

Appendix 3.11-2

Water System Hydraulic Evaluation

TECHNICAL MEMORANDUM

DATE: March 13, 2020 Project No.: 462-60-19-24
SENT VIA: EMAIL

TO: Hae Won Ritchie, City of San Bruno

CC: Jimmy Tan, City of San Bruno
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FROM: Kambria Tiano, PE, RCE #84129

REVIEWED BY: Amy Kwong, PE, RCE #73213

SUBJECT: Water System Hydraulic Evaluation of Bayhill Specific Plan Development



This Technical Memorandum (TM) summarizes the findings and conclusions of West Yost Associates' (West Yost's) technical evaluation of the ability of the City of San Bruno's (City's) existing water distribution system to provide supply for the proposed Bayhill Specific Plan Development Project (Project). The following sections summarize the water system hydraulic evaluation:

- Project Description
- Estimated Water Demand
- Storage Capacity Evaluation
- Hydraulic Evaluation
- Evaluation Findings and Conclusions
- Cost Allocation of New Zone 3/5 Tank and Booster Pump Station

PROJECT DESCRIPTION

The Project is part of the continued growth of an approximately 92.4-acre site that is located in the central-eastern portion of the City. The Project is generally bounded by Interstate 280 to the west, Interstate 380 to the north, El Camino Real to the east, and San Bruno Avenue West to the south, as shown on Figure 1.¹

The land within the Project site is currently a mixed-use district that includes the headquarters of YouTube, as well as various other land uses, including office, retail/commercial, hotel, and streets/right-of-way land uses. The first phase of the Project is YouTube's campus expansion plan

¹ Excludes the existing parcels fronting El Camino Real and at the corner of El Camino Real and San Bruno Avenue.

(Phase I Development), which consists of adding 301,476 square feet (sf) of net new office space to 8.15-acres. The Phase I Development is expected to be completed by 2022. Attachment A includes the proposed utility plans for the Phase I Development, prepared by the developer's engineer, that were used for this evaluation.

Four buildout scenarios of varying housing and office densities were evaluated in the Bayhill Specific Plan Development Project Water Supply Assessment (Project WSA) to capture the highest demand future scenario that would be permitted under the proposed Bayhill Specific Plan. Full buildout of the proposed Project is assumed to occur by 2040. The buildout scenarios included the following:

- Maximum Office Scenario
- Maximum Housing Scenario (Project)
- Increased Height Alternative – Maximum Office Scenario
- Increased Height Alternative – Maximum Housing Scenario (Project Alternative)

The proposed land use plans for each scenario is provided in Attachment B for reference.² The Maximum Housing Scenario resulted in higher water demands than the Maximum Office Scenario and was selected for this hydraulic evaluation. However, the Increased Height Alternative – Maximum Housing Scenario resulted in the highest buildout water demand and was therefore evaluated as a possible project alternative for this hydraulic evaluation to determine if additional water system improvements may be needed. Attachment C presents the Project Alternative Buildout evaluation findings and conclusions.

The selected Project Buildout scenario includes 3,500,743 sf of office buildings, 121,846 sf of retail buildings, a 133-room hotel, and 573 dwelling units (du) of multi-family residential housing (these totals include existing buildings that would remain). Proposed utility plans for buildout of the Project have not been prepared, and existing pipelines were assumed to serve the Project Buildout scenario. However, City staff identified that a new 10-inch diameter pipeline will be installed in Elm Avenue to connect Grundy Lane to Bayhill Drive at buildout.

The Project is located in Pressure Zone 3/5 of the City's water system. It is assumed that the Project will be served primarily from SFPUC supply (from the Rollingwood - C3 and Bayhill - C4 Turnouts) and that the City's groundwater wells would be offline under the City's current operations as a participant in the Regional Groundwater Storage and Recovery project. The preliminary Phase I Development utility plans provided to West Yost propose to abandon the existing 8-inch pipeline in Elm Avenue (north of Bayhill Drive), abandon and replace the existing 8-inch pipeline in Grundy Lane, and abandon and replace a section of the existing 10-inch pipeline in Bayhill Drive. The proposed pipelines would tie into the existing water system at four connections: one connection to the existing 8-inch diameter water main at the intersection of Grundy Lane and Cherry Avenue; a second connection to the existing 8-inch diameter water main that runs between Bayhill Drive and Grundy Lane (at a point approximately 1,230 ft northeast of the first connection); a third connection to the existing 10-inch diameter pipeline in Bayhill Drive, approximately 150 feet from the

² Provided to West Yost by ICF on March 29, 2019.

intersection of Bayhill Drive and Cherry Avenue; and a fourth connection to the existing 10-inch diameter pipeline in Bayhill Drive, approximately 450 feet east of the third connection. The proposed Phase I Development pipelines are 8-inches in diameter along Grundy Lane and 10-inches in diameter along Bayhill Drive, with ten new fire hydrants installed within the Project site.³ The proposed Project Buildout pipelines are 8-inches in diameter along Elm Avenue. Figure 2 shows the proposed Phase I and Project Buildout pipeline alignments.

The following sections provide additional details on the projected water demands, storage capacity evaluation, hydraulic evaluation results, and summary of evaluation findings and conclusions.

ESTIMATED WATER DEMAND

Average day demands for the Phase I Development and Project Buildout were estimated by West Yost in the Project WSA using unit water demand factors from the 2012 Water System Master Plan (WSMP) for Multi-Family Residential, Commercial Office, and Commercial Retail water uses, and actual hotel water use for a local San Francisco Bay Area water district. Maximum day and peak hour demands were estimated using peaking factors developed in the 2012 WSMP. Metered water demands from the existing developed parcels were subtracted from the projected water demands for the Project to determine the actual net increase in water demand from the Project.

Table 1 summarizes the projected average day, maximum day, and peak hour water demands for the Phase I Development and Project Buildout conditions.

Table 1. Summary of Average Day, Maximum Day, and Peak Hour Water Demands						
Project Phase	Average Day Demand		Maximum Day Demand ^(a)		Peak Hour Demand ^(b)	
	gpm	gpd	gpm	gpd	gpm	gpd
Proposed Demand^(c)						
Phase I Development	195.0	280,823	292.5	421,235	585.0	842,469
Project Buildout	391.0	562,968	586.5	844,452	1,173.0	1,688,904
Existing Demand^(d)						
Commercial Retail	128.4	184,854	192.6	277,281	385.2	554,562
Total Net Increase in Demand						
Phase I Development	66.6	95,969	99.9	143,954	199.8	287,907
Project Buildout	262.6	378,114	393.9	567,171	787.8	1,134,342
(a) Maximum day demand is 1.5 times the average day demand, per the 2012 WSMP (see Table 3-7). (b) Peak hour demand is 3.0 times the average day demand, per the 2012 WSMP (see Table 3-7). (c) Based on Table 2-4 from the Project WSA. (d) Based on the existing 2010 metered consumption data for the Bayhill Specific Plan parcels, provided by the City during development of the 2012 WSMP, and scaled to match the historical 2000/01 demands evaluated in the hydraulic model.						

³ Number of hydrants based on October 2019 Phase I Development utility plans.

STORAGE CAPACITY EVALUATION

The storage capacity required to serve the Phase I Development and Project Buildout was evaluated to determine the impacts, if any, on the City's existing water system. The storage capacity evaluation was based on the water system planning and design criteria defined in the 2012 WSMP.

The City's total water storage requirement can be described as the sum of operational storage, fire flow storage, and emergency storage, less a groundwater credit. Because the City is a participant in the Regional Groundwater Storage and Recovery (GSR) project and will no longer pump groundwater under normal supply conditions, the groundwater credit will no longer apply. The 2012 WSMP established water storage criteria for the City, as outlined below.

- **Operational Storage:** 25 percent of the maximum day demand
- **Fire Flow Storage:** Fire flow demand times duration for the most severe fire flow in pressure zone
- **Emergency Storage:** 50 percent of the maximum day demand

The storage capacity required to serve the net increase in demands from Phase I Development and Project Buildout is provided in Table 2.

Table 2. Required Water Storage to Serve Net Increase in Demand due to Project			
Storage Component	Planning Criteria ^(a)	Increase in Required Storage Volume, MG	
		Phase I Development	Project Buildout
Operational Storage	25% of maximum day demand	0.04	0.14
Fire Storage ^(b)	3,000 gpm for 3 hours	0.54	0.54
Emergency Storage	50% of maximum day demand	0.07	0.28
Total		0.65	0.96
(a) As presented in the 2012 WSMP (see Table 7-3).			
(b) As presented in the 2012 WSMP (see Table 6-2).			

The City currently contains no water storage facilities in Zone 3/5 and has a storage capacity deficit of approximately 1.1 million gallons (MG). Therefore, the existing storage deficit is worsened by the increase in water demands from the Phase I Development. Table 3 summarizes the City's existing storage deficit and the additional storage capacity required to serve the Phase I Development.

Table 3. Water Storage Capacity under Phase I Development Conditions

	Total Available Storage, MG	Required Storage Capacity, MG				Storage Capacity Surplus (Deficit), MG
		Operational ^(a)	Fire Flow ^(b)	Emergency ^(c)	Total	
Existing Storage ^(d)	0.0	0.20	0.54	0.40	1.14	(1.14)
Project – Phase I ^(e)	0.0	0.04	-	0.07	0.11	(0.11)
Total Storage Required	0.0	0.24	0.54	0.47	1.25	(1.25)
(a) Based on 25% of maximum day demand, as outlined in the 2012 WSMP. (b) Based on demand for most severe fire flow recommended in pressure zone multiplied by corresponding recommended fire flow duration from Table 6-2 from the 2012 WSMP. (c) Based on 50% of maximum day demand, as outlined in the 2012 WSMP. (d) Required storage capacity to meet existing demand, based on Table 7-3 from the 2012 WSMP. (e) Required storage capacity based on Net Increase in Demand due to Phase I Development. Fire flow storage is not included in total since the fire flow requirement for Zone 3/5 without the Project is equal to the fire flow required by the Project.						

The 2012 WSMP recommended a new 1.4 MG storage tank improvement in Zone 3/5 to eliminate the storage capacity deficit at buildout. However, as shown in Table 4, under future demand and Project Buildout conditions, a new 1.4 MG storage tank would yield a storage deficit within Zone 3/5 of approximately 0.3 MG. Therefore, West Yost recommends increasing the capacity of the proposed new Zone 3/5 storage tank from 1.4 MG to 1.7 MG to accommodate for the increase in Zone 3/5 storage capacity required to serve the Project.

