STAFF REPORT

To:	Board of Directors
From:	Rachél Lather, Principal Engineer
Date:	June 15, 2023
Subject:	Carmel Meadows Pipeline Replacement Project Project #19-03

RECOMMENDATION

It is recommended that the Board of Directors accept and file this report and direct staff to move forward with the county permitting.

BACKGROUND

Homes along the northeast side of Ribera Road between Mariposa Drive and Calle La Cruz are currently served by an existing 6 inch diameter sewer line that is a combination of shallow buried and aerial supported pipes (Existing Line). Kennedy Jenks (KJ) previously prepared studies to analyze whether the Existing Line could be replaced in kind. In 2017, the District Engineer tabled a proposal to replace the Existing Line in kind due to unexpected environmental constraints. The District Engineer's October 2017 staff report explained that "the Carmel Meadows sewer line includes several environmental obstacles which may cause the CEQA/NEPA documents to be delayed." In 2023, KJ provided a letter to the District summarizing the environmental constraints involved with replacing the Existing Line in kind. (Attachment 1, 2023 Kennedy Jenks Letter).

In 2018, CAWD's Principal Engineer determined that continuing to serve an aerial sewer supported by piles adjacent to the Carmel River was too risky due to sea level rise, the lack of adequate access, environmental impacts of constructing proper access to the pipe and manholes, impacts to cultural resources, the continued threat of spills in the Carmel Lagoon due to the pipeline location on steep slopes (see Attachment 5, Spill Map) and the existence of unstable slopes beneath the existing alignment that will require the construction of retaining walls and special foundations. (Attachment 2-4, Geotechnical Consultants and ENGEO reports dated 2013, 2014, and 2023).

KJ had provided three additional options in their 2013 report, including an option to construct a pump station and force main that would flow to the Calle la Cruz pump station. This option would require up to 19 homes between Mariposa Court and the Calle la Cruz pump station to use ejector pumps to get to the new sewer. This option was rejected because a separate force main was not needed in Ribera Road, the option would require laterals and ejector pumps to be installed in the front yard of each home, the option required direct connection from an ejector pump to the force main, and the overall cost would be high.

Another KJ option proposed horizontal directional drilling a new collection line, but that would be difficult to construct due to the bedrock underlying the site and would require deep laterals to be connected in bedrock materials behind the existing homes. That was not a constructible option. The third option was to do spot repairs of the existing pipeline, however that was not a long term solution. (Attachment 6, 2013 Kennedy/Jenks Design Alternatives Report).

SRT Consultants were retained by CAWD in 2019 to provide a study to determine whether rerouting the flow in the existing gravity sewer line behind the homes and directing it to a new lift station at the end of Mariposa Drive could eliminate the need for 19 ejector pumps. The new option would not require a sewer force main in Ribera Road but would connect directly to an existing force main that was constructed after 2016. This new alternative was able to eliminate the need for ejector pumps at all but 4 homes. The only similarity to the KJ option was the need for a pump station at the end of Mariposa Court to route all sewage away from the slopes and sensitive habitat (Project). (Attachment 7, SRT Consultants 2019 Report).

The District prepared a draft Initial Study/Mitigated Negative Declaration (IS/MND) under the California Environmental Quality Act to analyze potential impacts of the Project. The Public Review period for IS/MND commenced on April 15, 2022. To comply with the California Environmental Quality Act (CEQA) requirements, public notices were published in the Pine Cone (Attachment 8, Pine Cone CEQA Posting). On April 20, 2022 a community meeting with all affected neighbors was held via Zoom in order to present the proposed Project and explain the reasons for the design configuration and need for the Project. An invitation was sent to all of the residences adjacent to the Project (Attachment 9, April 20,2022 Community Meeting Invitation). After the 30 day CEQA review period, all CEQA related comments were incorporated into the final draft of the IS/MND and your Board approved the Project and the IS/MND on June 30, 2022 (Attachment 10, 2022 CAWD Resolution Approving IS/MND)).

Since that time, staff have been pursuing a coastal development permit from Monterey County. Two meetings with the Land Use Advisory Committee (LUAC) were held along with a site visit to demonstrate the need to replace the Existing Line. Rather than evaluate the Project that was presented to the committee, the LUAC chose to take public testimony and request that a different project be constructed.

After the LUAC meetings, District staff reached out to the Regional Water Quality Control Board (RWQCB) and Coastal Commission staff to request their input regarding replacing the Existing Line in kind. Both the RWQCB and Coastal Commission staff stated that they wanted the pipeline redirected and did not support replacing the Existing Line in kind. (Attachments 11, 2022 Coastal Commission Staff Email and12, 2023 Central Coast Regional Water Quality Board Letter).

The residents in the area have indicated their concerns about ejector pumps and pump stations, most recently in a letter from David Scopp dated May 23, 2023 and an email dated June 1, 2023 with specific questions for the June 15, 2023 meeting. Below are the 8 questions/issues raised in Mr. Scopp's email and staff's response (see attached copy of email).

DISCUSSION – Response to David Scopp email dated June 1, 2023

- Reason(s) that the District abandoned the Kennedy/Jenks (KJ) Consultants alternative after 2016. *Explained in Background section of this staff report. All KJ options were rejected due to construction and environmental constraints.*

- What did the Regional Water Board do/say that may have caused CAWD to change course, as mentioned by Chairman White at the last meeting?

    - *As noted in Background section of this staff report, the change from replace in place occurred due to the District Engineer coming to the realization that environmental and coastal permitting requirements would make the replace in kind option not feasible.*
    - *As documented in mandatory reporting to the Central Coast Regional Water Quality Control Board (CCRWQCB), the CCRWQCB considers replacement of the sewer main adjacent to Carmel Lagoon a high priority.(Attachment 5 shows spills in the project area)*
    - *The California Coastal Commission considers spills at this location to be "incredibly problematic from both ecological and public access perspectives." (Attachments 11 and 13)*
    - *The CCRWCB includes requirements in the National Pollutant Discharge Elimination permits that require wastewater agencies to address threats from climate change.*

- *Sanitary Sewer System permit adopted Dec 6, 2022 by the State Water Resources Control Board: Attachment D, sections 8.1 through 8.4, of the sanitary sewer system permit requires wastewater agencies to prioritize condition assessments for portions of their systems located in steep terrain, environmental areas more vulnerable to system failures, and components of the system more vulnerable to climate change impacts. Agencies must develop and plan to address those portions of their systems identified that need improvement.*
- *The CCRWCB's opinion is that the plan to move the aging existing sewer line away from Carmel Lagoon will protect the environment and reduce or eliminate sewage spills to this water body that drains to the Monterey Bay National Marine Sanctuary at Carmel River State Beach. The Project would benefit water quality as well as CAWD and property owners by reducing liability for future illicit discharges.*

- Consider withdrawing the pending application from the Planning Commission agenda pending an independent engineering review of the current application project vis a vis the Kennedy Jenks alternatives and/or finalization of grinder pump policy. *Staff does not recommend that the Board withdraw the application. As discussed in the Background section and above, several outside engineering firms as well as staff from the Coastal Commission and the RWQCB have stated the replace in kind option is not environmentally feasible. Staff believes it would be a waste of ratepayer money to re-analyze the replace in kind option. Further, there is no legal requirement for the District to adopt an ejector pump policy. The District may in its discretion consider a policy in the future, but there is no requirement to have a policy in place before implementing the Project that the Board approved on June 30, 2022.*

- Discussion of whether construction on 30% plus slopes is permissible and whether the project is in the same environmentally sensitive zone as the replacement in kind project. *This is a Local Coastal Plan requirement. The Project does not propose construction on a 30% plus slop. Rather, the Project would involve removing portions of the Existing Line, specifically existing aerial pipeline structures that are located on 30% plus slope. This is the only portion of the existing project that is located on 30% plus slopes is for the removal .*

- Please explain why CAWD added grinder pumps to this project in order to pump the sewage uphill when they were not included in the project analyzed by Kennedy Jenks. *The Kennedy Jenks project analysis for the pump station option was rejected by the District Engineer at the time. The analysis of how sewage would get from the homes to the new force main was not included in the analysis. If it were, all 19 of the homes would need ejector pumps. Please see the attached letter from KJ that explains why they would not propose the replace in kind option due to environmental permitting issues.*

- More clarity on the alternatives for the location of the lift pump. *We will use the public road easement adjacent to the existing manhole for the below ground pump station. Other locations had environmental and cultural constraints, as well as visual impacts to property owners backyards in that area. The owner of the land did not want to grant an access and permanent easement for a full pump station on their property. They have indicated that moving the electrical panels to a location on their property is feasible.*

- Can CAWD retain jurisdiction by adding a local coastal plan and/or doing an EIR? *Staff does not recommend this. If CAWD had its own local coastal plan, CAWD would have to enforce the requirements of the CCRWQCB and the Coastal Commission, which as explained below, makes the replace in kind option infeasible.*

  Per the California Coastal Commission-Central Coast District (Attachment 13):
  - *The Carmel Area Land Use Plan (LUP) specifically requires the water quality in the Carmel River Lagoon and the Carmel Bay be protected, and pollution sources minimized.*
  - *Point and non-point sources of pollution of Point Lobos and Carmel Bay ASBS's, coastal streams and the Carmel River Lagoon and Marsh shall be controlled and minimized (LUP 2.4.3.3)*
  - *Carmel River State Beach is one of the three most important locations for public access within the area covered (LUP 5.3.3.1.a)*
  - *Leaks of untreated effluent into the lagoon and coastal waters pose a significant barrier to public access at the location due to the health and safety risks associated with exposure to untreated sewage, as well as any closures that may be required to protect the public from these hazards.*
  - *The Local Coastal Plan (LCP) requires that sewage infrastructure in this area be carefully sited and designed to minimize the risks of spills into the lagoon.*
  - *In kind replacement of the existing sewer line in the existing alignment is incompatible with these requirements and is unlikely to be approvable under the LCP.*

  Further, the District approved the IS/MND for the Project in June 2022. The statute of limitations to challenge that approval has run and the IS/MND is presumed valid. No further environmental review of the Project is required under CEQA.

- Would the Board prefer the replacement in kind option if it were permissible*? The District's decisions are not based on personal "preferences." Rather, the decisions are based on substantial evidence in the record, including engineering reports showing that the Project is the most feasible option and that the replace in kind option is infeasible. In addition, the District's decisions must comply with district specifications and environmental and permitting requirements, not simply personal "preferences."*

Attachments:

1. 2023 Letter from Kennedy/Jenks Consultants
2. Geotechnical Consultants 2013 Report 2014, 2023
3. Geotechnical Consultants 2014 Report
4. ENGEO 2023 Report
5. Spill Map
6. 2013 Kennedy/Jenks Design Alternatives Report
7. SRT Consultants 2019 Report
8. Pine Cone CEQA Posting
9. April 20, 2022 Community Meeting Invitation
10. 2022 CAWD Resolution approving IS/MND
11. 2022 Coastal Commission Staff Email
12. 2023 Central Coast Regional Water Quality Control Board Letter
13. 2023 California Coastal Commission Letter

ATTACHMENT 1

2023 LETTER FROM KENNEDY/JENKS

Kennedy Jenks

3 March 2023

Rachél Lather, MS, PE
Principal Engineer
Carmel Area Wastewater District
3945 Rio Road
Carmel-By-The-Sea, CA 93922

Subject: Carmel Meadows Gravity Sewer

Dear Rachél:

The purpose of this letter is to inform you of our opinion related to past work that Kennedy Jenks (KJ) performed on the Carmel Meadows Gravity Sewer project in light of subsequent information and recent project efforts by Carmel Area Wastewater District (CAWD).

