SANITARY DISTRICT NO. 5 OF MARIN COUNTY
2001 Paradise Drive
Tiburon, California 94920

AGENDA
Capital Improvement Program Committee Meeting
Tuesday, December 8th, 2020, 11:00 a.m.

CORONA VIRUS (COVID-19) ADVISORY NOTICE

Consistent with Executive Orders No. N-25-20 and No. N-29-20 from the Executive Department of the State of California, the Meeting will not be physically open to the public and all Board Members and Staff will be teleconferencing into the meeting.

How to Submit Public Comments:
Comments submitted prior to the commencement of the meeting will be presented to the Committee and included in the public record for the meeting.

Public Comments are to be submitted via email to rdohrmann@sani5.org.

In addition, members of the public who are calling-in will have the opportunity to provide public comments by following the steps below:

How to Participate in the Meeting:
Join Zoom Meeting by clicking on the following link:

https://us02web.zoom.us/j/6230620778

Meeting ID: 623 062 0778

or join by phone:

Call in number: (669) 900-9128 **Participant Code: 623 062 0778**

I. Roll Call

II. Public Comments

III. New Business

1. **2020 Cove Rd Force Main Project update and review of credits due for approved change orders to date**

2. **Review & discuss HDR proposal for renewable energy study**

IV. Adjournment

This Committee may be attended by Board Members who do not serve on this committee. In the event that a quorum of the entire Board is present, this Committee shall act as a Committee of the Whole. In either case, any item acted upon by the Committee or the Committee of the Whole will require consideration and action by the full Board of Directors as a prerequisite to its legal enactment.

Accessible public meetings: *Any member of the public who needs accommodations should email the Office Manager, at rdohrmann@sani5.org, who will use her best efforts to provide as much accessibility as possible while also maintaining public safety.*

Project: Cove Road Sewer Rehab

Change Order No. 07

Date: November 17, 2020

Owner: Sanitary District No. 5 **Phone:** (415) 435-1501

Contractor: Maggiora & Ghilotti, Inc. **Phone:** (415) 435-4960

The following change is hereby made to the contract:

Description of Change:
Adjust force main plan and profile per November 2, 2020 letter request (see attached Revised Sheets 11 and 12). The Contractor has provided a credit for various bid items per his attached spreadsheet.

Reason for Change: The attached November 2, 2020 letter from Nute Engineering, including Caltrans Encroachment Permit Rider dated October 27, 2020, modified force main construction requirements within the Caltrans ROW. In addition, the sewer profile required deepening at storm drain in Caltrans ROW.

Pricing Data: Pricing per attached email and filled in spreadsheet from Maggiora & Ghilotti dated November 4, 2020 for a credit of $69,280.00.

Requested by: District

Contract Time: Adds 5 calendar days to the Contract.

The Owner and the Contractor hereby agree that this change order constitutes full and mutual accord and satisfaction for all time, all costs, and all impacts related to this revision. In accepting this change order, the Contractor agrees that it represents a full and equitable adjustment to the Contract, and further agrees to waive all rights to file claim with respect to any difficulties arising from, or as a result of, this change.

Original Contract:	$1,971,971.00
Previous Additions:	$ 522,888.33
Previous Deductions:	0.00
This Change Order:	($ 69,280.00)
Contract to Date:	$ 2,425,579.33

APPROVED:

Engineer

Owner

Contractor

COVE ROAD PUMP STATION FORCE MAIN REPLACEMENT PROJECT

REVISED COSTS FOR PLAN AND PROFILE CHANGE

		CONTRACT COSTS (Does not include Trench Plug Pave)						TOTAL	ADJUSTED COST CHANGE ITEM (Does not include Trench Plug Pave)					TOTAL
	LF	Install 16" HDPE at $322/LF Bid item #2	Install 16" HDPE Bend at $1,000/EA Bid item #6	Install Steel Cased 16" HDPE at $1,200/LF Bid item #3	Install Steel Cased Bend at $8,000 Bid item #4	Install Steel Cased Minor Bend at $13,000 Bid item #5	Install 5' Diameter Manhole at $15,000 Bid item #8		Install 16" HDPE New Adjusted Profile	Install 16" HDPE Bend - New Profile	Install HDPE Caltrans Trench Detail - New Deep Profile	Install HDPE Bend Caltrans Trench Detail	Install 5' Diameter Manhole - Shallower (New INV 6.5')	
Juanita Corner 17+40 to 18+65 Caltrans ROW	125	$40,250	$1,000					$41,250	125'@ $322LF = $40,250	1EA @ $1000 = $ 1,000				$ 41,250.00
18+65 Caltrans ROW to 20+91	226			$271,200	$8,000	$13,000		$292,200		2EA @ $4800 = $9,600	226'@$958LF= $ 216,508	N/A		$ 226,108.00
20+91 to 23+53	262	$84,364					$15,000	$99,364	262'@ $290LF = $ 75,980				$13,000	$ 88,980.00
							TOTAL	$432,814					**TOTAL**	$ 356,338.00

Difference	$ 76,476.00
* Bid item #3 - 22" casing bought and coated	$ 45,696.00
* Mark up on profit bid item #3 credit	$ 6,500.00
* Bid item #16 restore bricks, will use casing and not charge	$ 32,000.00
Adjusted Difference	$ 69,280.00

Mark Wilson

From: Don Muns <don@maggiora-ghilotti.com>
Sent: Wednesday, November 4, 2020 4:35 PM
To: Mark Wilson
Cc: John Moser
Subject: Adjusted cost for Sanitary 5
Attachments: 8766 MG Rev PP Costs ltr w Attachments DM.pdf

Mark, please see attached adjusted cost for 16" forced sewer main. Station 17+40 – 23+53. I will try and complete 6" change for Beach and Tiburon Blvd tomorrow.
M&G is planning on starting this work next week. Mr. Ghilotti wants written direction and approval of this change to start on Juanita before Maggiora-Ghilotti proceeds. As you mentioned we can get together Friday to discuss if necessary.

Regards

Don

Don Muns
Maggiora-Ghilotti
555 Dubois St.
San Rafael Ca. 94901
Office 415-459-8640
Cell 415-308-8875

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT RIDER

TR-0122 (REV 6/1999)

Collected by	Permit No. (Original)
	04-20-N-UL-0211
Rider Fee Paid $Exempt	Dist-Co-Rte-PM 04/MRN/131/4.38/4.41
Date October 27, 2020	Rider Number 04-20-N-RW-2498

TO: Sanitary District No. 5 of Marin County
2001 Paradise Dr
San Rafael, CA 94901
Email: trubio@sani5.org
m.wilson@nute-engr.com
Attn: Tony Rubio
c/o Mark Wilson, Nute Engineering.
Phone: (415) 435-1501, (415) 453- 4480 , **PERMITTEE**

In compliance with your request received on October 23, 2020. We are hereby amending the above numbered encroachment permit as follows:

Date of completion extended to: No change.

Reference your permit to: Encroach within State right-of-way for the purpose to conduct temporary traffic control and install a force main sanitary sewer at two locations; excavate 226' L x 4' W x 8" D, by open trench method and install a 16" Ø HDPE with a 22" Ø STL casing from Juanita Lane to Main Street; bore & jack, and install a 110'- 6" Ø HDPE with a 14" Ø STL casing across Tiburon Blvd. at Beach Road, and in accordance to the permittee's plans, specification and estimate, on State Highway, 04-MRN-131, Post Miles 4.38/4.41, in the Town of Tiburon.

Trench excavation must comply with the 2018 Caltrans Standard Specifications, Section 19-3, "Structure Excavation and Backfill" (available at https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications).

Trench backfill must comply with the attached trench detail and the 2018 Caltrans Standard Specifications, Section 19.3.02E, "Slurry Cement Backfill", and 19-3.02G, "Controlled Low-Strength Material" for top 6 feet of the excavation.

Trench plate must comply with the attached "Steel Plate Bridging Provisions" (TR-0157B).

The contractor will need to apply for an additional Rider and pay $492 fee.

Except as amended, all other terms and provisions of the original permit shall remain in effect.

Permit Writer: hirdaypal.dhillon@dot.ca.gov

CC: State Rep.: augusto.lumba@dot.ca.gov
Maint.: will.hauke@dot.ca.gov
DTM: marisa.muliadi-kleiber@dot.ca.gov
TMC: D4TMC/D04/Caltrans/CAGov
File: 04-20-N-UL-0211

APPROVED:

DAVID SALLADAY, District Permit Engineer

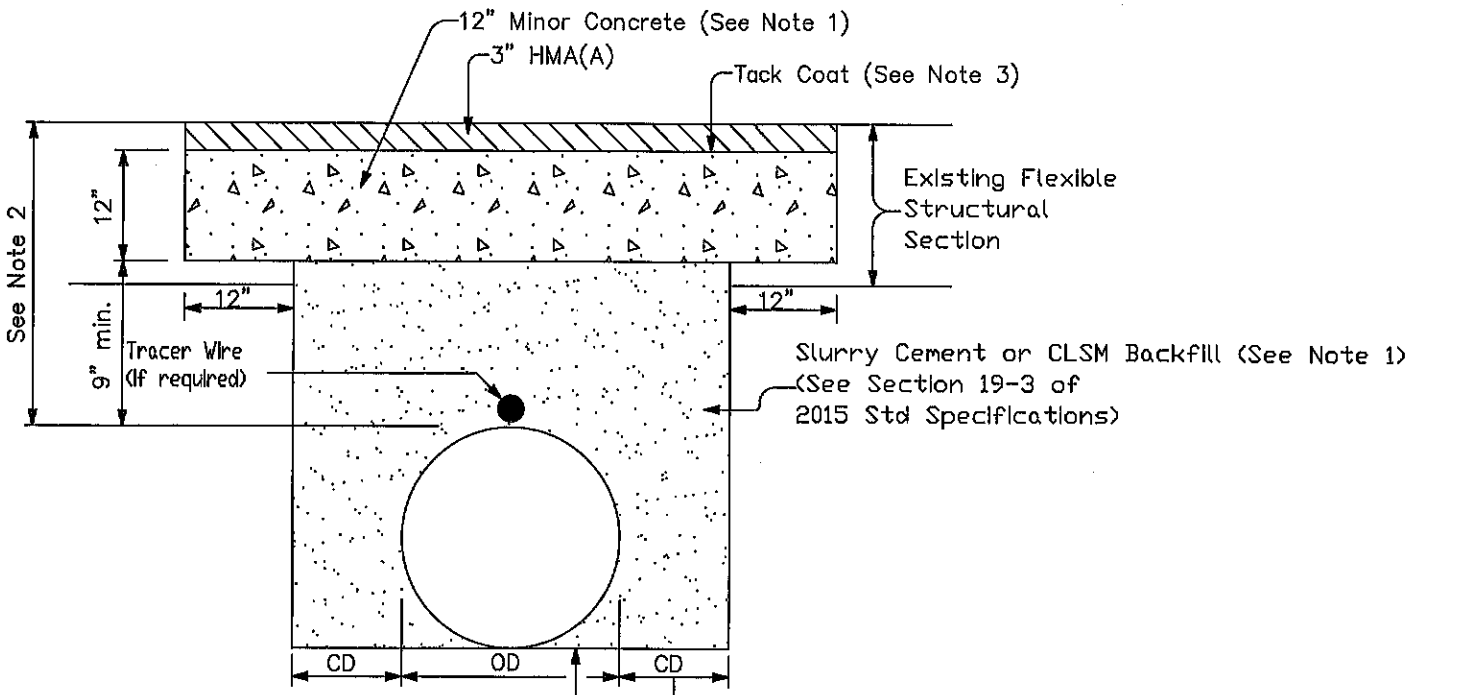
BY:

CHRIS MASTER, Senior Permit Engineer

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

FM 91 1437

CASE 1: FOR TRAFFIC INDEX (TI) LESS THAN OR EQUAL TO 12



LEGEND:

- Minor Concrete
- Hot Mix Asphalt
- Slurry Cement or CLSM Backfill

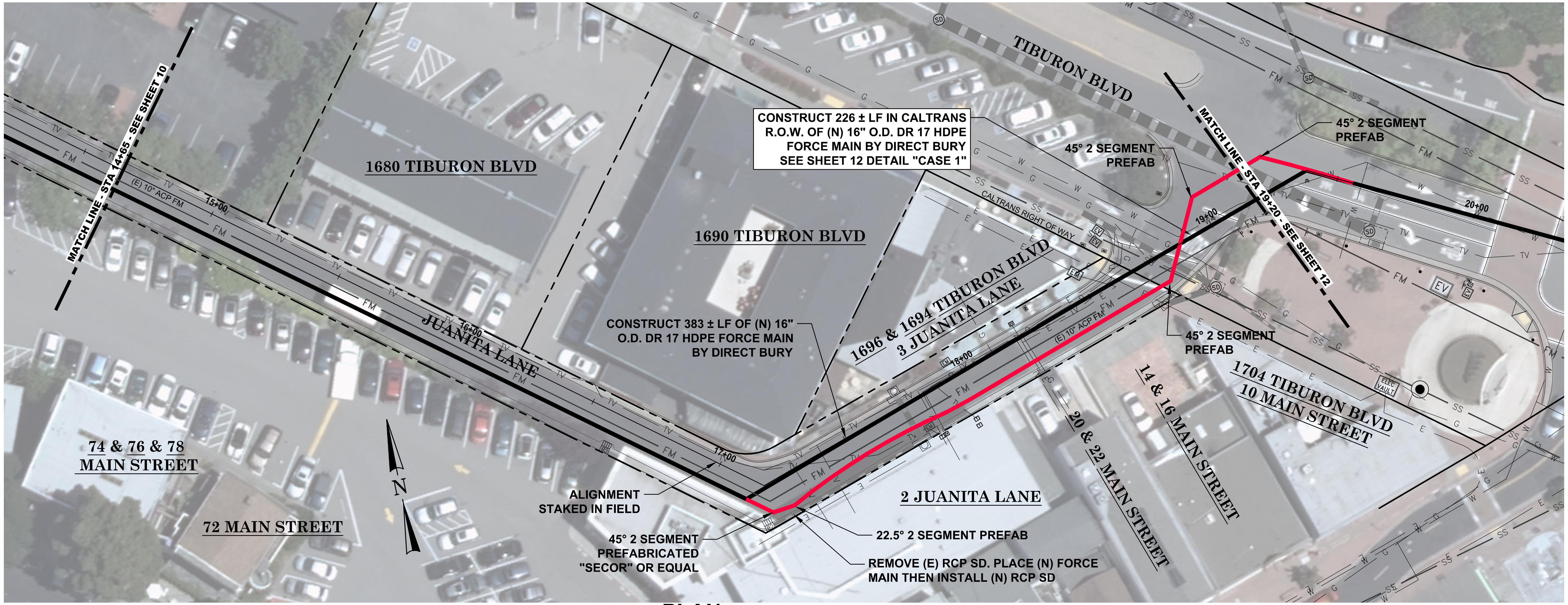
NOTES:

1. Concrete cap may be Rapid Strength Concrete (RSC); if RSC is used, replace the Slurry Cement or CLSM Backfill with Lean Concrete Backfill or RSC depending upon the project's time constraints.
2. For new installations, minimum depth of cover requirements are to follow guidelines in the Encroachment Permits Manual or Highway Design Manual. When cover over a replacement pipe/encasement pipe is less than 24", a Special Design is necessary (for In-house projects, refer to HQ Drainage Detail Library).
3. Tack Coat (Asphaltic Emulsion) shall be applied prior to placing HMA(A).
4. All trench work subject to state regulations and inspection.
5. All materials, workmanship, testing, and inspections shall comply with Caltrans Standard Specifications and project-specific Special Provisions.
6. Use of this detail is applicable if high groundwater conditions do not exist within the trench.

