TEC needs to be relocated from the D6 site to accommodate redevelopment of D6. A priority should be to acquire an appropriate site as soon as possible. If a new site can be acquired

before the water tower site, then a D2 replacement facility with up to 300 buses would be developed before the D5 facility. The combination of an expanded D4, a new D5, and a replacement D2 would bring the total system capacity to approximately 1,000 buses, which will accommodate the high growth fleet projections beyond 2047 (30 years). Note that development of a new D5 and a replacement D2 will require acquisition of two sites. Both sites should be acquired to give AC Transit the flexibility and capability to develop facilities as needed to accommodate the actual fleet growth.

Division 5 (D5)

D5 would be a new division developed on the site adjacent to and immediately south of the existing D4 site, known as the water tower site. This will require acquisition of the site (purchase or long term lease or other agreement) from the City of Oakland. The water tower site is only 6.8 acres and would essentially accommodate additional bus parking and green space for a buffer to the surrounding community. The maintenance and transportation facility for D5 would be developed on the 66th Avenue site (see D4 discussion). This is a significantly smaller site than would be required for a stand-alone replacement site for D2, which equates to less cost for site acquisition. Expanding D4 in the initial project plus development of D5 would bring the total system capacity to 740 buses. This would allow D2 to be vacated and demolished and would accommodate the high growth fleet projections for almost 15 years (to 2032).

Division 6 (D6)

D6 currently has an assigned fleet of 170 buses, but the existing maintenance capacity is only 150 buses. The facilities are also in poor condition and should be replaced. The projected need is for 170 buses at D6 to serve the southern portion of the AC Transit service area. A seismic analysis (under separate contract) of the existing parking garage indicates that it may need to be demolished soon. Development at D6 has been split into phases with Phase 1 being the demolition of the existing parking garage and development of surface parking for employees and visitors. Phase 2 would be redevelopment of D6 on site after the TEC is

relocated. Note that redevelopment of D6 is in direct response to the condition of existing facilities.

Training & Education Center (TEC) AC Transit, like most other transit agencies in the United States, faces an increasing demand for training and education of both drivers and mechanics. The increased demand is a direct result of attrition (including retirements) and fleet expansion. Replacement of the TEC is currently shown to be located at the new D2 site, however, it could be redeveloped on the D6 site if the Central Maintenance Facility (CMF) and Warehouse are not relocated to D6 in the future.

Central Maintenance Facility (CMF) **T**he existing CMF and Warehouse are adequate for at least the next 10 to 15 years. In addition, it is not known how new zero emission buses will impact the functions at the existing CMF. This gives AC Transit the flexibility to wait until 2027 to determine the specific needs for the CMF and Warehouse and whether they need to replaced / relocated.

Division 3 (D3) D3 currently has an assigned fleet of 61 buses, but has parking capacity for approximately 100 buses. In addition, D3 was recently upgraded and reopened for operations. Therefore, the specific needs for D3 do not need to be determined until about 2031 (13 years).

Other considerations in the phasing strategy include:

AC Transit Staff Capacity The design and construction of projects have been spread out to minimize having multiple projects under design simultaneously and under construction simultaneously. By necessity, there are some overlaps of design and construction of two projects. By spreading out design, AC Transit will be able to take advantage of lessons learned from previous projects.

Funding Capacity Funding the entire plan will require multiple grants over several years. Securing funding is shown throughout the implementation plan.

IMPLEMENTATION

IMPLEMENTATION PLAN

The implementation plan is shown in Figure 5.1 with the start, finish, and duration (in months) of each of the following activities for each facility:

- Secure Funding
- Consultant Selection
- Environmental Process, including traffic study and circulation analysis (both internal and external), if necessary
- Design / Permit / Bid and Award
- Demolition (if necessary)
- Construction, Commissioning, and Move-in

The plan assumes a design-bid-build project delivery method. See the discussion on project delivery methods in Chapter 8t.

The plan also assumes that there will be no design or construction until the East Bay Bus Rapid Transit project is complete at the end of 2019.

The schedule for the D2 Replacement could be accelerated by approximately 18 to 24 months if developer built to suit with lease is used.

The total implementation plan has a 19-year duration (through 2037).

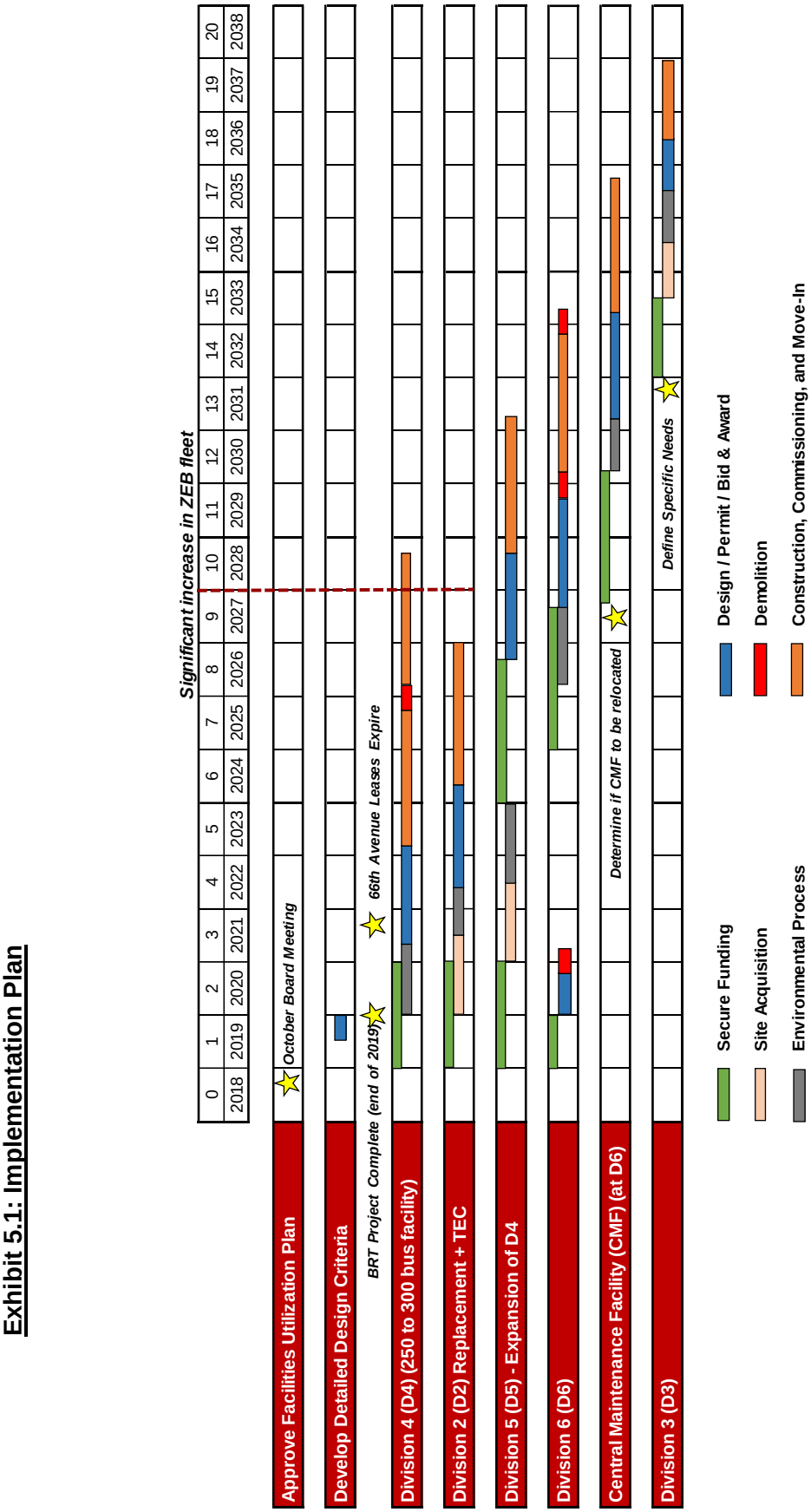
Note that the red dashed line between 2027 and 2028 in Exhibit 5.1 indicates when a significant increase in ZEB is anticipated based on projections developed in the ZEB Bus Study, which is based on the fleet being 100% ZEB by 2040. The implementation plan shows the D4 expansion and D2 replacement being essentially complete by that time, which will accommodate the projected ZEB fleet.

Implementation Plan Implications

The primary implications of the Implementation Plan shown in Exhibit 5.1 are that AC Transit needs to:

- Begin securing funding immediately
- Determine the project delivery method to be used for each project
- Acquire the water tower site (city-owned site adjacent to and south of D4) plus a site for D2 replacement as soon as possible. (See page 5.6 for additional discussion on site acquisition)
- Determine how to staff for the upcoming projects (in-house versus program manager)
- Determine CMF and Warehouse needs by 2027 (in 9 years)
- Determine D3 needs by 2031 (in 13 years)

Exhibit 5.1: Implementation Plan



Additional Site Acquisition Considerations

Federal Transit Administration (FTA) Compliance

If federal funds are to be used for site acquisition, the Federal Transit Administration (FTA) must be involved before any purchase offer is made. An appraisal and review appraisal will be required. Once these steps are completed and FTA has granted approval to make an offer and if the parties can reach tentative agreement on a purchase price, a purchase option agreement should be considered that will lock in the terms for a set period while AC Transit conducts additional due diligence activities to ensure there are no environmental issues, title issues, County approval issues, or other concerns with the site. A Title VI Facility Equity Analysis and public hearing process may also be needed during the due diligence period. FTA Title VI Circular requires recipients of federal funds to conduct a Title VI Facility Equity Analysis (FEA) when determining the site or location of certain types of facilities, including bus storage, maintenance and operations facilities. Per the circular, the FEA must occur before the selection of a preferred site and must include:

- Outreach to persons potentially impacted by the siting of the facility
- A comparison of the impacts of various siting alternatives
- An analysis of possible cumulative adverse impacts due to the presence of other facilities with similar impacts in the area

Implementation Flexibility

One of the stated goals of the Facilities Utilization Plan (the Plan) is to provide flexibility to meet changing needs and conditions. Availability of appropriate sites is one condition that could impact the Plan. For example, the water tower site adjacent to D4 is only 6.8 acres and is owned by the City of Oakland. This site may be more readily available, and for significantly less cost, than a 25-acre site needed to replace D2. Acquiring the water tower site early would provide flexibility with implementation of the Plan as follows:

- The fleet assigned to D4 could be increased as the entire fleet grows.
- The fleet assigned to D2 could be reduced by reassigning a portion of the fleet to D4 (based on an analysis of deadhead cost impacts), thus improving on-site bus circulation, relieving traffic congestion during the nightly service cycle, and improving the balance between fleet size and actual maintenance capacity at D2.
- Reduce the size of the fleet assigned to a D2 replacement site (and thus the size of the site required)

Finding a site large enough to accommodate 250 to 300 buses in a centrally located area is a challenge. The availability of appropriate sites may impact the options available for D2. These options could include:

- Replacing D2 with a new facility in the Oakland / Emeryville area to accommodate up to 300 buses, as recommended. The new site could be purchased or leased long-term.
- Replacing D2 and D3 with a new facility north of Emeryville to accommodate 250 to 300 buses.
- Redeveloping D2 with new facilities to accommodate 150 buses. This would require the fleet at D2 to be relocated to D4 / D5 while D2 is being redeveloped.


