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CHAPTER 4

infrastructure systems

4.01 INTRODUCTION

The purpose of infrastructure system analysis is to: 1) identify the utility providers for this corridor; 2) provide a general review of potential limitations in the currently installed systems; and 3) recommend feasibility-level improvements and associated costs. This review is based on block map information from the various utility companies, discussions with utility provider staff, and available public domain reports and records. A list of references is included at the end of this chapter.

Capacity for utility systems is determined by the type and density of development within the corridor. In the existing condition, San Pablo Avenue is primarily a business district with some medium density development up to three story buildings. It is assumed that the current utility facilities are sized to maintain service and operations at an optimal level.

For most systems, the future demands and the infrastructure system to support those demands evaluated two planning horizons, Buildout and Year 2040. The total proposed development for Year 2040 planning horizon assumes all the planned and entitled projects as well as development of high feasibility sites. The Buildout planning horizon assumes all development envisioned in the Year 2040 scenario as well as development of other underutilized parcels which maybe developed after 2040. The Building horizon is evaluated as some infrastructure improvements need to take account long term needs beyond 2040. A limited discussion of the ability of the utility systems to support future opportunities for development within the San Pablo Corridor is provided. Existing drainage system deficiencies known from other utility study documents are noted. Correction of these deficiencies is part of the City’s ongoing capital improvement program. Analyses of upstream and downstream requirements from the San Pablo corridor are not part of the analysis. The needs for additional information and investigation, to better confirm conclusions, are also discussed.
4.02 STORM DRAINAGE SYSTEM

4.02.01 GENERAL

The storm drainage system within San Pablo Avenue is owned and maintained by the City of Richmond and by the City of El Cerrito. State Route 123 roadway (including curb and gutter) from the Alameda/Contra Costa County line in the south to Cutting Blvd in the north is owned by Caltrans but the City of El Cerrito owns and maintains the sidewalks and the drainage system. Between Cutting Blvd and the City limit with Richmond in the north, the City of El Cerrito owns and maintains the roadway, the sidewalks and the drainage system. The pipelines collecting runoff from this area discharge to Baxter Creek and Cerrito Creek. Based upon the Caltrans Highway Design Manual, Chapter 830, Table 831.3, the system was most likely designed to handle the design event of the 10-year storm. This assumption is based upon the low roadway speed and the urbanized nature of the roadway. For roadway speed design, local standards were most likely used.

Based upon the review of aerial photography, the existing condition of San Pablo Avenue and the surrounding parcels is highly developed. There is little open, unpaved area. The study area consists of significant impervious surfaces including buildings, roadways, parking lots, sidewalks, and walkways.

The drainage systems within the area are subject to the standards of the cities, the Contra Costa Clean Water Program (CCCWP), and Caltrans Stormwater Quality requirements.

4.02.02 SUPPLY AND CAPACITY

The 1999 City of El Cerrito Storm Drain Master Plan (SDMP) noted certain storm drain deficiencies within the San Pablo Specific Plan corridor and ranked deficiencies by priority for improvements. Highest priority was 1 and lowest priority was 30. The SDMP listed a deficiency with the existing 54 lineal feet (LF) and 71 LF 16-inch x 25-inch storm drain (site number 8) at intersection of Potrero Avenue and San Pablo Avenue, and categorized this as priority 14. The SDMP listed a deficiency with the existing 360 LF 48-inch storm drain (site number 11) along San Pablo Avenue between Moeser Lane and Plumas Avenue and categorized this as priority 6. The SDMP listed a deficiency with the existing 150 LF 24-inch storm drain (site number 15) along San Pablo Avenue, between Fresno Avenue and Columbia Avenue, and categorized this as priority 16. Lastly, the SDMP listed a deficiency with the existing 480 LF 30-inch storm drain (site number 17) along San Pablo Avenue, between Central Avenue and Fairmont Avenue and categorizes this as priority 15. City staff has also noted some localized flooding on Kearney Street and San Pablo Avenue near Fairmount Avenue. Improvements to address these deficiencies are part of the City’s ongoing capital improvement program.

Based upon runoff patterns discussed below, the system appears to collect runoff from the residential areas east of San Pablo Avenue. This runoff is then conveyed via pipes to San Francisco Bay. Complete data are not available. However, Baxter Creek crosses San Pablo Avenue just south of MacDonald Avenue. Additional information concerning pipes collecting runoff within the City of El Cerrito was not available for this study. was made available from the City’s update to the Storm Drain Master Plan, which is underway.

4.02.03 RUNOFF PATTERNS

The general drainage direction of the watershed is from northeast to southwest. Drainage on San Pablo Avenue is collected in gutters along the face of existing concrete curbs. The gutters convey runoff to inlets along the edges of the roadway. The inlets discharge to underground pipes which then flow to Baxter Creek and Cerrito Creek, within the project limits. These underground pipes are assumed to connect to pipes within cross streets to the north and south.

Project limits are located within the Baxter Creek and Cerrito Creek watersheds. Baxter Creek is located near the northerly limits of the study, just south of MacDonald Avenue. Within the project limits, Baxter Creek is mainly a constructed earth channel. Downstream of the project, Baxter Creek is almost exclusively underground until discharge to Stege Marsh and the San Francisco Bay.

Within the project limits, North Fork Cerrito Creek is underground. Just downstream of the project, North Fork Cerrito Creek discharges to Cerrito Creek, which is almost exclusively a constructed or natural earth channel until discharge to Albany Flats and the San Francisco Bay.

The existence of 100-year floodplains was explored via Federal Emergency Management Agency (FEMA) flood mapping information. Per FEMA FIRMS Community Panel Number 0600350020 C, there is not a 100-year floodplain between the northerly limits of the project and the railroad crossing just south of MacDonald Avenue. Per FEMA FIRMS Community Panel Number 0650270003 B, the remaining study area is not within a 100-year floodplain.
4.02.04  RATIO OF PERVIOUS TO IMPERVIOUS AREA

The assessment of the amount of impervious surface is based upon review of aerial photography and approximations of this visual assessment.