ABBREVIATIONS:

CD = Clear Distance
HMA(A) = Hot Mix Asphalt Type A
OD = Outside Diameter of Utility or Culvert
CLSM = Controlled Low-Strength Material

REVISED 12/12/2016



PLAN

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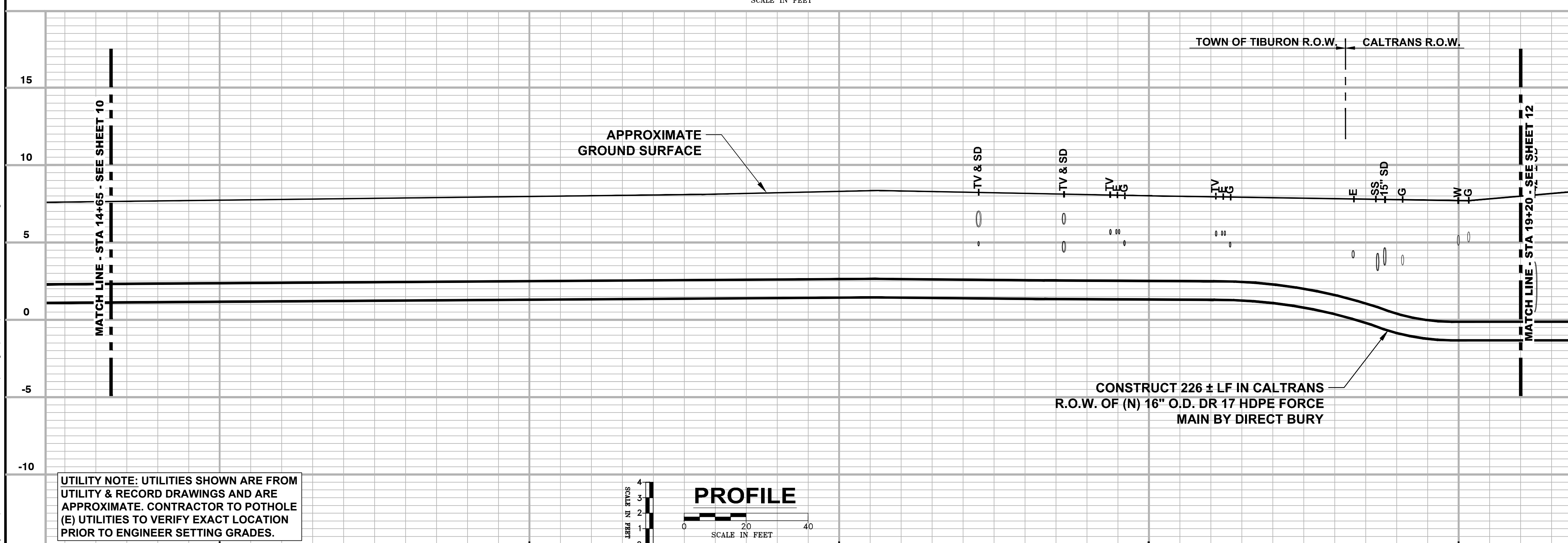
SCALE IN FEET



UTILITY NOTE: UTILITIES SHOWN ARE FROM UTILITY & RECORD DRAWINGS AND ARE APPROXIMATE. CONTRACTOR TO POTHOLE (E) UTILITIES TO VERIFY EXACT LOCATION PRIOR TO ENGINEER SETTING GRADES.

PROFILE

0 20 40
SCALE IN FEET

NOTES:

1. PRIOR TO CONSTRUCTION, CONTRACTOR TO POTHOLE (E) SEWER FORCE MAIN EVERY 100 FEET AND SUBMIT DEPTHS TO ENGINEER IN LOG FORM BY STATION.
2. CONTRACTOR TO POTHOLE UTILITIES AS SHOWN ON THE PLANS PRIOR TO CONSTRUCTION AND SUBMIT DEPTHS TO ENGINEER IN ABOVE REFERENCED LOG.
3. CONTRACTOR MAY USE ELECTROFUSION COUPLES WHERE APPROVED. CONTRACTOR SHALL PREPARE ELECTROFUSION COUPLING STATION LOG.

REGISTERED PROFESSIONAL ENGINEER · MARK T. WILSON · No. C47894 · Exp. 12/31/21 · CIVIL · STATE OF CALIFORNIA

1"

IF THIS DOES NOT MEASURE ONE INCH, THESE PLANS ARE NOT TO SCALE.

11 OF 20

REVISED SET 11/02/2020

SANITARY DISTRICT No.5
Marin County, California

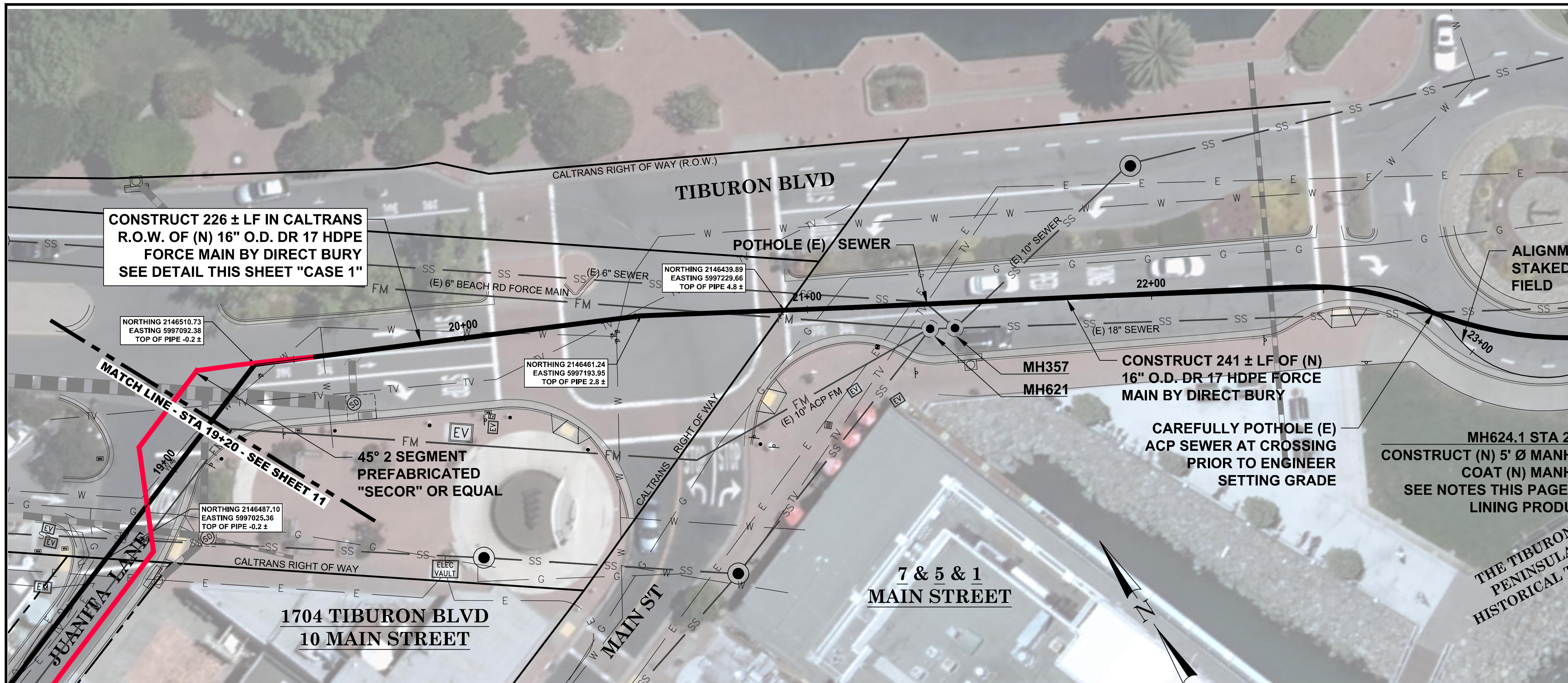
COVE ROAD PS FORCE MAIN REPLACEMENT PROJECT

PLAN AND PROFILE
JAUNITA LANE
STA 14+65 TO STA 19+20

NUTE ENGINEERING
907 MISSION AVE SAN RAFAEL, CALIFORNIA TEL 415-453-4480

Drawn by:	BEO	Job No.:	8766	Scale:	AS SHOWN
Checked by:	MTW			Date:	APRIL 2020

Printed: November 2, 2020 3:37 PM
P:_Projects\8766 SD5 Cove Force Main\Design\CAD\8766 Cove Road FM.dwg



PLAN

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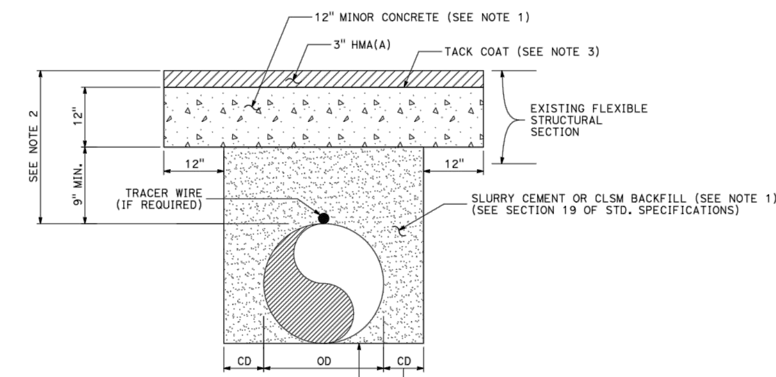
SCALE IN FEET

CASE 1: FOR TRAFFIC INDEX (TI) LESS THAN OR EQUAL TO 12

HIGH GROUNDWATER CONDITIONS DO NOT EXIST WITHIN THE TRENCH



CD = 6" TO 12"
(6' FOR PIPES 42 INCHES OR LESS IN DIAMETER OR SPAN,
12" FOR PIPES OVER 42 INCHES IN DIAMETER OR SPAN)

FOR APPLICABLE BEDDING REQUIREMENTS.
SEE STD PLANS A62D, A62DA OR A62F

LEGEND:

- MINOR CONCRETE
- HOT MIX ASPHALT
- SLURRY CEMENT OR CLSM BACKFILL

NOTES:

1. CONCRETE CAP MAY BE RAPID STRENGH CONCRETE (RSC); IF RSC IS USED, REPLACE THE SLURRY CEMENT OF CLSM BACKFILL WITH LEAN CONCRETE BACKFILL OR RSC DEPENDING UPON THE PROJECT'S TIME CONSTRAINTS.
2. FOR NEW INSTALLATIONS, MINIMUM DEPTH OF COVER REQUIREMENTS ARE TO FOLLOW GUIDELINES IN THE ENCROACHMENT PERMITS MANUL OR HIGHWAY DESIGN MANUAL. WHEN COVER OVER A REPLACEMENT PIPE/ENCASEMENT PIPE IS LESS THAN 24", A SPECIAL DESIGN IS NECESSARY (FOR IN-HOUSE PROJECTS, REFER TO HQ DRAINAGE DETAIL LIBRARY).
3. TACK COAT (ASPHALTIC EMULSION) SHALL BE APPLIED PRIOR TO PLACING HMA(A).
4. ALL TRENCH WORK SUBJECT TO STATE REGULATIONS AND INSPECTION.
5. ALL MATERIALS, WORKMANSHIP, TESTING, AND INSPECTIONS SHALL COMPLY WITH CALTRANS STANDARD SPECIFICATIONS AND PROJECT-SPECIFIC SPECIAL PROVISIONS.
6. USE OF THIS DETAIL IS APPLICABLE IF HIGH GROUNDWATER CONDITIONS DO NOT EXIST WITHIN THE TRENCH.

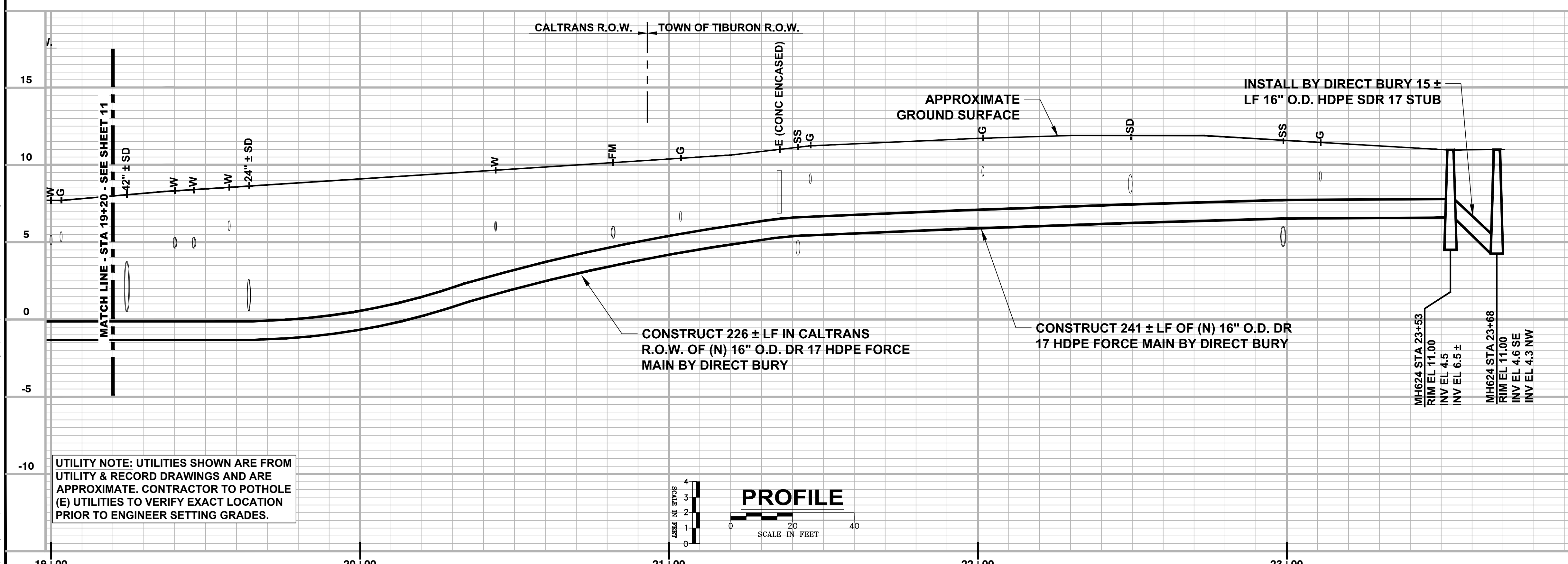
ABBREVIATIONS:

CD = CLEAR DISTANCE
HMA(A) = HOT MIX ASPHALT TYPE A
OD = OUTSIDE DIAMETER OF UTILITY OR CULVERT
CLSM = CONTROLLED LOW-STRENGH MATERIAL

REVISED 11/12/2019

NOTES:

1. PRIOR TO CONSTRUCTION, CONTRACTOR TO POTHOLE (E) SEWER FORCE MAIN EVERY 100 FEET AND SUBMIT DEPTHS TO ENGINEER IN LOG FORM BY STATION.
2. CONTRACTOR TO POTHOLE UTILITIES AS SHOWN ON THE PLANS PRIOR TO CONSTRUCTION AND SUBMIT DEPTHS TO ENGINEER IN ABOVE REFERENCED LOG.
3. WHEN NECESSARY FOR 4 MAXIMUM CONTRACTOR CAN BYPASS 18" SEWER FLOW AT MH 357 TO (E) 10" GRAVITY SEWER. PROVIDE 24 HOURS NOTICE TO DISTRICT.
4. CONTRACTOR MAY USE ELECTROFUSION COUPLES WHERE APPROVED. CONTRACTOR SHALL PREPARE ELECTROFUSION COUPLING STATION LOG.
5. FOR WORK WITHIN CALTRANS RIGHT OF WAY, CONTRACTOR SHALL COMPLY WITH CALTRANS TRENCH SECTION DETAILS, SEE SHEET 5.
6. CONTRACTOR MUST PREPARE AND PROVIDE GROUND SETTLEMENT MONITORING PREVENTION, AND MITIGATION PLAN. SEE NOTES SHEET 5.
7. CONTRACTOR TO COAT (N) MANHOLE MH624.1. CONTRACTOR TO USE MADEWELL PRODUCTS CORPORATION; MAINSTAY ML-10 HYDRAULIC CEMENT MORTAR, MAINSTAY ML-72, MAINSTAY ML-72 MICROSILICA MORTAR, MAINSTAY DS-6 NOVOLIC EPOXY COATING, ONLY.