KJ prepared a design in 2013 to replace the existing gravity sewer pipe that connects the end of Mariposa Drive to the Calle La Cruz pump station. It had been well documented that this sewer pipe was in poor condition, subject to sewer spills, and situated along a steep embankment adjacent to the Carmel River lagoon. In KJ's Final Technical Memorandum (27 August 2013), the evaluation of four alternatives is described and two of the alternatives (installation of a lift station with companion force main and construction of a new sewer using trenches technology) were eliminated from further consideration on the basis of estimated cost. This decision was made in coordination with CAWD given the information available at the time of the evaluation relative to the likelihood for those alternatives to emerge as preferred approaches through further analysis.

Subsequent to preparation of the Final Technical Memorandum, KJ completed design of the project and CAWD pursued the environmental permitting of the Carmel Meadows Gravity Sewer project in conjunction with the Outfall Underground project (another project for which Kennedy Jenks was preparing a preliminary design). As CAWD started the permitting process, it quickly became apparent that permitting heavy construction work in the sensitive lagoon area was extremely challenging. The permitting requirements led KJ and CAWD to change the design concept for the Outfall Underground project from a shored open cut installation to a horizontal directional drill (trenchless) project that avoided new installations and construction activities in the lagoon area.

The key permitting requirements from the preliminary design concept for the Outfall Underground project that made it impractical were: stringent monitoring requirements, mitigation of potential impacts, and timing and duration limits for performing work in sensitive areas. These time limitations and monitoring requirements in particular made the work difficult if not unfeasible within the boundaries of the permitting process.

Had that permitting information been available at the time of the original Carmel Meadows Gravity Sewer alternatives analysis, the cost estimates prepared for the removal and replacement of pipe in place would have been higher. As such, we expect that the installation of a pump station and force main in Ribera Road would have been carried forward in the analysis as a feasible alternative. It may also very well have been selected as the preferred approach for the Carmel Meadows Gravity Sewer

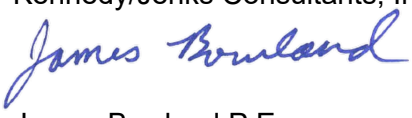
design given aspects of the replacement of pipe in place that were later found to be very challenging from a permitting and constructability perspective, including:

1. Increased environmental permitting requirements due to close proximity to the lagoon.
2. Additional mitigations to avoid discharge of untreated sewage to the lagoon during construction.
3. Modified construction techniques compared to those originally conceived.

In addition, considering recent Central Coast Regional Water Quality Control Board policy changes and feedback, it is expected that the approach of a lagoon alignment would be even more challenging under current regulatory requirements. To restate and summarize, due to the impact and implications of subsequently available information and in consideration our current understanding of the project and applicable regulatory requirements, we do not recommend that the Carmel Meadows Gravity Sewer replacement be pursued on the basis of KJ's 2013 Final Technical Memorandum or previous design documents for the project.

Very truly yours,

Kennedy/Jenks Consultants, Inc.



James Bowland P.E.
Principal

ATTACHMENT 2

GEOTECHNICAL CONSULTANTS 2013 REPORT

GEOTECHNICAL CONSULTANTS, INC.
Geotechnical Engineering • Geology • Hydrogeology

James Bowland, P.E.
Kennedy/Jenks Consultants, Inc.
116 Lupfer Avenue, Suite B
Whitefish, MT 59937

June 14, 2013
Project No. SF13013

Subject: Geotechnical Memorandum
Carmel Meadows Gravity Sewer
Carmel, California

Dear Mr. Bowland:

We performed a geotechnical evaluation of the Carmel Meadows gravity sewer located to the northeast and downslope from Ribera Road between Mariposa Drive and Calle La Cruz in Carmel, California. Our services were performed in accordance with our proposal dated February 19, 2013. Our services consisted of background review of geologic maps, geotechnical site reconnaissance and discussion of repair strategies with Mr. James Bowland of Kennedy/Jenks Consultants on May 14, 2013, discussion of repair strategies with local engineering contractors specializing in similar foundation systems, and preparation of this geotechnical memorandum. The purposes of our services were to assess the geotechnical stability of the gravity sewer pipeline, and to evaluate suitable construction techniques to rehabilitate or replace foundation supports based on site access, terrain and anticipated subsurface conditions.

SITE CONDITIONS

The existing sewer line is a 1,500-foot long, 6-inch diameter ductile iron pipe and it is routed along the sideslopes of hilly terrain. The approximately 60 to 80-foot high hill declines steeply (locally up to 1:1 slopes) toward the northeast from the rear of the properties along Ribera Road to the Carmel River. The hillslope is densely vegetated with trees, grasses and other plant undergrowth. The pipeline is predominantly buried but is elevated across five reaches where it crosses narrow, steep re-entrant valleys. The length of the elevated reaches range from approximately 34 feet to 128 feet. Through these elevated portions, the sewer line is supported on welded steel C-channel sections founded on concrete pedestal foundations. The sewer line is strapped to the C-channel sections at the support locations. Each 18.5-foot pipeline length typically has one or two support locations.

The site is underlain at shallow depths by the porphyritic granodiorite of Monterey (K_{gdp}) (Clark et al., 1997). This rock is hard and strong as evidenced at bedrock outcrops along the alignment. The bedrock is overlain by a relatively thin mantle of topsoil and colluvium.

Three faults are in the project vicinity. The San Gregorio fault zone, Sur Region section is located about 3.6 miles west (offshore). The southern end of the potentially active Cypress Point fault is located approximately 400 feet east of the northern end of the alignment. This fault has not been well studied, but is a Quaternary-aged dextral reverse fault. The Hatton Canyon fault, the closest fault segment of the Seaside-Monterey section of the Monterey Bay-Tularcitos fault zone is located approximately 2.3 miles northeast of the alignment. This fault zone is a complex, generally northwest-striking zone up to 15 km wide with dextral, dextral-reverse, and thrust faults with known Holocene displacement.

DISCUSSION

Based on discussions during the site visit, we understand that the Carmel Meadows gravity sewer has been in service for approximately 60 years. We are not aware of any incidents where the pipe needed to be repaired or replaced. Therefore, with regard to the serviceability of the existing pipeline, the system has performed well. However, it is evident from the horizontal and vertical profile of the elevated portions of the pipeline that the foundation supports have moved downslope. The maximum post-installation movement appears to be on the order of 2 feet though the movement is typically much less. The following paragraphs explain our observations of distress in a little more detail for each of the five reaches from the southeast part of the alignment to the northwest.

Reach 1 is approximately 55 feet long and is up to approximately 7 feet above the deepest point of the drainage re-entrant (Photos 1 and 2). Reach 1 is located approximately 100 feet southeast of manhole (MH) T601. The four C-channel supports range from 2.3 feet to 5.5 feet high. There are only very slight indications of foundation movement of up to approximately 2 inches. The foundations, at least at two locations, are founded on overburden soils and do not extend into bedrock. The depth to the bedrock is not known and there are no bedrock outcrops in close proximity.

Reach 2 is approximately 45 feet long with a buried manhole (MH T601) approximately midway along the reach (Photos 3 and 4). The manhole provides support for the pipeline as well as two C-channel supports and a concrete saddle in the portion of the pipe northwest of the manhole. The two C-channel supports are 1.6 and 4.5 feet high. We noted loose soil below the concrete saddle which provides little support at this location. The northwesterly pipeline joint appears to be up to approximately 6 inches out of alignment. Cracks in the concrete and brick of the manhole also indicate that some slope movement has occurred.

Reach 3 is approximately 24 feet long over a steep-sided drainage re-entrant (Photo 5), and is located located in the vicinity of MH T622. The pipe is up to 4.5 feet above the ground with the two C-channel supports at 3.2 and 3.7 feet high. The pipe is additionally

supported on a concrete saddle at the southeasterly end of the pipe. There appears to be slight movement of the elevated pipeline with the joints up to approximately 3 inches out of original alignment. Bedrock outcrops of granodiorite were observed in close proximity to this reach of the sewer line.

Reach 4 has the most noticeable post-installation movement with outward rotation of the two northwesterly foundation support locations (Photo 6). This reach is located between MH S622 and MH S616 based on GPS data collected during the site reconnaissance. The reach is approximately 65 feet long with four C-channel supports ranging from 1.3 to 2.8 feet high. The pipe is along a bench on an approximately 1 ½ to 1 (horizontal to vertical) hillside. Based on this unnatural break in slope, it appears the bench was likely created by cutting from the upslope side of the pipeline alignment and casting the soil on the downslope side. Bedrock outcrops of granodiorite were observed at either end of this reach. The fill soils along with the concrete pedestals have evidently creeped downslope. The pipeline has moved up to approximately 2 feet. One pipeline joint at the point of greatest movement is separating.

Reach 5 is approximately 128 feet long extending northwestward from MH S618 with nine C-channel supports ranging from 5.3 to 15 feet high (Photos 7 through 10). The concrete pedestal foundations are larger to accommodate the taller and wider C-channel sections. An intermediate concrete saddle in an area of higher ground has settled away from the pipe leaving one length of pipe unsupported. A manhole is located a short distance to the southeast of where the pipeline transitions from being elevated to below grade. The pipe along this reach has moved from its original location although it appears that the pipe was likely constructed with some variation in grade and horizontal alignment to accommodate the topography and elevations of the support structures. The supports do not have noticeable tilt or other similar indications of large scale movement. Due to the height of the supports, a small rotation of the concrete pedestal will have a more pronounced effect at the top of the C-channel section. Bedrock outcrops of granodiorite were observed in close proximity to this reach of the pipeline.

CONCLUSIONS AND RECOMMENDATIONS

As noted above, there has been some movement of the elevated portions of the Carmel Meadows gravity sewer since its installation approximately 60 years ago. The sewer line has performed well, however, given the steep topography through which it traverses. The rehabilitation strategy to mitigate possible future soil movement will depend on other aspects of the evaluation including whether or not the pipeline is to be replaced and the structural integrity and corrosion resistance of the C-channel sections. For example, if the pipeline is to be replaced in its entirety, it would make sense to replace the foundation systems of elevated portions of the pipeline as well to improve its future performance and reduce the risk of failure.

The sewer line along Reaches 1 and 3 exhibits the least downslope movement, and therefore we expect that these reaches have the least risk of future movement and resulting pipe failure. Conversely, Reach 4 has moved considerably and at least one joint is separating from its connection. The sewer line movement and risk of future movement for the other two reaches, Reach 2 and Reach 5, lie between these two extremes. Therefore, if a phased approach to pipeline upgrades is desirable, we recommend that Reach 4 be corrected in the near term. The other reaches do not appear to be in immediate risk of failure. All sections should be monitored periodically to document further distress until upgrades are constructed.

In broad terms, there are three strategies to reduce the risk of pipe failure due to slope movements: 1) avoid the area where slope displacement is possible either by re-routing pipeline or going underneath any vulnerable soils (i.e. bury the pipeline), 2) stabilize the hillside so that the risk of slope movement is limited, or 3) design the pipeline and/or foundation support systems so that any slope displacement can be accommodated or resisted by the structures. The existing pipeline has performed fairly well using shallow concrete pedestal foundations, which would fall within "Strategy 3" listed above.

We anticipate that the upgrades would likely focus on Strategy 3 as the most viable and least costly alternative while still providing a measurable reduction of risk of pipeline failure. However, Kennedy/Jenks and the Carmel Area Wastewater District may want to explore Strategies 1 and 2. Because of the vulnerability of the pipeline through Reach 4, consideration of a slope repair may be desirable if an access route can be constructed so that construction equipment and supplies can access the site. This repair strategy would involve rebuilding the slope underneath and below the pipe to provide a properly keyed-in fill slope that would not be prone to slope creep and erosion processes. A lower cost alternative would be to install plate piles in the existing slope to improve, but not necessarily fully arrest, future slope movement. The past performance of the pipeline along the remaining reaches indicates that slope stabilization is probably not warranted.