Table 4. Water Storage Capacity under Project Buildout Conditions

	Total Available Storage, MG	Required Storage Capacity, MG				Storage Capacity Surplus (Deficit), MG
		Operational ^(a)	Fire Flow ^(b)	Emergency ^(c)	Total	
Future Storage ^(d,e)	1.4	0.26	0.54	0.53	1.33	0.07
Bayhill Office Park ^(f)	0.0	(0.03)	-	(0.07)	(0.10)	0.10
Project - Buildout ^(g)	0.0	0.14	-	0.28	0.42	(0.42)
Total Additional Storage Required^(h)	--	0.37	0.54	0.74	1.65	(0.25)
(a) Based on 25% of maximum day demand, as outlined in the 2012 WSMP. (b) Based on demand for most severe fire flow recommended in pressure zone multiplied by corresponding recommended fire flow duration from Table 6-2 from the 2012 WSMP. (c) Based on 50% of maximum day demand, as outlined in the 2012 WSMP. (d) A 1.4 MG tank was recommended in the 2012 WSMP to alleviate Zone 3/5's storage capacity deficit; however, West Yost recommends upsizing the tank to 1.7 MG to meet buildout storage requirements with the Project. (e) Required storage capacity to meet future demand, based on Table 8-3 from the 2012 WSMP. (f) The future storage requirement projected in the 2012 WSMP for the Project site is based on the maximum day demand projected for the Bayhill Office Park. Average day demand projected for the Bayhill Office Park is presented in Table 3-10 of the 2012 WSMP. (g) Required storage capacity based on Net Increase in Demand due to Project Buildout. Fire flow storage is not included in total since the fire flow requirement for Zone 3/5 without the Project is equal to the fire flow required by the Project. (h) The Total Storage Required is based on the sum of the Available Storage and the Project, less the Bayhill Office Park.						

HYDRAULIC EVALUATION

To evaluate the infrastructure needs of the Project, West Yost updated the existing system scenarios in the hydraulic model to include the projected water demands, discussed previously, and updated the model to include the proposed Phase I Development and Buildout pipelines, as presented on Figure 2.

The potable water distribution system was evaluated under maximum day demand plus fire flow and peak hour demand for the Phase I Development and Project Buildout conditions. These evaluations were completed to confirm that the City's existing distribution system would be able to deliver the required potable water to the proposed Project while meeting the City's adopted water system performance criteria.

Planning and Modeling Criteria

The planning and modeling criteria used to evaluate the proposed Project are based on the system performance and operational criteria developed in the WSMP. The criteria used to evaluate the existing water system and proposed pipelines for the Project consist of the following:

- Minimum allowable service pressure is 35 pounds per square inch (psi) under normal system operating conditions.
- Residual pressure at the flowing hydrant (during a maximum day demand plus fire flow condition) and at service locations throughout Pressure Zone 3/5 must be equal to or greater than 20 psi.
- Maximum allowable pipeline velocity is 4 feet per second (ft/s) during a non-fire demand condition.
- Maximum allowable pipeline velocity is 10 ft/s during a simulated fire condition. However, it is preferred to keep pipeline velocities below 7 ft/s during a simulated fire condition, if feasible.
- Any new, required pipelines, are modeled with a roughness coefficient (C-factor) of 130.
- Available fire flow demand must meet a minimum flow of 2,500 gpm for New and Existing General Commercial land uses or 3,000 gpm for Existing High-Density Commercial land uses.
- Fire flow demands for the Project site were assigned to either New General Commercial or Existing High-Density Commercial⁴ land uses.
- The hydraulic model of the City's existing water distribution system from the Mills Park Development hydraulic evaluation (dated May 22, 2019) was used as the basis for this hydraulic evaluation.

⁴ Existing High-Density Commercial buildings were assumed to be unsprinklered to provide a more conservative fire flow requirement.

Results

Two demand conditions were evaluated to determine the impacts of the Project on the City's water system. The following demand conditions were evaluated for the Phase I Development and Project Buildout scenarios:

- Maximum Day Demand plus Fire Flow
- Peak Hour Demand

Maximum Day Demand plus Fire Flow

The available fire flow capacity was simulated during a maximum day demand condition with the fire flow requirements shown on Figure 2 for the Phase I Development and Project Buildout. It is assumed that all new buildings within the Phase I Development will be sprinklered, resulting in a required fire flow of 2,500 gpm. Fire flow requirements for Project Buildout were evaluated under existing fire flow demand requirements of 2,500 gpm to 3,000 gpm, depending on existing land use, and may be conservative. As shown on Figures 3 and 4, multiple fire flow locations within the Project area are deficient (red dots) under the evaluated conditions because the proposed pipelines exceed the maximum pipeline velocity criterion of 10 ft/s.

To meet the fire flow requirements, it is recommended that the proposed pipeline in Grundy Lane be upsized to a 10-inch diameter pipe, and the proposed pipeline in Bayhill Drive be upsized to a 12-inch diameter pipe during the Phase I Development. As shown on Figure 5, all fire flow locations evaluated in Zone 3/5 will meet fire flow requirements under Project Buildout conditions with these recommended pipeline improvements. Though not shown, the recommended pipeline improvements also allow the fire flow requirements to be met under the Phase I Development condition. It is important to note that these results are based on the available pipeline capacity and may not be representative of the actual flow that each fire hydrant can produce.

Peak Hour Demand

Under Phase I Development peak hour demand conditions, system pressures in the Project area range from 65.1 psi to 109.0 psi. Under Project Buildout peak hour demand conditions, system pressures in the Project area range from 58.6 psi to 104.5 psi.

Figures 6 and 7 show that system pressures during a peak hour demand condition remain above the required minimum pressure of 35 psi, and the velocities in the proposed pipelines remain below the maximum allowable pipeline velocity of 4 ft/s under Phase I Development and Project Buildout conditions. However, most of the system pressures in the Project area exceed the maximum pressure criterion of 80 psi during a peak hour demand condition, and customer service connections at these locations should have individual pressure reducing valves installed.

It should be noted that existing pipelines in Cherry Avenue, Bayhill Drive, and Elm Avenue exceed the maximum allowable pipeline velocity requirement of 4 ft/s under Phase I Development and Project Buildout conditions. Because these existing pipelines exceed the pipeline velocity criterion prior to the addition of the Project demands, no improvements are specifically recommended for the Project.

EVALUATION FINDINGS AND CONCLUSIONS

The evaluation findings and recommendations, previously described in detail, are summarized below. It should be noted that the hydraulic evaluation performed for the Project is based on the assumptions listed above. If any of these items are changed or modified in any way, other than as described in this TM, additional hydraulic evaluation may be required.

Water Storage

Approximately 0.11 MG and 0.42 MG of water storage in Zone 3/5 will be required to serve the Project at Phase I Development and Project Buildout, respectively. However, Zone 3/5 does not currently have any storage capacity and therefore, lacks adequate storage capacity to serve both the Phase I Development and Project Buildout conditions. The 2012 WSMP recommended a new 1.4 MG storage tank to serve Zone 3/5, but a larger 1.7 MG tank is recommended in Zone 3/5 to serve Project Buildout due to the increase in water demands from the Project. A new booster pump station preliminarily sized at 4.3 mgd (firm capacity) will also be required at this new storage tank as previously recommended in the 2012 WSMP.

Water Distribution

Based on the hydraulic modeling evaluation described previously, the proposed pipelines as provided on the Phase I Development preliminary utility plans and shown on Figure 2 are not adequate to serve the Project. To meet the City's water system performance criteria, it is recommended that the Project's proposed pipelines should be upsized to 10-inch diameter along Grundy Lane and 12-inch diameter along Bayhill Drive, as shown on Figure 5. These increases in pipeline diameters are recommended to serve the required fire flows in Phase I and Buildout at adequate pressures while meeting the City's maximum pipeline velocity requirement of 10 ft/s in the recommended pipelines. As existing pipelines are replaced in the area, they should be evaluated in the hydraulic model to determine the appropriate size for replacement to meet the City's maximum pipeline velocity requirement. It should also be noted that system pressures in the Project area exceed 80 psi and individual pressure reducing valves should be installed as needed.

COST ALLOCATION OF NEW ZONE 3/5 TANK AND BOOSTER PUMP STATION

The cost allocation for the proposed Zone 3/5 Tank and Booster Pump Station between existing customers and future development is summarized in Table 5. Based on the storage capacity evaluation presented in Tables 3 and 4, the cost allocation of this new facility is approximately 70 percent to existing customers and 30 percent to future development. The estimated cost allocation specifically to the Bayhill Specific Plan development is 25 percent.

Table 5. Cost Allocation of New Zone 3/5 Tank and Booster Pump Station		
Category	Storage Requirement, MG	Percent of Total
Existing Customers ^(a)	1.14	69.1%
Future Development in Zone 3/5 – Bayhill ^(b)	0.42	25.6%
Future Development in Zone 3/5 – Others ^(b)	0.09	5.5%
Total	1.65 ^(c)	100%
(a) Refer to Table 3. (b) Refer to Table 4. (c) Recommended tank size is rounded up to 1.7 MG.		