UTILITY NOTE: UTILITIES SHOWN ARE FROM UTILITY & RECORD DRAWINGS AND ARE APPROXIMATE. CONTRACTOR TO POTHOLE (E) UTILITIES TO VERIFY EXACT LOCATION PRIOR TO ENGINEER SETTING GRADES.

PROFILE

0 20 40
SCALE IN FEET
SCALE IN FEET 0 1 2 3 4

REGISTERED PROFESSIONAL ENGINEER MARK T. WILSON No. C47094 Exp. 12/31/21 CIVIL STATE OF CALIFORNIA

1"
IF THIS DOES NOT MEASURE ONE INCH, THESE PLANS ARE NOT TO SCALE.

12 OF 20

REVISED SET 11/02/2020

SANITARY DISTRICT No.5
Marin County, California

COVE ROAD PS FORCE MAIN REPLACEMENT PROJECT

PLAN AND PROFILE
TIBURON BOULEVARD
STA 19+20 TO STA 23+68

NUTE ENGINEERING
907 MISSION AVE SAN RAFAEL, CALIFORNIA TEL 415-453-4480

Drawn by: BEO	Job No.: 8766	Scale: AS SHOWN
Checked by: MTW		Date: APRIL 2020

Printed: November 2, 2020 3:37 PM
P:_Projects\8766 SD5 Cove Force Main\Design\CAD\8766 Cove Road FM.dwg

Project: Cove Road Sewer Rehab

Change Order No. 08

Date: December 2, 2020

Owner: Sanitary District No. 5 **Phone:** (415) 435-1501

Contractor: Maggiora & Ghilotti, Inc. **Phone:** (415) 435-4960

The following change is hereby made to the contract:

Description of Change:
Adjust Beach Rd Pump Station force main plan and profile per November 2, 2020 letter request (see attached Revised Sheet 13). The Contractor has provided a credit for various bid items per his attached spreadsheet.

Reason for Change: The attached November 2, 2020 letter from Nute Engineering, including Caltrans Encroachment Permit Rider dated October 27, 2020, modified force main construction requirements within the Caltrans ROW. The modifications included substituting open cut construction of Beach Rd Pump Station force main and deletion of steel casing in lieu of contract Bore and Jack, Bid Item 11.

Pricing Data: Pricing per attached email and filled in spreadsheet from Maggiora & Ghilotti dated November 5, 2020 for a credit of $22,931.00.

Requested by: District

Contract Time: Adds 0 calendar days to the Contract.

The Owner and the Contractor hereby agree that this change order constitutes full and mutual accord and satisfaction for all time, all costs, and all impacts related to this revision. In accepting this change order, the Contractor agrees that it represents a full and equitable adjustment to the Contract, and further agrees to waive all rights to file claim with respect to any difficulties arising from, or as a result of, this change.

Original Contract:	$1,971,971.00
Previous Additions:	$ 522,888.33
Previous Deductions:	($ 69,280.00)
This Change Order:	($ 22,931.00)
Contract to Date:	$2,402,648.33

APPROVED:

Engineer

Owner

FOR INFO ONLY-ORIGINALS IN MAIL FOR SIGNATURE

COVE ROAD PUMP STATION FORCE MAIN REPLACEMENT PROJECT

REVISED COSTS FOR PLAN AND PROFILE CHANGE

	CONSTRUCT LAUNCH & RECEIVE PITS, INSTALL BEACH PUMP STATION FORCE MAIN TIBURON BLVD CALTRANS ROW - CONTRACT COSTS (Does not include Trench Plug Pave)						TOTAL	INSTALL BEACH PUMP STATION FORCE MAIN BLVD CROSSING OPEN CUT CALTRANS PERMIT RIDER (Does not include Trench Plug Pave)					TOTAL
	Bore and Jack 14" Steel Casing and 6.625 HDPE at $1,000/LF							Install 6.625 HDPE PER RIDER TRENCH DETAIL at $ 791.54/LF	Brick Crosswalk Restoration				
Caltrans ROW, 110/LF	$110,000						$110,000	$ 87,069.00	N/A				$ 87,069.00
						TOTAL	$110,000					**TOTAL**	$ 87,069.00
												Difference	**$ 22,931.00**

Deleted

- Horizontal boring sub
- Purchase of 14" casing
- Welder
- Class 2 AB
- Pit excavation and shoring

Added

- Caltrans detail for CLSM and minor concrete back fill
- Flaggers
- Purchase casing for under bricks with labor
- Restricted work hours 9:00AM - 3:00PM
- * Use bid item #18 to repave, 9 tons

Mark Wilson

From: Don Muns <don@maggiora-ghilotti.com>
Sent: Thursday, November 5, 2020 4:31 PM
To: Mark Wilson
Cc: John Moser
Subject: Change order 14" casing with 6"HDPE
Attachments: 8766 MG Rev Beach PS FM Change ltr w attachments DM.pdf

Mark, please see attached change order for Beach and Tiburon Blvd. Deletion of steel casing.

Thanks Don

Don Muns
Maggiora-Ghilotti
555 Dubois St.
San Rafael Ca. 94901
Office 415-459-8640
Cell 415-308-8875

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT RIDER

TR-0122 (REV 6/1999)

Collected by	Permit No. (Original)
	04-20-N-UL-0211
Rider Fee Paid $Exempt	Dist-Co-Rte-PM 04/MRN/131/4.38/4.41
Date October 27, 2020	Rider Number 04-20-N-RW-2498

TO: Sanitary District No. 5 of Marin County
2001 Paradise Dr
San Rafael, CA 94901
Email: trubio@sani5.org
m.wilson@nute-engr.com
Attn: Tony Rubio
c/o Mark Wilson, Nute Engineering.
Phone: (415) 435-1501, (415) 453- 4480 , **PERMITTEE**

In compliance with your request received on October 23, 2020. We are hereby amending the above numbered encroachment permit as follows:

Date of completion extended to: No change.

Reference your permit to: Encroach within State right-of-way for the purpose to conduct temporary traffic control and install a force main sanitary sewer at two locations; excavate 226' L x 4' W x 8" D, by open trench method and install a 16" Ø HDPE with a 22" Ø STL casing from Juanita Lane to Main Street; bore & jack, and install a 110'- 6" Ø HDPE with a 14" Ø STL casing across Tiburon Blvd. at Beach Road, and in accordance to the permittee's plans, specification and estimate, on State Highway, 04-MRN-131, Post Miles 4.38/4.41, in the Town of Tiburon.

Trench excavation must comply with the 2018 Caltrans Standard Specifications, Section 19-3, "Structure Excavation and Backfill" (available at https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications).

Trench backfill must comply with the attached trench detail and the 2018 Caltrans Standard Specifications, Section 19.3.02E, "Slurry Cement Backfill", and 19-3.02G, "Controlled Low-Strength Material" for top 6 feet of the excavation.

Trench plate must comply with the attached "Steel Plate Bridging Provisions" (TR-0157B).

The contractor will need to apply for an additional Rider and pay $492 fee.

Except as amended, all other terms and provisions of the original permit shall remain in effect.

Permit Writer: hirdaypal.dhillon@dot.ca.gov

CC: State Rep.: augusto.lumba@dot.ca.gov
Maint.: will.hauke@dot.ca.gov
DTM: marisa.muliadi-kleiber@dot.ca.gov
TMC: D4TMC/D04/Caltrans/CAGov
File: 04-20-N-UL-0211

APPROVED:

DAVID SALLADAY, District Permit Engineer

BY:

CHRIS MASTER, Senior Permit Engineer

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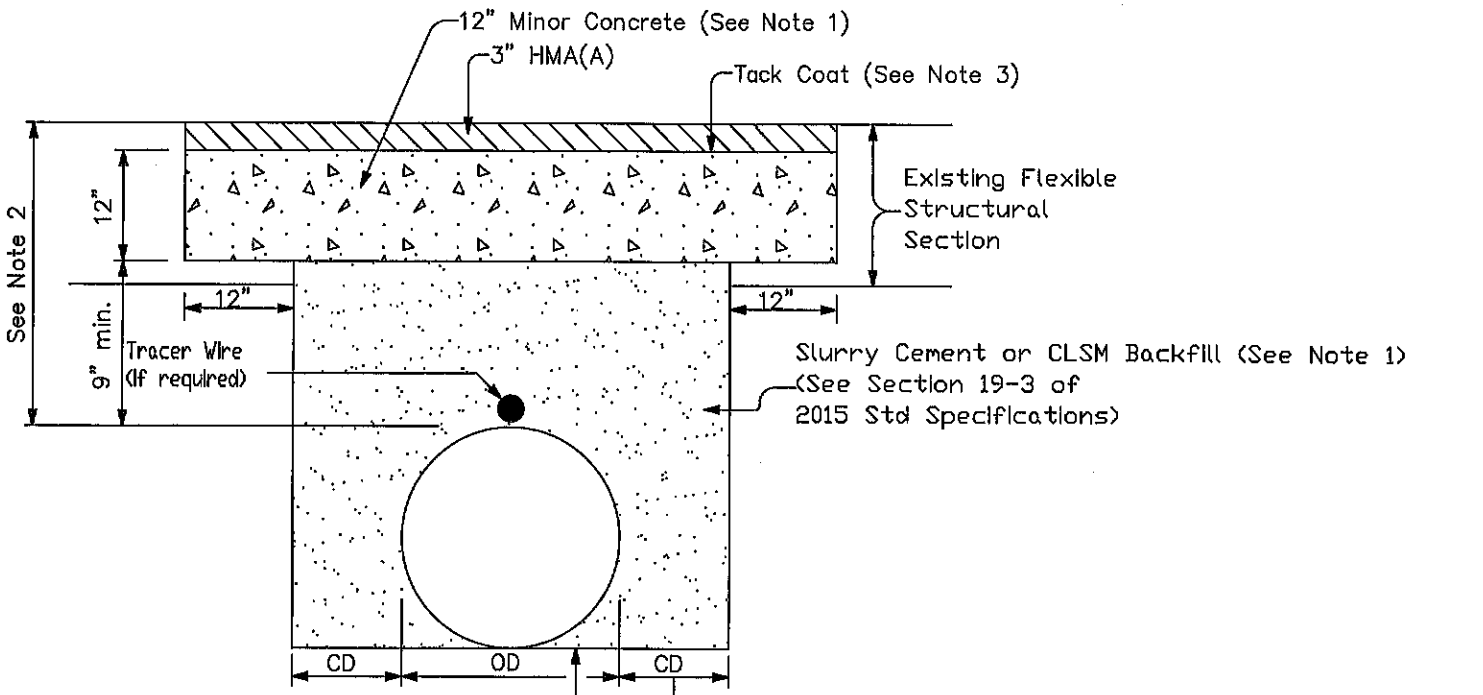
FM 91 1437

CASE 1: FOR TRAFFIC INDEX (TI) LESS THAN OR EQUAL TO 12



LEGEND:

- Minor Concrete
- Hot Mix Asphalt
- Slurry Cement or CLSM Backfill

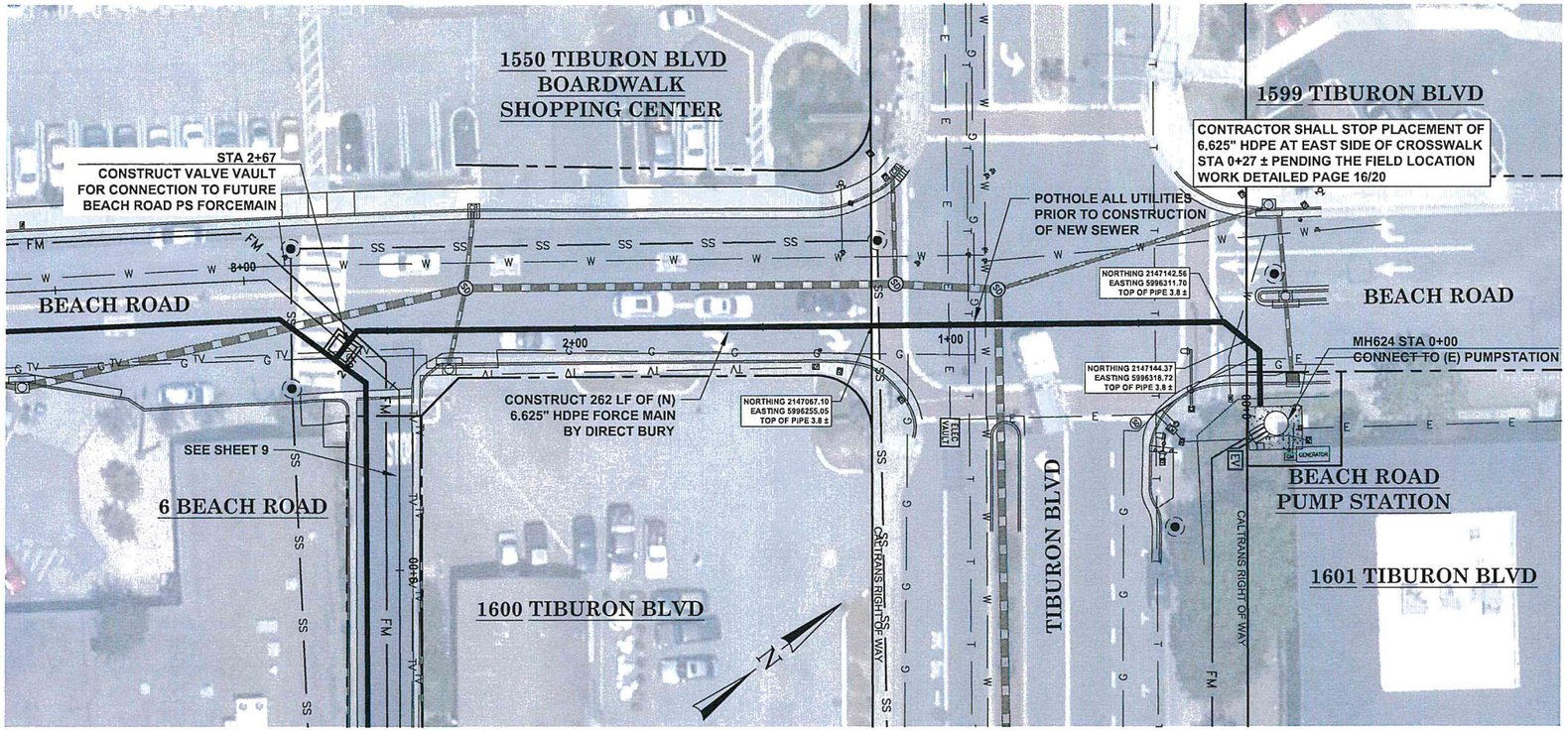
NOTES:

1. Concrete cap may be Rapid Strength Concrete (RSC); if RSC is used, replace the Slurry Cement or CLSM Backfill with Lean Concrete Backfill or RSC depending upon the project's time constraints.
2. For new installations, minimum depth of cover requirements are to follow guidelines in the Encroachment Permits Manual or Highway Design Manual. When cover over a replacement pipe/encasement pipe is less than 24", a Special Design is necessary (for In-house projects, refer to HQ Drainage Detail Library).
3. Tack Coat (Asphaltic Emulsion) shall be applied prior to placing HMA(A).
4. All trench work subject to state regulations and inspection.
5. All materials, workmanship, testing, and inspections shall comply with Caltrans Standard Specifications and project-specific Special Provisions.
6. Use of this detail is applicable if high groundwater conditions do not exist within the trench.