The study area is highly developed and impervious. The existing condition includes a paved roadway with a minimum of four lanes of traffic. At intersections, the roadway widens to accommodate varying numbers of turning lanes. Additional roadway width also accommodates parallel parking.

The existing medians vary between being raised and at-grade. Raised medians are landscaped with grass and trees and hardscaped with cobbles and concrete. New raised medians were installed at the south part between Central Avenue and Carlson Boulevard.

The parcels surrounding San Pablo Avenue are highly developed. Up to 90 percent of the existing parcels tend to include impervious surfaces such as buildings, parking lots, and sidewalks. Approximately 10 percent of the parcels have a landscape buffer. These buffers tend to be a maximum of 10 feet wide. Along approximately 25 percent of the length of the study, the sidewalks contain street trees. These trees tend to be located within tree well insets in the sidewalk.

4.02.05  DESIGN CONSIDERATIONS

There are three storm drainage requirements with which the project must comply:

A. Collection and conveyance of the 10-year storm event.

B. Compliance with hydromodification management.

C. Compliance with storm water quality regulations.

During the 10-year storm event, the project must collect roadway runoff efficiently. This collection will prevent impacts to the walking public and provide a safer environment for traffic.

To comply with generally accepted standards as well as City standards, the project may require additional inlets and connecting pipelines at traffic calming bulb-outs and upstream of mid-block crosswalks. Because of the highly-developed nature of the project and the requirement for compliance with hydromodification management within the County, it is assumed that there will be no need for trunk pipe size increases. However, during design it would be cost-effective to rehabilitate or replace existing pipelines in poor condition. Pipelines can be inspected via CCTV to verify condition. Modifications to curbs, gutters, medians, and crossing locations may necessitate the replacement of existing storm drain inlets and connecting pipelines. These modifications may also require the addition of manholes at junction points to facilitate maintenance.

Hydromodification Management (HM) is the management of storm water, “such that post-project stormwater discharge rates and durations match pre-project discharge rates and durations from 10% of the pre-project 2-year peak flow up to the pre-project 10-year peak flow.” [2] Typically, if a project creates or replaces more than one acre of impervious surface, it is subject to hydromodification management requirements. However, if the project does not increase the impervious surface to levels greater than the existing condition, hydromodification management is not required. In the case of the Specific Plan, the proposed roadway curb-to-curb width is anticipated to be equal to existing conditions.

In addition, the existing area is highly developed with very small amounts of remaining pervious surfaces. The validity of the assumption that the impervious surface will not increase will need to be verified when more defined site plans are developed.

Currently the San Pablo Avenue area is covered under the California Regional Water Quality Control Board, San Francisco Bay region, Municipal Regional Stormwater NPDES Permit (MRP) Order R2-2009-0074, NPDES Permit No. CAS612008. The Permit was adopted October 14, 2009 and revised November 28, 2011. All new projects in this plan are covered under this permit including new development, redevelopment, industrial and commercial sites. Under the current version of the 2018 303(d) List of Impacted Water Bodies, Baxter creek and Cerrito creek are listed under the TMDL required list. This list cites various creeks and water bodies as well as pollutants of concern.

Permanent post-construction Best Management Practices (BMPs) are required. The MRP, in effect since December 1, 2011, mandates a low impact development (LID) approach and went into effect December 1, 2011. LID treatment measures are: rainwater harvesting and re-use, infiltration, evapotranspiration, or bio-treatment. All projects shall follow the Contra Costa Clean Water Program Stormwater C.3 Guidebook (current edition- February 15, 2012). Special Projects defined in Table 4-14 of the Guidebook may use non LID treatment systems such as tree boxes or vault-based high-flow rate media filters meeting the minimum criteria per the C.3 website.

November 15, 2015
May 17, 2017
3-8
7th
November 28, 2011
303(d) List of Impacted Water Bodies
TMDL Required List
Contra Costa Clean Water Program
Stormwater C.3 Guidebook
San Pablo Avenue Specific Plan - August, 2014 - Corrected - 04-3
BMPs must be incorporated to accommodate the runoff from impervious surfaces in compliance with the NPDES Permit. This need can be achieved through the use of low impact development (LID) features as well as various BMPs. LID features reduce the impervious surfaces. These features include pervious pavements, landscape features, and green roofs. Parking stalls and plaza areas along San Pablo Avenue may be able to utilize pervious asphalt, pervious concrete, or permeable pavers. Medians may be landscaped to increase permeability. Landscaped open space will contribute to reductions in impervious surfaces.

Given the existing level of urbanization and the proposed plans for the areas adjacent to San Pablo Avenue, BMPs should fit the project character and account for potential constraints. Bioretention planter areas may be used to treat roadway runoff. Flow-through planter boxes may be used to treat roof runoff. During design, the Stormwater C.3 Guidebook should be referenced for acceptable BMPs, design considerations, design criteria, and operation and maintenance information. In addition to the C.3 Guidebook, the project should also determine if drainage will discharge to a water body impacted by specific pollutants. The 2008 2018 303(d) List of Impacted Water Bodies (303(d) List) has been prepared and issued by the Regional Board. Baxter Creek and Cerrito Creek have been added to the 303(d) List as TMDL required list. The Municipal Regional Permit (MRP) provides more detailed information concerning this subject.

4.02.06 RECOMMENDED IMPROVEMENTS

The recommended improvements cited relate to the right-of-way limits of San Pablo Avenue. The parcels to be developed into mixed use, office, residential, and commercial sites must accommodate their own storm drainage, hydromodification, and storm water quality improvements for each parcel. Regional facilities may be desirable to accommodate some developments or to reduce operation and maintenance responsibilities.