The possibilities for improving the pipeline and/or foundation supports (Strategy 3) are wide ranging. One may consider re-using the existing foundations, identifying which supports need replacement or underpinning, and upgrading only to the extent necessary. On the other end of the spectrum, the elevated portions of the pipe can be supported on all new foundations. These foundation improvement options can be coupled with replacing the pipe and pipe support system with something that is less affected by movement of the support system and can be easily adjusted to accommodate additional movement. The same strategies for underpinning and new foundations are relevant and consist of deepening the footings with hand excavated underpinning piers, or using drilling equipment to anchor the foundation into bedrock with rock bolts or micropiles. Although larger diameter drilled piers have been installed for pipeline support in unstable slopes, we think that the size of the equipment would preclude drilled piers as a viable foundation alternative for this project. If track-mounted drilling

equipment can access the site, the most robust and most risk averse option would be to support the elevated portions of the pipeline on a trellis or pipe saddles that are founded on a micropile-supported foundation. The micropiles would be drilled into the underlying bedrock. This micropile option would likely involve constructing new foundations rather than attempting to underpin existing shallow pedestal footings.

Based on the above discussion, the foundation improvements would likely consist of replacing the existing concrete pedestals with similar systems but extending deeper below grade to resist the earth pressures from the movement of soil overburden. The foundations should extend a sufficient distance into the bedrock to resist these earth pressures. If the depth to bedrock makes the excavation infeasible, the concrete footing can be secured into the bedrock by drilling small-diameter (approximately 3-inch diameter) rock bolts. We discussed the possible repair strategies with three local engineering contractors specializing in similar foundation systems. Due to the limited accessibility, the excavations and drilling will likely need to be conducted with hand-operated equipment including jackhammers and rotary drills. One contractor indicated larger diameter (approximately 6- to 9-inch diameter) drill holes can be constructed if within 200 feet of their diesel hydraulic power pack unit. The hard rock will likely make drilling progress slow with a high rate of drill bit wear.

The depth to bedrock is difficult to ascertain without a subsurface program consisting of test pits and/or borings. As bedrock outcrops are fairly close to the alignment at Reaches 3, 4 and 5, we anticipate that the colluvium overlying the bedrock at the support locations is relatively thin (perhaps less than about 5 feet deep). The fill and colluvium may be thicker at Reaches 1 and 2 as there were no nearby bedrock outcrops observed.

The transition between the elevated portion of pipeline and the below-grade portion should be carefully considered during development of repair strategies. The first length(s) of buried pipe can also be prone to movement and these should be adequately supported on concrete saddles embedded into the bedrock.

Also, it is important to revegetate the construction areas as soon as practicable after construction. Slopes will need temporary slope protection such as jute or coir netting until the vegetation is re-established.

The potential for and amount of future movement is dependent on additional factors including periods of intense rainfall and earthquakes. These events can lead to additional slope movement above that experienced in the past.

CLOSURE

The conclusions and recommendations presented herein are professional opinions based on geotechnical and geologic data and the project as described. The findings and professional opinions presented in this report are presented within the limits prescribed by the client, in accordance with generally accepted professional engineering and geologic practices. There is no other warranty, either express or implied.

Respectfully submitted,
GEOTECHNICAL CONSULTANTS, INC.

Deron J. van Hoff 6/14/13

Deron J. van Hoff, P.E., G.E.
Vice President

REFERENCES

Clark, J.C., Dupré, W.R. and Rosenberg, L.I., Geologic Map of the Monterey and Seaside 7.5−Minute Quadrangles, Monterey County, California: A Digital Database, USGS Open-File Report 97-30, 1997.

United States Geological Survey, 2012, Monterey Quadrangle, California, 7.5-Minute Series (Topographic), Map Scale 1:24,000.

PHOTOGRAPHS

Photo 1
Reach 1
Elevated sewer line on concrete pedestal foundation

Photo 2
Reach 1
Facing northwest

PHOTOGRAPHS

Photo 3
Reach 2
From manhole facing northwest

Photo 4
Reach 2
From manhole facing southeast

PHOTOGRAPHS

Photo 5
Reach 3
Elevated sewer line on C-channel supports

Photo 6
Reach 4
Facing northwest – outward rotation of foundation support

PHOTOGRAPHS

Photo 7
Reach 5
Elevated sewer line – facing southeast along northwestern portion of Reach 5

Photo 8
Reach 5
15-foot high supports through steep re-entrant valley

PHOTOGRAPHS

Photo 9
Reach 5
Facing northwest along northwestern portion of Reach 5

Photo 10
Reach 5
Facing southeast along southeastern portion of Reach 5

ATTACHMENT 3

GEOTECHNICAL CONSULTANTS 2014 REPORT

GEOTECHNICAL CONSULTANTS, INC.
Geotechnical Engineering • Geology • Hydrogeology

GEOTECHNICAL REPORT
CARMEL MEADOWS GRAVITY SEWER
CARMEL, CALIFORNIA

March 2014

Prepared for:

Kennedy/Jenks Consultants, Inc.
116 Lupfer Avenue, Suite B
Whitefish, MT 59937

Owner:

Carmel Area Wastewater District

Project No. SF13041

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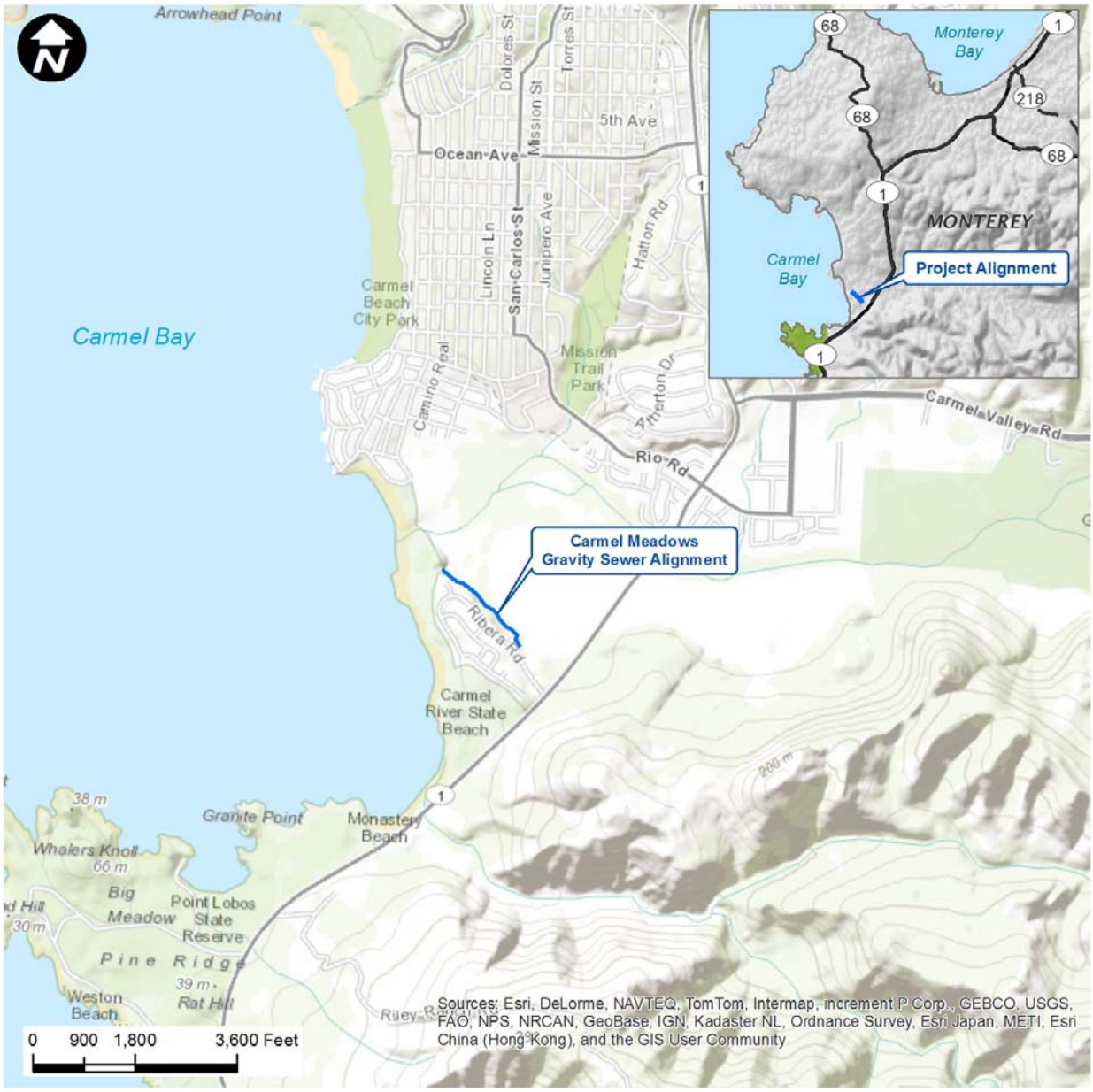
1. INTRODUCTION

1.1 PROJECT DESCRIPTION

This geotechnical report presents our geologic and geotechnical discussions, interpretations, and recommendations for the Carmel Area Wastewater District's (CAWD) Carmel Meadows Gravity Sewer. The Carmel Meadows gravity sewer is located to the northeast and downslope from Ribera Road between Mariposa Drive and Calle La Cruz in Carmel, California. The project location is shown on ***Figure 1 – Project Location***. The existing sewer line is a 1,500-foot long, 6-inch diameter pipe that was installed approximately 60 years ago. The pipeline is comprised of a combination of ductile iron pipe, PVC pipe and vitrified clay pipe. It is routed along the sideslopes of hilly terrain. The pipeline is predominantly buried but is elevated across five reaches where it crosses narrow, steep re-entrant valleys.

We understand the proposed pipeline upgrade project involves replacing the ductile iron portion of the pipeline between approximately sanitary sewer manhole (SSMH) T603 and S615. This segment represents approximately 1,050 feet of the overall length, and includes sections across the five elevated reaches of the alignment. We understand the new pipeline will be 6-inch diameter restrained joint ductile iron pipe. The elevated portions of the new pipeline will be supported on new foundations. We previously prepared a geotechnical memorandum (GTC, 2013) that discussed observed movement of the sewer line and suitable construction techniques to rehabilitate or replace foundation supports based on site access, terrain and anticipated subsurface conditions.

FIGURE 1
PROJECT LOCATION



1.2 WORK PERFORMED

In accordance with our proposal dated October 15, 2013, we completed the scope of work described below:

- ***Field Exploration Program.*** We explored subsurface conditions by means of performing seven limited-access borings (GTC-B-8 through GTC-B-14). (Borings GTC-B-1 through GTC-B-7 were performed at the CAWD Wastewater Treatment Plant and along the Calle La Cruz force main alignment.) The locations of our borings are shown on ***Plate 1 – Geotechnical Exploration Map***. Exploration number, date of exploration, surface elevation and depth are summarized on ***Table 1 – Summary of Geotechnical Explorations***. Elevations were estimated based on a topographic map of the site provided by Kennedy/Jenks Consultants. All elevations on ***Table 1***, and referred to throughout this report, are relative elevations with respect to a project datum.

TABLE 1 – SUMMARY OF GEOTECHNICAL EXPLORATIONS

Boring	Date Performed	Approximate Surface Elevation (feet, Project Datum)	Depth (feet)
GTC-B-8	1/6/14	+13.5	7.5
GTC-B-9	1/6/14	+18.0	8.5
GTC-B-10	1/6/14	+29.0	6.7
GTC-B-11	1/7/14	+28.0	8.4
GTC-B-12	1/7/14	+30.5	5.0
GTC-B-13	1/7/14	+32.0	10.2
GTC-B-14	1/7/14	+25.0	3.6

  We visually classified the soil during sampling. We recovered split-spoon (Standard Penetration Test) samples, and relatively undisturbed 2 inch and 2 ½ inch diameter sleeve samples using split-barrel samplers. Selected samples were transferred to a geotechnical laboratory for testing. Boring logs from this study are presented in ***Appendix A – Supporting Geotechnical Data***.