ABBREVIATIONS:

CD = Clear Distance
HMA(A) = Hot Mix Asphalt Type A
OD = Outside Diameter of Utility or Culvert
CLSM = Controlled Low-Strength Material

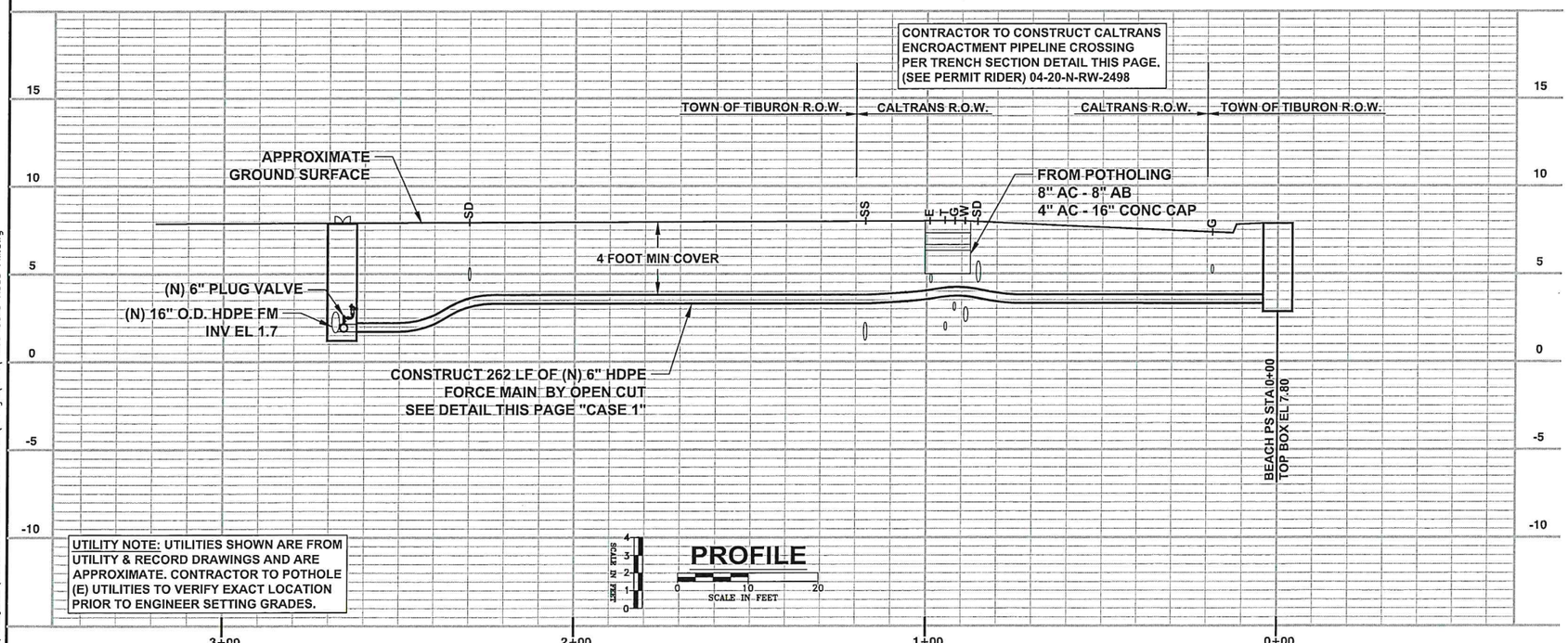
REVISED 12/12/2016



PLAN

0 20 40

SCALE IN FEET



UTILITY NOTE: UTILITIES SHOWN ARE FROM UTILITY & RECORD DRAWINGS AND ARE APPROXIMATE. CONTRACTOR TO POTHOLE (E) UTILITIES TO VERIFY EXACT LOCATION PRIOR TO ENGINEER SETTING GRADES.

PROFILE

0 10 20

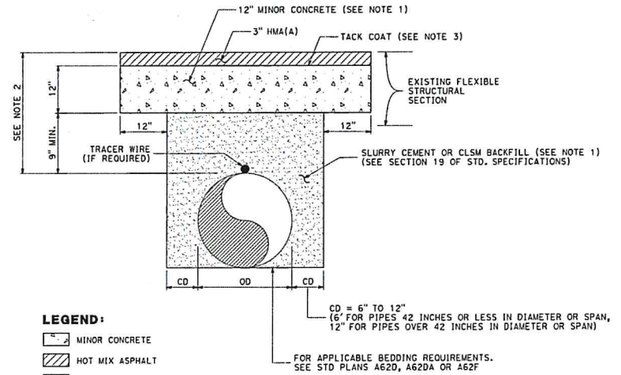
SCALE IN FEET

0 1 2 3 4

SCALE IN FEET

CASE 1: FOR TRAFFIC INDEX (TI) LESS THAN OR EQUAL TO 12

HIGH GROUNDWATER CONDITIONS DO NOT EXIST WITHIN THE TRENCH



LEGEND:

- MINOR CONCRETE
- HOT MIX ASPHALT
- SLURRY CEMENT OR CLSM BACKFILL

NOTES:

1. CONCRETE CAP MAY BE RAPID STRENGH CONCRETE (RSC); IF RSC IS USED, REPLACE THE SLURRY CEMENT OF CLSM BACKFILL WITH LEAN CONCRETE BACKFILL OR RSC DEPENDING UPON THE PROJECT'S TIME CONSTRAINTS.
2. FOR NEW INSTALLATIONS, MINIMUM DEPTH OF COVER REQUIREMENTS ARE TO FOLLOW GUIDELINES IN THE ENCROACHMENT PERMITS MANUL OR HIGHWAY DESIGN MANUAL. WHEN COVER OVER A REPLACEMENT PIPE/ENCASEMENT PIPE IS LESS THAN 24", A SPECIAL DESIGN IS NECESSARY (FOR IN-HOUSE PROJECTS, REFER TO HQ DRAINAGE DETAIL LIBRARY).
3. TACK COAT (ASPHALTIC EMULSION) SHALL BE APPLIED PRIOR TO PLACING HMA(A).
4. ALL TRENCH WORK SUBJECT TO STATE REGULATIONS AND INSPECTION.
5. ALL MATERIALS, WORKMANSHIP, TESTING, AND INSPECTIONS SHALL COMPLY WITH CALTRANS STANDARD SPECIFICATIONS AND PROJECT-SPECIFIC SPECIAL PROVISIONS.
6. USE OF THIS DETAIL IS APPLICABLE IF HIGH GROUNDWATER CONDITIONS DO NOT EXIST WITHIN THE TRENCH.

ABBREVIATIONS:

CD = CLEAR DISTANCE
HMA(A) = HOT MIX ASPHALT TYPE A
OD = OUTSIDE DIAMETER OF UTILITY OR CULVERT
CLSM = CONTROLLED LOW-STRENGH MATERIAL

REVISED 11/12/2019

NOTES:

1. PRIOR TO CONSTRUCTION, CONTRACTOR TO POTHOLE (E) SEWER FORCE MAIN EVERY 100 FEET AND SUBMIT DEPTHS TO ENGINEER IN LOG FORM BY STATION.
2. CONTRACTOR TO POTHOLE UTILITIES AS SHOWN ON THE PLANS PRIOR TO CONSTRUCTION AND SUBMIT DEPTHS TO ENGINEER IN ABOVE REFERENCED LOG.
3. FOR WORK WITHIN CALTRANS RIGHT OF WAY, CONTRACTOR SHALL COMPLY WITH CALTRANS TRENCH SECTION DETAIL ABOVE PER RIDER.
4. CONTRACTOR MUST PREPARE AND PROVIDE GROUND SETTLEMENT MONITORING PREVENTION, AND MITIGATION PLAN. SEE NOTES SHEET 5

REGISTERED PROFESSIONAL ENGINEER
MARK T. WILSON
No. 74538
EXP. 12/31/21
CIVIL
STATE OF CALIFORNIA

1"

IF THIS DOES NOT MEASURE ONE INCH, THESE PLANS ARE NOT TO SCALE.

13 OF 20

REVISED SET 11/03/2020

SANITARY DISTRICT No.5
Marin County, California

COVE ROAD PS FORCE MAIN REPLACEMENT PROJECT

PLAN AND PROFILE
BEACH ROAD
STA 0+00 TO STA 2+67

NUTE ENGINEERING
907 MISSION AVE SAN RAFAEL, CALIFORNIA TEL 415-453-4480

Drawn by:	BEO	Job No.:	8766	Scale:	AS SHOWN
Checked by:	MTW			Date:	APRIL 2020

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EXHIBIT C

MILLER PACIFIC ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
SANITARY DISTRICT NO. 5
COVE FORCE MAIN
TIBURON, CALIFORNIA

January 13, 2020

Job No. 1793.021

Prepared For:
Sanitary District No. 5
2001 Paradise Drive
Tiburon, California 94920

Attn: Mr. Tony Rubio

CERTIFICATION

This document is an instrument of service, prepared by or under the direction of the undersigned professionals, in accordance with the current ordinary standard of care. The service specifically excludes the investigation of polychlorinated byphenols, radon, asbestos or any other hazardous materials. The document is for the sole use of the client and consultants on this project. No other use is authorized. If the project changes, or more than two years have passed since issuance of this report, the findings and recommendations must be updated.

MILLER PACIFIC ENGINEERING GROUP
(a California corporation)

Michael Jewett
Certified Engineering Geologist No. 2610
(Expires 1/31/21)

REVIEWED BY

Scott Stephens
Geotechnical Engineer No. 2398
(Expires 6/30/21)

MILLER PACIFIC
ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
SANITARY DISTRICT NO. 5
COVE FORCE MAIN
TIBURON, CALIFORNIA

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MILLER PACIFIC ENGINEERING GROUP

GEOTECHNICAL INVESTIGATION
SANITARY DISTRICT NO. 5
COVE FORCE MAIN
TIBURON, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our Geotechnical Investigation for Sanitary District No. 5's Cove Force Main replacement project in Tiburon, California. As shown on the Site Location Map, Figure 1, the project area is located on various roadways within downtown Tiburon between Tiburon Boulevard and Main Street.

Our work was performed in accordance with our Agreement for Professional Services authorized on September 5, 2019. The purpose of our investigation was to explore subsurface conditions within the proposed project area and to develop geotechnical recommendations and criteria for use in design and construction of the project. The scope of our services includes:

- Reviewing published geologic and geotechnical background information.
- Exploring subsurface conditions with three borings located within the general vicinity of the planned sewer pipeline replacement.
- Laboratory testing to estimate pertinent engineering properties of the soils encountered during our subsurface exploration.
- General evaluation and discussion of relevant geologic hazards including seismic shaking, liquefaction, and other hazards.
- Engineering analyses to develop geotechnical recommendations and design criteria related to temporary support of excavations, temporary dewatering, earthwork, trench backfill, new pavement sections, seismic design, and other geotechnical-related items.
- Preparation of this Geotechnical Investigation report which summarizes the subsurface exploration and laboratory testing programs, evaluation of relevant geologic hazards, and geotechnical recommendations and design criteria.

Issuance of this report completes our initial phase of services. Subsequent phases of work should include geotechnical plan review and observation and testing of geotechnical-related work items during construction, if needed.

2.0 PROJECT DESCRIPTION

The project consists of constructing a new 16-inch O.D. HDPE sewage force main parallel to the existing, failing 10-inch Transite sewage force main. A portion of this work will occur within the Caltrans right of way on Tiburon Blvd and include constructing approximately 225 feet of sewer force main in the Caltrans right of way (from the intersection of Tiburon Blvd and Juanita Lane to the end of the Caltrans right of way where Tiburon Blvd intersects with Main Street). The project continues upstream on Juanita Lane within City of Belvedere right of way for over 1000 feet. This

entire sewer force main will be constructed using HDPE (High Density Polyethylene Pipe) and that trenchless construction methods are being considered based on shallow ground conditions. A Site Plan showing the approximate extents of the planned improvements is shown on Figure 2.

3.0 SITE CONDITIONS

3.1 Regional Geology

The project site lies within the Coast Ranges geomorphic province of California. Regional topography within the Coast Ranges province is characterized by northwest-southeast trending mountain ridges and intervening valleys that parallel the major geologic structures, including the San Andreas Fault System. The province is also generally characterized by abundant landsliding and erosion, owing in part to its typically high levels of precipitation and seismic activity.

The oldest rocks in the region are the sedimentary, igneous, and metamorphic rocks of the Jurassic- to Cretaceous-age (190- to 65-million years old) Franciscan Complex. Within San Mateo County, a variety of sedimentary and volcanic rocks of Tertiary (1.8- to 65-million years old) and Quaternary (less than 1.8-million years old) age locally overlie the basement rocks of the Franciscan Complex. Tectonic deformation and erosion during late Tertiary and Quaternary time (the last several million years) formed the prominent coastal ridges and intervening valleys typical of the Coast Ranges province. The youngest geologic units in the region are Quaternary age (last 1.8 million years) sedimentary deposits, including alluvial deposits which partially fill most of the valleys and colluvial deposits which typically blanket the lower portions of surrounding slopes.

The project site is located in relatively level terrain at the southwestern edge of the Tiburon Peninsula. Regional geologic mapping (Rice, 1976), indicates the site is underlain by artificial fill over bay mud (map symbol Qaf/Qm). The fill soils generally consist of engineered and non-engineered soil and rock debris, while the bay mud consists of soft, compressible, silts and clays. A Regional Geologic Map and descriptions of the mapped geologic units are shown on Figure 3.

3.2 Seismicity

The project site is located within the seismically active San Francisco Bay Area and will therefore experience the effects of future earthquakes. Earthquakes are the product of the build-up and sudden release of strain along a "fault" or zone of weakness in the earth's crust. Stored energy may be released as soon as it is generated or it may be accumulated and stored for long periods of time. Individual releases may be so small that they are detected only by sensitive instruments, or they may be violent enough to cause destruction over vast areas.