According to proposed Complete Streets streetscape designs, San Pablo Ave will mostly maintain existing curb edge and stormwater flowline. In the Uptown area the sidewalks will be widened away from the road. Those additional impervious areas will have to be treated for water quality along the sidewalk.

Improvements related to 10-year storm event include those items recommended to provide collection and conveyance for a designated design event. The improvements are not required to address additional flows since the proposed streetscape design maintains existing runoff conditions. Deficiencies along San Pablo Avenue have been analyzed as part of the update to City’s Storm Drain Master Plan, which included an evaluation of pipe sizes 18-inches and up. This is an on-going effort with most of the analysis completed in 2018. The goal of the update to the City’s Storm Drain Master Plan is to provide the City system with 10-year capacity. Projected costs for pipe capacity projects and condition improvement projects within the Specific Plan area are $1,937,000 and $578,000 respectively, based on the analysis to date. These costs were estimated based on the 2019 RS Means Heavy Construction Cost Data.

In September 2019, the City’s Green Infrastructure (GI) Plan was adopted to identify and prioritize green infrastructure projects that can be built to reach pollution reduction targets for PCBs and mercury by 2020, 2030, and 2040 for storm water management purposes. Green Infrastructure is intended to improve storm water quality, reduce flood risk, and provide other environmental and health benefits to the community of El Cerrito and its watersheds. Private Green Infrastructure facilities will also be built as a result of the re-development of parcels, in compliance with the City’s NPDES permit’s C.3 provision. In addition, the City intends to leverage new development’s design review process and related street frontage improvements to identify and pursue opportunities for Green Infrastructure on private and public property. The San Pablo Avenue Specific Plan update will ensure that planning documents relating to the City’s main commercial corridor will incorporate LID and Green Infrastructure considerations and opportunities. Several project opportunity sites listed in Appendix 1 of the Green Infrastructure Plan are within the Specific Plan area, such as at the El Cerrito Plaza BART Station and Shopping Center, 11645 San Pablo Avenue, El Cerrito Del Norte BART Station, and San Pablo Avenue at the Richmond Greenway. By 2040, the City is aiming to have 10 GI projects completed in the Specific Plan area leveraging improvements completed as part of development projects. The assumed costs for the green infrastructure improvements are based on the Green Infrastructure Estimation Technical Memorandum (Geosyntec, November 2018). See Chapter 4: Green Infrastructure, Table 4-1: Summary of Green Infrastructure Projects and Table 4-3: Green Infrastructure Costs for reference.

Storm drain improvements are recommended because streets may be repaved as part of the infill development projects, providing an opportunity to maintain the current system and bring it up to current standards based on maintenance or repairs/ replacement determined via CCTV evaluation as part
Infrastructure Figure 01. Impermeable surfaces are widespread in the study area.

Infrastructure Figure 02. Award winning low impact streetscape improvements along San Pablo Ave.

Infrastructure Figure 03. Green roof is a good stormwater best management practice.

Infrastructure Figure 04. Low impact development features may serve as community amenities.

Infrastructure Figure 05. Permeable paving, used for the parking spaces at right, is an example of LID.
condition issues noted above as part of the City’s update to the Storm Drain Master Plan. In addition, modifications to the existing storm drain system may be required with the proposed construction of landscaped bulb-outs at intersections, bus islands or the separated bikeway.

For all existing facilities, infrastructure and any new structures and pipes recommended as part of this document, they shall be designed to protect people and property from the threat of potential flooding according to the General Plan Section H1.15 Flood hazards.

New developments shall be designed to provide protection from potential impacts of flooding during the “1% chance” or “100-year” flood. New developments will be carefully reviewed to insure that adequate storm drain facilities are available both on and off the site.

To enforce maintenance of all drainage courses, existing laws are in place prohibiting the dumping of debris, litter, garbage, fill or other waste materials into creeks and channels within the public right of way. The City will also continue to maintain its storm drainage facilities. See General Plan section H1.16 Maintenance for the City’s Storm Drainage Facilities for reference.

The assumptions for drainage system improvements are as follows:

A. Project length is approximately 2.7 miles (14,200 feet).

B. Assume two existing inlets every 500 feet (Replacement of 60 inlets)

C. Assume addition of two new inlets at each midblock crossing with associated piping and junction structures.
   1. 13 new manholes
   2. 26 new inlets

D. Assume 10 percent of existing pipe is in poor condition and add specific locations identified in the on-going update to the Storm Drain Master Plan (offset joints, broken pipe, etc).
   1. Rehabilitate or replace 250 feet of 15-inch pipe
   2. Rehabilitate or replace 150 feet of 24-inch pipe
   3. Rehabilitate or replace 100 feet of 30-inch pipe

4. Rehabilitate or replace 1,400 feet of 36-inch pipe

5. Rehabilitate or replace 350 feet of 48-inch pipe

6. Rehabilitate or replace ten manholes

E. Improvements related to HM program include those items required to comply with the program by the CCCWP. It does not appear that the project will increase impervious surface or discharge. Therefore, no HM improvements are anticipated at this time. The existing system is a paved area discharging to inlets, which discharge to pipelines.

F. Improvements related to storm water quality are those items required to comply with Section C.3 of the NPDES Permit. For the purposes of this Study, storm water quality compliance is limited to those improvements related to San Pablo Avenue not the adjacent parcels, which are required to treat storm water runoff on a project by project basis. C.3 project scope includes any impervious surfaces added or replaced within the adjacent public right-of-way in connection with the project, including road resurfacing and sidewalk repair/replacement.

The San Pablo Specific Plan streetscape design maintains existing road runoff patterns and does not include road widening. The proposed streetscape plan describes future widening of the existing sidewalks in the Uptown area. Any increase in impervious area as a result of widening would be required to be treated for water quality along the sidewalk.