TRANSIT

COST ESTIMATE

BASIS OF ESTIMATE

1. The estimate of probable construction cost is based on:
   a. Concept Design Alternatives, Volume 2: Drawings
   b. Space Program, Volume 3: Appendix B
2. The general scope of work includes:
   a. D2: Replacement Facility for 300 buses at a new site.
   b. D3: Replacement Facility for 150 buses at a new site.
   c. D2/D3: Replacement Facility for 300 buses at a new site.
   d. D4: Expansion to 300 buses with the 66th Avenue site.
   e. D4/D5: Expansion to 500 buses with the 66th Avenue site plus the water tower site.
   f. D6: Demolition of existing parking garage and development of surface parking (Phase 1).
   g. D6: Replacement Facility for 170 buses on the existing site (Phase 2).
   h. D6: Central Maintenance Facility (CMF) (Phase 3).
   i. GO: Replacement of the general office, assuming it would be co-located with a new division to save site acquisition cost.

Exclusions

The estimate specifically excludes the following items:

- Off-site improvements (i.e. roadway work, signals, utility extensions, etc.)
- Hazardous material investigation and abatement, if any
- Cost escalation from the date of the estimate. (Note that escalation has been added based on the implementation plan presented in the previous section of this report.)
- Operations and maintenance costs

It is assumed that the above items, if needed, will be included elsewhere in AC Transit's overall project budget.

Assumptions and Qualifications

The following assumptions and qualifications apply to the estimate.

1. The work will be done under one general contract during normal working hours.
2. The estimate is based on process current as of May 2018 with four to five responsible and responsive bids under a competitive bidding environment for a fixed price lump sum contract (a fair market condition).
3. The estimate reflects probable construction costs obtainable in the project locality on the date of this estimate (May 13, 2018). Pricing assumes competitive bidding for every portion of the construction work for all subcontractors and general contractors, with a minimum of four (4) bidders for all major subcontracted work and four to five (4 to 5) general contractor bids.
4. Experience shows fewer bidders may result in higher bids, and conversely, more bidders may result in lower bids. Therefore, it is important to obtain as many bids as possible.
5. The following is a list of some items that may affect the cost estimate:

a. Modifications to the scope of work or assumptions included in this estimate.
b. Special phasing requirements.
c. Restrictive technical specifications or excessive contract conditions.
d. Any specific item of equipment, material, or product that cannot be obtained from at least three different sources.
e. Any other non-competitive bid situations.

6. Unit costs include costs for material, labor and equipment, sales tax, and installing contractor's (trade contractor's) mark-up.
7. The estimate represents M Lee Corporation's opinion of probable construction costs based on current market conditions as of May, 2018 and the assumptions and qualifications stated herein.
8. The estimate is intended to be a determination of fair market value for the project construction. It is not a prediction of low bid. Since the planning team has no control over market conditions and other factors which may affect the bid process, the planning team cannot and does not warrant nor guarantee that bids or ultimate construction costs will not vary from the cost estimate. The planning team makes no other warranties, either expressed or implied, and is not responsible for the interpretation by others of the contents in the cost estimate.
9. It should be noted that the cost estimate is a "snapshot in time" and that the reliability of this opinion of probable construction cost will inherently degrade over time.
10. This estimate has been prepared based on preliminary design information. It should be updated when more detailed project information is available.
11. Site acquisition cost included in the cost estimate are based on information provided by AC Transit and should be updated as actual sites become available.
12. Abbreviations used in the estimate:

CF = cubic foot
CY = cubic yard
(E) = existing
EA = each
LB = pound
LF = linear foot
LOC = location
LS = lump sum
MM = month
NIC = not in contract
PR = pair
SF = square foot

METHODOLOGY

The estimate of probable construction cost is broken down into the following major categories:

Sitework includes separate line items for grading, drainage, utilities (water, electric, sewer, and gas), landscape and irrigation, fencing, and stormwater management. Stormwater management is assumed to be underground due to general lack of availability of site area to accommodate detention ponds.

Paving includes separate line items for bus parking and circulation (10-inch reinforced concrete) and employee / visitor parking (typical asphalt pavement if at grade).

Demolition includes separate line items for pavement and site, parking garage, transportation building, maintenance building, fuel building, wash and detail clean building, tire shop, facility maintenance shop, miscellaneous canopy structures, existing training (TEC) building, and existing leased buildings (at 66th Avenue site).

New Building Construction includes separate line items for parking garage (one level including vertical circulation), parking garage (second level including vertical circulation), pedestrian bridge (from garage to building), transportation building, bus maintenance building, central maintenance facility (CMF), warehouse facility, fuel building, wash building, detailed clean building, facility maintenance shop, non-revenue vehicle (NRV) maintenance, training & education center (TEC), and the general office (GO – furnished).

Photovoltaic Panels includes separate line items for panels over employee parking (only over cars, not circulation areas) and for roof top panels (over 50% of the roofs).

ZEB Fueling Equipment includes separate line items for hydrogen fuel cell equipment, hydrogen dispensing equipment, battery electric bus (BEB) infrastructure, BEB charging stations, and an emergency generator. These costs have been coordinated with the ZEB study team.

Shop Equipment includes separate line items for fuel lanes, bus washer, water reclaim, vehicle lifts (for articulated buses), vehicle lifts (for standard buses), lubrication system (reels, pumps, tanks), paint booth (downdraft with manlift on each side), vehicle exhaust system (overhead reels), and miscellaneous equipment.

Furnishings	office furnishings including desks, chairs, file cabinets, bookcases, cubicles, etc. Does not include copiers and computers.
Security	includes access control, closed circuit television (CCTV) system, fire alarm system
IT and Communications	includes conduit and cabling for IT and communications

Due to the conceptual nature of the site and facility layouts developed as part of the Facilities Utilization Plan, unit costs were built up for the items listed above and applied to each facility listed under the scope in the Basis of Estimate. See Appendix B for the unit cost build up calculations.

ESTIMATE OF PROBABLE CONSTRUCTION AND PROJECT COST

The discussion below defines what is included in construction cost versus project cost.

Construction Cost

The items in the above categories were then subtotaled and a factor was applied to the subtotal for the General Contractor's General Conditions (10%) and for the General Contractor's Fee (8%). These were all subtotaled to which contingency is applied. A design contingency (25%) reflects the conceptual nature of the design. As the design progresses, the contingency should be reduced to reflect the additional information in the detailed design. A construction contingency (10%) is added to cover unforeseen conditions.

The total construction cost is the sum of the initial subtotal plus general conditions plus contractor's fee plus design contingency plus construction contingency.

Project Cost

The estimate of probable project cost is the construction cost plus owner's contingency plus soft cost. The owner's contingency (10% of construction cost) provides AC Transit with a budget to cover owner directed changes, both during design and construction. Soft cost (50% of construction cost) includes design fees, construction management, permits, testing, and AC Transit staff time allocated to the project. *Note that the actual soft cost for the recent D3 renovation were about 50% of construction cost.*

Site Acquisition Cost

In consultation with AC Transit Real Estate Manager, the following cost for leasing or purchasing a site were assumed. The average cost for leasing a site with no improvements is approximately $0.15 per square foot per month. The average cost for purchasing a site with no improvements is approximately $45 per square foot.

The water tower site adjacent to D4 is approximately 6.8 acres. The lease and purchase calculations are shown below:

Lease: $0.15 /square foot / month X 43,560 square feet / acre = $6,534 / month / acre X 6.8 acres = $44,431 / month X 12 months / year = $533,172 per year if leasing the site.

Purchase: $45 / square foot X 43,560 square feet / acre = $1,960,000 / acre X 6.8 acres = $13,328,000.

A site for D2 Replacement will be approximately 25 acres. The lease and purchase calculations are shown below.

Lease: $0.15 /square foot / month X 43,560 square feet / acre = $6,534 / month / acre X 25 acres = $163,350 / month X 12 months / year = $1,960,200 per year if leasing the site.

Purchase: $45 / square foot X 43,560 square feet / acre = $1,960,000 / acre X 25 acres = $49,000,000.

Estimated Purchase Price

Water Tower Site

$13,328,000

D2 Replacement Site

$49,000,000

D3 Replacement Site

$31,360,000

A site for D3 Replacement will be approximately 16 acres. The lease and purchase calculations are shown below.

Lease: $0.15 /square foot / month X 43,560 square feet / acre = $6,534 / month / acre X 16 acres = $104,544 / month X 12 months / year = $1,254,528 per year if leasing the site.

Purchase: $45 / square foot X 43,560 square feet / acre = $1,960,000 / acre X 16 acres = $31,360,000.

The purchase price is applied after the construction cost and project cost.

Exhibits 6.1, 6.2, and 6.3 show the estimate of probable construction cost and project cost for (respectively):

- D2 Replacement (300 buses), D3 Replacement (150 buses), and D2/D3 Replacement (300 buses).
- D4 Expansion (300 buses) and D5 (to reach 500 buses).
- D6 (Phase 1), D6 (Phase 2), and D6 (Phase 3).

The following are the numbered notes in the Exhibits:

Note 1: Drawings reference is the page number in Concept Design Alternatives, Volume 2: Drawings.

Note 2: See lines 4 and 5 for number of battery electric and hydrogen fuel cell buses.

COST ESTIMATE

Exhibit 6.1: Estimate of Probable Construction Cost and Project Cost (without escalation)

(D2 Replacement, D3 Replacement, D2/D3 Replacement)