Faults are seldom single cracks in the earth's crust but are typically comprised of localized shear zones which link together to form larger fault zones. Within the Bay Area, faults are concentrated along the San Andreas Fault zone. The movement between rock formations along either side of a fault may be horizontal, vertical, or a combination and is radiated outward in the form of energy waves. The amplitude and frequency of earthquake ground motions partially depends on the material through which it is moving. The earthquake force is transmitted through hard rock in short, rapid vibrations, while this energy becomes a long, high-amplitude motion when moving through soft ground materials, such as Bay Mud.

3.2.1 Regional Active Faults

The California Geological Survey (previously known as the California Division of Mines and Geology), defines a "Holocene-active fault" as one that had surface displacement within Holocene time (the last 11,700 years). CGS mapped various faults in the region as part of their Fault Activity Map of California (CGS, 2010). Many of these faults are shown in relation to the project site on the attached Active Fault Map, Figure 4. The nearest known Holocene-active faults are the San Andreas and Hayward Faults which are located approximately 13.9 kilometers (8.6 miles) southwest and 14.3 kilometers (8.9 miles) east[1].

3.2.2 Historic Fault Activity

Numerous earthquakes have occurred in the region within historic times. The results of our USGS earthquake search catalogue indicates that at least 22 earthquakes with a Richter Magnitude of 5.0 or larger have occurred within 100 kilometers (62 miles) of the site between 1900 and 2019. The approximate locations of many of these and other earthquakes are shown on the Historic Earthquake Map, Figure 5.

3.2.3 Probability of Future Earthquakes

The site will likely experience moderate to strong ground shaking from future earthquakes originating on any of several active faults in the San Francisco Bay region. The historical records do not directly indicate either the maximum credible earthquake or the probability of such a future event. To evaluate earthquake probabilities in California, the USGS has assembled a group of researchers into the "Working Group on California Earthquake Probabilities" (USGS 2003, 2008, 2013) to estimate the probabilities of earthquakes on active faults. These studies have been published cooperatively by the USGS, CGS, and Southern California Earthquake Center (SCEC) as the Uniform California Earthquake Rupture Forecast, Versions 1, 2, and 3. In these studies, potential seismic sources were analyzed considering fault geometry, geologic slip rates, geodetic strain rates, historic activity, micro-seismicity, and other factors to arrive at estimates of earthquakes of various magnitudes on a variety of faults in California.

Conclusions from the most recent UCERF3 and USGS indicate the highest probability of an earthquake with a magnitude greater than 6.7 originating on any of the active faults in the San Francisco Bay region by 2043 is assigned to the Hayward/Rodgers Creek Fault system. The Hayward Fault is located approximately 14.3 kilometers (8.9 miles) east of the site and is assigned a probability of 33 percent. The San Andreas Fault, located approximately 13.9 kilometers (8.6 miles) southwest of the site, is assigned a 22 percent probability of an earthquake with a magnitude greater than 6.7 by 2043. Additional studies by the USGS regarding the probability of large earthquakes in the Bay Area are ongoing. These current evaluations include data from additional active faults and updated geological data.

[1] Distances to faults estimated using Caltrans ARS Online (v2.3.09), accessed August 9, 2019.

3.3 Surface Conditions

Within the project area, surface conditions generally consist of asphalt-paved roadways with adjoining concrete gutters, driveways and sidewalks with surface elevations ranging from about 5 to 10 feet[2]. Widths of the roadways within the project area consist of 3-4 lane wide Tiburon Boulevard and 1-2 lane wide Juanita Lane. The sites are located within urban areas with neighboring properties generally consisting of commercial developments. There are numerous underground utilities exist and are often located within several feet of the proposed sewer alignments. The existing surface conditions are shown on the Site Plans included as Figure 2.

3.4 Field Exploration and Laboratory Testing

We explored subsurface conditions near the proposed improvements on September 13, 2019 with three borings at the approximate locations shown on Figure 2. The borings were excavated using truck-mounted drilling equipment to the approximate depth of 8.0 feet below ground surface. The borings were logged by our Field Geologist and samples were obtained for classification and laboratory testing. We prepared boring logs based on soil descriptions in the field, as well as visual examination and testing of the soil and rock samples in our laboratory. The boring logs are presented in Appendix A.

Laboratory testing of soil samples from the exploratory borings included determination of moisture content, dry density, unconfined compressive strength and sieve analyses. The results of our laboratory tests are presented on the boring logs and our laboratory testing program is discussed in greater detail in Appendix A.

3.5 Subsurface Conditions

Based on our field exploration, subsurface conditions are generally consistent with the regional geologic mapping and consist of varying thicknesses of fill soils over compressible bay mud. The fill soils are generally loose to medium dense and are classified under the Unified Soil Classification System as clayey sand and gravel (SP-SC, SC and GC), and well- and poorly-graded gravel (GW and GP). The bay mud, only encountered in Boring 2, is generally very soft to soft, of high plasticity and are classified as silty clay (CH).

Pavements were encountered at all of the borings in our field investigation and generally consist of asphalt over aggregate base. The estimated thicknesses of the asphalt and aggregate base sections at each boring location are summarized below in Table 1.

[2] Based on elevations shown in Google Earth aerial imagery.

Table 1 – Existing Pavement Sections

Boring Location	Asphalt Pavement Thickness (inches)	Aggregate Base Thickness (inches)
B-1	6	12
B-2	7	12
B-3	5	6

3.6 Groundwater

Groundwater was encountered in Borings 1 and 2 at depths ranging from about 4.0 to 7.5 feet below ground surface. Because the borings were not left open for an extended period of time, a stabilized depth to groundwater may not have been observed. Groundwater elevations fluctuate seasonally and higher groundwater levels may be present during or following periods of intense rainfall. Perched water tables may also exist within soil and bedrock materials. A cursory search of the State Water Resources Control Board's Geotracker website indicates that several groundwater monitoring wells were installed at the 1660 Tiburon Boulevard as part of previous environmental studies. The monitoring data from this site indicates the depth to groundwater varies from about 2 to 6 feet below ground surface and is generally higher during the winter and spring months.

4.0 GEOLOGIC HAZARDS

This section summarizes our review of commonly considered geologic hazards and discusses their potential impacts on the planned improvements. The primary geologic hazards which could affect the proposed development include strong seismic ground shaking and settlement. Other geologic hazards are judged less than significant with regard to the proposed project. Each significant geologic hazard considered is discussed in further detail in the following paragraph.

4.1 Seismic Shaking

The project site will likely experience seismic ground shaking similar to other areas in the seismically active Bay Area. The intensity of ground shaking will depend on the characteristics of the causative fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions.

While a detailed seismic hazard analysis is beyond the scope of our work for this project, it should be noted that the potential for strong seismic shaking at the project site is high. Due to their proximity and historic rates of activity, the San Andreas and Hayward Faults present the highest potential for severe ground shaking. The significant adverse impact associated with strong seismic shaking is potential damage to the pipelines and related improvements. Measures to mitigate the effects of ground shaking should, as a minimum, include using flexible connections and designing any new structures to resist seismic loads as discussed in Section 5.1.

4.2 Settlement

Significant settlement can occur when new loads are placed at sites due to consolidation of soft compressible clays (i.e., Bay Mud) or compression of loose granular soils. Additionally, significant settlements can occur in medium stiff clayey soils if significant structural loads or fills are anticipated. While the encountered bay mud soils are prone to settlement, installation of the new force main and backfill materials will likely result in similar loading to underlying bay mud compared to existing conditions and keep any potential continued settlement similar to the surrounding areas. Therefore, the potential for damage to the new pipelines due to settlement is generally considered low.

4.3 Liquefaction and Related Effects

Liquefaction refers to the sudden, temporary loss of soil strength during strong ground shaking. The strength loss occurs as a result of the build-up of excess pore water pressures and subsequent reduction of effective stress. While liquefaction most commonly occurs in saturated, loose, granular deposits, recent studies indicate that it can also occur in materials with relatively high fines content provided the fines exhibit lower plasticity. The effects of liquefaction can vary from cyclic softening resulting in limited strain potential to flow failure which cause large settlements and lateral ground movements. Buried pipelines and manholes embedded within liquefied soils may also experience uplift due to buoyancy.

Regional liquefaction hazard maps indicate the site is mapped within a zone of "very high" susceptibility to liquefaction (Association of Bay Area Governments, 2019). The results of our investigation indicate subsurface conditions include layers of loose to medium dense sandy and gravelly fill soils within the depths explored. However, these soils are limited in thickness which suggests liquefaction-induced settlements would be minor. While deeper subsurface exploration and a quantitative analysis of liquefaction susceptibility is beyond the scope of work for this project, the potential for damage to the new pipelines due to liquefaction is generally considered low.

4.4 Seismic Densification

Seismic ground shaking can induce settlement of unsaturated, loose, granular soils. Settlement occurs as the loose soil particles rearrange into a denser configuration when subjected to seismic ground shaking. Varying degrees of settlement can occur throughout a deposit, resulting in differential settlement of structures founded on such deposits. While layers of loose, granular soils were encountered in these borings, settlements induced by seismic densification are expected to be minor. Therefore, we judge the likelihood of damage to the new pipelines due to seismically induced settlement is low.

4.5 Corrosion Potential

Corrosive soil and groundwater can damage buried metallic structures, cause concrete spalling, and deteriorate rebar reinforcement. While corrosion testing was not included as part of our scope of work, the site is immediately adjacent to San Francisco Bay and groundwater is likely to include some brackish water. We note that the proposed HDPE pipe materials are generally resistant to corrosion. However, new concrete structures should be designed in accordance with applicable

durability requirements outlined in ACI 318. Metallic components should also incorporate protective coatings or other measures aimed at improving corrosion resistance in accordance with the Corrosion Engineer's recommendations.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface exploration, we judge that construction of the force main is feasible from a geotechnical standpoint. However, we note a variety of conditions, including shallow groundwater, variable and weak fill materials, soft underlying bay mud soils, an abundance of existing utility trench crossings along the alignment are likely to significantly complicate construction. We anticipate that typical trenchless methods, such as HDD or similar bore-and-jack methods could result in significant damage to existing improvements, including roadways, flatwork, a large fountain sculpture, and other adjacent utilities and structures.

In general, we recommend the project be constructed via open-cut methods to reduce the risk of damage to existing improvements. Primary geotechnical considerations for the project will include providing appropriate temporary support for excavations, providing appropriate groundwater control measures in areas where excavations extend below the water table, appropriate seismic structural design for any new buried structures, and providing for proper bedding and trench backfill. Additional discussion and recommendations addressing these, and other considerations are presented in the following sections.

5.1 Seismic Design

Minimum mitigation of ground shaking includes seismic design of new structures in conformance with the provisions of the most recent edition (2016) of the California Building Code. The magnitude and character of these ground motions will depend on the particular earthquake and the site response characteristics. Based on the interpreted subsurface conditions and close proximity of several nearby faults, we recommend the CBC coefficients and site values shown in Table 2.

Table 2 – 2016 California Building Code Seismic Design Criteria

Parameter	Design Value
Site Class	E
Site Latitude	37.8736°N
Site Longitude	-122.4570°W
Spectral Response (short), S_S	1.500 g
Spectral Response (1-sec), S_1	0.600 g
Site Coefficient, F_a	0.9
Site Coefficient, F_v	2.4
Spectral Response (Short), S_{MS}	1.350 g
Spectral Response (1 sec), S_{M1}	1.440 g
Design Spectral Response (short), S_{DS}	0.900 g
Design Spectral Response (1 sec), S_{D1}	0.960 g
MCE_G PGA Adjusted, PGA_M	0.45 g

Reference: SEA/OSHPD Seismic Design Maps online application, accessed on November 14, 2019.

5.2 Earthwork

Portions of the project that are constructed using open-trench methods are anticipated to include excavation depths of up to about eight feet for the new sewers. Earthwork for the new pipelines should be performed in accordance with the recommendations and criteria outlined in the following sections.

5.2.1 Excavations

Excavations will encounter variable subsurface conditions which include loose to dense sandy soils and soft to very stiff silty and clayey soils. In unsupported excavations, the sandy soils will be susceptible to flowing below groundwater and running to fast raveling above groundwater. Medium stiff to very stiff, silty and clayey soils will exhibit firm behavior while soft silty and clayey soils may be susceptible to squeezing. Definitions of the various ground behaviors are presented in the Tunnelman's Ground Classification for Soils, Figure 6. The site soils are generally considered "Type C" soils in accordance with OSHA soil type designations. Temporary support for excavations should be installed prior to or immediately following excavation to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring and temporary support of excavations is discussed in further detail in Section 5.3.

5.2.2 Trench Bottom Stabilization

Based on planned pipeline invert depths, we anticipate the bottom of pipeline excavations will extend below the groundwater table at some locations. In areas where trench bottoms are soft, loose, or otherwise unstable, we recommend the trench bottoms be over-excavated a minimum of 12 inches below the planned pipe invert and backfilled with drain

rock. The drain rock should be completely wrapped with a geotextile filter fabric consisting of Mirafi FW300 or an approved equivalent.

5.2.3 Fill Materials

Unless otherwise recommended by the Sanitary District or the pipe manufacturer, pipe bedding and embedment materials should consist of well-graded sand with 90 to 100 percent of particles passing the No. 4 sieve and no more than five percent finer than the No. 200 sieve. Provide the minimum bedding thickness beneath the pipe in accordance with the manufacturer's recommendations (typically three to six inches).

Fill materials used for pipe backfill should consist of non-expansive materials that are free of organic matter, have a Liquid Limit of less than 40 (ASTM D 4318), a Plasticity Index of less than 20 (ASTM D 4318), and have a minimum R-value of 20 (California Test 301). The fill material should contain no more than 50 percent of particles passing a No. 200 sieve and should have a maximum particle size of four inches. Some of the onsite soils may be suitable for re-use as trench backfill provided, they meet the requirements above.

5.2.4 Fill Placement and Compaction

Fill materials should be moisture conditioned to near the optimum moisture content prior to compaction. Properly moisture conditioned fill materials should subsequently be placed in loose, horizontal lifts of eight-inches-thick or less and uniformly compacted to at least 90 percent relative compaction. In pavement areas, the upper 12 inches of backfill should be compacted to at least 95 percent relative compaction. The maximum dry density and optimum moisture content of fill materials should be determined in accordance with ASTM D1557.

5.3 Temporary Support of Excavations

Temporary support of excavations will be required to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring types may include trench boxes or shields, driven sheet piles, vertical hydraulic shores, or other systems. While a variety of systems are available, shoring that applies positive pressure and immediate support to the side walls of the excavation will be more effective in controlling ground movements and reducing the risk of damage to nearby utilities and structures. For excavations that extend below the groundwater table, sheet piles may be used to reduce groundwater seepage thereby reducing the amount of dewatering, pumping, and groundwater disposal that would be required.

The selected support system should be designed to resist lateral pressures from earth and construction surcharge loads. Watertight shoring systems (e.g. interlocking sheet piles) which do not allow for drainage should also be designed to resist hydrostatic pressures. As a minimum, shoring systems should be designed based on the criteria provided in Table 3. Shoring walls that can slightly deflect at the top can be designed using the unrestrained criteria shown below. Shoring that is not allowed to deflect (e.g. braced walls) are considered restrained and are commonly designed using a uniform active earth pressure distribution rather than an equivalent fluid pressure.

Table 3 – Shoring Design Criteria

Parameter	Design Value
Active Earth Pressure, Unrestrained[1]	45 pcf
Active Earth Pressure, Restrained[2]	35 x H psf
Lateral Passive Resistance[1]	300 pcf
Minimum Surcharge Pressure[3,4]	125 psf

(1) Equivalent fluid pressure.
(2) Rectangular distribution, H is wall height in feet
(3) Apply surcharge load to upper five feet of shoring.
(4) Surcharge load to be adjusted at the discretion of the Contractor's shoring designer.