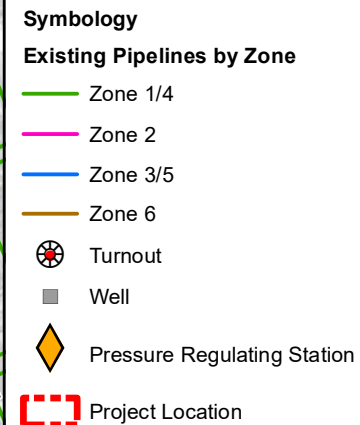
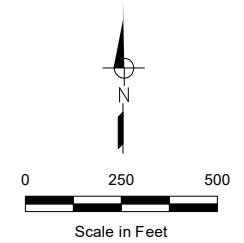
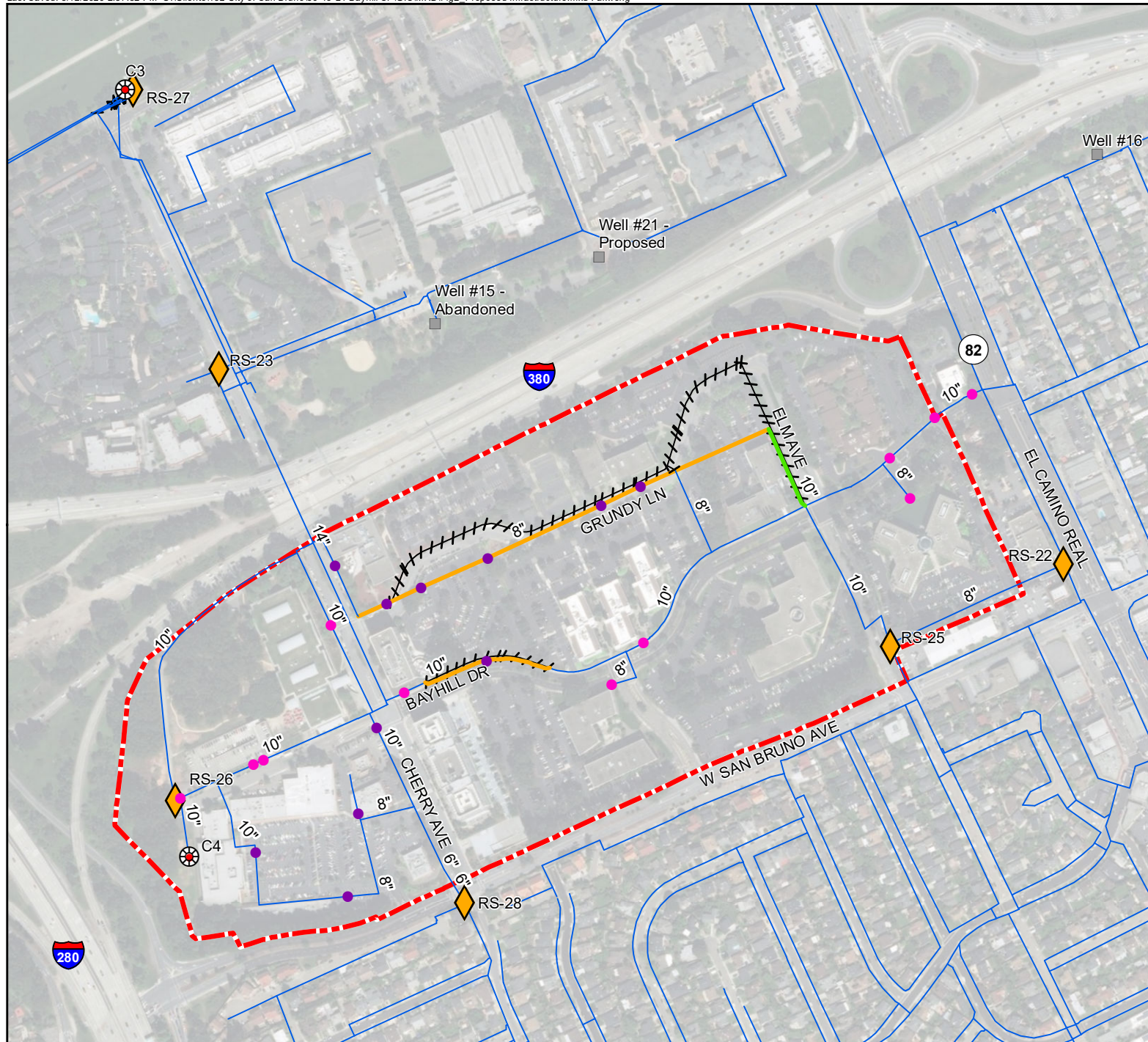


Figure 1
Project Location
City of San Bruno
Bayhill Specific Plan
Water System Evaluation



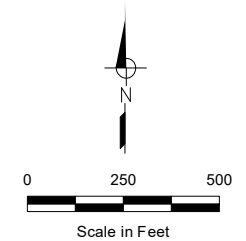
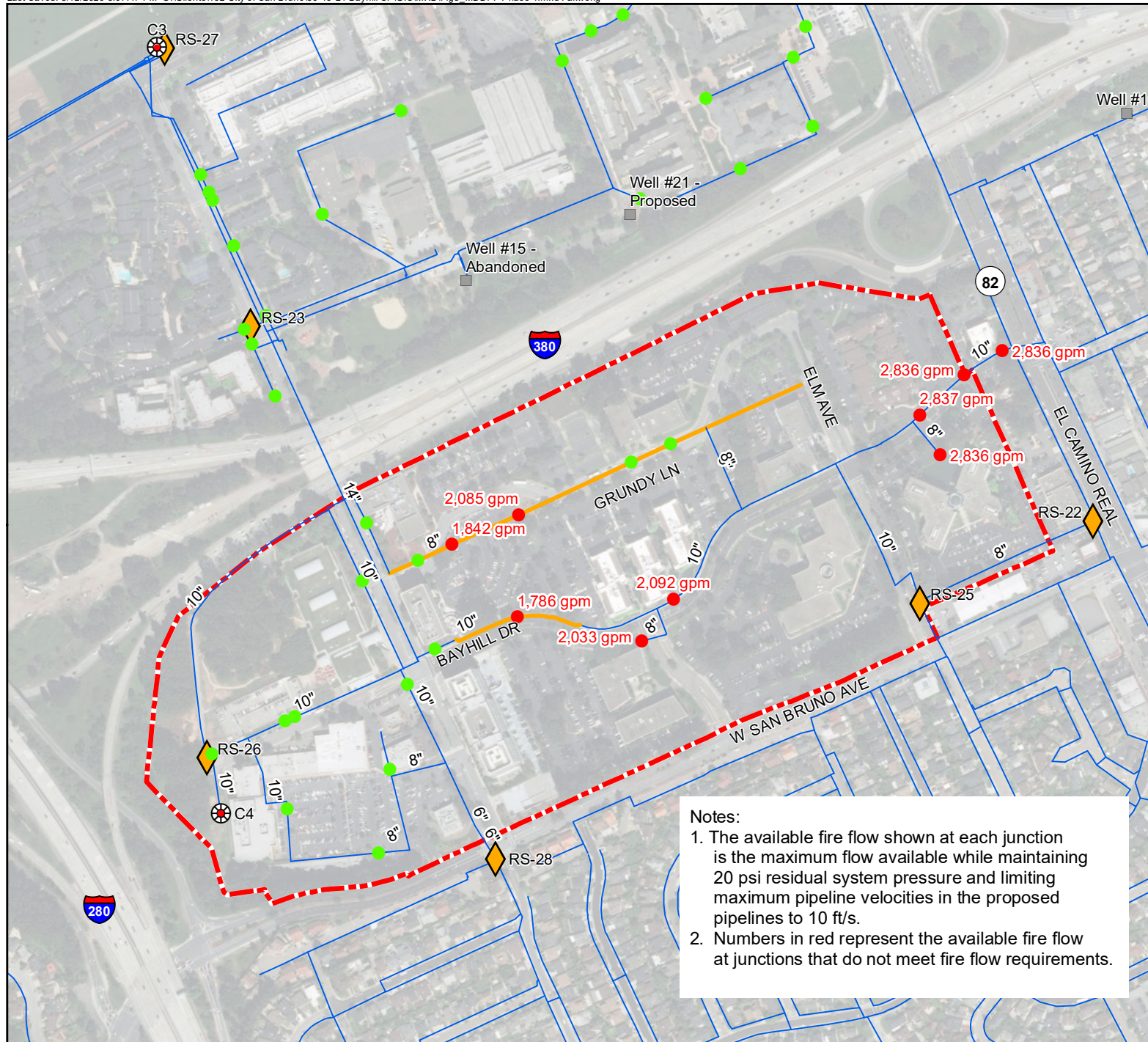
Symbology

- Abandon/Relocate Pipeline
- Existing Pipeline
- Proposed Pipeline (Phase 1)
- Proposed Pipeline (Buildout)
- 2,500 gpm Fire Flow Requirement
- 3,000 gpm Fire Flow Requirement
- Turnout
- Well
- Pressure Regulating Station
- Project Location



Figure 2
Proposed Pipeline Layout

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



Symbology

Available Fire Flow

- Does Not Meet Fire Flow Requirements
- Meets Fire Flow Requirements
- Existing Pipeline
- Proposed Pipeline
- Turnout
- Well
- Pressure Regulating Station
- - - Project Location

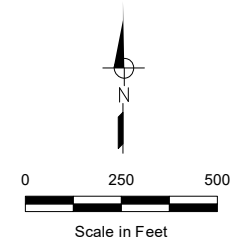
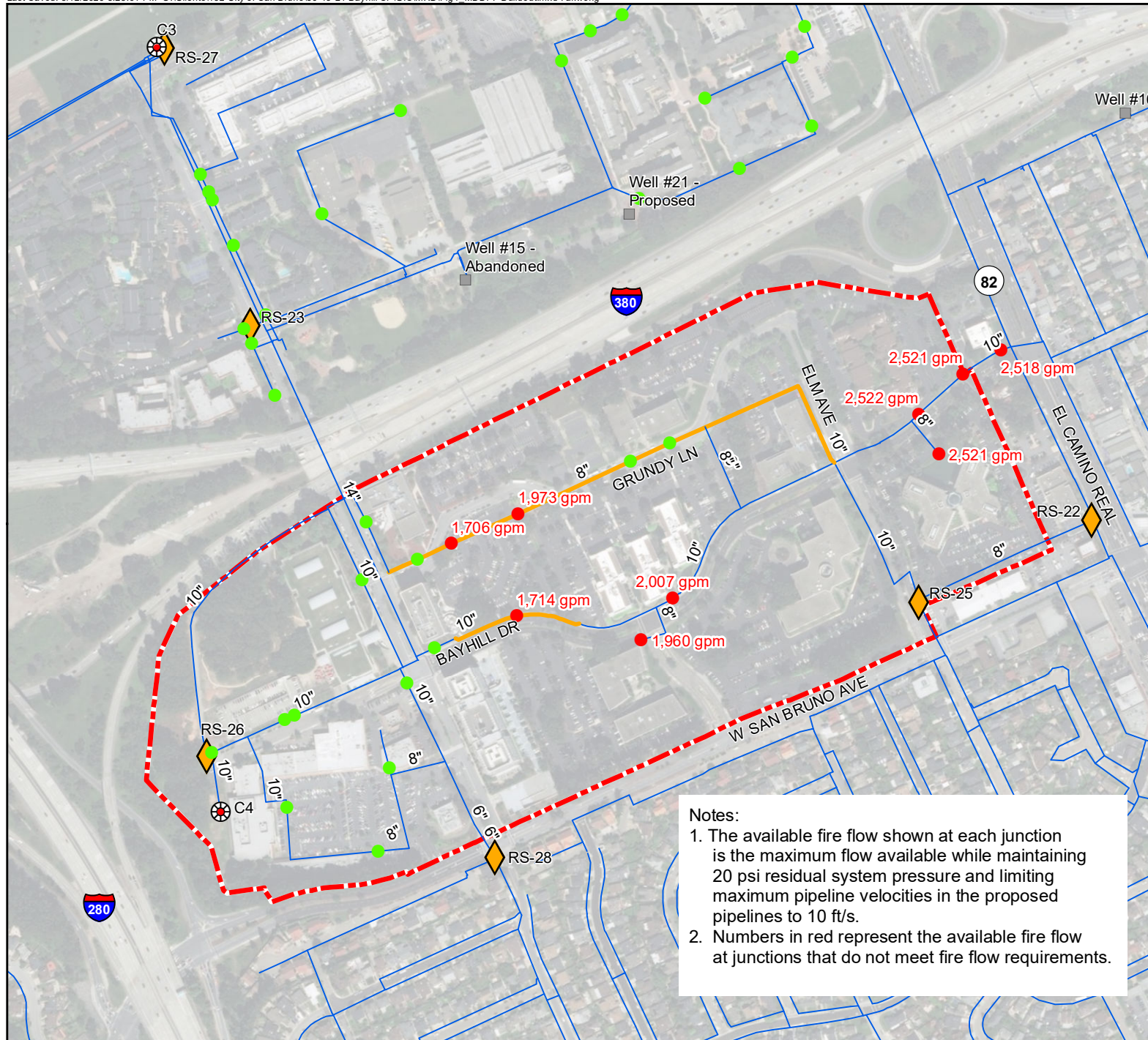
Notes:

1. The available fire flow shown at each junction is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities in the proposed pipelines to 10 ft/s.
2. Numbers in red represent the available fire flow at junctions that do not meet fire flow requirements.