	A	B	C	D	E	F	G	H	I	J
1					D2 Replacement (300 Buses)		D3 Replacement (150 Buses)		D2/D3 Replacement (300 Buses)	
2				Site Area	28 Acres		16.22		24.52 acres	
3				Ref. Dwgs. (Note 1)	41, 53, 54		47, 64		41, 65	
4				Battery Electric Buses	210		105		210	
5				Hydrogen Fuel Cell Buses	90		45		90	
6		Unit	Unit $	Remarks	Qty.	Estimated Cost	Qty.	Estimated Cost	Qty.	Estimated Cost
7	**Sitework (not including paving)**									
8	Grading	SF	$ 0.70		1,220,603	$ 854,422	706,516	$ 494,561	1,067,965	$ 747,576
9	Drainage	SF	$ 2.50		1,220,603	$ 3,051,508	706,516	$ 1,766,290	1,067,965	$ 2,669,913
10	Utilities (water, elect, sewer, gas)	SF	$ 3.70		1,220,603	$ 4,516,231	706,516	$ 2,614,109	1,067,965	$ 3,951,471
11	Landscape / Irrigation	SF	$ 15.60		217,158	$ 3,387,665	142,317	$ 2,220,145	138,705	$ 2,163,798
12	Fencing	LF	$ 190.00		4,171	$ 792,490	3,313	$ 629,470	4,408	$ 837,520
13	Stormwater Management	Allow		Underground	1	$ 4,400,000	1	$ 2,500,000	1	$ 3,800,000
14	**Paving**									
15	Bus Parking & Circulation (concrete)	SF	$ 9.30	10" reinforced concrete	820,795	$ 7,633,394	372,729	$ 3,466,380	587,325	$ 5,462,123
16	Employee/Visitor Parking (asphalt)	SF	$ 7.60	typical surface car parking	-	$ -	111,370	$ 846,412	203,035	$ 1,543,066
17	**Demolition**									
18	Pavement & Site	SF	$ 4.20		-	$ -	-	$ -	-	$ -
19	Parking Garage	SF	$ 15.00		-	$ -	-	$ -	-	$ -
20	Transportation Building	SF	$ 20.00		-	$ -	-	$ -	-	$ -
21	Maintenance Building	SF	$ 20.00		-	$ -	-	$ -	-	$ -
22	Fuel	SF	$ 25.00		-	$ -	-	$ -	-	$ -
23	Wash & Detail	SF	$ 25.00		-	$ -	-	$ -	-	$ -
24	Tire Shop	SF	$ 15.00		-	$ -	-	$ -	-	$ -
25	Facility Maintenance Shop	SF	$ 20.00		-	$ -	-	$ -	-	$ -
26	Miscellaneous Canopy Structures	SF	$ 10.00		-	$ -	-	$ -	-	$ -
27	Existing Training (TEC) Building	SF	$ 25.00		-	$ -	-	$ -	-	$ -
28	Existing Leased Buildings (66th Avenue)	SF	$ 25.00		-	$ -	-	$ -	-	$ -
29	**New Building Construction**									
30	Parking Garage, One Level (incl. stairs)	Space	$21,000.00		540	$ 11,340,000	-	$ -	-	$ -
31	Parking Garage, Second Level (incl. stairs)	Space	$20,000.00	For GO	-	$ -	-	$ -	-	$ -
32	Pedestrian Bridge (from Garage to Building)	SF	$ 256.00		1,400	$ 358,400	-	$ -	-	$ -
33	Transportation Building	SF	$ 257.00		28,700	$ 7,375,900	14,000	$ 3,598,000	30,000	$ 7,710,000
34	Bus Maintenance Building	SF	$ 174.00		92,900	$ 16,164,600	56,500	$ 9,831,000	92,900	$ 16,164,600
35	Central Maintenance Facility (CMF)	SF	$ 170.00		-	$ -	-	$ -	-	$ -
36	Warehouse Facility	SF	$ 131.00		-	$ -	-	$ -	-	$ -
37	Fuel	SF	$ 102.00		8,000	$ 816,000	4,800	$ 489,600	8,000	$ 816,000
38	Wash	SF	$ 111.00		8,000	$ 888,000	4,800	$ 532,800	8,000	$ 888,000
39	Detail Clean	SF	$ 111.00	Under deck at some sites	8,800	$ 976,800	5,600	$ 621,600	8,800	$ 976,800
40	Facility Maintenance Shop	SF	$ 202.00		-	$ -	-	$ -	-	$ -
41	NRV Maintenance	SF	$ 219.00		-	$ -	-	$ -	-	$ -
42	Training & Education Center (TEC)	SF	$ 219.00		36,250	$ 7,938,750	-	$ -	-	$ -
43	General Office (GO) (furnished)	SF	$ 251.00	30,000 SF per floor X 4 floors	-	$ -	-	$ -	-	$ -
44	**Photo-Voltaic Panels (over employee parking)**	SF	$ 80.00	Over cars only	108,000	$ 8,640,000	52,800	$ 4,224,000	108,000	$ 8,640,000
45	**Photo-Voltaic Panels (on roof top)**	SF	$ 64.00	Over 50% of roofs	91,325	$ 5,844,800	40,050	$ 2,563,200	69,450	$ 4,444,800
46	**ZEB Fueling Equipment (Note 2)**									
47	Hydrogen Fuel Cell Equipment	Allow		Different for each facility	1	$ 3,000,000	1	$ 1,500,000	1	$ 3,000,000
48	Hydrogen Dispensing Equipment	Allow		Different for each facility	1	$ 2,400,000	1	$ 1,200,000	1	$ 2,400,000
49	Battery Electric Bus (BEB) Infrastructure	Per Bus	$ 25,000		210	$ 5,250,000	105	$ 2,625,000	210	$ 5,250,000
50	BEB Charging Station	Per Bus	$ 27,000		210	$ 5,670,000	105	$ 2,835,000	210	$ 5,670,000
51	Power Upgrade Projects	Per Bus	$ 78,000	From ZEB Study	210	$ 16,380,000	105	$ 8,190,000	210	$ 16,380,000
52	Emergency Generator	Allow			-	$ 2,600,000	-	$ 1,300,000	-	$ 2,600,000
53	**Shop Equipment**									
54	Fuel Lanes	Each	$ 150,000		4	$ 600,000	2	$ 300,000	4	$ 600,000
55	Bus Washer	EA	$ 339,000		2	$ 678,000	2	$ 678,000	2	$ 678,000
56	Water Reclaim	EA	$ 72,320		1	$ 72,320	1	$ 72,320	1	$ 72,320
57	Vehicle Lift, Articulated Bus	EA	$ 285,000		8	$ 2,280,000	8	$ 2,280,000	8	$ 2,280,000
58	Vehicle Lift, Standard Bus	EA	$ 215,000		20	$ 4,300,000	8	$ 1,720,000	20	$ 4,300,000
59	Lubrication System (reels, pumps, tanks)	Per Bay	$ 10,000		28	$ 280,000	16	$ 160,000	28	$ 280,000
60	Paint Booth (downdraft with manlift)	EA	$ 601,700		1	$ 601,700	1	$ 601,700	1	$ 601,700
61	Vehicle Exhaust System	Per Bay	$20,000.00		28	$ 560,000	16	$ 320,000	28	$ 560,000
62	Miscellaneous Equipment	SF	$ 30.00		137,950	$ 4,138,500	62,100	$ 1,863,000	101,700	$ 3,051,000
63	**Furnishings (Office Areas)**	SF	$ 20.00		50,435	$ 1,008,700	18,386	$ 367,720	33,981	$ 679,620
64	**Security (access control, CCTV, etc)**	SF	$ 6.00	Entire Building Area	182,650	$ 1,095,900	85,700	$ 514,200	147,700	$ 886,200
65	**IT and Communications**	SF	$ 10.00	Entire Building Area	182,650	$ 1,826,500	85,700	$ 857,000	147,700	$ 1,477,000
66	Subtotal					**$137,720,579**		**$ 63,781,507**		**$111,581,505**
67	General Contractor's General Conditions		10.0%			$ 13,772,058		$ 6,378,151		$ 11,158,151
68	General Contractor's Contractors Fee		8.0%			$ 11,017,646		$ 5,102,521		$ 8,926,520
69	Subtotal					**$162,510,283**		**$ 75,262,179**		**$131,666,176**
70	Contingency, Design		25.0%			$ 40,627,571		$ 18,815,545		$ 32,916,544
71	Contingency, Construction		10.0%			$ 16,251,028		$ 7,526,218		$ 13,166,618
72	**TOTAL CONSTRUCTION COST**					**$219,388,882**		**$101,603,942**		**$177,749,338**
73	Contingency, Owner's		10.0%			$ 21,938,888		$ 10,160,394		$ 17,774,934
74	Soft Cost (design, CM, permits, etc.)		50.0%			$ 109,694,441		$ 50,801,971		$ 88,874,669
75	**TOTAL PROJECT COST**					**$351,022,211**		**$162,566,307**		**$284,398,941**

Exhibit 6.2: Estimate of Probable Construction Cost and Project Cost (without escalation)
(D4 Expansion and D5)

	A	B	C	D	K	L	M	N
1					D4 Expansion (300 Buses)		D4/D5 Expansion (500 Buses)	
2				Site Area	25.15 acres		Additional 6.78 acres	
3				Ref. Dwgs. (Note 1)	19 - 25 (existing) 37, 38, 41 (proposed)		39, 40, 42	
4				Battery Electric Buses	210		350	
5				Hydrogen Fuel Cell Buses	90		150	
6		Unit	Unit $	Remarks	Qty.	Estimated Cost	Qty.	Estimated Cost
7	**Sitework (not including paving)**							
8	Grading	SF	$ 0.70		1,095,680	$ 766,976	295,287	$ 206,701
9	Drainage	SF	$ 2.50		1,095,680	$ 2,739,200	295,287	$ 738,218
10	Utilities (water, elect, sewer, gas)	SF	$ 3.70		1,095,680	$ 4,054,016	295,287	$ 1,092,562
11	Landscape / Irrigation	SF	$ 15.60		113,149	$ 1,765,124	142,470	$ 2,222,532
12	Fencing	LF	$ 190.00		6,326	$ 1,201,940	991	$ 188,290
13	Stormwater Management	Allow		Underground	1	$ 3,900,000	1	$ 1,100,000
14	**Paving**							
15	Bus Parking & Circulation (concrete)	SF	$ 9.30	10" reinforced concrete	792,656	$ 7,371,701	150,312	$ 1,397,902
16	Employee/Visitor Parking (asphalt)	SF	$ 7.60	typical surface car parking	-	$ -	-	$ -
17	**Demolition**							
18	Pavement & Site	SF	$ 4.20		731,508	$ 3,072,334	295,287	$ 1,240,205
19	Parking Garage	SF	$ 15.00		98,780	$ 1,481,700	-	$ -
20	Transportation Building	SF	$ 20.00		20,810	$ 416,200	-	$ -
21	Maintenance Building	SF	$ 20.00		51,062	$ 1,021,240	-	$ -
22	Fuel	SF	$ 25.00		11,305	$ 282,625	-	$ -
23	Wash & Detail	SF	$ 25.00		4,800	$ 120,000	-	$ -
24	Tire Shop	SF	$ 15.00		-	$ -	-	$ -
25	Facility Maintenance Shop	SF	$ 20.00		-	$ -	-	$ -
26	Miscellaneous Canopy Structures	SF	$ 10.00		-	$ -	-	$ -
27	Existing Training (TEC) Building	SF	$ 25.00		-	$ -	-	$ -
28	Existing Leased Buildings (66th Avenue)	SF	$ 25.00		177,415	$ 4,435,375	-	$ -
29	**New Building Construction**							
30	Parking Garage, One Level (incl. stairs)	Space	$21,000.00		310	$ 6,510,000	550	$ 11,550,000
31	Parking Garage, Second Level (incl. stairs)	Space	$20,000.00	For GO	-	$ -	-	$ -
32	Pedestrian Bridge (from Garage to Building)	SF	$ 256.00		-	$ -	1,998	$ 511,488
33	Transportation Building	SF	$ 257.00		21,476	$ 5,519,332	52,535	$ 13,501,495
34	Bus Maintenance Building	SF	$ 174.00		92,900	$ 16,164,600	52,300	$ 9,100,200
35	Central Maintenance Facility (CMF)	SF	$ 170.00		-	$ -	-	$ -
36	Warehouse Facility	SF	$ 131.00		-	$ -	-	$ -
37	Fuel	SF	$ 102.00		8,000	$ 816,000	6,400	$ 652,800
38	Wash	SF	$ 111.00		8,000	$ 888,000	6,400	$ 710,400
39	Detail Clean	SF	$ 111.00	Under deck at some sites	8,800	$ 976,800	-	$ -
40	Facility Maintenance Shop	SF	$ 202.00		12,800	$ 2,585,600		$ -
41	NRV Maintenance	SF	$ 219.00		6,600	$ 1,445,400		$ -
42	Training & Education Center (TEC)	SF	$ 219.00		-	$ -	-	$ -
43	General Office (GO) (furnished)	SF	$ 251.00	30,000 SF per floor X 4 floors	-	$ -	-	$ -
44	**Photo-Voltaic Panels (over employee parking)**	SF	$ 80.00	Over cars only	62,000	$ 4,960,000	110,000	$ 8,800,000
45	**Photo-Voltaic Panels (on roof top)**	SF	$ 64.00	Over 50% of roofs	74,888	$ 4,792,832	58,818	$ 3,764,320
46	**ZEB Fueling Equipment (Note 2)**							
47	Hydrogen Fuel Cell Equipment	Allow		Different for each facility	1	$ 3,000,000	1	$ 3,000,000
48	Hydrogen Dispensing Equipment	Allow		Different for each facility	1	$ 2,400,000	1	$ 2,400,000
49	Battery Electric Bus (BEB) Infrastructure	Per Bus	$ 25,000		210	$ 5,250,000	140	$ 3,500,000
50	BEB Charging Station	Per Bus	$ 27,000		210	$ 5,670,000	140	$ 3,780,000
51	Power Upgrade Projects	Per Bus	$ 78,000	From ZEB Study	210	$ 16,380,000	350	$ 27,300,000
52	Emergency Generator	Allow			-	$ 2,600,000	-	$ 1,300,000
53	**Shop Equipment**							
54	Fuel Lanes	Each	$ 150,000		4	$ 600,000	4	$ 600,000
55	Bus Washer	EA	$ 339,000		2	$ 678,000	2	$ 678,000
56	Water Reclaim	EA	$ 72,320		1	$ 72,320	1	$ 72,320
57	Vehicle Lift, Articulated Bus	EA	$ 285,000		8	$ 2,280,000	5	$ 1,425,000
58	Vehicle Lift, Standard Bus	EA	$ 215,000		20	$ 4,300,000	16	$ 3,440,000
59	Lubrication System (reels, pumps, tanks)	Per Bay	$ 10,000		28	$ 280,000	21	$ 210,000
60	Paint Booth (downdraft with manlift)	EA	$ 601,700		1	$ 601,700	1	$ 601,700
61	Vehicle Exhaust System	Per Bay	$20,000.00		28	$ 560,000	21	$ 420,000
62	Miscellaneous Equipment	SF	$ 30.00		121,100	$ 3,633,000	52,300	$ 1,569,000
63	**Furnishings (Office Areas)**	SF	$ 20.00		35,707	$ 714,140	22,257	$ 445,140
64	**Security (access control, CCTV, etc)**	SF	$ 6.00	Entire Building Area	158,576	$ 951,456	117,635	$ 705,810
65	**IT and Communications**	SF	$ 10.00	Entire Building Area	158,576	$ 1,585,760	117,635	$ 1,176,350
66	Subtotal					**$128,843,371**		**$109,400,432**
67	General Contractor's General Conditions		10.0%			$ 12,884,337		$ 10,940,043
68	General Contractor's Contractors Fee		8.0%			$ 10,307,470		$ 8,752,035
69	Subtotal					**$152,035,178**		**$129,092,510**
70	Contingency, Design		25.0%			$ 38,008,794		$ 32,273,128
71	Contingency, Construction		10.0%			$ 15,203,518		$ 12,909,251
72	**TOTAL CONSTRUCTION COST**					**$205,247,490**		**$174,274,889**
73	Contingency, Owner's		10.0%			$ 20,524,749		$ 17,427,489
74	Soft Cost (design, CM, permits, etc.)		50.0%			$ 102,623,745		$ 87,137,445
75	**TOTAL PROJECT COST**					**$328,395,984**		**$278,839,823**