5.4 Temporary Dewatering

Temporary dewatering will be required where excavations extend below the groundwater table. While various systems are available, dewatering would most likely consist of a series of wells or sumps spaced as needed to keep the groundwater level below the excavation bottom. The selection, design, installation, monitoring, and removal of temporary dewatering should be the responsibility of the Contractor in accordance with their means and methods. The Contractor should be required to submit dewatering plans for review by the Sanitary District prior to implementation. Considering ground conditions include granular soils which are relatively permeable, dewatering could generate a large volume of water which could impact costs associated with groundwater treatment and disposal. We note that the available groundwater monitoring data from previous environmental investigations of nearby sites indicates the water level is generally higher during the winter and spring months. Therefore, project planning could include scheduling the work to be performed during the summer and fall months when groundwater levels are lower.

5.5 New Pavements

New pavements will be required for trenches that extend into traffic areas. We have provided preliminary pavement design in accordance with Caltrans procedures for flexible pavement (Caltrans, 2015). The calculated pavement section thicknesses are based on Traffic Index values ranging from four to seven and the minimum selected pavement thickness will be based on the expected traffic loads for a twenty-year design life. For our preliminary design, we assumed an R-value of 20 and 50 which are generally consistent with typical values for select fill and Class 2 aggregate subbase, respectively. During construction, we should test the backfill materials to confirm the R-value of the backfill material is consistent with our assumed values. The preliminary recommended pavement sections are presented in Table 4.

Table 4 – Preliminary Asphalt-Concrete Pavement Sections

Traffic Index[1]	Select Fill Backfill (R-Value = 20)		Class 2 Aggregate Subbase (R-Value = 50)	
	Asphalt Thickness (inches)	Class 2 Aggregate Base Thickness (inches)	Asphalt Thickness (inches)	Class 2 Aggregate Base Thickness (inches)
4	3.0	5.0	2.5	4.0
5	3.5	7.0	3.0	5.0
6	4.0	9.0	3.5	6.0
7	5.0	10.0	4.0	7.0

(1) Traffic Index to be determined by the project Civil Engineer

The Class 2 aggregate base should conform to the most recent version of Caltrans Standard Specifications and should be compacted to at least 95 percent relative compaction. Additionally, the aggregate base should be firm and unyielding under heavy, rubber-tired construction equipment.

6.0 SUPPLEMENTAL GEOTECHNICAL SERVICES

As project plans are nearing completion, we should review them to confirm that the intent of our geotechnical recommendations has been incorporated. We can also consult with project team to supplement or clarify geotechnical recommendations, if needed. During construction, we should be present intermittently to observe excavations, proper moisture conditioning of soils, fill placement and compaction, compaction of asphalt pavement and other geotechnical-related work items. The purpose of our observation and testing is to confirm that site conditions are as anticipated, to adjust our recommendations and design criteria if needed, and to confirm that the Contractor's work is performed in accordance with the project plans and specifications.

7.0 LIMITATIONS

We believe this report has been prepared in accordance with generally accepted geotechnical engineering practices in the San Francisco Bay Area at the time the report was prepared. This report has been prepared for the exclusive use of the project Owner and/or their assignees specifically for this project. No other warranty, expressed or implied, is made. Our evaluations and recommendations are based on the data obtained during our subsurface exploration program and our experience with soils in this geographic area.

8.0 LIST OF REFERENCES

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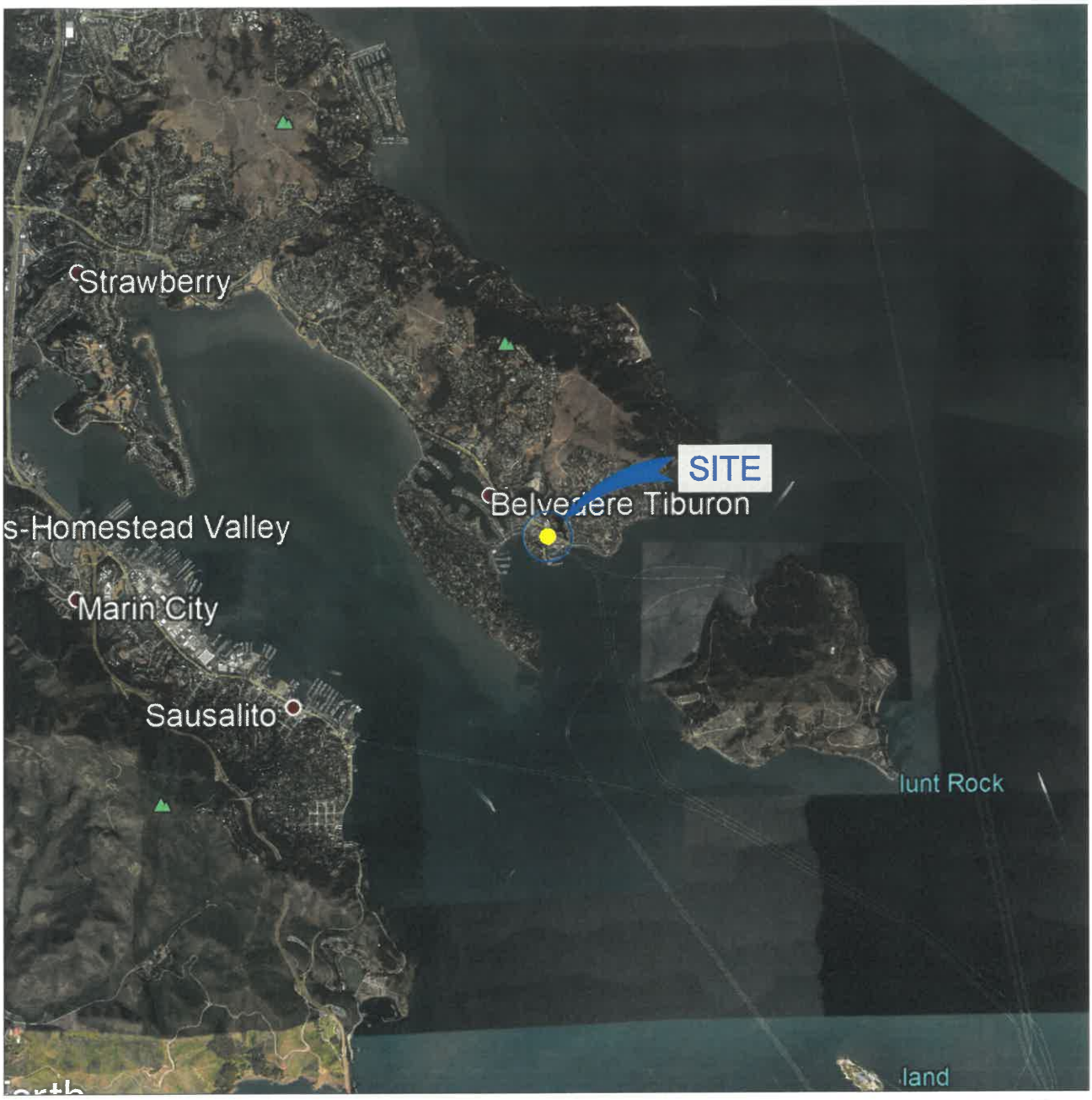

SITE COORDINATES
LAT. 37.8736°
LON. -122.4570°

SITE LOCATION

(NO SCALE)

NORTH

REFERENCE: United States Geological Survey, "San Francisco South and Montara Mountain 7.5' Topographic Quadrangle", 2018.

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SITE LOCATION MAP

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 11/18/2019

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1
FIGURE

SITE PLAN

NORTH

APPROXIMATE BORING LOCATION BY MPEG, SEPTEMBER 2019

APPROXIMATE FORCE MAIN ALIGNMENT

SCALE

0 100 200 400 FEET

REFERENCE: Site Plan provided by Sanitary District No. 5

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SITE PLAN

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Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 11/18/2019

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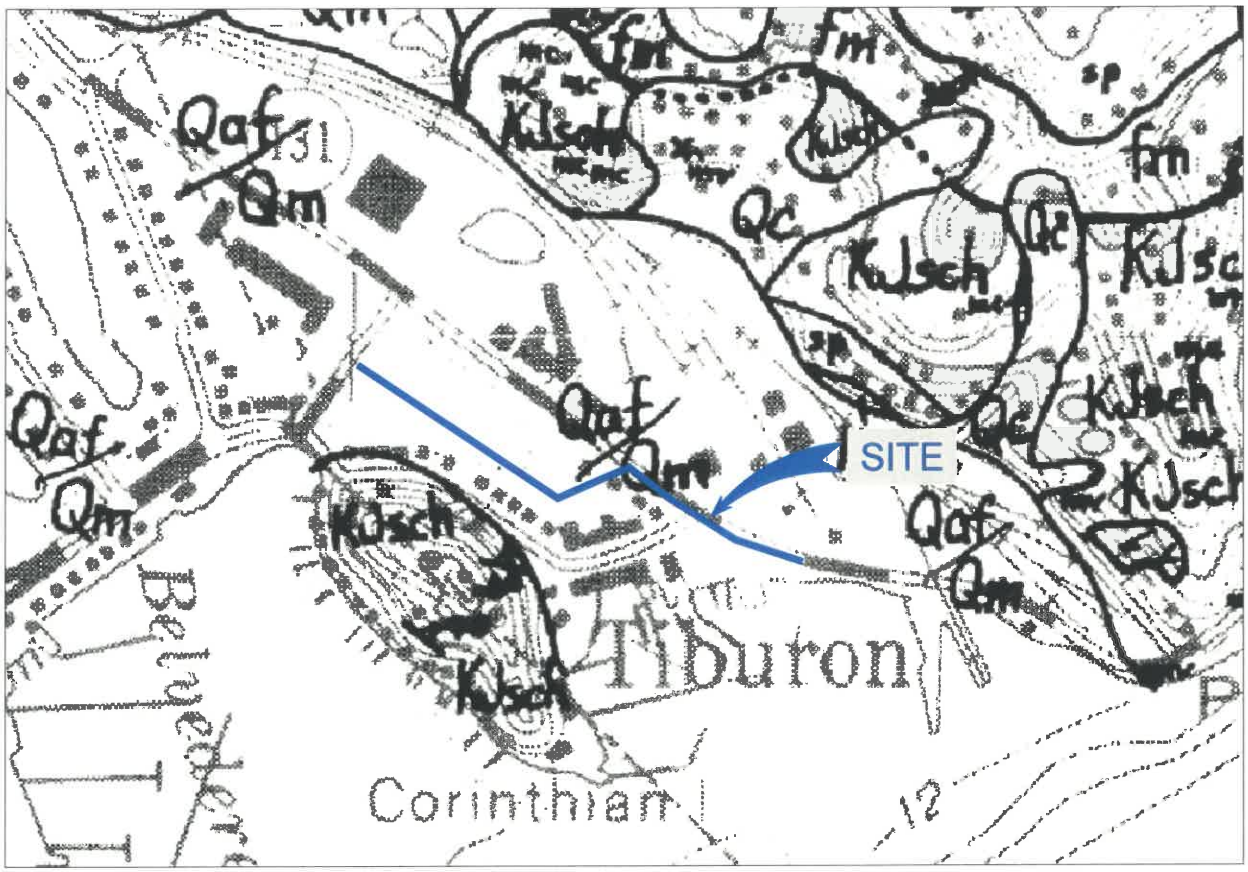
2
FIGURE



REGIONAL GEOLOGIC MAP

(NOT TO SCALE)

NORTH

LEGEND

Qaf/Qm **Artificial Fill over Bay Mud -** Deposits of rock, soil, garbage and trash or bay mud placed on natural surfaces, mostly for engineering purposes. Bay mud consists of marshlands, former marshlands, and mudflats bordering the San Francisco and San Pablo Bays. Soils characterized as unconsolidated, low density, semi-fluid, highly compressible silty clay.

Qc **Colluvium -** Unconsolidated and unsorted soil material and weathered rock fragments acumuated on or at the base of slopes by natural gravitational or slope wash processes.

KJsch **Semi-Schist, Phyllite, and Schist -** Slightly to well foliated or lineated metamorphose sedimentary and volcanic rocks.

Reference: Rice, Salem J., and Smith, Theodore C., (1976), "Geology of the Tiburon Peninsula, Sausalito, and Adjacent Areas, Marin County, California," California Department of Conservation, California Department of Mines and Geology, Scale 1:12,000.

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REGIONAL GEOLOGIC MAP

Sanitary District No. 5
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Tiburon, California

Project No. 1793.021 Date: 11/18/2019

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3
FIGURE

SITE COORDINATES
LAT. 37.8736°
LON. -122.4570°

SCALE
0 12.5 25 50 MILES

NORTH

DATA SOURCE:
1) U.S. Geological Survey, U.S. Department of the Interior, "Earthquake Outlook for the San Francisco Bay Region 2014-2043", Map of Known Active Faults in the San Francisco Bay Region, Fact Sheet 2016-3020, Revised August 2016 (ver. 1.1).

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ACTIVE FAULT MAP

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Tiburon, California
Project No. 1793.021 Date: 11/18/2019

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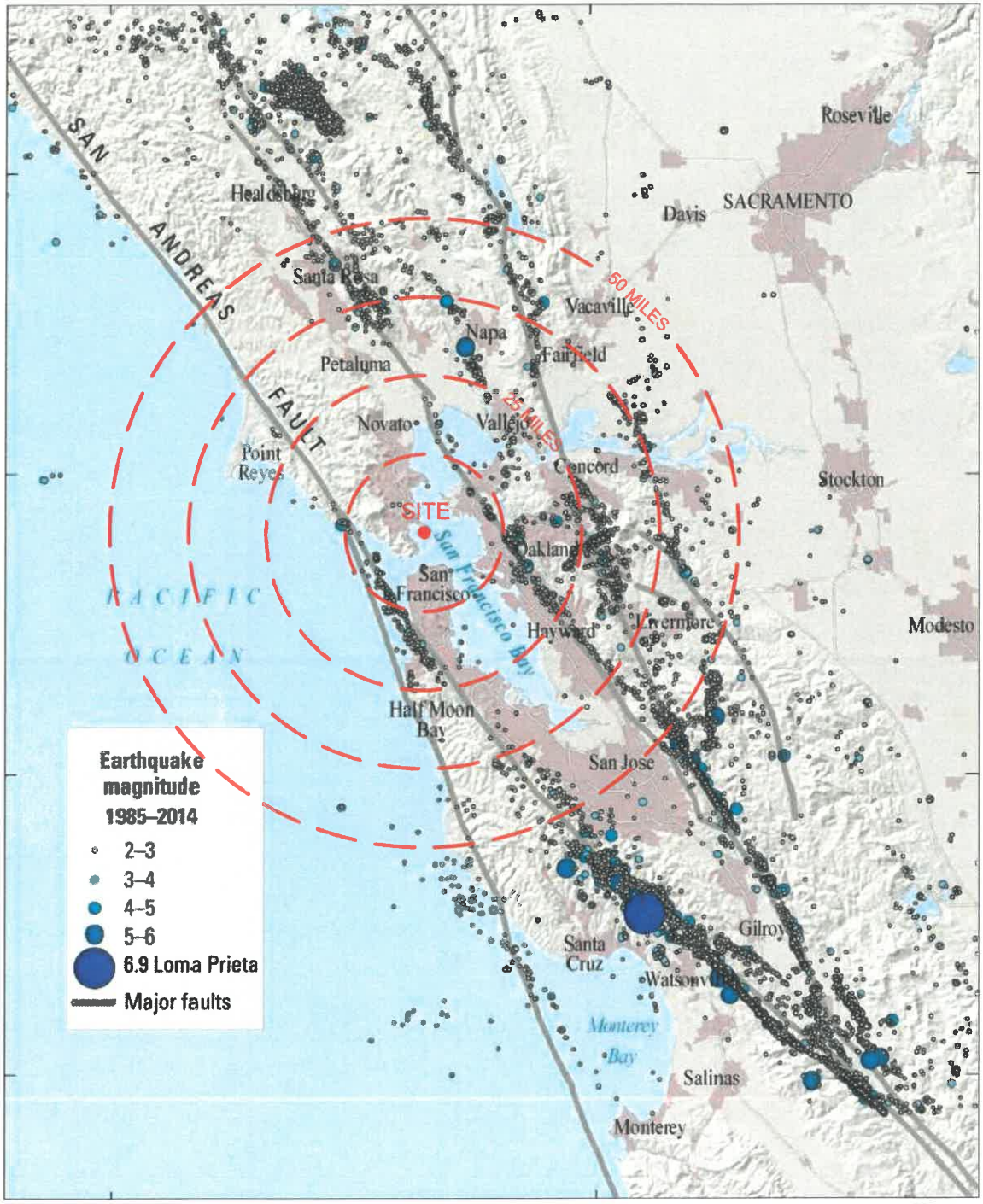
4
FIGURE



SITE COORDINATES
LAT. 37.8736°
LON. -122.4570°

SCALE
0 12.5 25 50 MILES

NORTH

DATA SOURCE:
1) U.S. Geological Survey, U.S. Department of the Interior, "Earthquake Outlook for the San Francisco Bay Region 2014-2043", Map of Earthquakes Greater Than Magnitude 2.0 in the San Francisco Bay Region from 1985-2014, Fact Sheet 2016-3020, Revised August 2016 (ver. 1.1).