G. The GI Plan, and thereby this Specific Plan, enhances the C.3 Guidebook provisions for storm drain system retrofits within the public right of way such that development applicants that propose to construct off-site or non-LID facilities, if allowed by the most current version of the NPDES permit, will be required to comply with the following:

1. The development applicant must consider constructing or financially contributing to construction of a public GI project identified in the GI Plan, Specific Plan or another GI project in the public right-of-way that will treat run-off from public streets adjacent to or near the development site.

2. If the public GI project is constructed in-lieu of part or all of the on-site project
requirements, the public GI project must treat runoff from an amount of impervious surface greater than, as feasible, the impervious surface that would be subject to requirements at the project location.

3. The development applicant must design or proportionally contribute to the detailed design of the public GI project.

4. The development applicant must proportionally contribute to the operations and maintenance of the public GI project.

4.03 WATER SYSTEM

4.03.01 EXISTING CONDITIONS

Based on information provided by EBMUD that was used to generate information for this section, there is no additional analysis that needs to be done at this time.

Water service to San Pablo Avenue is supplied by the East Bay Municipal Utility District (EBMUD). The Pardee Reservoir (supplied by the Mokelumne River Basin system) is the main source of water for EBMUD.

Based upon utility block maps obtained from EBMUD, the general pipe size within San Pablo Avenue (from north to south) ranges from 12-inch on the right side of the street (from Knott Avenue to Potrero Avenue) to 8-inch on the right side of the street (from Potrero Avenue to Fairmount Avenue). Similarly, on the left side of the street, pipe sizes range between 4-inch and 6-inch (from MacDonald Avenue to Cutting Boulevard) to 8-inch (from Cutting Boulevard to Fairmount Avenue).

The San Pablo Avenue corridor is served by two separate pressure zones: 1) GIAa (elevation 355) at the north from Nevin Avenue to Ohio Street, and 2) G0A (elevation 202) from Ohio Street in the north to the boundary of the City of Albany. San Pablo Avenue elevation ranges from 50 ft in the north to 40 ft in the south.

4.03.02 RECOMMENDED IMPROVEMENTS

The following water design criteria are used to develop conceptual improvements for both Buildout and Year 2040 planning horizons:

A. For residential areas, a demand factor of 80 gallons per day per person and a factor of three persons per unit are assumed.

B. For commercial areas, a usage factor of 0.13 gallons per day per sq ft has been used.

C. For the pipe sizing, an assumed maximum day factor of 2 is used; a peak hour factor of 3 is also assumed.

D. Fire flows are based on maximum building area, type of building, and if a sprinkler system is required.

E. Per the 2019 California Fire Code Appendix BB, assumed type V building construction, maximum fire area is 55,000 sq ft reduced by 50% under the assumption that the building is provided with an approved automatic fire sprinkler system. An additional 500 gallons per minute (gpm) will be used for fire sprinkler for a total maximum fire demand of 3,625 gpm.

F. Total water demand will include the maximum daily usage demand in addition to the fire flow required.

G. Proposed development is expected to consist of buildings ranging in height from 55 to 65 feet. To support the plumbing of these buildings and to provide the required fire flows, the water system with the higher pressure (GIAa, elevation 355) will need to be used.

H. Master Plan level modeling of the existing distribution system will be required. This modeling effort is needed to determine if the existing system can provide the additional demands. Computer simulations were not conducted as part of this report.

I. For the purposes of the Specific Plan, the assumption is that the existing high pressure 36 inch pipeline along Key Boulevard, Liberty Street, and Elm Street (four blocks north of San Pablo Avenue) will be adequate. It is assumed that this high pressure pipeline will be used to supply the additional demands and will feed the development with new mains to San Pablo Avenue. In addition, EBMUD plans to construct a new 36-inch transmission main along San Pablo Avenue starting in 2024-2027 that would connect to existing mains at Nevin Avenue in Richmond and Central Avenue in El Cerrito. The proposed 36-inch transmission main is part of EBMUD’s West of Hills Northern Pipelines project.
# Infrastructure Analysis Table 01. Buildout Planning Horizon: Additional Water Demands and Associated Distribution System Improvements

<table>
<thead>
<tr>
<th>Location Along San Pablo Avenue</th>
<th>Proposed Commercial (Sq Ft)</th>
<th>Proposed Residential Units</th>
<th>Total Water Demand, Max Day (gpm)</th>
<th>Fire Demand (gpm)</th>
<th>Total Water Demand, Max Day + Fire (gpm)</th>
<th>Pipe Size (in)</th>
<th>2014 Rounded Cost ($)</th>
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<tbody>
<tr>
<td>Knott Ave to Potrero Ave&lt;sup&gt;a&lt;/sup&gt;</td>
<td>168,000</td>
<td>900</td>
<td>330</td>
<td>3,625</td>
<td>3,955</td>
<td>12</td>
<td>3,120</td>
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<tr>
<td>Kearney and Schmidt&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
<td>200</td>
<td>67</td>
<td>1,500</td>
<td>1,567</td>
<td>8</td>
<td>1,000</td>
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<td>Manila Ave to Santa Cruz Ave&lt;sup&gt;c&lt;/sup&gt;</td>
<td>164,712</td>
<td>408</td>
<td>166</td>
<td>3,625</td>
<td>3,791</td>
<td>12</td>
<td>2,750</td>
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<tr>
<td>Santa Cruz Ave to Fairmount Ave&lt;sup&gt;d&lt;/sup&gt;</td>
<td>244,400</td>
<td>812</td>
<td>315</td>
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<td>3,940</td>
<td>12</td>
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<td>Creekside Project&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0</td>
<td>128</td>
<td>43</td>
<td>3,625</td>
<td>3,668</td>
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<td>5620 Central Ave Project&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>170</td>
<td>57</td>
<td>3,625</td>
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</tr>
</tbody>
</table>

<sup>a</sup>: Length includes 660 LF along Cutting Boulevard to serve opportunity sites.
<sup>b</sup>: Length extends along Kearney St (Manila to Schmidt) and Schmidt (Kearney to San Pablo).
<sup>c</sup>: Improvements excluded for Ohlone Gardens project. EBMUD did not require upgrades to existing system.
<sup>d</sup>: Length extends along Fairmount Avenue to serve proposed opportunity sites.
<sup>e</sup>: Extend 12-inch main along San Pablo Ave, south of Fairmount Ave. Looped water main through existing shopping center with connections at Fairmount Ave and San Pablo Ave.
<sup>f</sup>: Length extends along Central Ave from Pierce St to Carlson Blvd.