COST ESTIMATE

Exhibit 6.3: Estimate of Probable Construction Cost and Project Cost (without escalation)

(D6 Phases 1, 2, and 3)

	A	B	C	D	O	P	Q	R	S	T
1					D6 Phase 1 (Demo Garage)		D6 Phase 2 (165 Buses)		D6 Phase 3 - CMF and Warehouse	
2				Site Area	3.21 acres		11 acres		8.79 acres	
3				Ref. Dwgs. (Note 1)	26 (existing) 43 (proposed)		26 - 35 (existing) 44, 45, 47 (proposed)		44, 48	
4				Battery Electric Buses	na		115		na	
5				Hydrogen Fuel Cell Buses	na		50		na	
6		Unit	Unit $	Remarks	Qty.	Estimated Cost	Qty.	Estimated Cost	Qty.	Estimated Cost
7	**Sitework (not including paving)**									
8	Grading	SF	$ 0.70		139,718	$ 97,803	479,112	$ 335,378	383,054	$ 268,138
9	Drainage	SF	$ 2.50		139,718	$ 349,295	479,112	$ 1,197,780	383,054	$ 957,635
10	Utilities (water, elect, sewer, gas)	SF	$ 3.70		139,718	$ 516,957	479,112	$ 1,772,714	383,054	$ 1,417,300
11	Landscape / Irrigation	SF	$ 15.60		-	$ -	-	$ -	-	$ -
12	Fencing	LF	$ 190.00		1,560	$ 296,400	4,468	$ 848,920		$ -
13	Stormwater Management	Allow		Underground	1	$ 500,000	1	$ 1,700,000	1	$ 1,400,000
14	**Paving**									
15	Bus Parking & Circulation (concrete)	SF	$ 9.30	10" reinforced concrete	-	$ -	406,912	$ 3,784,282	178,254	$ 1,657,762
16	Employee/Visitor Parking (asphalt)	SF	$ 7.60	typical surface car parking	99,284	$ 754,558	-	$ -	-	$ -
17	**Demolition**									
18	Pavement & Site	SF	$ 4.20		64,009	$ 268,838	338,085	$ 1,419,957	306,296	$ 1,286,443
19	Parking Garage	SF	$ 15.00		105,825	$ 1,587,375	-	$ -	-	$ -
20	Transportation Building	SF	$ 20.00		-	$ -	18,866	$ 377,320	-	$ -
21	Maintenance Building	SF	$ 20.00		-	$ -	44,100	$ 882,000	-	$ -
22	Fuel	SF	$ 25.00		-	$ -	10,347	$ 258,675	-	$ -
23	Wash & Detail	SF	$ 25.00		-	$ -	4,800	$ 120,000	-	$ -
24	Tire Shop	SF	$ 15.00		-	$ -	13,125	$ 196,875	-	$ -
25	Facility Maintenance Shop	SF	$ 20.00		-	$ -	14,300	$ 286,000	-	$ -
26	Miscellaneous Canopy Structures	SF	$ 10.00		-	$ -	35,489	$ 354,890	-	$ -
27	Existing Training (TEC) Building	SF	$ 25.00		-	$ -	28,975	$ 724,375	-	$ -
28	Existing Leased Buildings (66th Avenue)	SF	$ 25.00		-	$ -	-	$ -	-	$ -
29	**New Building Construction**									
30	Parking Garage, One Level (incl. stairs)	Space	$21,000.00		-	$ -	433	$ 9,093,000	-	$ -
31	Parking Garage, Second Level (incl. stairs)	Space	$20,000.00	For GO	-	$ -	-	$ -	-	$ -
32	Pedestrian Bridge (from Garage to Building)	SF	$ 256.00		-	$ -	2,397	$ 613,632	-	$ -
33	Transportation Building	SF	$ 257.00		-	$ -	18,125	$ 4,658,125	-	$ -
34	Bus Maintenance Building	SF	$ 174.00		-	$ -	61,000	$ 10,614,000	-	$ -
35	Central Maintenance Facility (CMF)	SF	$ 170.00		-	$ -	-	$ -	129,800	$ 22,066,000
36	Warehouse Facility	SF	$ 131.00		-	$ -	-	$ -	75,000	$ 9,825,000
37	Fuel	SF	$ 102.00		-	$ -	4,800	$ 489,600	-	$ -
38	Wash	SF	$ 111.00		-	$ -	6,400	$ 710,400	-	$ -
39	Detail Clean	SF	$ 111.00	Under deck at some sites	-	$ -	-	$ -	-	$ -
40	Facility Maintenance Shop	SF	$ 202.00		-	$ -	-	$ -	-	$ -
41	NRV Maintenance	SF	$ 219.00		-	$ -	-	$ -	-	$ -
42	Training & Education Center (TEC)	SF	$ 219.00		-	$ -	-	$ -	-	$ -
43	General Office (GO) (furnished)	SF	$ 251.00	30,000 SF per floor X 4 floors	-	$ -	-	$ -	-	$ -
44	**Photo-Voltaic Panels (over employee parking)**	SF	$ 80.00	Over cars only	-	$ -	86,600	$ 6,928,000	-	$ -
45	**Photo-Voltaic Panels (on roof top)**	SF	$ 64.00	Over 50% of roofs	-	$ -	46,361	$ 2,967,104	102,400	$ 6,553,600
46	**ZEB Fueling Equipment (Note 2)**									
47	Hydrogen Fuel Cell Equipment	Allow		Different for each facility	-	$ -	1	$ 1,700,000	-	$ -
48	Hydrogen Dispensing Equipment	Allow		Different for each facility	-	$ -	1	$ 1,300,000	-	$ -
49	Battery Electric Bus (BEB) Infrastructure	Per Bus	$ 25,000		-	$ -	115	$ 2,875,000	-	$ -
50	BEB Charging Station	Per Bus	$ 27,000		-	$ -	115	$ 3,105,000	-	$ -
51	Power Upgrade Projects	Per Bus	$ 78,000	From ZEB Study			115	$ 8,970,000		
52	Emergency Generator	Allow						$ 1,300,000		
53	**Shop Equipment**									
54	Fuel Lanes	Each	$ 150,000		-	$ -	2	$ 300,000	-	$ -
55	Bus Washer	EA	$ 339,000		-	$ -	2	$ 678,000	-	$ -
56	Water Reclaim	EA	$ 72,320		-	$ -	1	$ 72,320	-	$ -
57	Vehicle Lift, Articulated Bus	EA	$ 285,000		-	$ -	8	$ 2,280,000	12	$ 3,420,000
58	Vehicle Lift, Standard Bus	EA	$ 215,000		-	$ -	8	$ 1,720,000	13	$ 2,795,000
59	Lubrication System (reels, pumps, tanks)	Per Bay	$ 10,000		-	$ -	16	$ 160,000	25	$ 250,000
60	Paint Booth (downdraft with manlift)	EA	$ 601,700		-	$ -	1	$ 601,700	4	$ 2,406,800
61	Vehicle Exhaust System	Per Bay	$20,000.00		-	$ -	16	$ 320,000	25	$ 500,000
62	Miscellaneous Equipment	SF	$ 30.00		-	$ -	61,000	$ 1,830,000	204,800	$ 6,144,000
63	**Furnishings (Office Areas)**	SF	$ 20.00		-	$ -	18,386	$ 367,720	20,158	$ 403,160
64	**Security (access control, CCTV, etc)**	SF	$ 6.00	Entire Building Area	-	$ -	90,325	$ 541,950	204,800	$ 1,228,800
65	**IT and Communications**	SF	$ 10.00	Entire Building Area	-	$ -	90,325	$ 903,250	204,800	$ 2,048,000
66	Subtotal					**$ 4,371,225**		**$ 79,357,967**		**$ 64,627,638**
67	General Contractor's General Conditions		10.0%			$ 437,123		$ 7,935,797		$ 6,462,764
68	General Contractor's Contractors Fee		8.0%			$ 349,698		$ 6,348,637		$ 5,170,211
69	Subtotal					**$ 5,158,046**		**$ 93,642,401**		**$ 76,260,613**
70	Contingency, Design		25.0%			$ 1,289,512		$ 23,410,600		$ 19,065,153
71	Contingency, Construction		10.0%			$ 515,805		$ 9,364,240		$ 7,626,061
72	**TOTAL CONSTRUCTION COST**					**$ 6,963,363**		**$126,417,241**		**$102,951,827**
73	Contingency, Owner's		10.0%			$ 696,336		$ 12,641,724		$ 10,295,183
74	Soft Cost (design, CM, permits, etc.)		50.0%			$ 3,481,682		$ 63,208,621		$ 51,475,914
75	**TOTAL PROJECT COST**					**$ 11,141,381**		**$202,267,586**		**$164,722,924**

ESCALATION

The impact of escalation on the overall project cost is significant. Escalation is calculated by overlaying the implementation plan and the estimate of probable construction cost and project cost. Soft costs are escalated separately from construction cost plus owner's contingency because soft cost are incurred throughout design and construction. Construction cost and owner's contingency are typically incurred during construction. The escalation rate used in the calculations is 3% per year. The detailed calculations in Volume 3, Appendix C show the escalated cost by year. Exhibit 6.4 shows a summary of the estimated project cost per year including escalation and land acquisition.