Figure 3
Maximum Day
Plus Fire Flow for
Phase 1 Development

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



Symbology

Available Fire Flow

- Does Not Meet Fire Flow Requirements
- Meets Fire Flow Requirements
- Existing Pipeline
- Proposed Pipeline
- Turnout
- Well
- Pressure Regulating Station
- - - Project Location

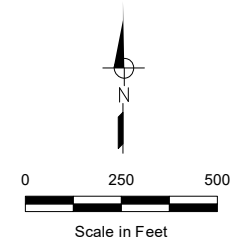
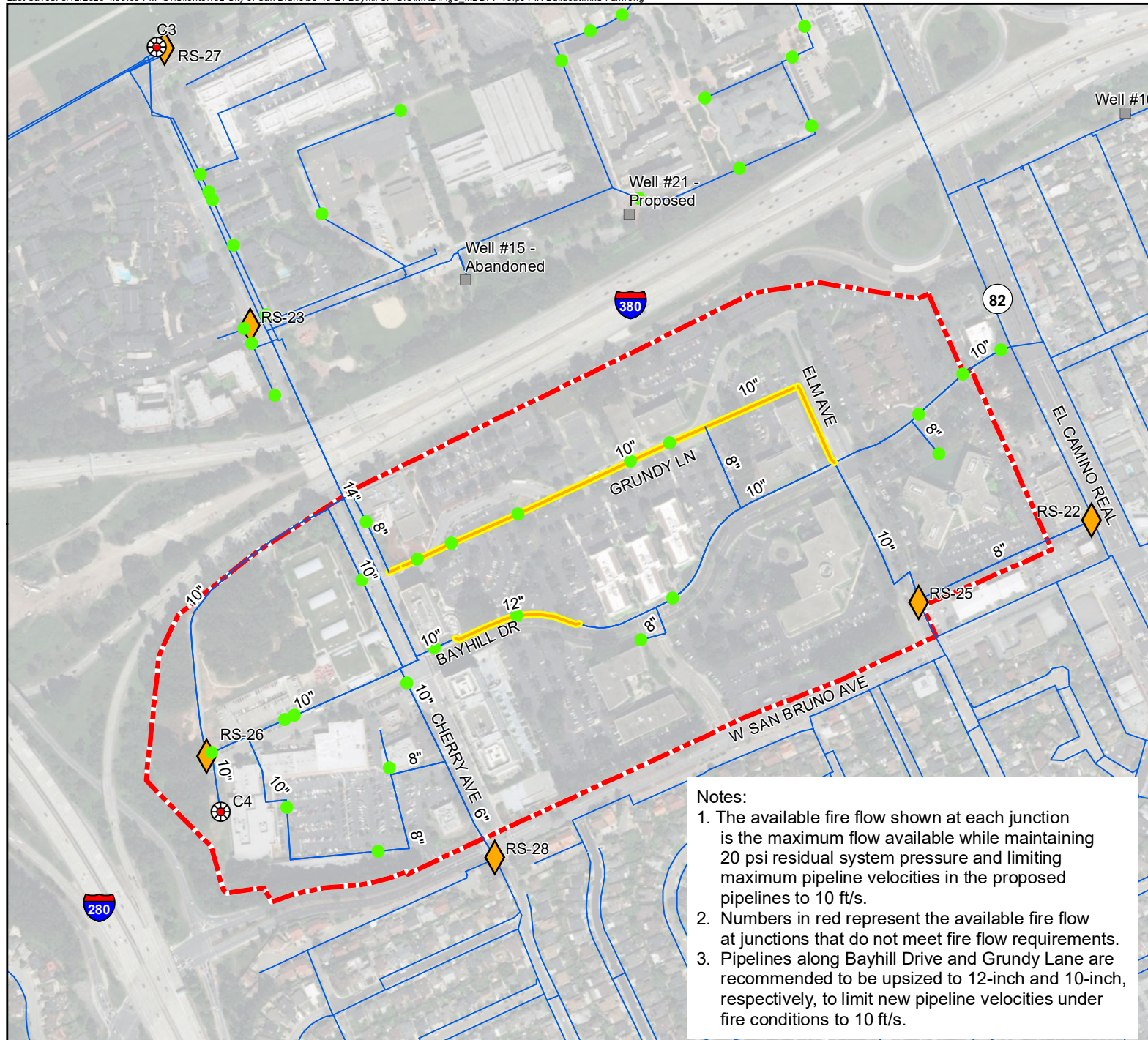


Notes:

1. The available fire flow shown at each junction is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities in the proposed pipelines to 10 ft/s.
2. Numbers in red represent the available fire flow at junctions that do not meet fire flow requirements.

Figure 4
Maximum Day Plus Fire Flow for Project Buildout

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



Symbology

Available Fire Flow

- Does Not Meet Fire Flow Requirements
- Meets Fire Flow Requirements
- Existing Pipeline
- Recommended Pipeline Improvement
- Turnout
- Well
- Pressure Regulating Station
- - - Project Location

Notes:

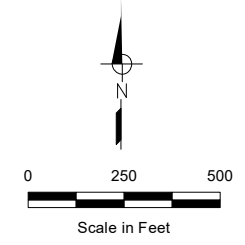
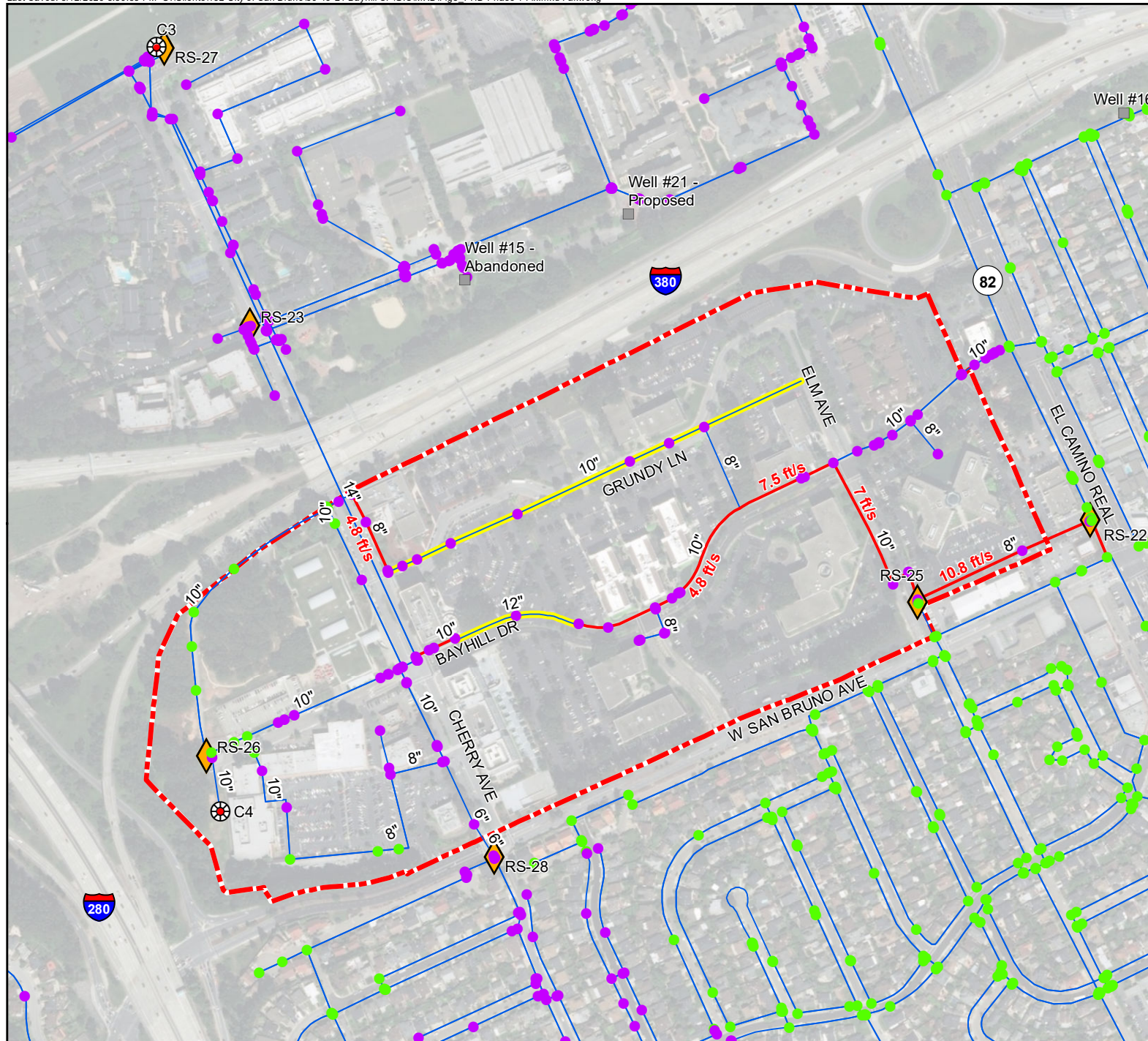
1. The available fire flow shown at each junction is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities in the proposed pipelines to 10 ft/s.
2. Numbers in red represent the available fire flow at junctions that do not meet fire flow requirements.
3. Pipelines along Bayhill Drive and Grundy Lane are recommended to be upsized to 12-inch and 10-inch, respectively, to limit new pipeline velocities under fire conditions to 10 ft/s.