# Infrastructure Analysis Table 02. Year 2040 Development: Additional Water Demands and Associated Distribution System Improvements

<table>
<thead>
<tr>
<th>Location Along San Pablo Avenue</th>
<th>Proposed Commercial (Sq Ft)</th>
<th>Proposed Residential Units</th>
<th>Total Water Demand, Max Day (gpm)</th>
<th>Fire Demand (gpm)</th>
<th>Total Water Demand, Max Day + Fire (gpm)</th>
<th>Pipe Size (in)</th>
<th>2014 Rounded Cost ($)</th>
</tr>
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<tbody>
<tr>
<td>Knott Ave to Potrero Ave&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92,000</td>
<td>680</td>
<td>243</td>
<td>3,625</td>
<td>3,868</td>
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<td>Manila Ave to Santa Cruz Ave&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>198</td>
<td>75</td>
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<td>103,400</td>
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<td>5620 Central Ave Project&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>170</td>
<td>57</td>
<td>3,625</td>
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<td><strong>Total</strong></td>
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</table>

<sup>a</sup>: Length includes 660 LF along Cutting Boulevard to serve opportunity sites.
<sup>b</sup>: Improvements excluded for Ohlone Gardens project. EBMUD did not require upgrades to existing system.
<sup>c</sup>: Length extends along Fairmount Avenue to serve proposed opportunity sites.
<sup>d</sup>: Extend 12-inch main along San Pablo Ave, south of Fairmount Ave. Looped water main through existing shopping center with connections at Fairmount Ave and San Pablo Ave.
<sup>e</sup>: Length extends along Central Ave from Pierce St to Carlson Blvd.
J. The water system is a looped system.

*Infrastructure Table 01. Buildout Planning Horizon: Additional Water Demands and Associated Distribution System Improvements* and *Infrastructure Table 02. Year 2040 Development: Additional Water Demands and Associated Distribution System Improvements* present the proposed commercial floor area, residential units, water demands, improvements required, and the costs associated with these improvements. The costs include pipe construction only. Pump stations and general system upgrades are excluded from this cost.

As part of the San Pablo Avenue Specific Plan update, additional revisions were made to this section because the basis of that section was a sewer capacity study completed in December 2013 for the San Pablo Avenue corridor. However, in 2017 a new sewer capacity study was run for the Specific Plan Area where a growth scenario was estimated and integrated into the Plan Area developments to simulate 2040 growth and estimate additional future sewer demand to identify areas of deficiency within the system.

Sewage within the San Pablo Avenue corridor is managed by the Stege Sanitary District (SSD). SSD provides sewer service to businesses along San Pablo Avenue in the City of El Cerrito and has about 13,000 connections.

SSD operates and maintains 148 miles of sanitary sewer over a total area of 5.3 square miles. SSD also operates two pumping stations. Wastewater collected in the SSD system flows to the EBMUD Special District #1 Interceptor Sewer. Sewage is then conveyed to the EBMUD Wastewater Treatment Facility in Oakland.

Based upon utility block maps obtained from SSD, pipelines are located on the westerly (southbound lanes) and the easterly (northbound lanes) side of median along San Pablo Avenue.

A review of the block maps indicates that the existing sewer is split into segments along San Pablo Avenue and discharged to larger diameter collector mains that extend along cross streets. From north to south, the general routing of flows is westerly as summarized below:

A. A 10-inch collector main along Cutting Boulevard collects flows along San Pablo Avenue between Knott Avenue and Cutting Boulevard (Cutting Tributary)

B. A 12-inch collector main along Potrero Avenue collects flows along San Pablo Avenue between Cutting Boulevard and Potrero Avenue and flows from Hill Boulevard and Blake Street (Potrero Tributary)

C. An 18-inch collector main along Potrero Avenue collects flows along San Pablo Avenue between Potrero Avenue and Schmidt Lane (Potrero Tributary)

D. An 18-inch collector main along Huntington Avenue collects flows along San Pablo Avenue between Schmidt Lane and Waldo Avenue (properties on east side of San Pablo Avenue) (Waldo Tributary)

E. An 8-inch collector main along Central Avenue collects flows along San Pablo Avenue between El Dorado Street and Central Avenue (properties on west side of San Pablo Avenue) (Central Tributary)

F. An 18-inch collector main just south of Fairmount Avenue collects flows along San Pablo Avenue between Waldo Avenue and Fairmount Avenue (properties on east side of the San Pablo Avenue) and between Central Avenue and Fairmount Avenue (properties on west side of San Pablo Avenue) (Central Tributary)

G. A 6-inch collector main along Santa Cruz Avenue collects flows along San Pablo Avenue between Schmidt Lane and Santa Cruz Avenue (properties on the west side of San Pablo Avenue). (Santa Cruz Tributary)

H. A 6-inch collector main along San Jose Avenue collects flows along San Pablo Avenue between Santa Cruz Avenue and San Jose Avenue (properties on the west side of San Pablo Avenue) (San Jose Tributary)

I. A 15-inch collector main along Knott Avenue collects flows along San Pablo Avenue between Macdonald Avenue and Knott Avenue from both the east and west sides of San Pablo Avenue (Knott Tributary)