- ***Laboratory Testing.*** We performed tests to evaluate moisture, density, and grain size distribution on selected soil samples to measure pertinent index and engineering properties. The laboratory test results are presented in ***Appendix A – Supporting Geotechnical Data*** and on the boring logs on Plates A-1.8 through A-1.14 in ***Appendix A***.

- ***Engineering Analysis.*** We analyzed subsurface conditions and field and laboratory test results, and reviewed regional and local geology and seismicity. Additionally, we analyzed the following geotechnical design issues:
    - Seismic hazards evaluation including strong ground shaking and seismically-induced landslides;
    - Allowable bearing capacities for new footing or pier foundations;
    - Allowable axial capacities of micropile foundations;
    - Base friction coefficients for new foundations;
    - Lateral earth pressures (active, passive, at rest, and seismic increment) against foundation elements;
    - Settlement estimates of new shallow foundations and micropile foundations; and
    - Earthwork recommendations for excavations and backfill, and compaction requirements.
- ***Report.*** We prepared this report presenting our geotechnical/geological findings, interpretations, conclusions, and recommendations for the design of the proposed project.

2. FINDINGS

2.1 SITE SETTING

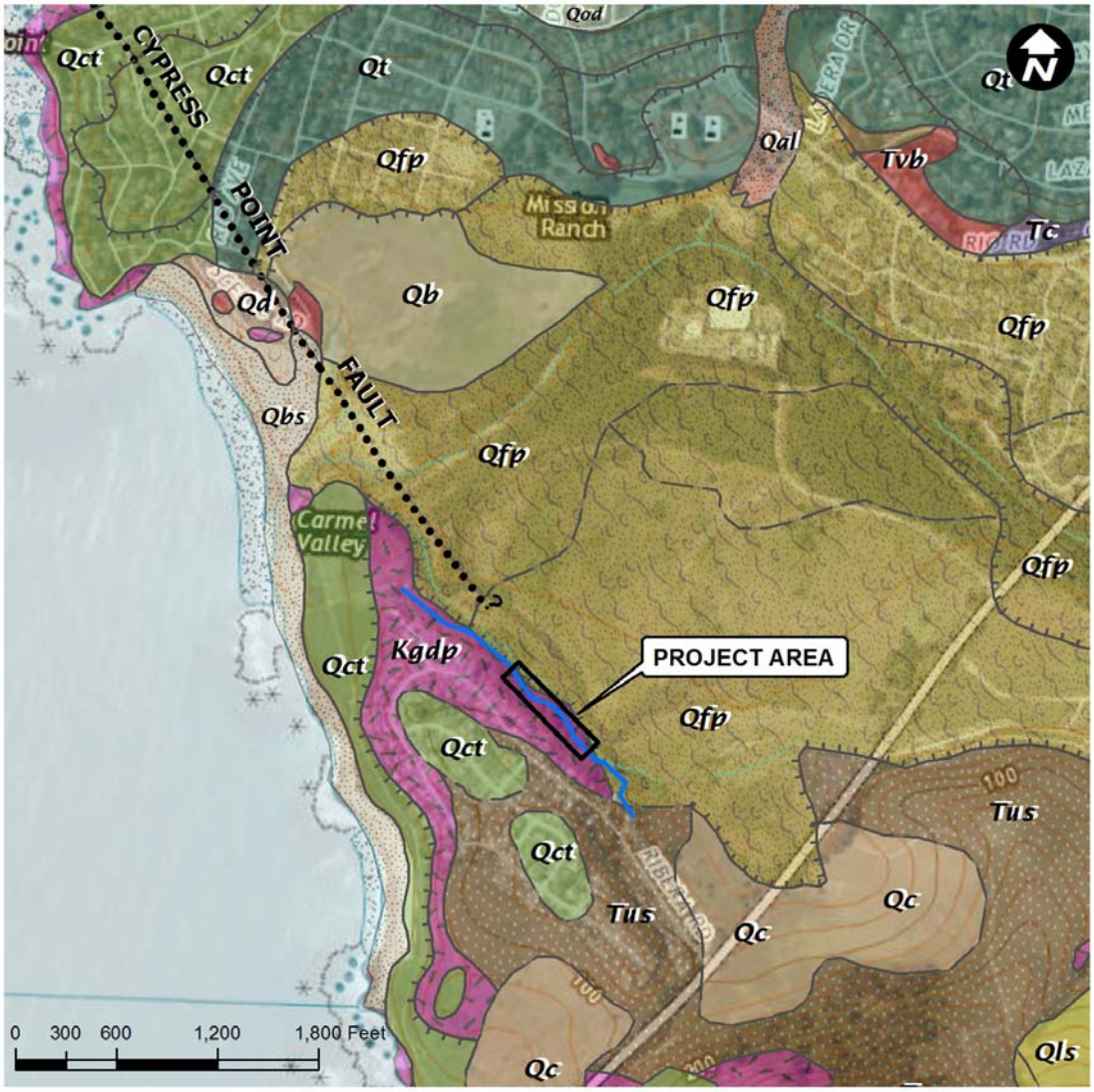
The Carmel Meadows gravity sewer is routed along the sideslopes of hilly terrain. The approximately 60 to 80-foot high hill declines steeply (locally up to 1:1 slopes) toward the northeast from the rear of the residential properties along Ribera Road to the Carmel River Lagoon. The hillslope is densely vegetated with trees, grasses and other plant undergrowth. The pipeline is predominantly buried but is elevated across five reaches where it crosses narrow, steep re-entrant valleys.

2.2 GEOLOGIC SETTING

The Carmel Meadows gravity sewer is located in the City of Carmel along the southern edge of the Carmel River Valley in Monterey County. The Carmel River Valley is located within the Coast Ranges Geomorphic Province of California, a geologically young and seismically active region with many elongate ranges and narrow valleys that approximately parallel the coast. The project area is located in the Santa Lucia Range within a structural block known as the Salinian block. The Salinian block in the project area is a sliver of Cretaceous granitic rock, bounded on the east by the San Andreas fault zone and on the west by the Palo Colorado - San Gregorio fault zone. The granitic bedrock is overlain primarily by Miocene to Holocene marine and non-marine sedimentary rocks that are typically folded and faulted into a series of generally northwest-southeast trending folds and faulted blocks, largely as a result of predominantly right-lateral strike-slip stresses related to movement along the San Andreas fault system.

The Carmel River Valley in the project area is bounded by hills and terraces underlain by Cretaceous granitic rock, Miocene marine sandstones and siltstones, and Quaternary terrace and dune deposits. The Carmel River Valley is underlain by Quaternary alluvium, floodplain deposits, and channel deposits. Near the coast, the valley has widened in to an estuarine environment and is partially underlain by estuarine deposits of silt and clay. Regional surficial deposits within the project vicinity are shown on ***Figure 2 – Local Geology***.

FIGURE 2
LOCAL GEOLOGY



Geology Source: Modified from USGS, 1997. Geologic Map Of The Monterey and Seaside 7.5-Minute Quadrangles, Monterey County, California: A Digital Database, USGS Open-File Report 97-30.

LEGEND

Carmel Meadows Gravity Sewer Alignment

Geologic Contact Lines

- Geologic Contact, dashed where approximately located, dotted where concealed
- Inner edge of terrace deposits, barbs of terrace side of scarp
- Fault, dashed where approximately located, dotted where concealed

Geologic Units

- Qbs - Beach Sand Deposits
- Qd - Dune Sand Desposits
- Qb - Basin Deposits
- Qal - Alluvial Deposits
- Qfp - Undivided Flood Plain Deposits
- Qc - Colluvium
- Qls - Landslide Deposits
- Qod - Older Coastal Dunes
- Qct - Coastal Terrace Deposits
- Qt - Terrace Deposits
- Tus - Unnamed Sandstone
- Tm - Monterey Formation
- Tvb - Volcanic Rocks
- Tc - Carmelo Formation
- Kgdp - Porphyritic Granodiorite of Monterey

2.3 LOCAL GEOLOGY

The project area is consistently underlain by colluvium with a thin layer of topsoil at the surface, and shallowly underlain by Salinian granitic bedrock consisting of porphyritic granodiorite. Descriptions of the units that may be encountered during construction activities are summarized below.

Colluvium (Qc). Colluvium consisting of a variable mixture of unconsolidated, heterogeneous deposits of moderately to poorly sorted silt, sand, and gravel, deposited by slope wash and mass movement are found in the hillside areas bracketing the Carmel River Valley, most commonly thinly blanketing the hillslopes and within topographic swales (Clark et al., 1997). Holocene aged colluvium was found at the surface along the Carmel Meadows gravity sewer. Colluvium was found at depths ranging from 1.25 to 7.5 feet below ground surface (bgs). The depths of the colluvium at the boring locations are summarized in ***Table 2 – Colluvium Depths***. Except for boring GTC-B-9 which was within a colluvial-filled swale, the depth of colluvium was less than 5 feet thick which is anticipated to be typical along the project alignment. The thickness of colluvium increased to 7.5 feet within the swale at the northwesterly end of the alignment (Reach No. 5). The colluvium generally consists of very loose to medium dense, dark gray to dark yellowish brown silty sand, sandy clay and sandy silt with varying amounts of gravel clasts. Borings GTC-B-8 and GTC-B-11 encountered a thin, 1.5- and 0.5-foot thick layer, respectively, of dark brown to light yellowish brown sand just above the underlying porphyritic granodiorite.

TABLE 2 – COLLUVIUM DEPTHS

Boring	Reach No.	Colluvium Depth (feet)
GTC-B-8	5	4.5
GTC-B-9	5	7.5
GTC-B-10	4	4.0
GTC-B-11	3	3.75
GTC-B-12	2	2.25
GTC-B-13	Between 1 and 2	4.75
GTC-B-14	1	1.25

Notes:
1. Reaches refer to the five elevated portions of the pipeline with Reach No. 5 at the northwest end and Reach No. 1 at the southeast end.

Porphyritic Granodiorite of Monterey (Kgdp). Porphyritic[1] granodiorite is mapped on the Monterey Peninsula and on the south side of Carmel where the Carmel Meadows gravity sewer runs parallel along the hillslope of a mapped granitic outcrop (Clark et al., 1997). The porphyritic granodiorite is light gray to moderate pink and medium grained with large orthoclase phenocrysts (3 to 10 cm long) (Clark et al., 1997). The granodiorite encountered in borings for this project was friable and highly to completely weathered below the thin layer of colluvium. The granodiorite became less weathered with depth, and it was difficult to drive the SPT sampler near the bottom of each of the borings.