Exhibit 6.4: Estimated Project Cost Per Year

Year	Construction	Soft Cost	Land Acquisition	Escalation	TOTAL
2019	$ -	$ 1,547,414		$ 46,422	**$ 1,593,837**
2020	$ 3,829,850	$ 32,932,008	$ 62,328,000	$ 6,034,572	**$ 105,124,430**
2021	$ 3,829,850	$ 31,771,447		$ 3,301,201	**$ 38,902,498**
2022	$ -	$ 31,384,593		$ 3,939,043	**$ 35,323,636**
2023	$ 30,787,123	$ 31,384,593		$ 9,902,343	**$ 72,074,059**
2024	$ 137,418,452	$ 31,384,593		$ 32,756,619	**$ 201,559,664**
2025	$ 169,541,436	$ 52,452,005		$ 51,030,490	**$ 273,023,932**
2026	$ 137,418,452	$ 52,452,005		$ 50,651,757	**$ 240,522,214**
2027	$ 41,049,498	$ 33,201,546		$ 22,629,727	**$ 96,880,772**
2028	$ 30,787,123	$ 38,027,413		$ 23,666,446	**$ 92,480,983**
2029	$ 76,680,951	$ 35,396,035		$ 43,063,774	**$ 155,140,761**
2030	$ 111,445,693	$ 27,501,901		$ 59,158,451	**$ 198,106,044**
2031	$ 84,693,464	$ 20,799,021		$ 49,426,786	**$ 154,919,270**
2032	$ 46,352,988	$ 21,716,436		$ 34,891,688	**$ 102,961,112**
2033	$ 45,562,350	$ 18,510,296	$ 31,360,000	$ 53,248,307	**$ 148,680,953**
2034	$ 45,298,804	$ 16,594,883		$ 37,427,511	**$ 99,321,199**
2035	$ 52,601,492	$ 14,986,261		$ 44,124,505	**$ 111,712,258**
2036	$ 74,509,558	$ 10,160,394		$ 59,474,973	**$ 144,144,925**
2037	$ 18,627,389	$ 2,540,099		$ 15,949,830	**$ 37,117,318**
TOTAL	**$ 1,110,434,474**	**$ 504,742,945**	**$ 93,688,000**	**$ 600,724,447**	**$ 2,309,589,866**
	48.08%	**21.85%**	**4.06%**	**26.01%**	**100.00%**

COST ESTIMATE

Exhibit 6.5 shows the estimate project cost by facility including land acquisition but without escalation.

Exhibit 6.5: Estimated Project Cost By Facility Without Escalation

	Construction $	Soft Cost $	Land Acquisition	Total	Move-In
D4 (300 bus)	$ 225,772,239	$ 102,623,745		$ 328,395,984	2025 / 2028
D2 Replacement + TEC (300 buses)	$ 241,327,770	$ 109,694,441	$ 49,000,000	$ 400,022,211	2026
D5 (Expansion of D4 to 500 buses)	$ 191,702,378	$ 87,137,445	$ 13,328,000	$ 292,167,823	2031
D6 - Phase 1 (Demo Garage + New Surface Parking)	$ 7,659,699	$ 3,481,682		$ 11,141,381	2021
D6 - Phase 2 (165 buses)	$ 139,058,965	$ 63,208,621		$ 202,267,586	2033
D6 - Phase 3 (CMF + Warehouse)	$ 113,247,010	$ 51,475,914		$ 164,722,924	2035
D3 Replacement (150 buses)	$ 111,764,336	$ 50,801,971	$ 31,360,000	$ 193,926,307	2037
General Office (GO)	$ 79,902,076	$ 36,319,126		$ 116,221,202	2026 with D2 Replacement
TOTAL	$ 1,110,434,474	$ 504,742,945	$ 93,688,000	$ 1,708,865,419	

Exhibit 6.6 shows the estimate project cost by facility with land acquisition and escalation.

Exhibit 6.6: Estimated Project Cost By Facility With Escalation

	Construction $	Soft Cost$	Land Acquisition	Escalation	Total	Move-In
D4 (300 bus)	$ 225,772,239	$ 102,623,745		$ 78,100,711	$ 406,496,695	2025 / 2028
D2 Replacement + TEC (300 buses)	$ 241,327,770	$ 109,694,441	$ 49,000,000	$ 76,230,659	$ 476,252,870	2026
D5 (Expansion of D4 to 500 buses)	$ 191,702,378	$ 87,137,445	$ 13,328,000	$ 110,239,838	$ 402,407,661	2031
D6 - Phase 1 (Demo Garage + New Surface Parking)	$ 7,659,699	$ 3,481,682		$ 764,900	$ 11,906,281	2021
D6 - Phase 2 (165 buses)	$ 139,058,965	$ 63,208,621		$ 90,312,141	$ 292,579,727	2033
D6 - Phase 3 (CMF + Warehouse)	$ 113,247,010	$ 51,475,914		$ 93,388,724	$ 258,111,648	2035
D3 Replacement (150 buses)	$ 111,764,336	$ 50,801,971	$ 31,360,000	$ 127,436,008	$ 321,362,315	2037
General Office (GO)	$ 79,902,076	$ 36,319,126		$ 24,251,466	$ 140,472,668	2026 with D2 Replacement
TOTAL	$ 1,110,434,474	$ 504,742,945	$ 93,688,000	$ 600,724,447	$ 2,309,589,866	

ESTIMATED IMPACT ON OPERATING COST

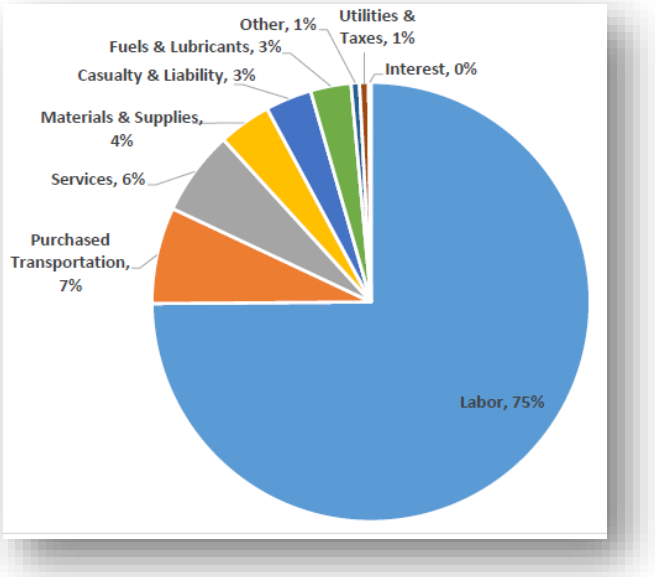
Facilities can have a significant impact on operating cost in several of areas including:

- Staffing
- Productivity (workflow on site and within the facility)
- Energy Efficiency
- Deadhead (based on location in relation to the service area)

This section provides a high-level analysis of the impacts of the proposed facility master plan on the operating cost in areas for which there is readily available data and information.

Staffing

Staffing cost (labor) accounts for 75% of AC Transit's operating expense budget adopted for FY 2017-18 as shown in the chart to the right (taken from AC Transit's website). The relative difference in labor cost has been calculated for the current and proposed operating divisions. Note that the staffing at the TEC and CMF have not been included because it is difficult to evaluate what the impact of zero emission buses (ZEBs) will have on these functions. The staff at GO is also not included in this analysis.



AC Transit Operating Expense Budget FY 2017 - 2018

Exhibit 6.7 shows the current and projected staffing cost for the transportation, vehicle maintenance, and facility maintenance for the operating divisions. The cost shown are monthly cost based on the current and project staffing shown. AC Transit provided the minimum and maximum monthly compensation for each staff position and the average monthly compensation is shown. The existing and proposed staffing is based on the information provided and generated as part of the space needs analysis. The total number of staff in each position was multiplied times the average monthly compensation to arrive at the Total Monthly Cost for the existing and proposed staff. Because the number of divisions and the total number of buses are projected to increase, a common denominator was needed to compare the relative cost between existing and proposed. To that end, the total labor cost was divided by the total fleet size to arrive at a total labor cost per bus. The monthly labor cost per bus is reduced slightly from $13,288 (current) to $13,272 (proposed). The lower cost per bus includes significant improvements such as adding body repair and paint at D3, going to three shifts at D3, and making better use of service workers time with the proposed bus parking and nightly servicing configuration.