Figure 5

Maximum Day Plus Fire Flow for Project Buildout with Improvements

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



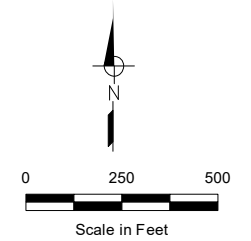
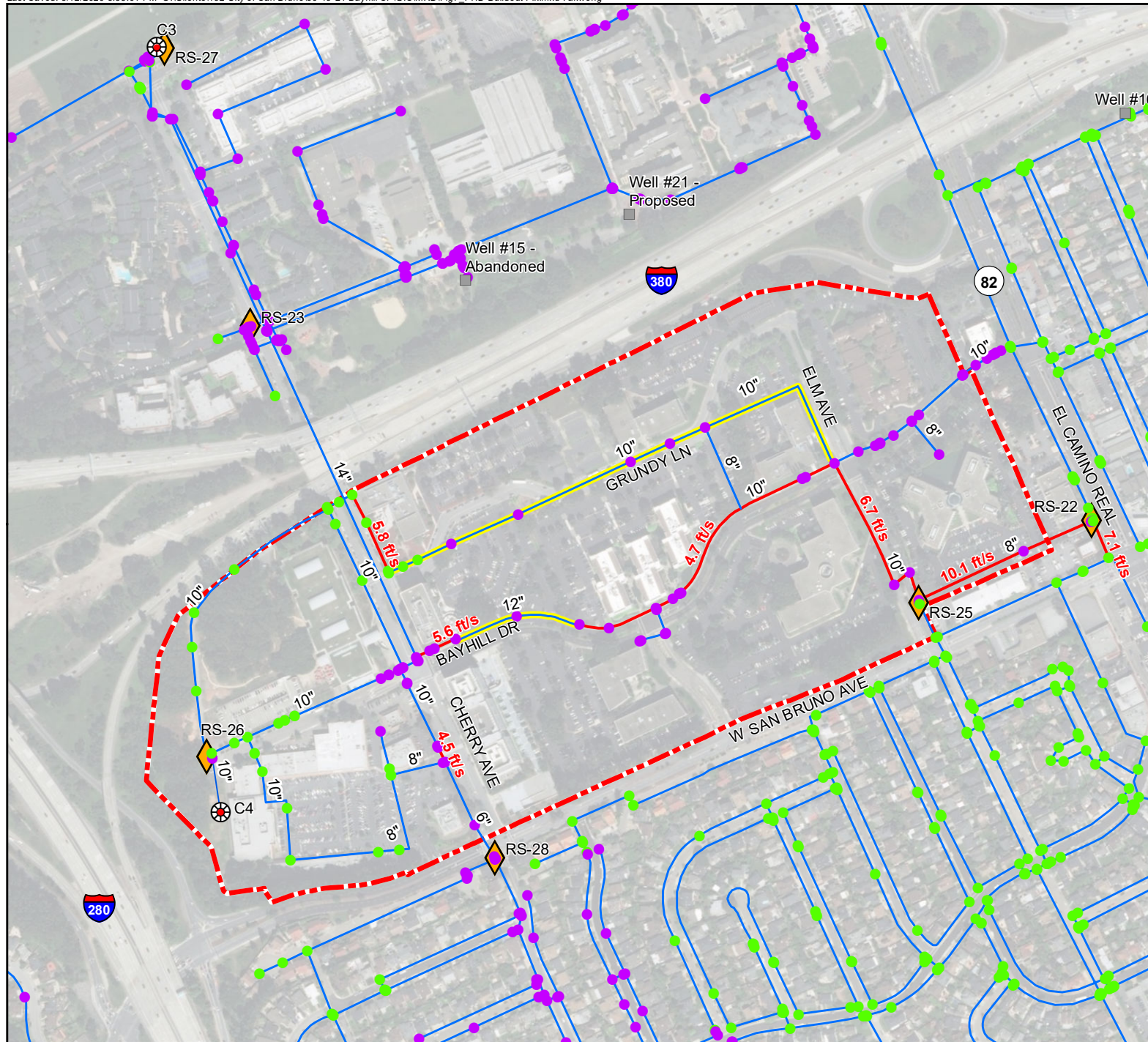
- Symbology**
- Junction Pressure**
- Less than 35 psi
 - 35 psi - 80 psi
 - Greater than 80 psi
- Recommended Pipeline Improvement
- Pipeline Velocity**
- Less than or equal to 4 ft/s
 - Greater than 4 ft/s
- Turnout
 - Well
 - Pressure Regulating Station
 - Project Location



Figure 6

Peak Hour Demand for Phase 1 Development with Improvements

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



Symbology

Junction Pressure

- Less than 35 psi
- 35 psi - 80 psi
- Greater than 80 psi

— Recommended Pipeline Improvement

Pipeline Velocity

- Less than or equal to 4 ft/s
- Greater than 4 ft/s

⊗ Turnout

■ Well

◆ Pressure Regulating Station

--- Project Location



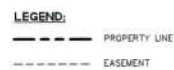
WEST YOST
ASSOCIATES

Figure 7
Peak Hour Demand for
Project Buildout
with Improvements

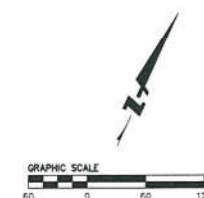
City of San Bruno
Bayhill Specific Plan
Water System Evaluation

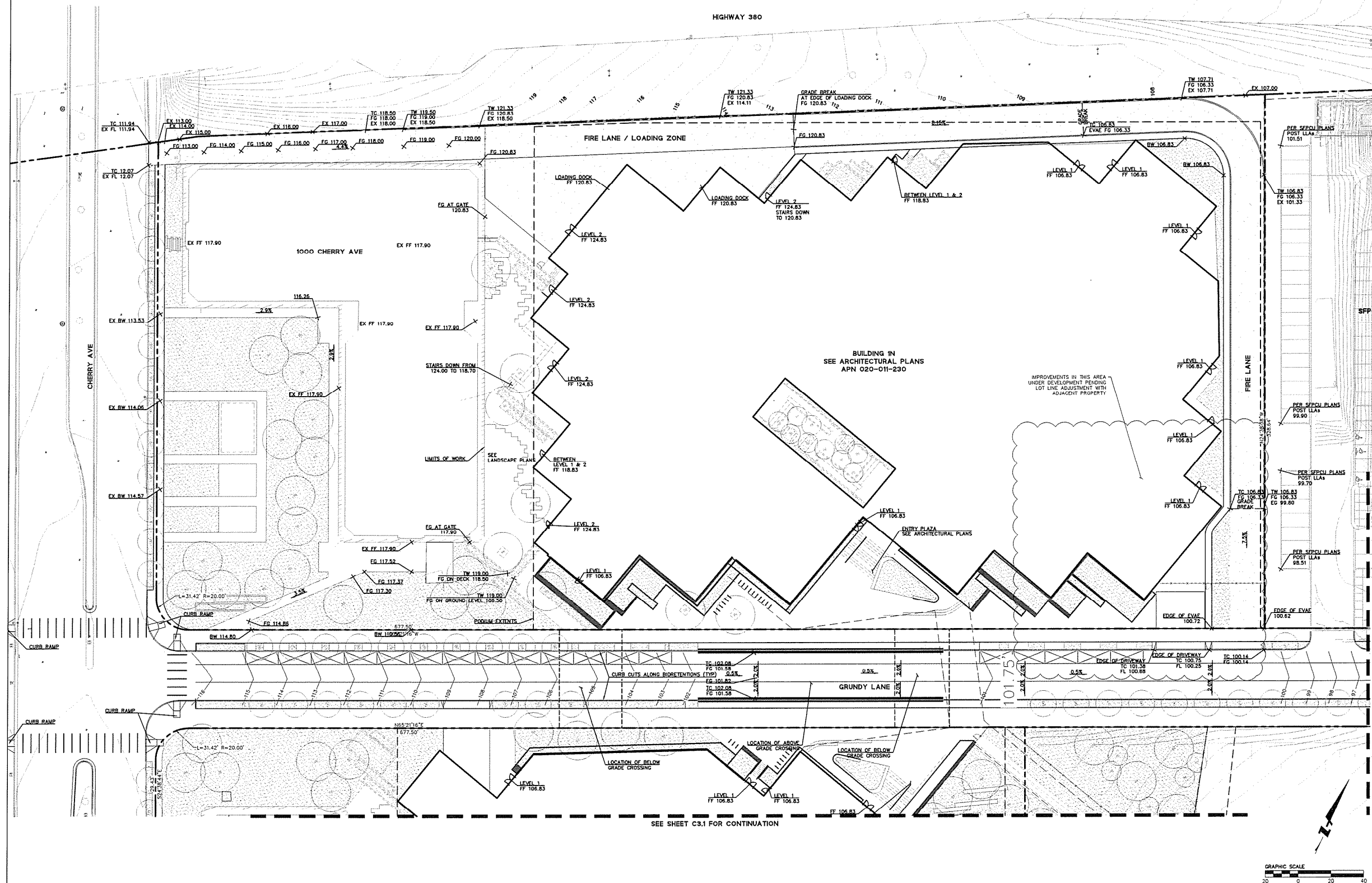
ATTACHMENT A

Utility Plan (Phase I Development)

ALEX CALDER PLS 880
BEN SANTOS PLS 935

C1.0

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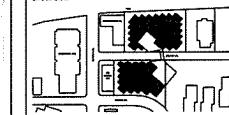


DESIGN ARCHITECT	ARCHITECT OF RECORD
SHO ARCHITECTS 200 PARK AVENUE NEW YORK, NY 10022 MR. JIM HALL, MR. 212/687-1000	HEERY 1000 WEST 17TH STREET NEW YORK, NY 10011 MR. JIM HALL, MR. 212/687-1000
OWNER/APPLICANT	DEVELOPMENT MANAGER
COOK+LEACH 1400 PARK AVENUE NEW YORK, NY 10022 MR. JIM HALL, MR. 212/687-1000	CLUBS PARTNERS 115 BATTERY PL. NEW YORK, NY 10002 MR. JIM HALL, MR. 212/687-1000
CIVIL ENGINEER	CLIMATE PLANNER
BOF	CMV
200 WEST 10TH ST. NEW YORK, NY 10011 MR. JIM HALL, MR. 212/687-1000	SHO PART. INC. 200 PARK AVENUE NEW YORK, NY 10022 MR. JIM HALL, MR. 212/687-1000
LIGHTING DESIGNER	LANDSCAPE ARCHITECT
INTRO LIGHTING 400 BROAD ST. NEW YORK, NY 10002 MR. JIM HALL, MR. 212/687-1000	SHO ASSOCIATION INC. 200 PARK AVENUE NEW YORK, NY 10022 MR. JIM HALL, MR. 212/687-1000