2.4 SEISMIC SETTING

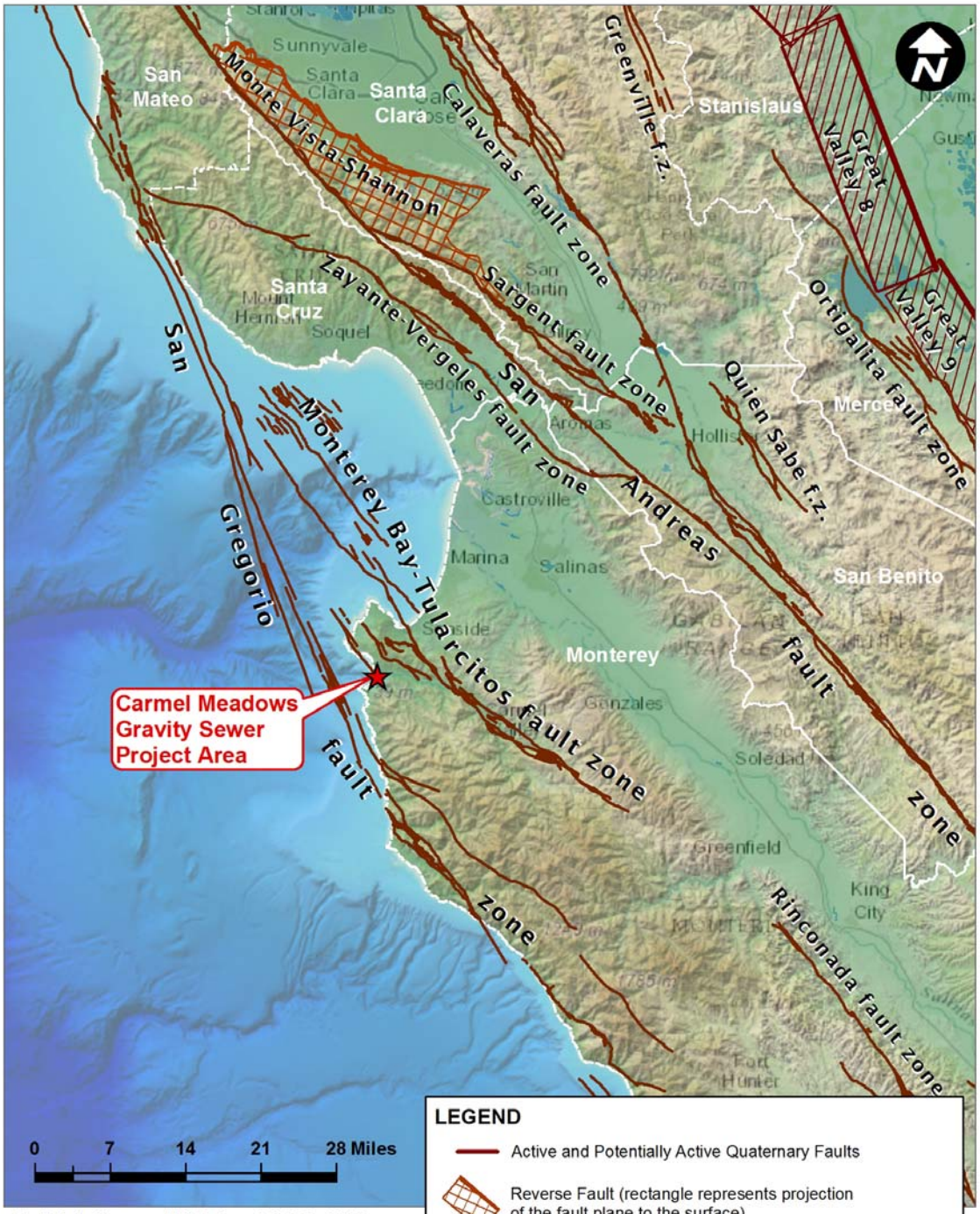
The site is in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. The relative movement between the Pacific Plate and the North American Plate generally occurs across a 50-mile zone extending from the San Gregorio fault in the southwest to the Great Valley Thrust Belt to the northeast. Strain produced by the relative motions of these plates is relieved by right lateral strike slip (dextral) faulting on the San Andreas fault zone and related faults (San Gregorio, Calaveras, Hayward), and by vertical reverse slip displacement on the Great Valley and other thrust faults in the central California area.

Strong ground shaking at the project site could occur as a result of an earthquake on any one of the active regional faults shown in ***Figure 3– Regional Fault Map***. In the Monterey area, the right lateral motion between the North American and Pacific tectonic plates is primarily accommodated by three main fault structures within the broad transform boundary: the San Andreas fault zone, the Monterey Bay - Tularcitos fault zone, and the San Gregorio fault zone (***Figure 3***).

Movement of the North American and Pacific plates is primarily translated in the Monterey area as right lateral slip along the San Andreas fault zone, and right lateral and reverse slip movement along the Monterey Bay - Tularcitos and San Gregorio fault zones.

[1] Porphyritic is a textural description for a rock that has a distinct difference in the size of the crystals, with at least one group of crystals obviously larger than another group.

FIGURE 3
REGIONAL FAULT MAP



Fault Data Sources: U.S.G.S. and C.G.S., 2010, Quaternary fault and fold database for the United States; and Cao, et. al., 2003, The Revised 2002 California Probabilistic Seismic Hazard Maps, Appendix A - 2002 California Fault Parameters (blind thrust fault data).

Active faults in California have been divided into activity categories by the California Geological Survey based on their predicted activity and ability to generate strong earthquakes; "Type A" faults which generally have higher and more well defined slip rates and well defined recurrence intervals, and "Type B" faults with well defined slip rates but poorly constrained recurrence intervals. "Type A" faults are commonly considered more active (generally with higher slip rates) and/or capable of generating larger earthquakes than "Type B" faults. The USGS has divided the major active faults into segments based on work by the USGS Working Group on California Earthquake Probabilities (WGCEP). Based on this segmentation, various fault rupture scenarios were developed that include earthquakes and rupture of segments of the individual faults in varying segment combinations, i.e. rupture of one segment by itself or rupture of two or more segments concurrently. These scenarios result in differing earthquake and fault parameters for each of the potential segment combinations.

Both "Type A" and "Type B" faults that are mapped in the vicinity of the project site are summarized in ***Table 3 –Active and Potentially Active Faults***. The distance to significant active faults and fault segments, California Geological Survey (CGS) assigned fault type ("A" or "B"), and estimated maximum magnitude earthquake are summarized in ***Table 3***.

The WGCEP concluded that there is a 62 percent probability of a strong earthquake (M≥6.7) occurring in the San Francisco Bay Region in a thirty year period between 2003 and 2032 (WGCEP, 2003). Additionally the 2007 WGCEP (WGCEP, 2008) has concluded that within the next 30 years the probability of a strong earthquake (M≥6.7) occurring on regional faults is as follows: 21% for the N. San Andreas fault zone, 7% for the Calaveras fault zone, and 6% for the San Gregorio fault.

TABLE 3 - ACTIVE AND POTENTIALLY ACTIVE FAULTS

Fault Name	Type[1]	Distance (Miles)[2]	Estimated Max. Earthquake Magnitude[1, 3]
Monterey Bay - Tularcitos fault zone	B	1.9	7.3
San Gregorio fault zone - Connected	B [4]	3.5	7.5
Zayante - Vergeles fault zone	B	26.3	7.0
N. San Andreas fault zone (Varying rupture combinations of segments of the N. San Andreas with the Santa Cruz Mountain segment alone and with the Offshore, North Coast, and Peninsula segments)	A	30.5	7.1-7.9
San Andreas fault zone – Creeping segment	B	31.1	6.7
Calaveras fault zone (Varying rupture combinations of the Calaveras Southern segment alone and with the Northern and Central segments)	A	35.4	5.8-7.0
Calaveras fault zone (Varying rupture combinations of the Calaveras Central segment alone and with Northern segment)	A	39.8	6.4-7.0
Quien Sabe fault zone	B	40.4	6.6
Monte Vista – Shannon fault zone	B	46.5	6.7
N. San Andreas fault zone (Varying rupture combinations of segments of the N. San Andreas with the Peninsula segment alone and with the Offshore, and North Coast)	A	51.4	7.2-7.9

Notes:
1. Fault parameters from The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2) by the USGS (2008).
2. Fault-to-site distances based on the 2008 National Seismic Hazard Maps - Fault parameters website at http://geohazards.usgs.gov/cfusion/hazfaults_search/hf_search_main.cfm ; and the U.S.G.S. and C.G.S., 2010, Quaternary fault and fold database for the United States. Distance measured from the nearest point on the force main alignment.
3. Maximum Earthquake Magnitude – the maximum earthquake that appears capable of occurring under the presently known tectonic framework, using moment magnitude.
4. San Gregorio fault analyzed as a Type A fault by the 2007 Working Group on California Earthquake Probabilities.

2.5 LOCAL FAULTING

The closest active faults to the project site are the Hatton Canyon fault of the Monterey Bay - Tularcitos fault zone, located about 1.9 miles northeast of the gravity sewer alignment, and the San Gregorio fault zone, located approximately 3.5 miles west of the gravity sewer alignment. The southern end of the mapped trace of the Cypress Point fault is located approximately 400 feet northeast of the project and the fault trends approximately parallel to the gravity sewer alignment. The Cypress Point fault is not considered to be a significant seismic source. These faults are further described below:

Hatton Canyon Fault. The Hatton Canyon fault is part of the larger Monterey Bay - Tularcitos fault zone. The Monterey Bay-Tularcitos fault zone is a complex, generally northwest-striking zone up to 15 km wide of dextral, dextral-reverse, and thrust faults. Although there is documented evidence of Holocene displacement along the Hatton Canyon, Sylvan Thrust, and Tularcitos faults, the Monterey Bay - Tularcitos fault zone, in general, lacks detailed studies. Late Pleistocene and Holocene slip rates of the Monterey Bay - Tularcitos fault zone are poorly constrained with vertical slip rates ranging from 0.02 to 0.4 mm/yr and dextral strike-slip rates are not known (USGS, 2014). The Hatton Canyon fault, 1.9 miles northeast of the project alignment, consists of northwest-striking, near-vertical reverse faults that extend from Carmel Valley Road northwest to Point Joe. The Hatton Canyon fault has rotated terrace deposits, offset Monterey shale against fluvial terrace and landslide deposits, and in at least one locality offset Holocene colluvium (Clark et al., 1997).

San Gregorio Fault Zone. The San Gregorio fault zone is a structurally complex transpressional fault zone as much as 5 km wide that extends for about 230 km from the Big Sur region south of Monterey Bay to the north where it merges with the San Andreas fault system near Bolinas Bay north of San Francisco. The San Gregorio fault zone exhibits both right lateral (dextral) strike-slip and reverse slip motion with the cumulative strike-slip displacement since middle Miocene time reported to be between 115 km and 156 km and an unknown amount of west-vergent reverse displacement. The closest strand of the San Gregorio fault zone is located offshore, approximately 3.5 miles to the west of the project site.

Cypress Point Fault. The Cypress Point fault is the closest mapped fault to the project site (***Figure 2***). It is a short fault, approximately 3 to 6 km long, extending from Carmel River Valley northwest to the southern edge of Monterey Canyon (Clark et al., 1997; USGS, 2014). The motion and activity of the Cypress Point fault is poorly constrained, however mapping indicates that it is primarily right-lateral (dextral) with a minor vertical displacement. Geologic mapping indicates that fault movement may have resulted in an approximate 1 meter offset of a 102,000 year old terrace platform; however, the elevation difference across the fault of the terrace platform could also be the result of deposition on an irregular surface. The field studies to the south of the mapped trace of this fault failed to find any evidence of this fault extending southward of the Carmel River Valley (Clark et al., 1997). Due to the lack of evidence of recent faulting and the short length of this fault, it is not considered to be a ground rupture hazard or a significant seismic source by the 2007 WGCEP.

2.6 GROUNDWATER

Groundwater was not encountered in any of the borings for this investigation. Due to the project's location on a hillslope underlain shallowly by granitic bedrock, the upper colluvial soils may become temporarily saturated during heavy rains.

3. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings from our geotechnical exploration and engineering analysis, it is our opinion that the construction of the proposed pipeline improvements for the CAWD Carmel Meadows gravity sewer is geotechnically feasible. Key geotechnical/geologic conclusions and recommendations to be considered during project design include:

- Access to the pipeline is difficult, and the excavations and drilling for foundations will likely need to be conducted with hand-operated equipment. Limited-access equipment powered by hydraulic systems may be possible at the most northwesterly of the elevated pipeline sections (Reach 5).
- The pipeline traverses hilly terrain where the colluvium overlying the granodioritic bedrock is prone to landsliding and downslope creep.
- Depending upon the depth of excavation required, the bedrock may be difficult to excavate in some zones.

The conclusions and recommendations for geologic hazards and seismic design considerations, groundwater, foundations, lateral earth pressures, and earthwork are provided in the following sections of this report.