Currently, outside the Specific Plan area, prior to construction, Stege Sanitary District requires completion of sanitary sewer capacity studies for proposed projects with 10 or more residential units,
10,000 square feet or more of office or commercial facility, 1,000 square foot or more of restaurant, and laundromats or industrial facilities. SSD requires flow monitoring of the existing system to be conducted as part of the capacity study. In July 2017, BKF performed a sewer capacity study to further understand the existing sanitary sewer system’s ability to support future developments in the Plan Area of the San Pablo Avenue Specific Plan. A growth scenario was estimated and overlaid onto the Plan Area to simulate 2040 growth and estimate additional sewer demand in order to identify areas of the system that could be deficient with the additional development. The growth scenario estimated sewer demand within the Plan Area by use and peak demand flow rate, broken down as follows:

- Housing = 3,241 Units
- Commercial Space = 158,669 square feet
- Hotels = 260 Rooms
- Housing = 300 gal/day per unit
- Commercial Space = 0/1 gal/day-sf per square foot
- Hotels = 300 gal/day per room

This study used data and flows from an existing base model developed by AECOM in 2011 and 2012 to analyze system capacity by primary flow path and then recommend system upgrades. The intent of the recommended system upgrades was to eliminate system surcharging within the sewer networks that make up the Plan area (as noted by items A through I above). Using the modeling results and SSD design standards which state that main sewer design capacities shall be based on sewers flowing full, and trunk sewer design capacities shall be based on sewers flowing full without overflowing, pipes that showed overflowing and capacities higher than that of the pipe were upsized in diameter within the model.

### 4.04.02 RECOMMENDED IMPROVEMENTS

Design criteria are summarized below.

A. Sewer generation at the build out phase is based on 95 percent of indoor water demand projection. (Average dry weather flow)

B. Peaking factor of two times average dry weather flow to determine peak dry weather flow and a factor of four times the peak dry weather flow to determine the peak wet weather flow. (SSD Sanitary Sewer Capacity Study Criteria requires wet weather flow be calculated as 400% of peak dry weather flow in lieu of wet weather monitoring data.)

C. The July 2017 model performed by BKF in conjunction with the AECOM base model from 2011 proposed sewer main upsizing within the Plan Area. Estimated costs for the recommended pipe upsizing was developed and consolidated across the Plan Area to implement a Sewer Capacity Fee to be paid by incoming developers based on the number of dwelling units or estimated additional sewer flow that a new development was proposing. This fee was adopted by the Stege Sanitary District Board and is collected directly through Stege. See Table 3 of the published Stege Sewer Capacity Charge Memo for more details.

D. At this stage no modeling has been performed for the existing system to evaluate the capacity under the new loads. Improvements are proposed for San Pablo Avenue area and not for downstream systems.

E. Master Plan level modeling of the existing sewer system will be required. This effort will assist in determining the effects of this project on the existing infrastructure as well as required improvements. Computer simulations were not conducted as part of this report.

### Infrastructure Table 03. Year 2040 Planning Horizon: Projected Additional Sanitary Sewer Flows and Collection System Improvements and Infrastructure Table 04. Buildout Planning Horizon: Projected Additional Sanitary Sewer Flows and Collection System Improvements present the additional sewer flows that will be generated by the additional commercial and residential areas. The pipes shown in the table are sized to serve only the additional development area. Infrastructure Table 04. Plan Area Upsizing by Tributary shows estimated costs for the recommended pipe replacements based on 2016 District sewer capital improvement construction bids and other Bay Area construction bids from April-May 2017. The study estimated a consolidated rate that included all work activities that typically contribute to sewer replacement costs based on replacement costs using a pipe burst method for 8-inch, 10-inch, and 12-inch construction, and remove and replace for 15-inch and larger. This is the basis for the Sewer Capacity fee that is collected by Stege Sanitary District. Estimated unit rates can be found in Section 3. Estimated Upgrade Costs of the 2017 Stege Sanitary Sewer District Capacity Analysis.
<table>
<thead>
<tr>
<th>Location Along San Pablo Avenue</th>
<th>Proposed Commercial (sq ft)</th>
<th>Potential Residential Units</th>
<th>Total PWWF (gpm)</th>
<th>Pipe size (in)</th>
<th>Length (ft)</th>
<th>Rounded Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Pablo, Knott Ave to Potrero Ave(a)</td>
<td>92,000</td>
<td>680</td>
<td>924</td>
<td>12</td>
<td>3,120</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Eden Housing(b)</td>
<td>3,042</td>
<td>63</td>
<td>82</td>
<td>--</td>
<td>--</td>
<td>267,000</td>
</tr>
<tr>
<td>Ohlone Gardens(c)</td>
<td>4,650</td>
<td>57</td>
<td>75</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>San Pablo, Burlingame Ave to Huntington Ave</td>
<td>40,000</td>
<td>78</td>
<td>126</td>
<td>8</td>
<td>1,540</td>
<td>600,000</td>
</tr>
<tr>
<td>San Pablo, Avila Ave to Central Ave(d)</td>
<td>26,400</td>
<td>60</td>
<td>94</td>
<td>8</td>
<td>500</td>
<td>200,000</td>
</tr>
<tr>
<td>Fairmount Ave, Richmond St to San Pablo(e)</td>
<td>77,000</td>
<td>470</td>
<td>648</td>
<td>10</td>
<td>1,300</td>
<td>600,000</td>
</tr>
<tr>
<td>San Mateo St, south of Central Ave(f)</td>
<td>0</td>
<td>170</td>
<td>215</td>
<td>8</td>
<td>400</td>
<td>200,000</td>
</tr>
<tr>
<td>Creekside project(g)</td>
<td>0</td>
<td>128</td>
<td>162</td>
<td>6</td>
<td>1,700</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3,767,000</strong></td>
</tr>
</tbody>
</table>

\(a\): Length includes 660 LF along Cutting Boulevard to serve opportunity sites.

\(b\): Cost based on December 2013 Sewer Capacity Study recommended improvements to address existing deficiencies.

\(c\): Per December 2013 sewer capacity study, improvements not required to serve Ohlone Gardens project.