PROJECT NAME
YouTube
PHASE 1

PROJECT ADDRESS
GRUNDY LANE
SAN BRUNO, CA 94066

ESTE DIAGRAMA



15 QUANTUM

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SEAL & SIGNATURE

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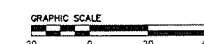
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The site plan illustrates the proposed development at 1050 Bayhill Drive. Key features include:

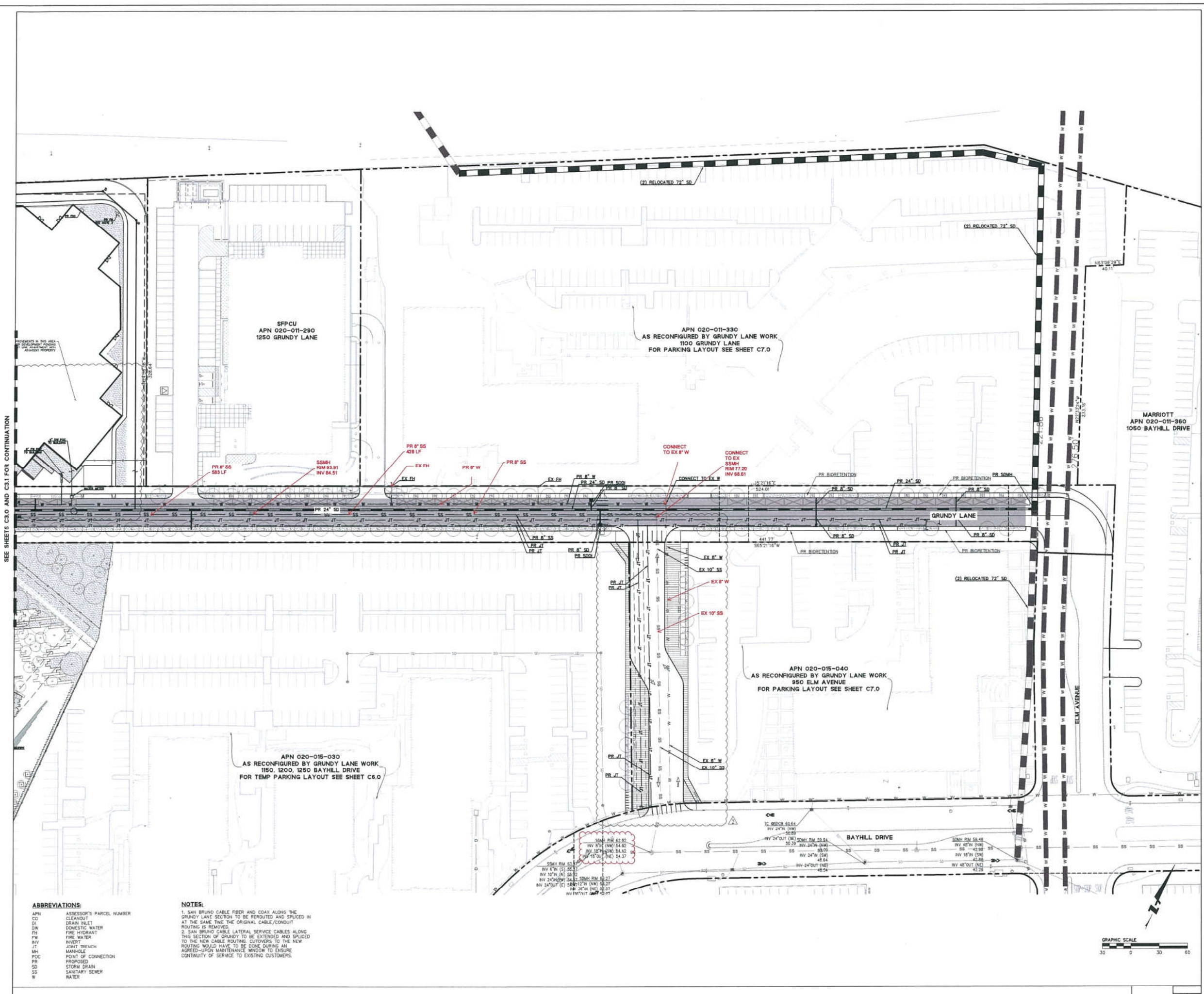
- APN 020-011-290:** Located at 1250 Grundy Lane, this area is designated for SFPCU (Single-Family Private Care Unit) use.
- APN 020-011-330:** Located at 1100 Grundy Lane, this area is designated for reconfiguration by Grundy Lane work.
- APN 020-015-040:** Located at 950 Elm Avenue, this area is designated for reconfiguration by Grundy Lane work.
- Streets:** Grundy Lane, Bayhill Drive, and Elm Avenue are shown with their respective right-of-way lines and easements.
- Topography:** The plan includes contour lines indicating the terrain of the site.
- Annotations:** Various dimensions and bearings are provided for the property lines and easements.
- Scale and Orientation:** A north arrow and a graphic scale (0 to 60 feet) are included in the bottom right corner.

63.2

C3.2



A horizontal scale bar with alternating black and white segments. It is labeled with '0', '10', and '20' at the bottom.



SEE SHEETS C3.0 AND C3.1 FOR CONTINUATION

- ABBREVIATIONS:**
- | | |
|-----|--------------------------|
| APN | ASSESSOR'S PARCEL NUMBER |
| CO | CLEANOUT |
| DI | DRAIN INLET |
| DW | DOMESTIC WATER |
| PH | FIRE HYDRANT |
| FW | FIRE WATER |
| RV | INVERT |
| JT | JOINT TRENCH |
| MH | MANHOLE |
| POC | POINT OF CONNECTION |
| PR | PROPOSED |
| SD | STORM DRAIN |
| SS | SANITARY SEWER |
| W | WATER |
- NOTES:**
1. SAN BRUNO CABLE FIBER AND COAX ALONG THE GRUNDY LANE SECTION TO BE REROUTED AND SPLICED IN AT THE SAME TIME THE ORIGINAL CABLE/CONDUIT ROUTING IS REMOVED.
 2. SAN BRUNO CABLE LATERAL SERVICE CABLES ALONG THIS SECTION OF GRUNDY TO BE EXTENDED AND SPLICED TO THE NEW CABLE ROUTING. CUTOVERS TO THE NEW ROUTING WOULD HAVE TO BE DONE DURING AN AGREED-UPON MAINTENANCE WINDOW TO ENSURE CONTINUITY OF SERVICE TO EXISTING CUSTOMERS.

sh p

h+k

hlw

BkF

SURFACEDSIGN INC

niteo

DESIGN ARCHITECT

ARCHITECT OF RECORD

OWNER/APPLICANT

DEVELOPMENT MANAGER

CIVIL ENGINEER

CAMPUS PLANNER

LANDSCAPE ARCHITECT

PROJECT NAME

PRIME 1

PROJECT ADDRESS

GRUNDY LANE

SAN BRUNO, CA 94066

DATE

06/01/20

PROJECT NO.

100112

DRAWN BY

ML

CHECKED BY

ML

DRAWING NUMBER

C4.2

YouTube

GRUNDY LANE

SAN BRUNO, CA 94066

GRAPHIC SCALE

30 0 30 60

ATTACHMENT B

Proposed Land Use Plans

Project Maximum Office Scenario

	Office (sf)^a	Retail (sf)	Hotel (sf)	Residential (DU)^b
Existing Building Area	1,557,847	121,846	79,152 (133 rooms)	-
Existing to be Removed				
Phase I Development (2021)	138,524	-	-	-
Remaining Specific Plan Buildout	554,328	-	-	-
Total Existing to be Removed	692,852	-	-	-
Proposed New Construction				
Phase I Development	440,000	-		-
Remaining Specific Plan Buildout	2,712,699	-		-
Total Proposed	3,152,699^a	-	-	-
Net Change	2,459,847	-	-	-
Total at Buildout	4,017,694	121,846	79,152 (133 rooms)	-
<p>Footnote: The Specific Plan would also allow for an up to 50,000-sf civic use to be developed on a 2.1 acre parcel bordering San Bruno Avenue West. If the civic use were to be developed, the overall capacity of the Specific Plan area to accommodate new office uses would be reduced, and less office square footage would be developed. Thus, the civic use is not shown in the Maximum Office Scenario, which assumes that the maximum possible amount of office square footage is built. The potential civic use is discussed in this Draft EIR where relevant to the impact analysis.</p> <p>^a sf = square feet</p> <p>^b du = dwelling unit</p>				

Project Maximum Housing Scenario

	Office (sf)^a	Retail (sf)	Hotel (sf)	Residential (DU)^b
Existing Building Area	1,557,847	121,846	79,152 (133 rooms)	-
Existing to be Removed				
Phase I Development (2021)	138,524	-	-	-
Remaining Specific Plan Buildout	689,040	-	-	-
Total Existing to be Removed	827,564	-	-	-
Proposed New Construction				
Phase I Development (2021)	440,000	-	-	-
Remaining Specific Plan Buildout	2,330,460	-	-	573
Total Proposed	2,770,460	-	-	573^a
Net Change	1,942,896	-	-	573
Total at Buildout	3,500,743	121,846	79,152 (133 rooms)	573
<p>Footnote: The Specific Plan would also allow for an up to 50,000-sf civic use to be developed on a 2.1 acre parcel bordering San Bruno Avenue West. If the civic use were to be developed, the overall capacity of the Specific Plan area to accommodate new residential uses would be reduced, and fewer than 573 housing units would be developed. Thus, the civic use is not shown in the Maximum Housing Scenario, which assumes that the maximum possible number of residential dwelling units is built. The potential civic use is discussed in this Draft EIR where relevant to the impact analysis.</p> <p>^a sf = square feet</p> <p>^b du = dwelling unit</p>				

Increased Height Alternative Maximum Office Scenario

	Office (sf) ^a	Retail (sf)	Hotel (sf)	Residential (DU) ^b
Existing Building Area	1,557,847	121,846	79,152 (133 rooms)	-
Existing to be Removed				
Phase I Development (2021)	138,524	-	-	-
Remaining Specific Plan Buildout	554,328	-	-	-
Total Existing to be Removed	692,852	-	-	-
Proposed New Construction				
Phase I Development	440,000	-	-	-
Remaining Specific Plan Buildout	2,712,699	-	31,661 (53 rooms)	-
Total Proposed	3,152,699^a	-	110,813 (186 rooms)	-
Net Change	2,459,847	-	31,661 (53 rooms)	-
Total at Buildout	4,017,694	121,846	110,813 (186 rooms)	-
<p>Footnote: The Specific Plan would also allow for an up to 50,000-sf civic use to be developed on a 2.1 acre parcel bordering San Bruno Avenue West. If the civic use were to be developed, the overall capacity of the Specific Plan area to accommodate new office uses would be reduced, and less office square footage would be developed. Thus, the civic use is not shown in the Maximum Office Scenario, which assumes that the maximum possible amount of office square footage is built. The potential civic use is discussed in this Draft EIR where relevant to the impact analysis.</p> <p>^a sf = square feet</p> <p>^b du = dwelling unit</p>				