3.1 GEOLOGIC HAZARDS AND SEISMIC DESIGN CONSIDERATIONS

The primary geologic hazards along the alignment of the CAWD Carmel Meadows gravity sewer are strong ground shaking and landsliding. The potential for hazards related to fault rupture, liquefaction, lateral spread, and expansive soils is considered to be low to very low. These potential geologic hazards are discussed in the following sections.

3.1.1 Fault Rupture

While many potentially active faults exist within the Monterey Bay area, no active or potentially active faults are known to traverse the project site; consequently, the risk of hazards related to fault rupture/offset at the site is considered very low.

3.1.2 Strong Ground Shaking

The Carmel Meadows gravity sewer is in seismically active coastal California where multiple faults are located in relatively close proximity to the site as shown on ***Figure 3*** and presented in ***Table 3***. The closest faults to the site are the Hatton Canyon fault of the Monterey Bay -

Tularcitos fault zone and the San Gregorio fault zone located approximately 1.9 miles northeast and 3.5 miles west of the site, respectively. Strong ground shaking at the site will result from a large earthquake on these or any of the regional faults presented in ***Table 3***.

We anticipate that the project will be designed in accordance with the 2010 American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) "Minimum Design Loads for Buildings and Other Structures" (referred to hereafter as ASCE 7-10). ASCE 7-10 was adopted by the 2013 California Building Code effective as of January 1, 2014.

Based on the magnitude of the ASCE7-10 mapped spectral response, the proposed improvements will be assigned Seismic Design Category D per ASCE 7-10, Section 11.6. Recommended parameters for ASCE 7-10 code-based seismic design are presented in ***Table 4 – ASCE 7-10 Seismic Design Parameters***. The seismic design parameters presented in ***Table 4***, which are based on mapped 0.2-second short-period (S_S) and 1-second long-period (S_1) acceleration response spectra from Section 22 of ASCE7-10, may be used to develop mapped design response spectra and risk targeted response spectra in accordance with Section 11 of ASCE7-10.

TABLE 4 – ASCE 7-10 SEISMIC DESIGN PARAMETERS [1]

Site/Design Parameters	Seismic Design Category	D
	Site Class	B
Mapped Spectral Acceleration	PGA (g)	0.666
	S_S at 0.2-second (g)	1.634
	S_1 at 1-second (g)	0.624
Site Adjustment Factors	Site Coefficient F_{PGA}	1.0
	Site Coefficient F_a	1.0
	Site Coefficient F_v	1.0
	Seis. Risk Coeff.C_{RS}	0.909
	Seis. Risk Coeff.C_{R1}	0.895
Site Adjusted Spectral Acceleration	PGA_M (g)	0.666
	$S_{MS} = F_a \times S_S$ (g)	1.634
	$S_{M1} = F_v \times S_1$ (g)	0.624
Design Spectral Acceleration	PGA (g)	0.422
	$S_{DS} = 2/3 \times S_{MS}$ (g)	1.089
	$S_{D1} = 2/3 \times S_{M1}$ (g)	0.416

Notes:
1. The seismic design parameters were determined, and spectral response calculated, in accordance with ASCE 7-10 using the USGS web-based U.S. Seismic Design Maps tool (http://geohazards.usgs.gov/designmaps/us/application.php).

3.1.3 Liquefaction and Lateral Spread

Liquefaction is a phenomenon wherein a temporary, partial loss of shear strength occurs in a soil due to increases in pore pressure that result from the cyclic loading accompanying an earthquake. Saturated, loose to medium dense sands and silty sands are most susceptible to liquefaction, although documented field cases have shown that gravelly soils and certain fine grained soils are also capable of liquefying. Lateral spreading is one potential consequence of liquefaction, and is a seismically-induced ground deformation failure in which near surface soil layers typically break into blocks that progressively move downslope or toward a free face such as a stream channel, river embankment, or a shoreline.

The site is not underlain by deposits that are prone to liquefaction as it is on a hillside with shallow bedrock, and therefore the potential for liquefaction and lateral spread is very low.

3.1.4 Landsliding

The gradient of the hillside typically ranges from 2:1 to 1 ½:1 (horizontal to vertical), and locally up to 1:1. The underlying bedrock is competent and able to resist slope movement. However, the upper 5 to 10 feet of colluvial soil is subject to landsliding due to water saturation or earthquakes, downslope creep, and other erosional processes that transport material downslope. Pipelines or foundations passing through colluvial soils are susceptible to movement and/or increased pressures from moving soil.

3.1.5 Expansive Soils

Expansion and contraction of expansive soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to structures and equipment. The on-site soils generally have low plasticity and low expansion potential. Provided import materials are not of high plasticity, the hazards associated with expansive soil movement are not significant for this project.

3.2 GROUNDWATER

We did not encounter groundwater during our subsurface program on January 6 and 7, 2014 although our field work was during a historically dry winter season. In fact, the soils were typically dry to damp. We would expect that the upper colluvial soils may become saturated during heavy rains as the water percolates through the soil and ponds on top of the relatively impermeable bedrock. These conditions could make construction more difficult during the rainy season. Foundations should not experience significant hydrostatic pressures from the saturated soils, however.

3.3 FOUNDATIONS

We evaluated several repair strategies during a feasibility evaluation of the project and provided a discussion, conclusions, recommendations, and photographs in a memorandum dated June 14, 2013 (GTC, 2013). Subsequently, we understand that it has been decided to replace the pipeline along the same alignment and at about the same elevation between approximately SSMH T603 and S615. The elevated sections of the pipe will be supported on new foundations. The span length between support locations will likely be increased.

Because of difficult site access, the excavations and drilling for foundations will likely need to be conducted with hand-operated equipment. Limited-access equipment powered by hydraulic

systems may be possible at the most northwesterly of the elevated pipeline sections (Reach 5). Therefore, we anticipate that the foundation systems for pipeline support will consist of either hand-excavated concrete block footings, hand-excavated piers, or micropile-supported pile caps.

The transition between the elevated portion of pipeline and the below-grade portion should be carefully considered during design. The first length(s) of buried pipe can also be prone to movement and these should be adequately supported on concrete saddles embedded into the bedrock.

3.3.1 Hand-Excavated Footings and Piers

Hand-excavated foundations are expected to consist of either concrete block footings that are large enough to incorporate the entire pipe-support structure, or individual piers of smaller plan dimension at each of the legs of the pipe-support structure. Concrete block footings or piers should be embedded below the upper colluvial soils into the underlying bedrock to provide foundation support and to resist lateral loads. The bedrock will have varying degrees of weathering, but should provide adequate support even if highly weathered. The excavations should be free of loose material and ponded water prior to placing reinforcing steel and pouring concrete.

For footings or piers bearing on clean bedrock, an allowable bearing capacity of 5,000 pounds per square foot (psf) may be used for dead plus live loads. The allowable bearing capacity may be increased by one-third when considering additional short-term seismic loading. These values of allowable bearing capacities are based on factors of safety of at least 3.0 against bearing failure.

Settlement of footings and piers bearing on clean bedrock should be negligible. Settlement, if any, should occur during, or immediately after, construction. The primary consideration will be downslope movement of the footing. Design recommendations for evaluating lateral loading are provided in *Section 3.4*.

3.3.2 Micropiles

Small-diameter micropiles (approximately 6- to 9-inch diameter) may be used if access is possible with either track-mounted drilling equipment or with limited-access portable hydraulic equipment within 200 feet of a truck-accessible roadway. Larger diameter drilled piers are not a viable foundation alternative due to the large size of the equipment needed to drill into the rock.

Micropiles gain their capacity through frictional resistance along the length of the shaft. An allowable unit grout-to-rock bond stress of 2,500 psf may be used to size the micropile. The adhesion along the portion of micropile in the colluvial soils should be ignored. Movement at the top of the micropile is estimated to be less than approximately ½ inch to mobilize the allowable bond stress.

Micropiles should be spaced at least three pile diameters center to center. Axial group reduction factors for allowable capacities can be provided for micropiles that are spaced more closely, upon request.

Vertical micropiles generally do not provide significant lateral load resistance (although high-strength permanent casing is sometimes added for this purpose). Therefore, we recommend battering the micropiles to resist lateral loading. The component of axial capacity in the direction of lateral loading may be used to resist lateral loads. Additional design recommendations for evaluating lateral loading are provided in *Section 3.4*.

The hard bedrock will likely make drilling progress slow with a high rate of drill bit wear.

3.4 LATERAL EARTH PRESSURES

Structural components that extend below ground surface, such as concrete footings and pier foundations, will experience lateral earth pressure from the soil. We recommend that foundations be designed using at-rest earth pressures to account for the tendency for the soil to creep downslope. Recommendations for the at-rest, passive, and seismic earth pressures, and coefficient of base friction to resist at-rest and seismic loads are provided on ***Plate 2 – Design Lateral Earth Pressures***, and discussed in the following sections.

3.4.1 At-Rest Earth Pressure

At-rest pressures should be used to design the footings or pier foundations for static conditions. The at-rest pressures provided on Plate 2 account for a 1 ½ to 1 (horizontal to vertical) slope above the foundation element. The at-rest earth pressure may be calculated using a design equivalent fluid pressure (EFP) of 75 pcf and 35 pcf in the colluvium and bedrock, respectively.

3.4.2 Seismic Active Earth Pressure Increment

For seismic design, in addition to the at-rest pressures, design of footings or pier foundations should consider additional earth pressures imposed by earthquake-induced lateral pressures. The

distribution of the seismic earth pressure increment is illustrated on ***Plate 2*** where the maximum pressure increment should be taken as $20*D_c$ where D_c is the depth of colluvium. The seismic active earth pressure increment should be considered as an addition to any inertial lateral loads transferred from the superstructure into the foundation system.

3.4.3 Passive Resistance

Lateral loads on structures can be resisted by passive pressures that develop against the sides of footings or piers. Because of the tendency for the colluvial soils to erode and creep downslope, the passive pressure resistance from the colluvium should be ignored. Therefore, passive pressure resistance will be developed within the embedment depth into the underlying bedrock. An ultimate passive earth pressure of 5,000 psf may be used in the bedrock. Ultimate passive pressures may be used to assess resistance to seismic loading. For resisting long-term sustained lateral loads, a minimum factor of safety of 1.5 should be applied.

For hand-excavated piers, the effective width of passive pressure resistance will be larger than the diameter of the pier. The effective width may be assumed to be twice the diameter of the pier up to a maximum effective width of 5 feet.

3.4.4 Base Friction

Friction mobilized at the base of concrete foundations may be relied upon to resist lateral loads. An ultimate coefficient of friction of 0.60 may be considered at the interface of mass concrete and bedrock. An ultimate coefficient of base friction may be used to assess resistance to seismic loading. For resisting long-term sustained lateral loads, a minimum factor of safety of 1.5 should be applied. The passive earth pressure and base friction mobilized at the concrete-rock interface may be combined to resist lateral loading provided the passive resistance does not exceed two-thirds of the total resistance.

3.5 EARTHWORK RECOMMENDATIONS

Earthwork will include excavations for foundation support of elevated portions of the pipe, excavations for removal and replacement of buried portions of the pipe, pipe bedding and backfill, and finished grading and erosion protection. Because of access limitations, much of the work will be accomplished with hand-held equipment. Geotechnical considerations for earthwork are presented in the following sections.

3.5.1 Excavation Characteristics

Excavations will encounter colluvium consisting primarily of silty sand, sandy clay and sandy silt with varying amounts of gravel- and cobble-sized clasts, and granodiorite bedrock. The bedrock will likely be highly to completely weathered near the colluvium/bedrock contact, but may become quite strong and resistant at shallow depths. Bedrock may require methods commonly used to loosen and excavate hard rock (e.g. jackhammers and perhaps expansive chemical agents). For drilled foundations, the drilling progress may be slow with a high rate of drill bit wear.

Groundwater was not encountered during the subsurface exploration program in January 2014. Groundwater is not expected during excavation except in the event of rain, at which time the colluvium may become saturated due to the relatively impermeable bedrock underlying the site. For this reason, earthwork should be performed during the drier portions of the year.