COST ESTIMATE

Exhibit 6.7: Staffing Cost Analysis

	Avg. Monthly Comp.	EXISTING STAFF D2	D3	D4	D6	Total Staff	Monthly Cost	PROPOSED STAFF D3	D2*	D4	D5	D6	Total Staff	Monthly Cost	Remarks
Fleet Size		187	61	212	170			100	300	250	250	165			
Total		630						1065							
Transportation															
Superintendent	$ 10,239.71	1	1	1	1	4	$ 40,959	1	1	1	1	1	5	$ 51,199	
Assist. Superintendent	$ 8,777.25	2	1	2	2	7	$ 61,441	2	3	5	5	3	18	$ 157,991	Currently 1 per 200 drivers. Future at 1 per 100 drivers.
Office Manager	$ 7,534.63	1	1	1	1	4	$ 30,139	1	1	1	1	1	5	$ 37,673	
Division Clerk	$ 5,024.07	1	1	1	1	4	$ 20,096	1	1	1	1	1	5	$ 25,120	
Timekeeper	$ 5,024.07	1	1	1	1	4	$ 20,096	1	1	1	1	1	5	$ 25,120	
Chief Dispatcher	$ 6,732.27	1	2	1	1	5	$ 33,661	1	1	1	1	1	5	$ 33,661	
Dispatcher	$ 5,856.93	4	2	4	6	16	$ 93,711	3	5	5	5	5	23	$ 134,709	
Senior Supervisor	$ 8,777.25	1	1	1	1	4	$ 35,109	1	1	1	1	1	5	$ 43,886	
Road Supervisor	$ 7,534.63	11	8	10	10	39	$ 293,850	9	27	23	23	15	97	$ 730,859	Currently average 11.25 buses per supervisor
Transportation Supv. Assist. (Helper)	$ 6,453.13	2	1	2	1	6	$ 38,719	1	1	1	1	1	5	$ 32,266	
Drivers	$ 4,352.40	440	91	430	401	1362	$ 5,927,969	206	618	515	515	340	2194	$ 9,549,166	Currently average 2.06 drivers per bus
Maintenance															
Superintendent	$ 10,239.71	1	1	1	1	4	$ 40,959	1	1	1	1	1	5	$ 51,199	
Senior Supervisor	$ 8,777.25	1	1	1	1	4	$ 35,109	1	1	1	1	1	5	$ 43,886	
Supervisor (Day)	$ 8,129.92	1	1	2	3	7	$ 56,909	2	2	2	2	2	10	$ 81,299	
Supervisor (Swing)	$ 8,129.92	1	1	3	1	6	$ 48,779	2	2	2	2	2	10	$ 81,299	
Supervisor (Night)	$ 8,129.92	1	1	1	1	4	$ 32,520	2	2	2	2	2	10	$ 81,299	
Mechanics		Incl. Apprentice Mech., Journey Level Mech., Lift Mech., Sr. Elect. Tech.													4 buses per mechanic
Mechanics (Day)	$ 6,210.53	10	6	14	15	45	$ 279,474	10	29	24	24	16	103	$ 639,685	38% of mechanics
Mechanics (Swing)	$ 6,210.53	10	5	12	9	36	$ 223,579	8	24	20	20	13	85	$ 527,895	31% of mechanics
Mechanics (Night)	$ 6,210.53	13	0	14	10	37	$ 229,790	8	24	20	20	13	85	$ 527,895	31% of mechanics
Body Repair and Paint															
Body Mechanic (incl. Lift Mech.)	$ 6,210.53	6	0	9	6	21	$ 130,421	3	10	8	8	6	35	$ 217,369	Currently about 32 buses per body mechanic
Upholsterer	$ 5,910.67	1	0	1	1	3	$ 17,732	1	3	2	2	1	9	$ 53,196	
Parts Storeroom															
Working Parts Supervisor	$ 7,534.63	1	1	1	1	4	$ 30,139	1	1	1	1	1	5	$ 37,673	
Parts Clerk	$ 5,131.54	3	2	4	3	12	$ 61,578	3	5	4	4	3	19	$ 97,499	
Relief Parts Clerk	$ 5,131.54	1	1	1	1	4	$ 20,526	1	1	1	1	1	5	$ 25,658	
Fuel and Wash															
Service Worker	$ 4,157.40	25	7	32	25	89	$ 370,009	13	38	32	32	21	136	$ 565,406	Approximately 8 buses per service worker
Facility Maintenance (Division)															
FM Supervisor	$ 8,129.92	1	1	1	1	4	$ 32,520	1	1	1	1	1	5	$ 40,650	
FM Mechanic	$ 6,071.00	3	2	3	2	10	$ 60,710	2	4	3	3	2	14	$ 84,994	
FM Preventive Maint. Mechanic	$ 6,071.00	1	1	2	1	5	$ 30,355	1	3	2	2	1	9	$ 54,639	
FM Electrician	$ 6,569.33	1	1	1	1	4	$ 26,277	1	2	1	1	1	6	$ 39,416	
Custodian	$ 3,469.27	4	2	4	4	14	$ 48,570	2	4	4	4	4	18	$ 62,447	
Security		Contracted Out						Contracted Out							

TOTAL Labor Cost (Existing)	**$ 8,371,705**
TOTAL Labor Cost per Bus (Existing)	**$ 13,288**

TOTAL Labor Cost (Proposed)	**$ 14,135,053**
TOTAL Labor Cost per Bus (Proposed)	**$ 13,272**

Energy Efficiency

The Facilities Utilization Plan recommends eventually replacing all existing facilities at D2, D4, and D6 either on-site or at a new site. The facilities at D3 could remain, however the fleet would be increased to around 100 buses (from 61 currently). In addition, a fifth division (D5) is proposed to accommodate the fleet growth projections. New facilities must meet California Title 24 Building Energy Efficiency Standards that address energy efficiency requirements and outdoor/indoor environmental quality. These standards can significantly reduce energy and facility maintenance cost over the life of the facilities.

AC Transit is conducting an independent Utility Bill Review and Cost Recovery project, which will help identify actual operating cost related to utility usage. This information will be help a design team estimate the impact on operating cost associated with various design solutions in the future.

Deadhead Cost

The analysis of deadhead cost is not in the scope of this project; however, the Facilities Utilization Plan recommends expansion of the D4 and addition of D5 on an adjacent site, plus replacement of D2. The combination of these three facilities in the core of AC Transit's service area will support a total fleet of 650 to 800 buses. It is anticipated that the location of these facilities in relation to the AC Transit service area will minimize deadhead costs as the facilities come on-line and the fleet expands.

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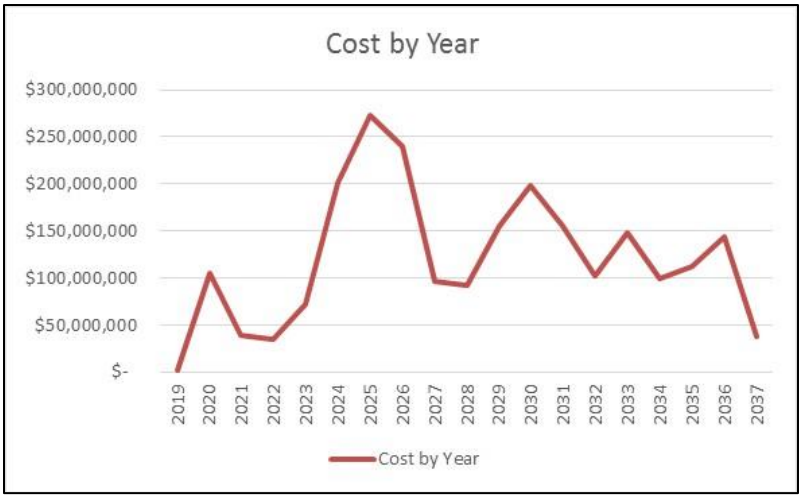
TRANSIT

FUNDING AND FINANCING OPTIONS

INTRODUCTION

The estimate of probable project cost presented earlier in this report shows a total cost (including construction, soft cost, land acquisition, and escalation) of over $2.3 billion over the next 19 years. This equates to an average of approximately $121.6 million per year. Exhibit 7.1 shows the estimated funds needed per year in tabular and graphic format. Note that over $62 million of the $105.1 million needed in 2020 is for acquisition of two sites, the water tower site and a new site for a D2 replacement facility.

Exhibit 7.1: Estimated Funds Needed Per Year



Year	TOTAL
2019	$ 1,593,837
2020	$ 105,124,430
2021	$ 38,902,498
2022	$ 35,323,636
2023	$ 72,074,059
2024	$ 201,559,664
2025	$ 273,023,932
2026	$ 240,522,214
2027	$ 96,880,772
2028	$ 92,480,983
2029	$ 155,140,761
2030	$ 198,106,044
2031	$ 154,919,270
2032	$ 102,961,112
2033	$ 148,680,953
2034	$ 99,321,199
2035	$ 111,712,258
2036	$ 144,144,925
2037	$ 37,117,318
TOTAL	$ 2,309,589,866

Due to the uncertain nature of transit funding over this timeframe, AC Transit will need to constantly monitor funding and financing opportunities and coordinate with federal, state, and local sources. This section provides a snapshot of the funding and financing programs currently available.

Funding Programs

Exhibit 7.2 shows the current funding programs available to AC Transit for bus maintenance and operating facilities at the federal, state, and local level. For each program, the following information is provided, if available.

Amount Enacted in FY 17
Amount Enacted in FY18
Amount Proposed in FY 19
Eligibility Criteria
Success Rate
Average Grant Size
Next Deadline
Comments

FUNDING AND FINANCING OPTIONS

The ballot measure for Regional Measure 3 passed on June 5, 2018. This will provide AC Transit with a stream of income in the coming years to help fund projects that reduce travel times and increase service along key corridors and to increase service across the Bay Bridge.

The announced deadlines in 2018 have all passed or are approaching quickly.

Deadlines for 2019 are expected to be in the same timeframe as those in 2018.

Note that FTA Capital Investment Grants are listed, however, the need across the nation (i.e. current pipeline) is nine times the expected funding!

The total amount proposed for funding programs in FY 19 is almost $12.5 billion on a competitive basis. AC Transit's projected need for the next four years (2019 through 2022) is approximately $180.94 million

AC Transit Need (2019 through 2022)

$180.94 M

Financing Programs

Exhibit 7.3 shows the current financing programs available to AC Transit.

Abbreviations used in Exhibits 7.2 and 7.3

CARB (California Air Resources Board)
GHG (Greenhouse Gas Emissions)
MTC (Metropolitan Transportation Commission)
STIP (Statewide Transportation Improvement Program)
TIFIA (Transportation Infrastructure Finance & Innovation Act)
VMT (Vehicle Miles Traveled)

The Federal Transit Administration (FTA) provides formula grants such as State of Good Repair Granst – 5337 and Grants for Buses and Bus Facilities Formula Program – 5339(a), which are handled through the Metropolitan Transportation Commission (MTC). AC Transit is subject to the MTC's Transit Capital Priorities (TCP) Program and their Core Capacity Challenge Grant Program (CCCGP). Therefore, the amount that might be available to AC Transit annually for facilities through these grants is difficult to identify.

Exhibit 7.2: Funding Programs

FUNDING PROGRAMS	FY 17 Enacted	FY18 Enacted	FY19 Proposed	Eligibility Criteria	Average Grant ($)	Type / Schedule	Comments
	In Millions						
BUILD (formerly TIGER) Transportation Grants	$ 500.0	$ 1,500.0	$ 1,000.0	Wide range of transportation projects including bus facilities	11,880,044	Competitive Q2 2019	
Bus / Bus Facility Discretionary Grants	$ 400.0	$ 654.6	$ 513.0	Vehicles and facilities	$2,034,206	Competitive August 2019	
Lo-No Discretionary Grants		$ 84.5	$ 84.5	Vehicles and facilities that support low or no emission vehicles	$1,078,275	Competitive Q3 2019	
State Low Carbon Transit Operations Program	$ 45.0	$ 75.0	$ 75.0	Vehicles and facilities	$328,944 See Comments	Formula Around March, 2019	AC Transit has typically received about $4M annually.
CARB Hybrid and Zero-Emission Truck and Bus Voucher Incentive	$ 10.0	$ 10.0	$ 25.0	Vehicles and facilities	$54,477	Competitive	
State Transit and Intercity Rail Capital Program	$ 245.0	$ 245.0	$ 245.0	Capital for "transformative projects that reduce GHGs and VMT"	$94,642,857	Competitive January 2019	
Regional (MTC) Gas Tax Increase							Possible source in the future
California Volkswagen Assessment		$ 35.0	$ 40.0	Vehicles and charging infrastructure		Competitive	
Regional Measure 3 (AC Transit Rapid Bus Corridor)			$ 100.0	Vehicles and capital improvements	Ballot measure passed 6/5/18		To reduce travel times and increase service along key corridors
Regional Measure 3 (Core Capacity Transit Improvements)			$ 140.0		Ballot measure passed 6/5/18		AC Transit projects designed to increase service across Bay Bridge is priority recipient
FTA Capital Investment Grants	$ 2,650.0	$ 2,550.0	$ 2,550.0	BRT and rail		Competitive Early fall 2019	**Current pipeline is nine times (9X) expected funding!!!**

FUNDING AND FINANCING OPTIONS

Exhibit 7.3: Financing Programs

FINANCING PROGRAMS	FY 17 Enacted	FY18 Enacted	FY19 Proposed	Eligibility Criteria	Success Rate	Next Deadline	Comments
TIFIA Loans		$275 M (leverages almost $3 B in loans)	$300 M (leverages $3 B in loans)	All bus and rail capital is eligible. Must be included in California's STIP. Projects must be at least $50 M TIFIA credit limited to a maximum of 33% of the total eligible project costs.	Rare for bus depots	Ongoing	Although not typically used to operations and maintenance facility replacements, WMATA and other agencies have used these loans for facilities (thypically part of larger projects).
Tax Increment Financing	N/A			Potential Contra Costa County special District 2 parcel tax could be leveraged for a Fremont location (which is too far south for a facility).		TBD	Could be leveraged as part of the nearby adjacent proposed property tax increase strategy. Need to check bonding capacity, political feasibility etc.
Joint Development Options	N/A				Rare for maintenance facilities	TBD	Further discussion needed to determine colocation interest (i.e. with other local agencies, etc.). One possibility would be codevelopment of the water tower site for Division 5 to include community amenities such as retail, police substation, or fire station with the City of Oakland.