Increased Height Alternative Maximum Housing Scenario

	Office (sf) ^a	Retail (sf)	Hotel (sf)	Residential (DU) ^b
Existing Building Area	1,557,847	121,846	79,152 (133 rooms)	-
Existing to be Removed				
Phase I Development (2021)	138,524	-	-	-
Remaining Specific Plan Buildout	689,040	-	-	-
Total Existing to be Removed	827,564	-	-	-
Proposed New Construction				
Phase I Development (2021)	440,000	-	-	-
Remaining Specific Plan Buildout	2,330,460	-	31,661 (53 rooms)	1,070
Total Proposed	2,770,460	-	110,813 (186 rooms)	1,070^a
Net Change	1,942,896	-	31,661 (186 rooms)	1,070
Total at Buildout	3,500,743	121,846	110,813 (186 rooms)	1,070
<p>Footnote: The Specific Plan would also allow for an up to 50,000-sf civic use to be developed on a 2.1 acre parcel bordering San Bruno Avenue West. If the civic use were to be developed, the overall capacity of the Specific Plan area to accommodate new residential uses would be reduced, and fewer than 573 housing units would be developed. Thus, the civic use is not shown in the Maximum Housing Scenario, which assumes that the maximum possible number of residential dwelling units is built. The potential civic use is discussed in this Draft EIR where relevant to the impact analysis.</p> <p>^a sf = square feet</p> <p>^b du = dwelling unit</p>				

ATTACHMENT C

Project Alternative Buildout Evaluation

ATTACHMENT C

Project Alternative Buildout Evaluation



This attachment presents the Project Alternative Buildout water system evaluation findings and conclusions. Because the Increased Height Alternative – Maximum Housing Scenario resulted in the highest buildout water demand, it was evaluated as a possible project alternative. The Project Alternative Buildout scenario includes 3,500,743 sf of office buildings, 121,846 sf of retail buildings, a 186-room hotel, and 1,070 dwelling units (du) of multi-family residential housing (these totals include existing buildings that would remain).

ESTIMATED WATER DEMAND

Average day demands for the Project Alternative Buildout were estimated by West Yost in the Project WSA using unit water demand factors from the 2012 Water System Master Plan (WSMP) for Multi-Family Residential, Commercial Office, and Commercial Retail water uses, and actual hotel water use for a local San Francisco Bay Area water district. Maximum day and peak hour demands were estimated using peaking factors developed in the 2012 WSMP. Metered water demands from the existing developed parcels were subtracted from the projected water demands for the Project Alternative to determine the actual net increase in water demand from the Project Alternative.

Table C-1 summarizes the projected average day, maximum day, and peak hour water demands for the Project Alternative Buildout condition.

Table C-1. Summary of Average Day, Maximum Day, and Peak Hour Water Demands						
Project Phase	Average Day Demand		Maximum Day Demand ^(a)		Peak Hour Demand ^(b)	
	gpm	gpd	gpm	gpd	gpm	gpd
Proposed Demand^(c)						
Project Alternative Buildout	436.8	628,968	655.2	943,452	1,310.4	1,886,904
Existing Demand^(d)						
Commercial Retail	128.4	184,854	192.6	277,281	385.2	554,562
Total Net Increase in Demand						
Project Alternative Buildout	308.4	444,114	462.6	666,171	925.2	1,332,342
(a) Maximum day demand is 1.5 times the average day demand, per the 2012 WSMP (see Table 3-7). (b) Peak hour demand is 3.0 times the average day demand, per the 2012 WSMP (see Table 3-7). (c) Based on Table 2-4 from the Project WSA. (d) Based on the existing 2010 metered consumption data for the Bayhill Specific Plan parcels, provided by the City during development of the 2012 WSMP, and scaled to match the historical 2000/01 demands evaluated in the hydraulic model.						



STORAGE CAPACITY EVALUATION

The storage capacity required to serve the Project Alternative Buildout was evaluated to determine the impacts, if any, on the City's existing water system. The storage capacity evaluation was based on the water system planning and design criteria defined in the 2012 WSMP.

The City's total water storage requirement can be described as the sum of operational storage, fire flow storage, and emergency storage, less a groundwater credit. Because the City is a participant in the Regional Groundwater Storage and Recovery (GSR) project and will no longer pump groundwater under normal supply conditions, the groundwater credit will no longer apply. The 2012 WSMP established water storage criteria for the City, as outlined below.

- **Operational Storage:** 25 percent of the maximum day demand
- **Fire Flow Storage:** Fire flow demand times duration for the most severe fire flow in pressure zone
- **Emergency Storage:** 50 percent of the maximum day demand

The storage capacity required to serve the net increase in demands from the Project Alternative Buildout is provided in Table C-2.

Table C-2. Required Water Storage to Serve Net Increase in Demand due to Project Alternative		
Storage Component	Planning Criteria ^(a)	Increase in Required Storage Volume, MG
Operational Storage	25% of maximum day demand	0.17
Fire Storage ^(b)	3,000 gpm for 3 hours	0.54
Emergency Storage	50% of maximum day demand	0.33
Total		1.04
(a) As presented in the 2012 WSMP (see Table 7-3).		
(b) As presented in the 2012 WSMP (see Table 6-2).		

The 2012 WSMP recommended a new 1.4 MG storage tank improvement in Zone 3/5 to eliminate the storage capacity deficit at buildout. However, as shown in Table C-3, under the Project Alternative Buildout condition, a new 1.4 MG storage tank would yield a storage deficit within Zone 3/5 of approximately 0.3 MG. Therefore, West Yost recommends increasing the capacity of the proposed new Zone 3/5 storage tank from 1.4 MG to 1.8 MG to accommodate for the increase in Zone 3/5 storage capacity required to serve the Project Alternative at buildout.

ATTACHMENT C

Project Alternative Buildout Evaluation



Table C-3. Water Storage Capacity under Project Alternative Buildout Condition

	Total Available Storage, MG	Required Storage Capacity, MG				Storage Capacity Surplus (Deficit), MG
		Operational ^(a)	Fire Flow ^(b)	Emergency ^(c)	Total	
Future Storage ^(d,e)	1.4	0.26	0.54	0.53	1.33	0.07
Bayhill Office Park ^(f)	0.0	(0.03)	-	(0.07)	(0.10)	0.10
Project Alternative - Buildout ^(g)	0.0	0.17	-	0.33	0.50	(0.50)
Total Storage Required ^(h)	1.4	0.40	0.54	0.79	1.73	(0.33)

(a) Based on 25% of maximum day demand, as outlined in the 2012 WSMP.
 (b) Based on demand for most severe fire flow recommended in pressure zone multiplied by corresponding recommended fire flow duration from Table 6-2 from the 2012 WSMP.
 (c) Based on 50% of maximum day demand, as outlined in the 2012 WSMP.
 (d) A 1.4 MG tank was recommended in the 2012 WSMP to alleviate Zone 3/5's storage capacity deficit; however, West Yost recommends upsizing the tank to 1.8 MG to meet buildout storage requirements with the Project Alternative.
 (e) Required storage capacity to meet future demand, based on Table 8-3 from the 2012 WSMP.
 (f) The future storage requirement projected in the 2012 WSMP for the Project site is based on the maximum day demand projected for the Bayhill Office Park. Average day demand projected for the Bayhill Office Park is presented in Table 3-10 of the 2012 WSMP.
 (g) Required storage capacity based on Net Increase in Demand due to Project Alternative Buildout. Fire flow storage is not included in total since the fire flow requirement for Zone 3/5 without the Project is equal to the fire flow required by the Project.
 (h) The Total Storage Required is based on the sum of the Available Storage and the Project Alternative, less the Bayhill Office Park.

HYDRAULIC EVALUATION

Two demand conditions were evaluated to determine the impacts of the Project Alternative on the City's water system. The following demand conditions were evaluated for the Project Alternative Buildout scenario:

- Maximum Day Demand plus Fire Flow
- Peak Hour Demand

Maximum Day Demand plus Fire Flow

The available fire flow capacity was simulated during a maximum day demand condition with the fire flow requirements shown previously on Figure 2. It is assumed that fire flow requirements for the Project Alternative Buildout were evaluated under existing fire flow demand requirements of 2,500 gpm to 3,000 gpm, depending on existing land use, and may be conservative. As shown on Figure C-1, multiple fire flow locations within the Project area are deficient (red dots) at buildout because the proposed pipelines exceed the maximum pipeline velocity criterion of 10 ft/s.

To meet the fire flow requirements, it is recommended that the proposed pipeline in Grundy Lane be upsized to a 10-inch diameter pipe, and the proposed pipeline in Bayhill Drive be upsized to a 12-inch diameter pipe during the Phase I Development. As shown on Figure C-2, all fire flow locations evaluated in Zone 3/5 will meet fire flow requirements under the Project Alternative Buildout condition with these recommended pipeline improvements. It is important to note that these results are based on the available pipeline capacity and may not be representative of the actual flow that each fire hydrant can produce.

ATTACHMENT C

Project Alternative Buildout Evaluation



Peak Hour Demand

Under the Project Alternative Buildout peak hour demand condition, system pressures in the Project area range from 57.7 psi to 103.4 psi. System pressures during a peak hour demand condition remain above the required minimum pressure of 35 psi, and the velocities in the proposed pipelines remain below the maximum allowable pipeline velocity of 4 ft/s under the Project Alternative Buildout condition. However, most of the system pressures in the Project area exceed the maximum pressure criterion of 80 psi during a peak hour demand condition, and customer service connections at these locations should have individual pressure reducing valves installed.

It should be noted that existing pipelines in Cherry Avenue, Bayhill Drive, and Elm Avenue exceed the maximum allowable pipeline velocity requirement of 4 ft/s under the Project Alternative Buildout condition. Because these existing pipelines exceed the pipeline velocity criterion prior to the addition of the Project demands, no improvements are specifically recommended for the Project.