Evaluation of the presence, or absence, and treatment of contaminated or hazardous materials was not part of this study. If such materials are encountered during excavation, proper handling and treatment during construction will depend on the contaminant type, concentration, and volatility of the contaminants.

3.5.2 Temporary Slopes, Shoring, and Bracing

Excavations for foundations and the pipeline may allow for unshored excavations with adequately sloped sidewalls. Deeper excavations may require a series of sloped and benched cut-backs, or require vertical walled shored or braced excavations to account for space constraints. At a minimum, excavations should be constructed in accordance with the current California Occupational Safety and Health Administration (OSHA) regulations (Title 8, California Code of Regulations) pertaining to excavations. Colluvium is typically "Type C" soil and bedrock is typically "Type A" soil per Title 8 definitions. All excavations should be closely monitored during construction to detect any evidence of instability.

Temporary shoring may be necessary to support construction excavations related to the project. The type and design of the shoring will depend on the depth of excavation and excavation bracing sequence. The design and installation of a suitable shoring and bracing system should be made the responsibility of the construction contractor. The shoring and bracing should accommodate surcharge loads that may be imposed by adjacent structures, soil stockpiles, or other construction-related activities.

3.5.3 General Fill

On-site material that is determined non-hazardous and that is free of debris and other unsuitable materials may be used as general fill. Excavation and redistribution of general fill materials will likely require monitoring and screening as necessary. Any zones containing excessive debris should be identified, segregated from the suitable material, and disposed of appropriately. Typically, soils used as general fill should have a low potential for expansion (i.e., plasticity index less than 15 and liquid limit less than 40), and should be relatively free of organic matter and other unsuitable materials, or rocks, broken concrete, or other solid materials greater than 4 inches in greatest dimension. Some fragments greater than 4 inches may also be incorporated into the fill provided that they are distributed in a manner that prevents nesting and so that the voids between large fragments are filled with finer material. The on-site materials are generally suitable for general fill, although some segregation of unsuitable materials may be required.

3.5.4 General Fill Placement and Compaction

General fill should be placed in layers no greater than 8 inches in uncompacted thickness, conditioned with water or allowed to dry to achieve a water content close to optimum, then mechanically compacted to at least 90 percent relative compaction based on ASTM D1557. All compaction should be performed using mechanical compaction means; flooding or jetting should not be used as a means to achieve compaction. The ASTM D1557 laboratory compaction tests should be performed at the time of construction to provide a proper basis for compaction control.

3.5.5 Pipe Bedding and Pipe Zone Backfill

Some of the on-site soils may be suitable for using for pipe bedding and pipe zone backfill. At a minimum, the material used for pipe bedding and pipe zone backfill should meet the requirements of general fill except that the maximum particle size should be no greater than 2 inches. Since much of the excavated material will be rocky, soils may need to be imported. Imported soil, if used, should consist of well-graded sand or a sand-gravel mixture. Maximum gravel size of imported material for pipe bedding and pipe zone backfill should be ½ inch and the bedding and pipe zone backfill material should have less than 12 percent passing the No. 200 sieve. Uniformly graded material such as pea gravel should not be used as pipe bedding material. Pipe bedding should have a minimum thickness of 6 inches beneath the pipe and the pipe zone backfill should extend to 6 inches above the pipe. All pipe bedding and pipe zone backfill should be placed to achieve uniform contact with the pipe and mechanically compacted to achieve a minimum relative compaction of 90 percent per ASTM D1557.

3.5.6 Utility Trench Backfill

Utility and pipe trenches should be backfilled above the pipe with general fill as outlined in *Sections 3.5.3 and 3.5.4*.

3.5.7 Slope Erosion Protection

Weathering and erosion of slopes over time should be expected as a result of runoff, wetting and drying cycles, animal burrowing and gravity. To improve the performance of slopes, planting should be accomplished as soon as practicable after the completion of construction, and coir or other heavy-duty erosion control mat should be used on the slope face. Vegetation should consist of a combination of shallow and deep-rooted plants. Native vegetation is generally desirable. If feasible, it is also desirable to divert water from flowing across disturbed areas until the establishment of plants. Slope areas that are not adequately vegetated should be covered with plastic sheeting during the rainy season.

4. CLOSURE

The conclusions and recommendations presented herein are professional opinions based on geotechnical and geologic data and the project as described. A review by this office of any foundation, excavation, grading plans and specifications, or other work product that relies on the content of this report, together with the opportunity to make supplemental recommendations is considered an integral part of this study. Should unanticipated conditions come to light during project development or should the project change from that described, we should be given the opportunity to review our recommendations.

The findings and professional opinions presented in this report are presented within the limits prescribed by the client, in accordance with generally accepted professional engineering and geologic practices. There is no other warranty, either express or implied.

Sincerely,
GEOTECHNICAL CONSULTANTS, INC.

Deron J. van Hoff 3/25/14
Deron J. van Hoff, P.E., G.E.
Vice President

5. REFERENCES

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Topographic Source: 2013, Kennedy/Jenks Consultants, Site Survey by Baseline Consulting, Carmel Meadows Gravity Sewer, Carmel Area Wastewater District, Carmel, California.

LEGEND

- Carmel Meadows Gravity Sewer Alignment
- Existing Pipe Support

Exploration

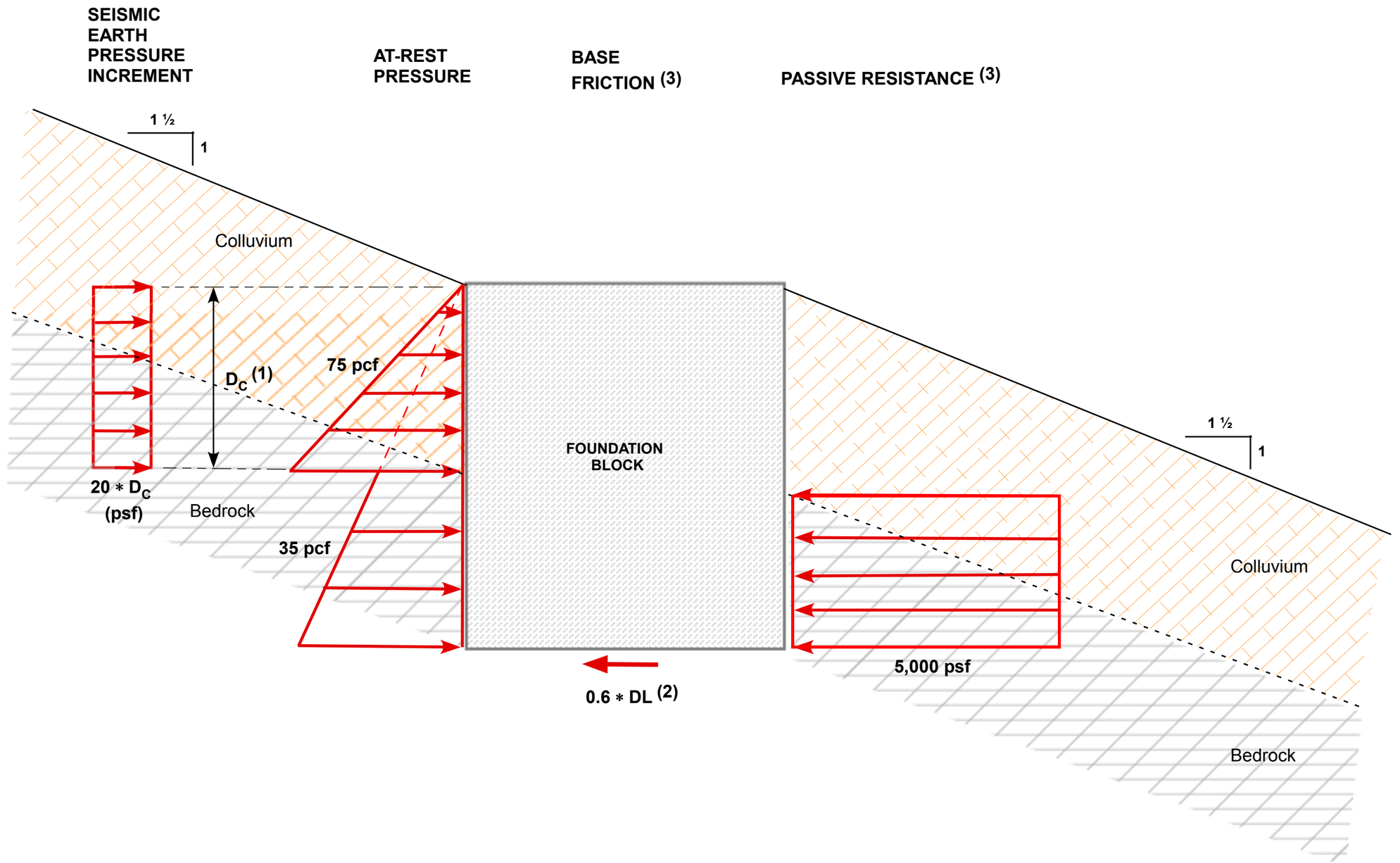
- Geotechnical Boring by Geotechnical Consultants, Inc., conducted on January 6-7, 2014

Contour Lines (feet, project datum)

- 5 foot contour interval
- 1 foot contour interval

GEOTECHNICAL CONSULTANTS, INC.
500 Sansome St., Suite 402
San Francisco, CA 94111

EXPLORATION LOCATION MAP	PLATE
CAWD CARMEL MEADOWS GRAVITY SEWER CARMEL, CA	1
MARCH 2014	SF13041



NOTES:

1. D_C = Depth of colluvium in feet.
2. DL = Dead load of structure.
3. Passive resistance and base friction are ultimate values.

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DESIGN LATERAL EARTH PRESSURES	PLATE
CAWD CARMEL MEADOWS GRAVITY SEWER CARMEL, CA	**2**
MARCH 2014	SF13041

APPENDIX A

SUPPORTING GEOTECHNICAL DATA

APPENDIX A
SUPPORTING GEOTECHNICAL DATA

SUBSURFACE EXPLORATION

Subsurface exploration for our geotechnical study of CAWD Carmel Meadows Gravity Sewer took place between January 6 and 7, 2014. The subsurface exploration consisted of seven limited-access borings (GTC-B-8 through GTC-B-14). The borings were continuously sampled using successively smaller diameter samplers to the final depth. The borings were backfilled with soil cuttings upon completion. The following table shows the depth and approximate elevation of the explorations.

TABLE A-1 – SUMMARY OF GEOTECHNICAL EXPLORATIONS

Boring	Date Performed	Approximate Surface Elevation (feet, Project Datum)	Depth (feet)
GTC-B-8	1/6/14	+13.5	7.5
GTC-B-9	1/6/14	+18.0	8.5
GTC-B-10	1/6/14	+29.0	6.7
GTC-B-11	1/7/14	+28.0	8.4
GTC-B-12	1/7/14	+30.5	5.0
GTC-B-13	1/7/14	+32.0	10.2
GTC-B-14	1/7/14	+25.0	3.6

Locations of the subsurface explorations are shown on ***Plate 1***. Logs of the borings are presented as Plate A-1.8 through Plate A-1.14. A legend to the logs is attached as Plate A-2.

The stratification lines shown on the boring logs represent the approximate boundaries between soil types; the actual transition may be gradual. The boring locations were estimated in the field by measuring from the pipeline and pipeline support locations. Surface elevations were estimated based on a topographic map of the site provided by Kennedy/Jenks Consultants. The locations and elevations of the borings should be considered accurate only to the degree implied by the method used.

SOIL SAMPLING METHODS

Soil sampling methods used during the exploration program were Standard Penetration Tests (SPTs), a 2-inch diameter split barrel sampler, and a 2.5-inch diameter split barrel sampler. Each of the samplers was 24 inches long.