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HISTORIC EARTHQUAKE MAP

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 11/18/2019

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5
FIGURE

Tunnelman's Ground Classification for Soils[1]

Classification		Behavior	Typical Soil Types
Firm		Heading can be advanced without initial support, and final lining can be constructed before ground starts to move.	Loess above water table; hard clay, marl, cemented sand and gravel when not highly overstressed.
Raveling	Slow raveling ----- Fast raveling	Chunks or flakes of material begin to drop out of the arch or walls sometime after the ground has been exposed, due to loosening or to over-stress and "brittle" fracture (ground separates or breaks along distinct surfaces, opposed to squeezing ground). In fast raveling ground, the process starts within a few minutes, otherwise the ground is slow raveling.	Residual soils or sand with small amounts of binder may be fast raveling below the water tale, slow raveling above. Stiff fissured clays may be slow or fast raveling depending upon degree of overstress.
Squeezing		Ground squeezes or extrudes plastically into tunnel, without visible fracturing or loss of continuity, and without perceptible increase in water content. Ductile, plastic yield and flow due to overstress.	Ground with low frictional strength. Rate of squeeze depends on degree of overstress. Occurs at shallow to medium depth in clay of very soft to medium consistency. Stiff to hard clay under high cover may move in combination of raveling at excavation surface and squeezing at depth behind surface.
Running	Cohesive-running ----- Running	Granular materials without cohesion are unstable at a slope greater than their angle of repose (+/- 30° – 35°). When exposed at steeper slopes they run like granulated sugar or dune sand until the slope flattens to the angle of repose.	Clean, dry granular materials. Apparent cohesion in moist sand, or weak cementation in any granular soil, may allow the material to stand for a brief period of raveling before it breaks down and runs. Such behavior is cohesive-running.
Flowing		A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances, completely filling the tunnel in some cases.	Below the water table in silt, sand, or gravel without enough clay content to give significant cohesion and plasticity. May also occur in highly sensitive clay when such material is disturbed.
Swelling		Ground absorbs water, increases in volume, and expands slowly into the tunnel.	Highly preconsolidated clay with plasticity index in excess of about 30, generally containing significant percentages of montmorillonite.

1 Modified by Heuer (1974) from Terzaghi (1950)

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TUNNELMANS GROUND CLASSIFICATION FOR SOILS

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Tiburon, California
Project No. 1793.021 Date: 11/18/2019

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6
FIGURE

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APPENDIX A
SUBSURFACE EXPLORATION AND LABORATORY TESTING

A. SUBSURFACE EXPLORATION

We explored subsurface conditions with three exploratory borings drilled with a truck-mounted drill rig on September 13, 2019 at the approximate locations shown on the Site Plan, Figure 2. The exploration was conducted under the technical supervision of our Field Geologist who examined and logged the soil materials encountered and obtained samples. The subsurface conditions encountered in the test borings are summarized and presented on the boring logs, Figures A-1 through A-4.

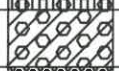
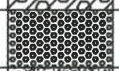
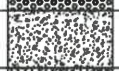
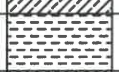
Relatively "undisturbed" samples were obtained using a three-inch diameter, split-barrel Modified California Sampler with 2.5 by six-inch tube liners or a Standard Penetration Test (SPT) Sampler. The samplers were driven by a 140-pound hammer at a 30-inch drop. The number of blows required to drive the samplers 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory.

B. LABORATORY TESTING

We conducted laboratory tests on selected intact samples to classify soils and to estimate engineering properties. The following laboratory tests were conducted in general accordance with the ASTM standard test method cited:

- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D2937
- Unconfined Compressive Strength of Cohesive Soil, ASTM D2166
- Particle Size Analysis, ASTM D6913 & ASTM D1140

The results of our laboratory testing are shown on the exploratory boring logs, with exception of the particle size analyses results, which are presented on Figures A-5 and A-6. The exploratory boring logs, description of soils encountered, and the laboratory test data reflect conditions only at the location of the boring at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate and changes in surface and subsurface drainage.

MAJOR DIVISIONS		SYMBOL		DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW		Well-graded gravels or gravel-sand mixtures, little or no fines
		GP		Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM		Silty gravels, gravel-sand-silt mixtures
		GC		Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW		Well-graded sands or gravelly sands, little or no fines
		SP		Poorly-graded sands or gravelly sands, little or no fines
	SAND with fines	SM		Silty sands, sand-silt mixtures
		SC		Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL		Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL		Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH		Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH		Inorganic clays of high plasticity, fat clays
		OH		Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT		Peat, muck, and other highly organic soils
ROCK				Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

PI	PLASTICITY INDEX
LL	LIQUID LIMIT
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

SAMPLER TYPE

- MODIFIED CALIFORNIA
- STANDARD PENETRATION TEST
- THIN-WALLED / FIXED PISTON
- HAND SAMPLER
- ROCK CORE
- X DISTURBED OR BULK SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the excavation location during the time of exploration. Subsurface rock, soil or water conditions may vary in different locations within the project site and with the passage of time. Boundaries between differing soil or rock descriptions are approximate and may indicate a gradual transition.

STRENGTH TESTS

TV	FIELD TORVANE (UNDRAINED SHEAR)
UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress

SAMPLER DRIVING RESISTANCE

Modified California and Standard Penetration Test samplers are driven 18 inches with a 140-pound hammer falling 30 inches per blow. Blows for the initial 6-inch drive seat the sampler. Blows for the final 12-inch drive are recorded onto the logs. Sampler refusal is defined as 50 blows during a 6-inch drive. Examples of blow records are as follows:

- 25 sampler driven 12 inches with 25 blows after initial 6-inch drive
- 85/7" sampler driven 7 inches with 85 blows after initial 6-inch drive
- 50/3" sampler driven 3 inches with 50 blows during initial 6-inch drive or beginning of final 12-inch drive

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SOIL CLASSIFICATION CHART

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 12/6/2019

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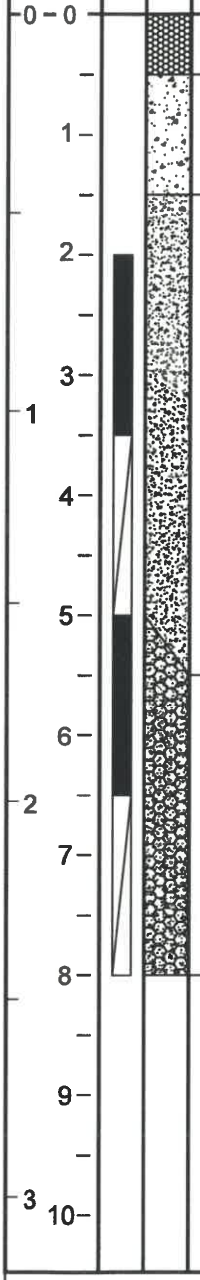
A-1
FIGURE

BORING 1

EQUIPMENT: Truck-Mounted Drill Rig with 6.0-inch Solid Flight Auger
DATE: 9/13/19
ELEVATION: 10 - feet*
*REFERENCE: Google Earth, 2019



DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			6" Asphalt Concrete						
	1			12" Aggregate Baserock						
	2			SAND with Clay and Gravel (SP-SC) Light brown, dry to moist, loose, fine sand, ~5-10% low plasticity clay, ~20% fine to medium subrounded gravels. [Fill]						
	3				14	120	4.6		P200 7.3%	
1	4				8	109	13.0			
	5									
	6			Sandy GRAVEL with Clay (GW) Medium brown, moist, loose, fine to medium subrounded gravels, ~30% fine sand, <5% clay. [Fill] Grades wet at 6.5 feet.	15		5.5			
2	7									
	8			Bottom of boring at 8.0 feet. Groundwater measured at 7.5 feet 10 mins. after drilling.	10		2.3			
	9									
3	10									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

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BORING LOG

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California
Project No. 1793.021 Date: 12/6/2019

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A-2
FIGURE

BORING 2

EQUIPMENT: Truck-Mounted Drill Rig with 6.0-inch Solid Flight Auger
DATE: 9/13/19
ELEVATION: 8 - feet*
*REFERENCE: Google Earth, 2019

DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			7" Asphalt Concrete						
	1			12" Aggregate Baserock						
	2			Clayey SAND with Gravel (SC) Medium brown, moist, medium dense, fine to coarse sand, ~20-30% medium plasticity clay, ~15-20% fine to medium gravel. [Fill]						
1	3			Clayey GRAVEL with Sand (GC) Medium brown, moist, loose, fine to medium gravel, ~30% medium plasticity clay, ~20% fine to coarse sand. [Fill]	9	108	15.5			
	4			Sandy CLAY (CH) Medium blue-gray, wet, very soft to soft, high plasticity clay, ~40-50% fine to medium sand and shell fragments. [Bay Mud]	3		24.3		P200 50.4%	
	5									
	6				2	83	36.8			
2	7									
					1		40.3		P200 55.6%	
	8			Bottom of boring at 8.0 feet. Groundwater measured at 4.0 feet immediately after drilling.						
	9									
3	10									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
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BORING LOG

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California
Project No. 1793.021 Date: 12/6/2019

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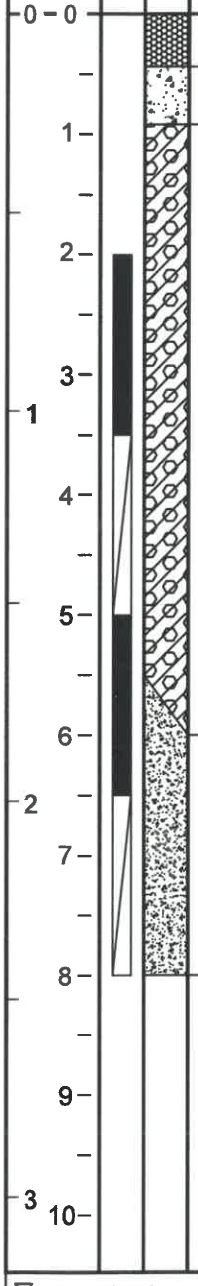
A-3
FIGURE

BORING 3

EQUIPMENT: Truck-Mounted Drill Rig with 6.0-inch Solid Flight Auger
DATE: 9/13/19
ELEVATION: 7 - feet*
*REFERENCE: Google Earth, 2019



DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (4)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
0	0			5" Asphalt Concrete						
				6" Aggregate Baserock						
	1			Clayey GRAVEL (GC) Dark brown, moist, medium dense, fine to coarse gravel, ~30% medium plasticity clay, ~10% fine to medium sand. [Fill]						
	2									
	3				20	113	9.8			
1										
	4			Grades with interbeds of gravelly clay, locally blue-green.						
					7		12.4			
	5									
	6			SAND with Clay and Gravel (SP-SC) Dark brown, moist, medium dense, fine to medium sand, ~20-25% low to medium plasticity clay, ~20-25% gravel. [Fill]	14	120	17.1		P200 22.4%	
2										
	7									
					6		15.5			
	8			Bottom of boring at 8.0 feet. No groundwater observed during drilling.						
	9									
3										
	10									

▽ Water level encountered during drilling
▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3= 0.1571 x DRY UNIT WEIGHT (pcf)
(3) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

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BORING LOG

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California
Project No. 1793.021 Date: 12/6/2019

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A-4
FIGURE

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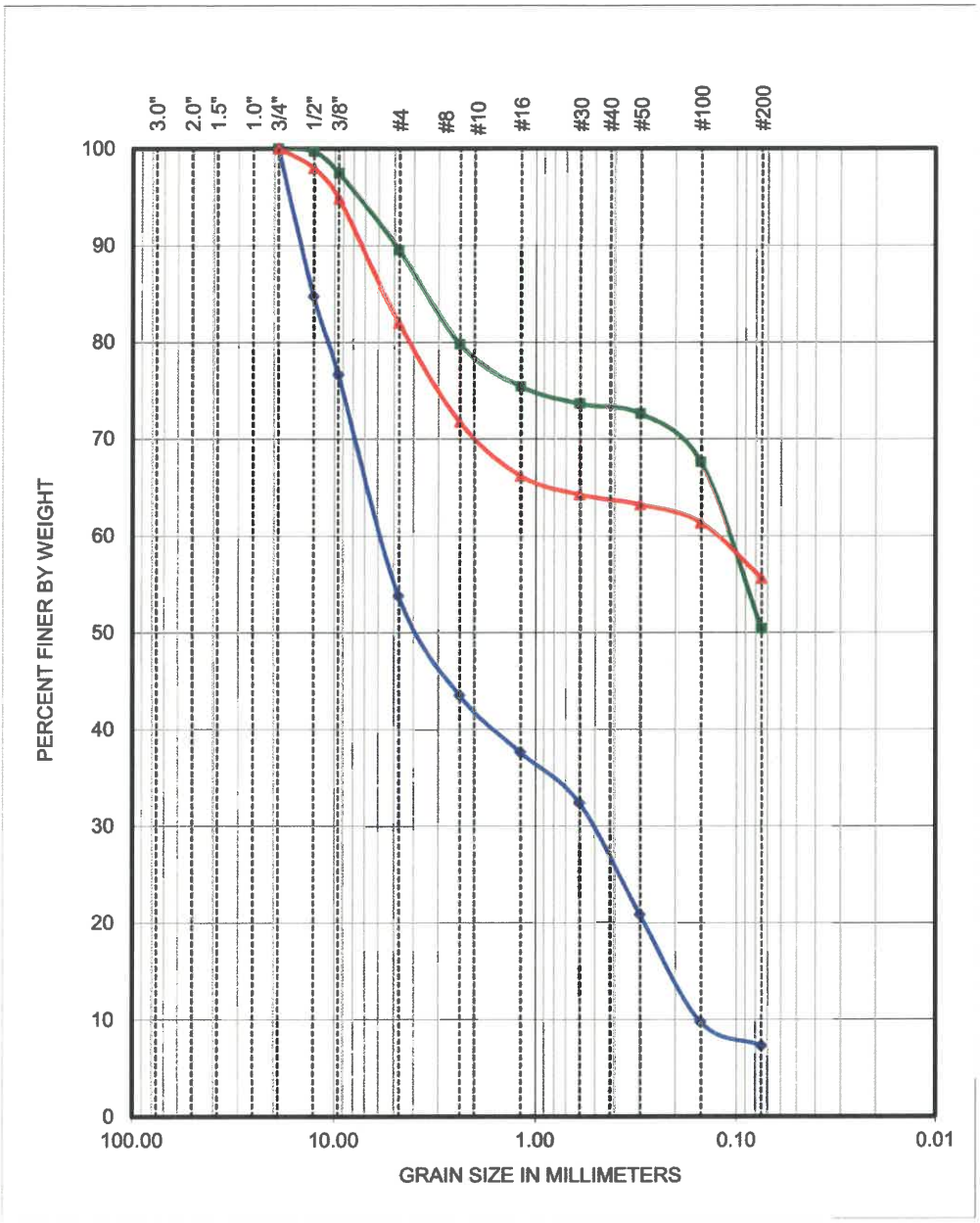
PARTICLE SIZE ANALYSIS - ASTM D 6913 & ASTM D 1140