EVALUATION FINDINGS AND CONCLUSIONS

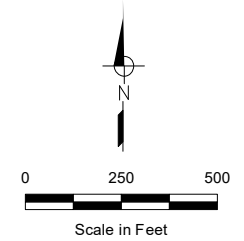
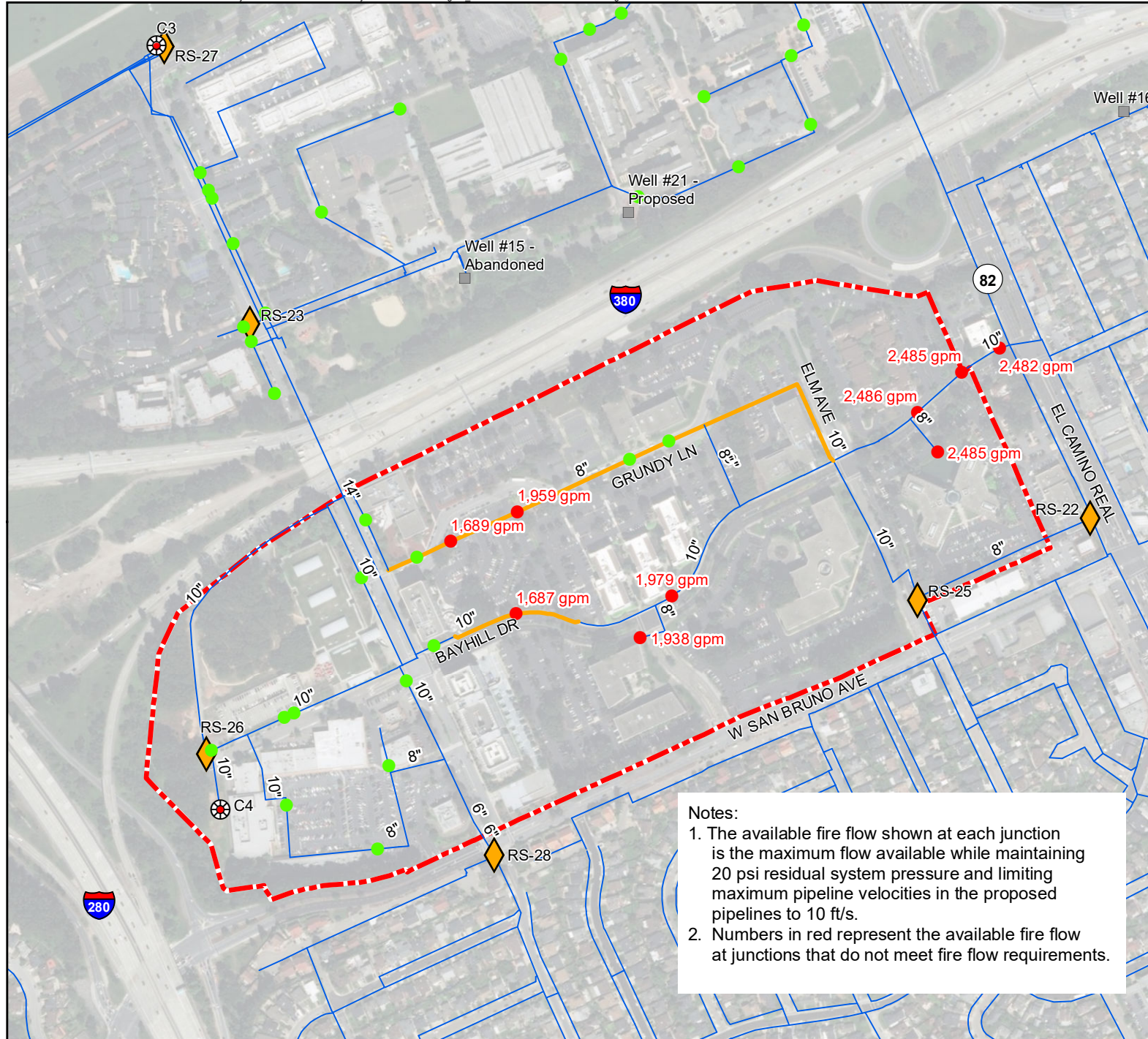
The evaluation findings and recommendations, previously described in detail, are summarized below. It should be noted that the hydraulic evaluation performed for the Project is based on the assumptions listed above. If any of these items are changed or modified in any way, other than as described in this TM, additional hydraulic evaluation may be required.

Water Storage

Approximately 0.50 MG of water storage in Zone 3/5 will be required to serve the Project Alternative Buildout. However, Zone 3/5 does not currently have any storage capacity and therefore, lacks adequate storage capacity to serve both the Phase I Development and Project Alternative Buildout conditions. The 2012 WSMP recommended a new 1.4 MG storage tank to serve Zone 3/5, but a larger 1.8 MG tank is recommended in Zone 3/5 to serve Project Alternative Buildout due to the increase in water demands from the Project. A new booster pump station preliminarily sized at 4.3 mgd (firm capacity) will also be required at this new storage tank as previously recommended in the 2012 WSMP.

Water Distribution

Based on the hydraulic modeling evaluation described previously, the proposed pipelines as provided on the Phase I Development preliminary utility plans are not adequate to serve the Project. To meet the City's water system performance criteria, it is recommended that the Project's proposed pipelines should be upsized to 10-inch diameter along Grundy Lane and 12-inch diameter along Bayhill Drive. These increases in pipeline diameters are recommended to serve the required fire flows in Phase I and Buildout at adequate pressures while meeting the City's maximum pipeline velocity requirement of 10 ft/s in the recommended pipelines. As existing pipelines are replaced in the area, they should be evaluated in the hydraulic model to determine the appropriate size for replacement to meet the City's maximum pipeline velocity requirement. It should also be noted that system pressures in the Project area exceed 80 psi and individual pressure reducing valves should be installed as needed.



Symbology

Available Fire Flow

- Does Not Meet Fire Flow Requirements
- Meets Fire Flow Requirements
- Existing Pipeline
- Proposed Pipeline
- Turnout
- Well
- Pressure Regulating Station
- - - Project Location

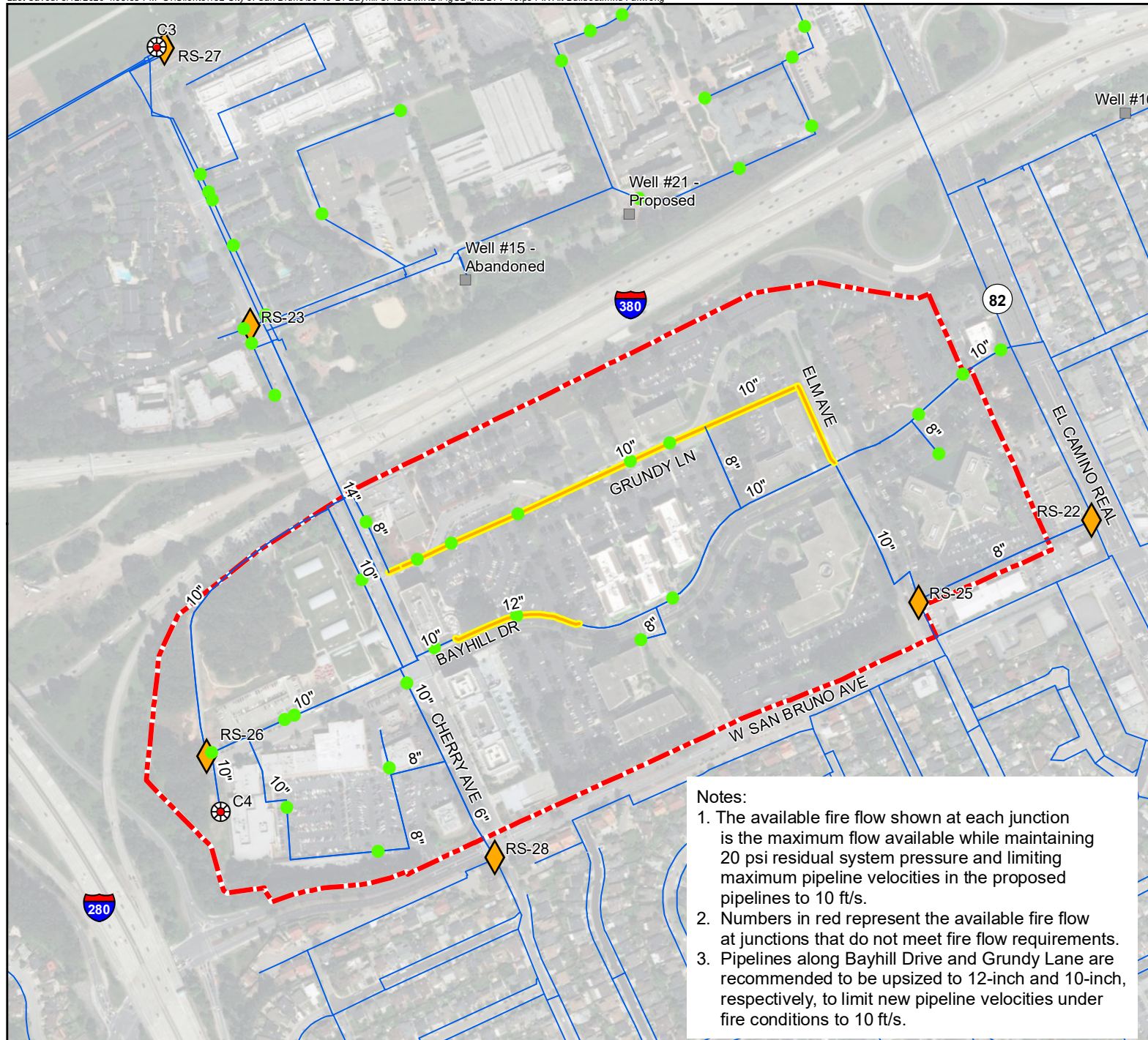


Notes:

1. The available fire flow shown at each junction is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities in the proposed pipelines to 10 ft/s.
2. Numbers in red represent the available fire flow at junctions that do not meet fire flow requirements.

Figure C-1
Maximum Day
Plus Fire Flow for
Alternative Buildout

City of San Bruno
Bayhill Specific Plan
Water System Evaluation



Symbology

Available Fire Flow

- Does Not Meet Fire Flow Requirements
- Meets Fire Flow Requirements
- Existing Pipeline
- Recommended Pipeline Improvement
- Turnout
- Well
- Pressure Regulating Station
- Project Location

Notes:

1. The available fire flow shown at each junction is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities in the proposed pipelines to 10 ft/s.
2. Numbers in red represent the available fire flow at junctions that do not meet fire flow requirements.
3. Pipelines along Bayhill Drive and Grundy Lane are recommended to be upsized to 12-inch and 10-inch, respectively, to limit new pipeline velocities under fire conditions to 10 ft/s.



Figure C-2

Maximum Day Plus Fire Flow for Alternative Buildout with Improvements

City of San Bruno
Bayhill Specific Plan
Water System Evaluation