Sale of Existing Property

Another source of funds could come from the sale of existing property as it becomes available. The table below shows the appraised value of sites that could be considered, along with the appraisal date and the date when they might be available for sale based on the implementation schedule.

When AC transit develops a detailed financing plan for facility redevelopment, the appraised values of AC Transit property, including the GO and D2, should be reviewed closely to take advantage of increased values in the downtown Oakland and Emeryville areas.

Proceeds from the sale of property may be used as local match in grant applications, however, the value of FTA's interest in the sold property must be coordinated with FTA.

Another alternative would be to sell the property and lease it back for a specified period. This could provide cash immediately for investing in land or for use as local match in grant applications, however, this would impact operating cost with the addition of a lease.

Exhibit 7.4: Existing Property Appraisals

Property	Appraised Value	Appraisal Date	Projected Year Available
D2 (Emeryville) *	$ 26,500,000	October 23, 2017	2027
D3 (Richmond)	$ 12,000,000	August 1, 2017	2037
Newark Warehouse	$ 4,700,000	September 15, 2017	2019
General Office (GO) **	$ 29,500,001	November 28, 2017	TBD
CMF	$ 26,196,000	October 22, 1999	2036

* D2 was appraised after the City of Emeryville re-zoned the site for open space use. Therefore, the appraised value may not reflect the full potential of the site if it was zoned for more intense land use.

*** The projected replacement cost for the GO is over $140 M with escalation.*

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PROJECT DELIVERY OPTIONS

INTRODUCTION

Transit agencies in the United States have several project delivery methods available for design and construction of maintenance and operations facilities. The purpose of this section is to identify project delivery methods, provide a definition of each method and the advantages and disadvantages of each method. Project delivery methods has been the subject of many publications and extensive research. The information contained herein is drawn from:

- "Evaluation of Project Delivery Methods"
  Sponsored by the Federal Transit Administration (FTA) in cooperation with the Transit Development Corporation. Conducted through the Transit Cooperative Research Program (TCRP), which is administered by the Transportation Research Board (TRB) of the National Academies. Herein after this document will be referred to as "TCRP". A PDF of the report is available at http://nap.edu/23043.
- "Handbook on Project Delivery" published by The American Institute of Architects, California Council (1996). Herein after this document will be referred to as "AIACC".
- WSP experience in project delivery

PROJECT DELIVERY METHODS

There are a wide range of project delivery methods with various permutations of each, however, the methods can be grouped under the following five project delivery methods that are addressed in this report.

- Design-Bid-Build (DBB)
- Construction Manager-at-Risk (CMR)
- Design-Build (DB)
- Design-Build-Operate-Maintain (DBOM)
- Developer Led Design-Build (Developer DB)

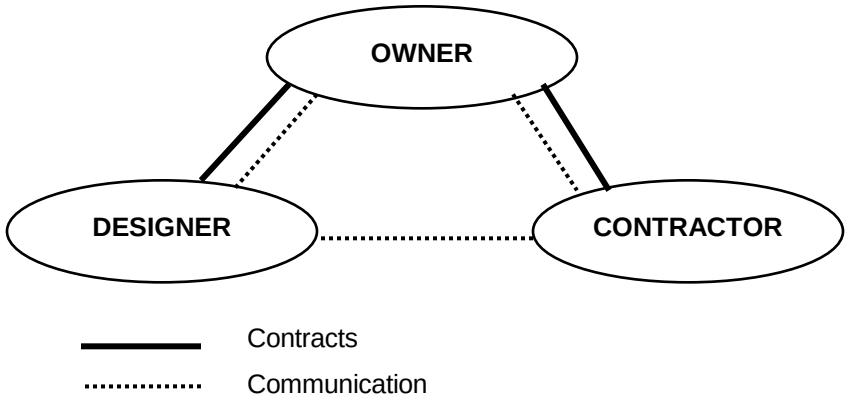
Note that research shows that all project delivery methods addressed herein have statutory authorization in Oakland, California

Design-Bid-Build (DBB)

Design-Bid-Build is the most common delivery method used by transit agencies across the country. The owner has a direct contractual relationship with the designer and the contractor, as shown in Exhibit 8.1 (adapted from AIACC). The designer is responsible for preparing construction documents (drawings and specifications), which are used as the basis for bidding the work and the award is made to the lowest responsible bidder. The owner is financially liable for all cost of design and construction. The owner, designer, and contractor must work throughout the process to avoid adversarial relationships. Note that there is no such thing as a "perfect set of documents" and the contractor has no incentive to minimize the cost of change orders in DBB. The TCRP report references that the defining characteristics of DBB are:

- The owner has separate contracts for design and construction.
- Contractor selection is based entirely on cost.
- Design documents are 100% complete.

Exhibit 8.1: Design-Bid-Build (DBB)



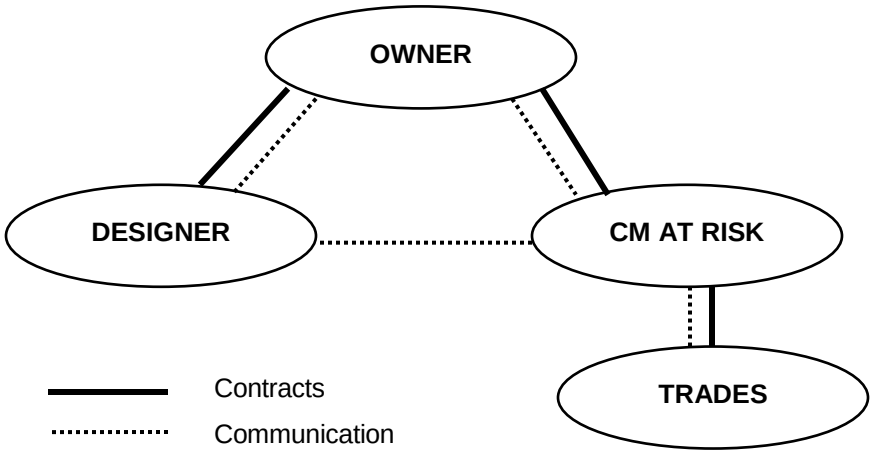
Construction Manager-at-Risk (CMR)

Construction Manager-at-Risk is an approach that utilizes a construction manager who is responsible for coordinating all construction trades and is at risk for the final cost and time of construction. The owner has a direct contractual relationship with the designer and the CMR and the CMR has direct contractual relationships with each construction trade as shown in Exhibit 8.2 (adapted from TCRP). The CMR typically works collaboratively with the designer during the design process to provide cost estimating, scheduling, constructability reviews and value engineering. The CMR is selected based on qualifications and past performance. At some point in the design process, the CMR submits a guaranteed maximum price (GMP) that becomes the basis for a contract between the owner and the CMR. The GMP may be established between 60% and 90% design, depending on several variables.

The TCRP report references that the defining characteristics of CMR are:

- The owner has separate contracts with the designer and the CMR.
- The CMR is chosen based on criteria other than just the lowest construction cost, such as qualifications and past performance.
- The CMR contracts directly with trades and takes on 'performance risk' (cost and schedule commitments).
- Schedule allows for overlapping design and construction.
- Owner procures preconstruction services from the CMR.
- Owner expects the CMR to provide guaranteed maximum price (GMP) and to commit to a delivery schedule.
- "Transparency is enhanced, because all costs and fees are in the open, which diminishes adversarial relationships between components working on the project, while at the same time eliminating bid shopping."

Exhibit 8.2: Construction Manager-at-Risk (CMR)



AC Transit may be allowed to utilize CMR as a project delivery method based on California Senate Bill 914 (SB 914) recently signed into law.

Design-Build (DB)

Design-Build is an approach in which the owner has a single contract for both design and construction with the design-builder, as shown in Exhibit 8.3 (adapted from TCRP). This provides a single point of responsibility for design and construction. The TCRP report states that "There are a number of variations on the DB process, but all involve three major components. The owner develops an RFQ/RFP that describes essential project requirements in performance terms. Next is the evaluation of proposals, and finally with evaluation complete, the owner must engage in some process that leads to contract award for both design and construction services. The DB entity is liable for all design and construction cost and normally, must provide a firm, fixed price in its proposal."

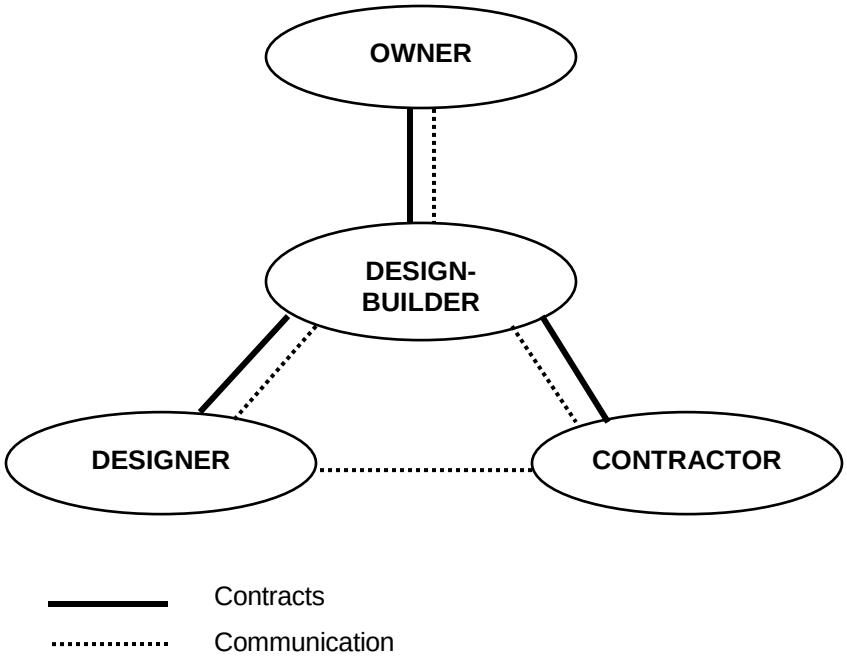
The DB approach is typically used when schedule is critical, however, the owner relinquishes some control of the design. Several transit agencies across the United States have used this method successfully by developing a set of "bridging documents" and including them in the RFQ/RFP for DB services. The bridging documents provide design criteria, specifications, and drawings at the 20% to 30% level including site plans, floor plans, building elevations, and building sections. Washington Metropolitan Area Transit Authority (WMATA) in Washington, DC used this approach on its Shepard's Parkway Bus Operating Facility (complete) and Andrews Federal Bus Facility (under construction), and is currently developing the bridging documents for its Bladensburg Bus Operating Facility and its Northern Bus Operating Facility. The experience with WMATA and several other agencies as shown that DB teams understand building systems, but may not have the expertise necessary to select, specify, and layout the shop equipment in the maintenance, fuel, and wash facilities. For this reason, the shop equipment drawings and specifications in the bridging documents are developed to the 90% to 100% level. This gives the agency more control in this critical area while allowing the DB team to bring its expertise to the building systems to meet the performance requirements outlined in the RFQ/RFP.