\(d\): Serves McNevin planned/entitled project. Improvements to serve site “J” are not anticipated. It is assumed that the existing sewer main can accommodate projected additional PWWF of 10 gpm from the project site.

\(e\): Length consists of 1300 LF along Fairmount from Richmond St west to San Pablo Ave to serve proposed opportunity sites.

\(f\): Serves planned/entitled 5620 Central Avenue project.

\(g\): Length consists of 1700 LF to serve planned/entitled Creekside project.
INFRASTRUCTURE TABLE 03. YEAR 2040 PLANNING HORIZON: PROJECTED ADDITIONAL SANITARY SEWER FLOWS AND COLLECTION SYSTEM IMPROVEMENTS

<table>
<thead>
<tr>
<th>Planned Commercial Space (SQ FT)</th>
<th>Planned Residential Units</th>
<th>Projected Sanitary Sewer Flows (GPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 Specific Plan</td>
<td>243,112</td>
<td>1,706</td>
</tr>
<tr>
<td>2017 Stege Study *</td>
<td>158,669</td>
<td>3,501</td>
</tr>
<tr>
<td>2021 Specific Plan Update</td>
<td>205,273</td>
<td>2,765</td>
</tr>
</tbody>
</table>

*a: The values from the Stege Study and 1.30.18 Post Upizing Capacity Analysis in this row supersede what was planned for from the 2014 Specific Plan, and also account for more than was is currently outlines in the 2021 Specific Plan Update.*

Modeling of the sewer system will be required to determine the impact of the additional flows resulting from the proposed building areas on the downstream system. Both planning horizons take into account planned and entitled projects, including Ohlone Gardens, Creekside, 5620 Central Ave, and Eden Housing. A December 2013 sewer capacity study completed for the Ohlone Gardens project concluded that the existing sewer main along Portola Drive adjacent to the project site, and the existing sewer main along San Pablo (at Waldo Avenue) have sufficient capacity to serve the proposed Ohlone Gardens project. Therefore, improvements to serve the project are not anticipated.

Both planning horizons take into account planned and entitled projects, including Ohlone Gardens, Creekside, 5620 Central Ave, and Eden Housing. A December 2013 sewer capacity study completed for the Ohlone Gardens project concluded that the existing sewer main along Portola Drive adjacent to the project site, and the existing sewer main along San Pablo (at Waldo Avenue) have sufficient capacity to serve the proposed Ohlone Gardens project. Therefore, improvements to serve the project are not anticipated.
### INFRASTRUCTURE TABLE 04. BUILDOUT PLANNING HORIZON: PROJECTED ADDITIONAL SANITARY SEWER FLOWS AND COLLECTION SYSTEM IMPROVEMENTS

<table>
<thead>
<tr>
<th>Location Along San Pablo Avenue</th>
<th>Proposed Commercial (sq ft)</th>
<th>Potential Residential Units</th>
<th>Total PWWF (gpm)</th>
<th>Pipe size (in)</th>
<th>Length (ft)</th>
<th>Rounded Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Pablo, Knott Ave to Potrero Ave&lt;sup&gt;a&lt;/sup&gt;</td>
<td>168,000</td>
<td>900</td>
<td>1,255</td>
<td>15</td>
<td>3,120</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Eden Housing&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3,062</td>
<td>63</td>
<td>82</td>
<td>--</td>
<td>--</td>
<td>267,000</td>
</tr>
<tr>
<td>Ohlone Gardens&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4,650</td>
<td>57</td>
<td>75</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>San Pablo, Burlingame Ave to Huntington Ave</td>
<td>0</td>
<td>200</td>
<td>253</td>
<td>8</td>
<td>800</td>
<td>300,000</td>
</tr>
<tr>
<td>San Pablo, Avila Ave to Central Ave&lt;sup&gt;d&lt;/sup&gt;</td>
<td>286,400</td>
<td>462</td>
<td>762</td>
<td>12</td>
<td>5,400</td>
<td>2,300,000</td>
</tr>
<tr>
<td>Fairmount Ave, Richmond St to San Pablo&lt;sup&gt;e&lt;/sup&gt;</td>
<td>115,000</td>
<td>638</td>
<td>887</td>
<td>12</td>
<td>1,300</td>
<td>600,000</td>
</tr>
<tr>
<td>San Mateo St, south of Central Ave&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>170</td>
<td>215</td>
<td>8</td>
<td>400</td>
<td>200,000</td>
</tr>
<tr>
<td>Creekside project&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0</td>
<td>128</td>
<td>162</td>
<td>8</td>
<td>1,700</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>5,767,000</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Length includes 660 LF along Cutting Boulevard to serve opportunity sites.

<sup>b</sup> Cost based on December 2013 Sewer Capacity Study recommended improvements to address existing deficiencies.

<sup>c</sup> Per December 2013 sewer capacity study, improvements not required to serve Ohlone Gardens project.

<sup>d</sup> Serves McNevin planned/entitled project. Improvements to serve site “J” are not anticipated. It is assumed that the existing sewer main can accommodate projected additional PWWF of 10 gpm from the project site.

<sup>e</sup> Length consists of 1300 LF along Fairmount from Richmond St west to San Pablo Ave to serve proposed opportunity sites.

<sup>f</sup> Serves planned/entitled 5620 Central Avenue project.