SYMBOL	SAMPLE SOURCE	CLASSIFICATION
	B1 @ 3.0	SAND with Clay and Gravel (SP-SC)
	B2 @ 3.5 -5.0	Sandy CLAY (CH) / Clayey SAND (SC)
	B2 @ 6.5	Sandy CLAY (CH)

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PARTCLE SIZE ANALYSIS RESULTS

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 12/6/2019

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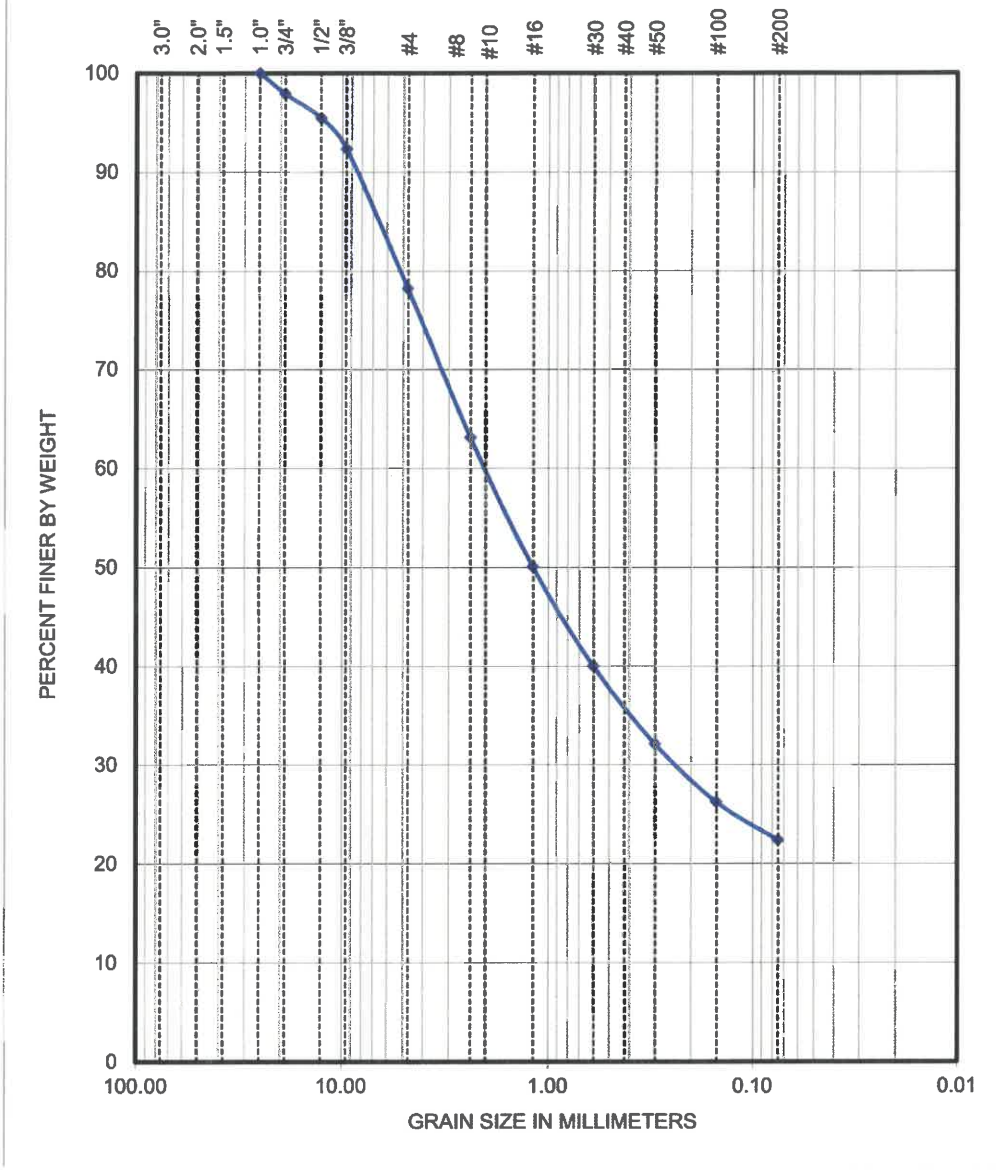
A-5
FIGURE

MILLER PACIFIC ENGINEERING GROUP
PARTICLE SIZE ANALYSIS - ASTM D 6913 & ASTM D 1140



SYMBOL	SAMPLE SOURCE	CLASSIFICATION
——●——	B3 @ 6.0	Clayey SAND with Gravel (SC)

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PARTCLE SIZE ANALYSIS RESULTS

Sanitary District No. 5
Cove Force Main Replacement
Tiburon, California

Project No. 1793.021 Date: 12/6/2019

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A-6
FIGURE

Sanitary District No. 5
Cove Road Force Main Sewer Rehabilitation
COST TRACKING TABLE THROUGH NOVEMBER 2020

Bid Item	Bid Item Description	Unit Price	Original Bid Item Quantity	Original Contract Total Cost	Current Bid Item Quantity Thru Nov 2020	Current Cost	Change Order #1 - Different Pothole Conditions	Change Order #2 - T&M STA 0+00 to STA 2+00	Change Order #3 - T&M STA 2+00 to STA 2+25	Change Order #4 - T&M STA 2+25 to STA 5+00	Change Order #5 - T&M STA 5+00 to STA 5+75	Change Order #6 - T&M STA 5+75 to STA 6+00	Total Cost Change
1	Mobilization & Demobilization	$95,668	LS	$95,668	80%	$76,534							
2	Install (N) 16” OD HDPE Force Main	$322	2,142 LF	$689,724	1,192 LF	$383,824		($64,000)	($8,050)	($88,550)	($24,150)	($8,050)	($192,800)
3	Install (N) 16” FM with Steel Casing	$1,200	226 LF	$271,200	226 LF	$0							
4	Install (N) 5 Segment Bend w/Steel Casing	$8,000	1 Ea	$8,000	1 Ea	$0							
5	Install Steel Cased Minor Defl Bend	$13,000	1 Ea	$13,000	1 Ea	$0							
6	Install 5 Segment HDPE Bend	$1,000	8 Ea	$8,000	0 Ea	$7,000		($2,000)	($2,000)		($1,000)		($5,000)
7	Connect To Existing Manhole 624	$7,000	1 Ea	$7,000	1 Ea	$0							
8	Construct New 5 Ft Manhole	$15,000	1 Ea	$15,000	1 Ea	$7,500							
9	Mortar Coat New 5 Ft Manhole	$800	7 VF	$5,600	7 VF	$0							
10	Construct Vault For 12” Flowmeter And Existing Force Main Connection	$95,000	1 Ea	$95,000	1 Ea	$95,000							
11	Install Bore And Jack 14” Steel Casing	$1,000	110 LF	$110,000	0 LF	$0							
12	Install 6.625 OD HDPE Force Main	$300	152 LF	$45,600	152 LF	$0							
13	Construct FM Valve Vault Connection	$76,000	1 Ea	$76,000	1 Ea	$0							
14	Connect New 6.625 FM to (E) Valve Pit	$15,000	1 Ea	$15,000	1 Ea	$0							
15	RestoreDamaged SW and Driveway	$50	64 SF	$3,200	64 SF	$0							
16	Restore Damaged SW Crossing	$80	400 SF	$32,000	400 SF	$0							
17	Curb and Gutter Replacement	$50	20 LF	$1,000	20 LF	$0							
18	AC Trench Repair-Repl Markings	$290	900 Tons	$261,000	900 Tons	$166,834							
19	Hard Rock Excavate/Buried Concrete	$1	50 CY	$50	50 CY	$0							
20	Groundwater Pumping Treatment Sys	$30,000	LS	$30,000	LS	$15,000							
21	Shoring For All Excavations	$25,000	LS	$25,000	LS	$18,750							
22	Temporary Sewage Bypassing	$24,979	LS	$24,979	LS	$0							
23	Caltrans Approved EP-Double Permit	$54,300	LS	$54,300	LS	$49,080							
24	Pothole Utility Mains	$650	21 Ea	$13,650	21 Ea	$32,500							
25	Pothole(E Sewer FM a 100 Ft Intervals	$650	20 Ea	$13,000	26 Ea	$16,900							
26	Approved Traffic Control-Tib/Belvedere	$15,000	LS	$15,000	LS	$14,250							
27	Changed Condition Allowance	$40,000	LS	$40,000	LS	$0							
28	As-Built Drawings	$4,000	LS	$4,000	LS	$0							
	Base Bid Amount			$1,971,971	*Subtotal*	$883,173	*Subtotal*	$0.00	($66,000.00)	($1,050.00)	($88,550.00)	($25,150.00)	($8,050.00)	($281,011)
A-1	Additive Alternate CDF Backfill (Belvere Requirement Only)			$135,000		$0	Alt A-1	$0.00	($45,000.00)	($5,597.00)	($61,325.00)	($16,725.00)	($5,575.00)	($134,222)
	Base and Alt Bid Amount			$2,106,971	*Base & Alt Bid*	$883,173	CO Total	18,456.74	171,037.48	41,546.47	191,699.43	83,916.62	16,231.59	522,888.33
							Adjusted CO Total	18,456.74	60,037.48	34,899.47	41,824.43	42,041.62	2,606.59	**107,655.33**

Base and Alt Bid Work Completed	$883,173
Adjusted CO Total	$107,655
Grand Total - November 30, 2020	$990,828

October 14, 2020

Mr. Tony Rubio, District Manager
Sanitary District 5 of Marin County
2001 Paradise Drive
Tiburon, CA 94920

Submitted via email: trubio@sani5.org

RE: Proposal for a Renewable Energy Study

Dear Mr. Rubio:

Sanitary District 5 of Marin County (SD5) is interested in assessing the feasibility of installing a source of renewable energy (i.e., solar) to offset petroleum-based sources of fuel currently used at SD5's wastewater treatment plant. HDR, Inc. (HDR) has prepared the following scope of work, including fee estimate, to perform a renewable energy study.

SCOPE OF WORK

HDR will perform a Renewable Energy Feasibility Study for SD5 in Tiburon and Belvedere and will begin with a virtual Project Kickoff.

HDR will review existing energy performance data for all SD5 facilities to determine the amount of energy currently used on an annual basis and will then use this information to provide recommendations for potential renewable energy systems types and the locations at each facility where renewable energy is determined to be feasible. As part of this work, HDR will virtually review potential locations with SD5 representatives and identify the preferred locations for renewable energy at the SD5 facilities.

HDR will coordinate the amount of renewable energy systems with local suppliers to determine preferred ownership models and identify the areas that would be attractive for bidders. As part of this effort, HDR will determine potential first costs and simple payback duration for system types. Note: costs will either be based on information provided by manufacturers or on systems costs for other PV systems in the San Francisco Bay Area.

HDR will summarize the findings of its work in a brief feasibility study report (10 to 15 pages) outlining recommendations, the anticipated renewable energy to be generated and conceptual images (marked up aerial photos) indicating the location and size of the potential renewable energy systems. The report will include an appendix with the calculations that identify the amount of renewable energy. HDR will virtually meet with representatives from SD5 for review of the draft report and finalize the report incorporating SD5 comments.

Estimated Fee

HDR proposes to perform the scope of work on a time and materials basis, for an estimated twenty one thousand nine hundred and ninety five dollars ($20,995). A breakdown of estimated labor hours and cost by task follows.

Task No.	Task Name	Estimated Labor Hours	Estimated Cost
1	Project Management	13	$2,042
2	Client Meetings (Kickoff, Draft Report, and Final)	6	$1,192
3	Review Existing Energy Performance Data	12	$2,385
4	Provide Recommendations for Renewable Energy Systems and Preferred Locations	16	$3,388
5	Model Renewable Energy and Conceptual Images	15	$3,137
6	Survey Suppliers and Provide Net Lifecycle Costs	15	$3,137
7	Feasibility Study Report (Draft and Final)	26	$5,713
	Total:	**103**	**$20,995**

We appreciate the opportunity to work with SD5 on this project. Please contact Mary Martis at (415) 741-7025 or Mary.Martis@hdrinc.com if you have any questions or concerns.

Sincerely,
HDR ENGINEERING, INC.

Holly L.L. Kennedy
Senior Vice President

Mary Martis, PE
Project Manager

DECISION/ACTION ITEM LOG
CIP Committee: December 8, 2020
Sanitary District No. 5 of Marin County
ACTIVE ITEMS SHEET

No.	Item	Submission Date	Responsible Party	DECISION ONLY Due	DECISION ONLY Completed	ACTION REQUIRED Due	ACTION REQUIRED Completed	Comment/Reference Document
29	Cove Rd. Force Main Replacement Project	3.12.19	Nute/TR/CIP					Nute Preparing Bid Docs, as of 3.12.19; Waiting for CalTrans response re horizontal drilling, as of 5.14.19; Still working w/ CalTrans, waiting for approval, as of 11.12.19; Design Review from Nute, 12.10.19, 1.14.19, 2.11.20; Received Caltrans Permit, 3.9.2020; Notice for Sealed Bid @ Marin IJ on 4.28.2020 w/ Bids due 5.19.2020; Posted RFP at SD5 Wesbite, (http://www.sani5.org/ about/contracts-proposals-bidding), 5.5.2020; Project granted to Maggiora & Ghilotti, Inc.; Work to begin on 7.27.2020; Job well underway and progressing smoothly, as of 10.13.2020; **Job is 70% complete, as of 11.10.2020**
31	FY2020-2021 Sewer Rehab Project		CIP/TR					**Small project for Paradise Cove; Enginnering to begin in ~~Dec 2020, as of 7.14.2020~~; Jan 2021, as of 12.8.2020**
32	SD5 Collection Sytsem Master Plan		CIP/TR					Posted RFP at SD5 Wesbite, (http://www.sani5.org/ about/contracts-proposals-bidding), 5.5.2020; Revised RFP from HDR, as of 7.14.2020; **Underway, as of 11.10.2020**