The TCRP report references that the defining characteristics of DB are:

- Single point of responsibility.
- Schedule allows for overlapping design and construction.
- The design-builder furnishes preconstruction services during the project design.
- Owner expects the design-builder to provide a firm fixed price and to commit to a delivery schedule.

Note that the design-builder may be the designer, the contractor, or a third party, however, the contractor is typically the design-builder due to the risk being taken.

Exhibit 8.3: Design-Build (DB)



Design-Build-Operate-Maintain (DBOM)

Design-Build-Operate-Maintain is a variation on Design-Build with the design-builder assuming the operation and maintenance risk for a specified period. This approach has been used on large transportation projects such as toll roads, light rail projects, and people mover projects like the Hartsfield Terminal to Rental Car Facility People Mover in Atlanta.

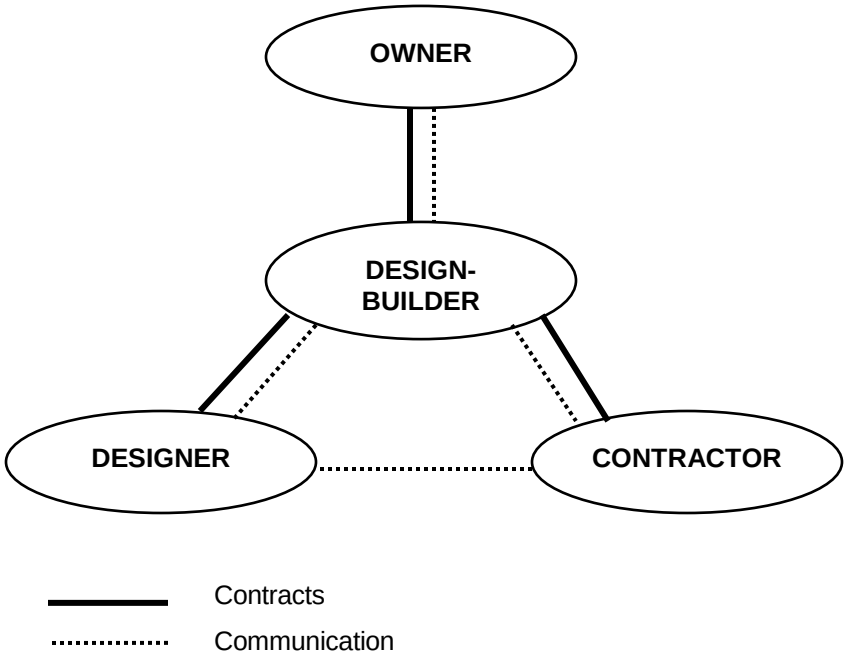
This project delivery approach is not typically used for bus maintenance and operations facilities and would probably not be applicable to AC Transit's Facilities Utilization Plan due to labor issues. For purposes of this report, the DBOM project delivery method is dropped from further discussion.

Developer Led Design-Build (Developer DB)

Developer Led Design-Build is also a variation on Design-Build with the developer being the design-builder with direct contractual relationships with the designer and the contractor. The developer has a contractual relationship with the owner as shown in Exhibit 8.4, which provides a single point of responsibility. This approach is most often used when the developer owns the project site (or has a long-term lease on the site) and develops the facilities in a "build to suit" arrangement with the owner for leasing or lease to own.

The approach may be appropriate for AC Transit for sites available for lease but not for sale.

Exhibit 8.4: Developer Led Design-Build (Developer DB)



ADVANTAGES AND DISADVANTAGES

There are a host of issues that should be considered when selecting the most appropriate project delivery method for each project. The TCRP Report lists the issues under five broad categories as shown below.

Project Level Issues

- Project Size
- Cost
- Schedule
- Risk Management
- Risk Allocation
- LEED Certification

Agency Level Issues

- Agency Experience
- Staffing required
- Staff Capability
- Agency Goals & Objectives
- Agency Control of Project
- Third Party Agreement

Public Policy / Regulatory Issues

- Competition
- DBE Impacts
- Labor Unions
- Fed/State/Local Laws
- FTA/EPA Regulations
- Stakeholder/ Community Input

Life Cycle Issues

- Life-Cycle Costs
- Maintainability
- Sustainable Design Goals
- Sustainable Construction Goals

Other Issues

- Construction Claims
- Adversarial Relationship

Chapter 5 of the TCRP Report provides an extensive description of the advantages and disadvantages for each project delivery method for each of the issues listed above in an objective manner (i.e. it "is not deterministic or judgmental"). The matrix in Exhibit 8.5 has been developed to specifically tailor the information for AC Transit consideration.

Project delivery method is not restricted by project size, however per the TCRP report, "this issue needs to be considered in combination with other issues such as schedule, agency staffing, risk management, and others."

TIMING OF PROJECT DELIVERY METHOD SELECTION

Ideally, the project delivery method to be used for a specific project should be selected as early as possible in the facility development process. This will allow AC Transit to develop the appropriate procurement documents for soliciting the services needed in a timely manner.

Exhibit 8.5: Project Delivery Method Advantages and Disadvantages

(see Chapter 5 of TCRP report for detailed discussion)

	Advantages	Disadvantages
Design-Bid-Build (DBB)	1. AC Transit maintains control over design. 2. Bidding is based on 100% design. 3. Contractor competition is enhanced (depending on local bid climate). 4. Unit price bids may be used when quantities are uncertain. 5. AC Transit has experience with DBB. 6. Can more easily assure achievement of agency goals and objectives such as DBE participation and addressing stakeholder concerns.	1. Contractor not involved during design. 2. Contractor has no incentive to minimize cost of change orders. 3. Less opportunity to compress schedule. 4. May require more AC Transit staff time than other methods. 5. Typically has the highest occurrence of claims and disputes. 6. There is no single point of responsibility for design and construction
Construction Manager-at-Risk (CMR)	1. AC Transit maintains control of design 2. The contractor is involved during design (cost, schedule, constructability, value engineering). 3. A guaranteed maximum price (GMP) can be established prior to completion of design (i.e. AC Transit will know the cost earlier). 4. Schedule could be compressed by overlapping design and construction. 5. May require less AC Transit staff time than other methods because some managing duties are delegated to the CMR	1. Project not put out to bid (however, "open book" pricing can assure competitive pricing) 2. May be difficult to evaluate validity of GMP compared to DBB process. 3. AC Transit does not have experience with CMR. 4. There is no single point of responsibility for design and construction.
Design-Build (DB)	1. Reduces potential for cost overruns. 2. AC Transit will have a firm fixed price earlier in design. 3. Schedule could be compressed by overlapping design and construction. 4. Greater schedule certainty earlier in the project. 5. Obligates design and construction funds at the same time. 6. There is one point of responsibility for design and construction	1. To take advantage of DB, AC Transit must clearly define performance based design criteria and forfeit some control of the design. 2. If AC Transit goals are not clearly defined prior to procurement, DB results may not meet expectations. 3. AC Transit does not have experience with DB. 4. Studies are not conclusive regarding impact on agency staff time (i.e. may be like DBB).
Developer Design-Build	1. See Design-Build (DB) 2. May allow the project to be developed much quicker as a "build to suit" with lease back or lease to purchase agreement. 3. There is one point of responsibility for design and construction	1. See Design-Build (DB) 2. May require lease back, which would fund the project from operating dollars rather than capital dollars (i.e. increase operating cost).

PROJECT DELIVERY RECOMMENDATIONS

Based on the information in this section and the implementation plan for the AC Transit Facilities Utilization Plan presented in this report, the following are recommended project delivery methods to be used in development of the facilities scheduled for the next ten years. Beyond these projects, the project delivery method to be used should be evaluated based on experience with the initial projects and the in-house expertise at AC Transit at the time.

1. **Develop Detailed Design Criteria**

   The Facilities Utilization Plan is based on input from over forty (40) key AC Transit staff. During those discussions, specific criteria were identified and used to develop the detailed space program. A detailed design criteria document should be developed to guide design teams as they prepare detailed designs for each facility. The detailed design criteria can be used in any project delivery method and should be developed as soon as possible (in 2019) to form the basis for design of facilities moving forward.

2. **Division 4 should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk (CMR)** for the following reasons:
   - The implementation plan does not indicate a need to accelerate the schedule. Schedule acceleration is one of the primary reasons for using DB. If schedule is not an issue, there is no need to relinquish some design control.
   - AC Transit is familiar with DBB and CMR requires similar management expertise.
   - These methods maintain AC Transit's control of the design.
   - Using CMR will involve the contractor during design, which may help with coordination of workaround planning.

3. **Division 2 Replacement should consider utilizing Developer Led Design-Build if:**
   - The selected site is owned by the developer or the developer has a long-term lease on the site (note that AC Transit has had difficulty identifying sites for acquisition, so this may be an alternative that must be considered) and,
   - The developer will not sell the site.

4. **Division 2 Replacement should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk if the site is acquired by AC Transit (i.e. not owned or leased by a developer)**, for the same reasons listed above for Division 4, except workaround planning is not anticipated.

5. **Division 5 should utilize Design-Bid-Build (DBB) or Construction Manager-at-Risk (CMR)** for the same reasons listed above for Division 4.

Note that the information contained in this section is a general overview and not intended to be providing legal advice. AC Transit should consult an attorney for legal advice.

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TRANSIT

RECOMMENDATIONS AND NEXT STEPS

Recommendations (listed in order of importance based on current priorities)**:**

1. Redevelop and expand D4 utilizing the AC Transit owned 66th Avenue site to accommodate 250 to 300 buses.
2. Replace D2 with a new facility on a new site with at least 28 acres to accommodate 250 to 300 buses. (Note that finding a new site has been a challenge. AC Transit may also consider long-term leasing in addition to purchasing a site.)
3. Relocate the Training and Education Center (TEC) to the site of the new D2 facility.
4. If fleet growth indicates the need for additional capacity, develop D5 adjacent to D4 (on the Water Tower Site) to accommodate up to 250 buses.
5. Redevelop D6 to accommodate 170 buses.
6. Per the implementation plan, in 9 years (2027), identify the needs of the Central Maintenance Facility (CMF) and determine if the CMF needs to be relocated.
7. Per the implementation plan, in 13 years (2031), define specific needs of D3 and determine if a new site is needed to accommodate a fleet larger than 100 buses.
8. Identify an internal "champion" for the Facilities Utilization Plan who will have responsibility for overseeing the implementation of the plan and periodic review of the plan.
9. Periodically review the Facilities Utilization Plan and update it as necessary to reflect changing conditions and priorities.
10. Begin implementation of the Facilities Utilization Plan as outlined under "Next Steps".

Next Steps:

The following are the next steps for implementation of the Facilities Utilization Plan.

- Board approval of the Facilities Utilization Report (February 2019)
- Establish ZEB fleet mix (battery electric versus fuel cell electric) to be accommodated
- Develop design criteria document for a typical operating division to guide development of facilities
- Conduct a traffic study on Seminary Avenue and 66th Avenue and surrounding intersections to determine if off-site improvements are needed at D4.
- Begin implementation as soon as possible
  - ✓ Secure funding
  - ✓ Acquire property (the water tower site and a site for D2 replacement)
  - ✓ Environmental (if necessary)
  - ✓ Determine project delivery method to be used for each project
  - ✓ Determine how to staff for projects (in-house versus program manager)
  - ✓ Design & construction

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