<sup>g</sup> Length consists of 1700 LF to serve planned/entitled Creekside project.
## INFRASTRUCTURE TABLE 04. PLAN AREA UPSIZING BY TRIBUTARY

<table>
<thead>
<tr>
<th>TRIBUTARY</th>
<th>TOTAL PIPE LENGTH (LF)</th>
<th>EXISTING DIAMETER (IN)</th>
<th>UNIT COST ($/LF)</th>
<th>2017 COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knott</td>
<td>220</td>
<td>6</td>
<td>$372</td>
<td>$81,840</td>
</tr>
<tr>
<td>Knott</td>
<td>620</td>
<td>8</td>
<td>$372</td>
<td>$230,640</td>
</tr>
<tr>
<td>Knott</td>
<td>320</td>
<td>15</td>
<td>$475</td>
<td>$152,000</td>
</tr>
<tr>
<td>Knott</td>
<td>2,350</td>
<td>18</td>
<td>$500</td>
<td>$1,175,000</td>
</tr>
<tr>
<td>Cutting</td>
<td>150</td>
<td>6</td>
<td>$372</td>
<td>$55,800</td>
</tr>
<tr>
<td>Potrero 12-inch</td>
<td>4,390</td>
<td>6</td>
<td>$372</td>
<td>$1,633,080</td>
</tr>
<tr>
<td>Potrero 12-inch</td>
<td>1,400</td>
<td>8</td>
<td>$372</td>
<td>$520,800</td>
</tr>
<tr>
<td>Potrero 12-inch</td>
<td>1,340</td>
<td>12</td>
<td>$450</td>
<td>$603,000</td>
</tr>
<tr>
<td>Potrero 18-inch</td>
<td>620</td>
<td>6</td>
<td>$372</td>
<td>$230,640</td>
</tr>
<tr>
<td>Potrero 18-inch</td>
<td>1,700</td>
<td>18</td>
<td>$500</td>
<td>$850,000</td>
</tr>
<tr>
<td>Potrero 18-inch</td>
<td>630</td>
<td>21</td>
<td>$550</td>
<td>$346,500</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>1,550</td>
<td>6</td>
<td>$372</td>
<td>$576,600</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>275</td>
<td>8</td>
<td>$372</td>
<td>$102,300</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>1,090</td>
<td>10</td>
<td>$372</td>
<td>$405,480</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>310</td>
<td>12</td>
<td>$450</td>
<td>$139,500</td>
</tr>
<tr>
<td>Central 36-inch</td>
<td>320</td>
<td>6</td>
<td>$372</td>
<td>$119,040</td>
</tr>
<tr>
<td>Central 36-inch</td>
<td>760</td>
<td>24</td>
<td>$600</td>
<td>$456,000</td>
</tr>
<tr>
<td>Lassen</td>
<td>1,320</td>
<td>6</td>
<td>$372</td>
<td>$491,040</td>
</tr>
<tr>
<td>Lassen</td>
<td>640</td>
<td>8</td>
<td>$372</td>
<td>$238,080</td>
</tr>
<tr>
<td>Lassen</td>
<td>500</td>
<td>10</td>
<td>$450</td>
<td>$225,000</td>
</tr>
<tr>
<td>Lassen</td>
<td>1,250</td>
<td>12</td>
<td>$475</td>
<td>$593,750</td>
</tr>
<tr>
<td>Lassen</td>
<td>370</td>
<td>14</td>
<td>$475</td>
<td>$175,750</td>
</tr>
<tr>
<td>Lassen</td>
<td>210</td>
<td>16</td>
<td>$475</td>
<td>$99,750</td>
</tr>
</tbody>
</table>

**Construction Subtotal** $9,501,590

**60% Additional for Contingency, Program, Design, and Construction Management** $5,700,960

**Total** $15,202,550

*This column represents the number of units/commercial square footage/hotel rooms used to provide the 1.30.18 Post Upsizing Capacity Analysis*
4.05 DRY UTILITIES

Dry utilities within the San Pablo Specific Plan corridor include Pacific Gas and Electric (PG&E), Comcast (cable and communication lines) and AT&T (telecommunications).

4.05.01 PG&E GAS LINE LOCATION

Upon examination of utility block maps obtained from PG&E, the general gas pipeline size within San Pablo (from north to south) is as follows:

A. Left side of the street:
   1. 3-inches to 2-inches from Ohio Street to Knott Avenue
   2. 8-inches from Cutting Avenue to Manila and from Schmidt to Fairmount
   3. 10-inches from Manila to Schmidt Avenue

B. Right side of the street:
   1. 8-inches from MacDonald Avenue to Cutting Avenue
   2. 2-inches from Hill to Potrero Avenue and from Madison to Moeser
   3. 3-inches from Potrero Avenue to Madison Avenue and from Moeser to Huntington
   4. From Huntington through Central Avenue, the lines vary between 2-inch and 3-inch

There appear to be no large diameter gas pipelines crossing San Pablo Avenue. Per the mapping information, all crossing gas pipelines are either 2-inch or 3-inch lines.

4.05.02 PG&E ELECTRIC LINE LOCATION

In general, it appears from the PG&E electric block maps that electric service is underground through the limits of the San Pablo Specific Plan area (opportunity sites located between Knott Avenue at the north and Fairmount Avenue at the south end of the project).

There are locations where underground and overhead lines cross San Pablo Avenue. These locations are as follows:

A. 4-inch underground electric at Conlon Avenue.
B. 4-inch underground electric at Knott Boulevard.
C. 115KV UG crossing at Cutting Boulevard.
D. 6-inch underground electric at Hill Avenue.
E. Two 6-inch underground electric and one 4-inch underground electric at Alameda.
F. One 6-inch vacant underground electric and one 4-inch vacant underground electric at Manila.
G. A three-wire overhead line at Manila.
H. Two 6-inch underground electric lines at Portola.
I. Six-wire and four-wire overhead lines at Columbia to Eureka Avenue.
J. 4-inch underground electric at Central Avenue.

4.05.03 CABLE, INTERNET, AND TELECOM ACCESS

Access to cable, internet, and telecom service lines are within the adjacent streets/properties along San Pablo Avenue. There are no major service lines locations within the Specific Plan Area.
4.06 REFERENCES


8. EBMUD block maps

9. Stege Sanitary District sewer map (PDF)

10. Stege Sanitary District Sanitary Sewer Capacity Study Criteria

11. City of Richmond GIS data for sewer and storm systems.

12. 2010 California Fire Code

13. PG&E block maps

14. Comcast Block maps