SPTs were performed using a 2-inch outside diameter, 1.5-inch inside diameter steel sampler without liners. The sampler was driven by repeatedly dropping a 140-pound safety hammer approximately 30 inches onto the sampling rod to which the sampler was attached. The sampler was driven a total of 18 to 24 inches. The number of blows required to drive each 12-inch increment of the sampler is recorded on the drill hole logs. For an 18-inch drive, the blows over the initial 6 inches were ignored. Blow counts were recorded for the purpose of estimating relative soil densities.

Split barrel samplers were driven a total of 18 to 24 inches per ASTM D1586. The 2-inch sampler is 2.5 inches outside diameter and 2 inches inside diameter with three six-inch long stainless steel tubes with an inside diameter of 1.92 inches. The 2.5-inch sampler is 3 inches outside diameter and 2.5 inches inside diameter lined with three six-inch long stainless steel tubes with an inside diameter of 2.42 inches. The sampler was driven by repeatedly dropping a 140-pound safety hammer approximately 30 inches on the drill rod to which the sampler was attached. The number of blows required to drive each 12-inch increment of the sampler is recorded on the drill hole logs. For an 18-inch drive, the blows over the initial 6 inches were ignored.

LABORATORY TEST RESULTS

LABORATORY TESTING

Laboratory tests were performed on representative soil samples in order to define the engineering properties of the earth materials.

MOISTURE AND DENSITY DETERMINATIONS

Moisture content (per ASTM D2216) and dry density (per ASTM D7263) determinations were performed on representative samples to evaluate the natural water content and dry density of the soils encountered. The results are presented on the boring logs.

GRAIN SIZE DISTRIBUTION DATA (GS)

Grain-size distribution tests were conducted on representative samples. The tests were performed in accordance with ASTM D422 - Particle-Size Analysis of Soils. Results of these tests are included in this Appendix.

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 5, between SSMH S615 and S616; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-8
DRILLING DATE: January 6, 2014
ELEVATION: Approx. 13.5 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		8				"COLLUVIUM (Qco)" SILTY SAND with GRAVEL (SM), dark gray, dry to damp, loose, abundant roots.						
		8										
		8										
		11					95	4				GS (-#200=23%)
		27										
5		64				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), light yellowish brown with reddish brown mottles, completely to highly weathered, friable.						
		50/5"				Highly weathered.						
		93/9"										
		50/4"										
						NOTES: 1) Bottom of boring at 7.5 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/6/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 5, between SSMH S615 and S618; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-9
DRILLING DATE: January 6, 2014
ELEVATION: Approx. 18 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		2				"COLLUVIUM (Qco)" SILTY SAND with GRAVEL (SM), dark yellowish brown, dry to damp, very loose, fine to coarse grained sand, gravel clasts primarily granodiorite, abundant roots and organics.						
		4										
		5										
		6										GS (-#200=16%)
5						Loose.						
		19				WELL GRADED SAND (SW), mottled dark brown and light yellowish brown, dry to damp, medium dense, fine to coarse grained sand, minor roots.						
		84/11"										
		111/7"				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), light yellowish brown with dark gray mottles, highly weathered, friable, abundant quartz veins.						
						NOTES: 1) Bottom of boring at 8.5 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/6/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 4, between SSMH S616 and S622; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-10
DRILLING DATE: January 6, 2014
ELEVATION: Approx. 29 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		7				"COLLUVIUM (Qco)" SILTY SAND (SM), very dark gray, dry to damp, very loose, trace fine gravel, abundant roots.						
		16				Loose.						
		18				Medium dense, 1 inch diameter root. CLAYEY SAND (SC), light olive gray, dry to damp, medium dense, abundant roots.	80	4				GS (-#200=29%)
		90/11"				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), light yellowish brown, completely weathered, minor roots. Highly weathered, friable, minor roots.						
5		88										
		110/9"										
						NOTES: 1) Bottom of boring at 6.7 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/6/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 3, between SSMH S622 and T601; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-11
DRILLING DATE: January 7, 2014
ELEVATION: Approx. 28 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		29				"COLLUVIUM (Qco)" SILTY SAND (SM), dark grayish brown, dry to damp, medium dense, minor gravel, fine to medium grained sand, abundant roots and organics.						
		24				Grayish brown.						GS (-#200=26%)
						POORLY GRADED SAND (SP), very light yellowish brown, dry to damp, dense, fine grained sand.						
		85				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), very light yellowish brown, completely to highly weathered, friable, thin reddish brown veins.						
5		100/10.5"										
		94				Very light gray with reddish brown and olive mottling.						
		86										
						NOTES: 1) Bottom of boring at 8.4 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/7/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 2, northwest of SSMH T601; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-12
DRILLING DATE: January 7, 2014
ELEVATION: Approx. 30.5 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		17				"COLLUVIUM (Qco)" SILTY SAND (SM), dark grayish brown, dry to damp, loose, minor roots.						
		53				Dense.	97	10				GS (-#200=19%)
		114/10"				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), reddish brown with dark gray and light gray mottles, highly weathered, friable.						
		126/9"				Light gray with olive and reddish brown mottling.						
		108/10.5"				Light yellowish brown with dark gray and white mottling.						
5						NOTES: 1) Bottom of boring at 5.0 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/7/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Between Reaches 1 and 2, between SSMH T601 and T602; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-13
DRILLING DATE: January 7, 2014
ELEVATION: Approx. 32 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		22				"COLLUVIUM (Qco)" SANDY CLAY (CL), light brown, dry to damp, medium dense, trace gravel, some sandy silt layers, minor roots.						
		35					104	12				GS (-#200=62%)
		49										
		65				Dense.						
		23				Medium dense.						
5		43				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), mottled light gray, brown, and reddish brown, completely weathered, friable.						
		52										
		86				Dark gray with white mottles.						
		57										
		90/11"				Mottled light gray, brown, and reddish brown, large quartz and feldspar crystals.						
10		50/3"										
						NOTES: 1) Bottom of boring at 10.2 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/7/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

LOG OF DRILL HOLE

JOB NO.: SF13041
PROJECT: CAWD Carmel Meadows Gravity Sewer
LOCATION: Reach 1, between SSMH T601 and T602; Carmel, California
DRILLING METHOD: Continuous Drive Sampling, Rope and Cathead Hammer

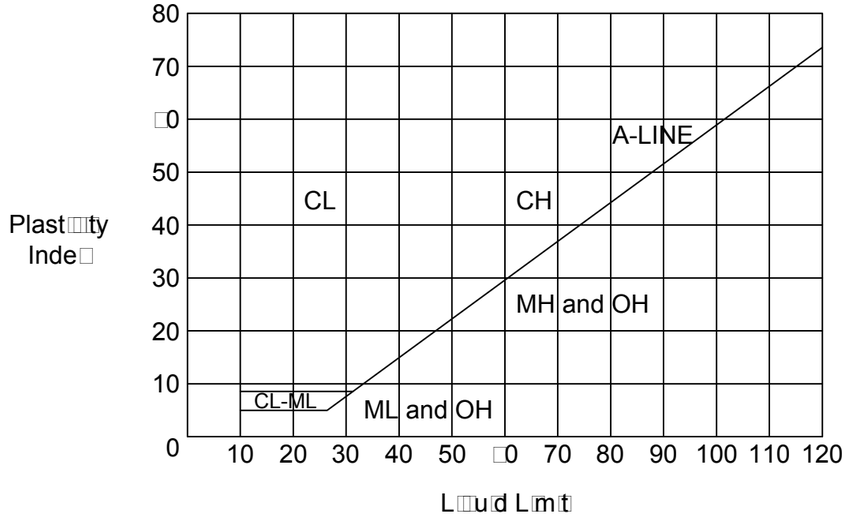
LOGGED BY: D. Agnew
CHECKED BY: D. van Hoff

DRILL HOLE NO.: GTC-B-14
DRILLING DATE: January 7, 2014
ELEVATION: Approx. 25 feet
DATUM: Project Datum

DEPTH (FEET)	SAMPLE	BLOW COUNT	TORVANE SHEAR STRENGTH (TSF)	POCKET PENETROMETER COMP. STRENGTH (TSF)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	UNDRAINED SHEAR STRENGTH (PSF)	ADDITIONAL TESTS
		18				"COLLUVIUM (Qco)" SANDY SILT (ML), very dark gray, dry to damp, medium dense, abundant roots.						
		67				"PORPHYRITIC GRANODIORITE OF MONTEREY (Kgdp)" PORPHYRITIC GRANODIORITE (R), mottled light gray, light brown, and reddish brown, highly weathered, abundant olive gray crystals.						
		125/9"										
		102/10"										
						NOTES: 1) Bottom of boring at 3.6 feet. 2) Groundwater not encountered. 3) Boring backfilled with soil cuttings on 1/7/14. 4) Hammer efficiency of manual hammer assumed to be 60 percent (C_E=1.0).						
5												
10												

LOG_DRILL_HOLE SF13041 - CARMEL MEADOWS.GPJ GTC.GDT 2/11/14

PLASTICITY CHART - Used for Classification of Fine Grained Soils



BLOW COUNT - The number of blows required to drive the sampler the last 12 inches of an 18-inch drive. When the sampler is not advanced the last 12 inches, i.e. 100 blows in 9 inches, the notation is 100/9". WOH (Weight of Hammer) denotes only the weight of the drive hammer was required to drive the sampler or zero blows.

ADDITIONAL TESTS -

C:	Consolidation	GS:	Grain Size Distribution	SU:	Sulfate
CL:	Chloride	OC:	Organic Matter Content	TD:	Triaxial Compression, Drained
CORR:	Corrosion	pH:	Hydrogen Ion Concentration	TDy:	Triaxial Compression, Dynamic
CP:	Compaction	PM:	Permeability	TCU:	Triaxial Compression, Consolidated Undrained
DS:	Direct Shear	R:	R-Value	TUU:	Triaxial Compression, Unconsolidated Undrained
EL:	Elasticity Index	RS:	Resistivity	UCS:	Unconfined Compressive Strength Test
E:	Expansion	S:	Swell	VS:	Field Vane Shear Test
FC:	Fines Content (#200 Sieve Wash)	SE:	Sand Equivalent		
		SP:	Specific Gravity		

UNIFIED SOIL CLASSIFICATION SYSTEM

	MAJOR DIVISION		GROUP SYMBOL	DESCRIPTION	GRAPHIC LOG
COARSE GRAINED SOILS (Over 50% By Weight Coarser Than No.200 Sieve Size)	GRAVELLY SOILS OVER 50% OF COARSE FRACTION LARGER THAN NO.4 SIEVE SIZE	CLEAN GRAVELLY SOILS LITTLE OR NO FINES	GW	well graded gravels or gravel-sand mixtures	
			GP	poorly graded gravels or gravel-sand mixtures	
		GRAVELLY SOILS WITH FINES OVER 12% FINES	GM	silty gravels or gravel-sand-silt mixtures	
			GC	clayey gravels or gravel-sand-clay mixtures	
	SANDY SOILS OVER 50% OF COARSE FRACTION SMALLER THAN NO.4 SIEVE SIZE	CLEAN SANDY SOILS LITTLE OR NO FINES	SW	well graded sands or gravelly sands	
			SP	poorly graded sands or gravelly sands	
		SANDY SOILS WITH FINES OVER 12% FINES	SM	silty sands or sand-silt mixtures	
			SC	clayey sands or sand-clay mixtures	
FINE GRAINED SOILS (Over 50% By Weight Finer Than No.200 Sieve Size)	SILTY AND CLAYEY SOILS LIQUID LIMIT LESS THAN 50		ML	inorganic silts, very fine sands, silty fine sands, clayey silts with slight plasticity	
			CL	inorganic clays, gravelly, sandy, silty, or lean clays, of low to medium plasticity	
			OL	organic clays or organic silts of low plasticity	
	SILTY AND CLAYEY SOILS LIQUID LIMIT GREATER THAN 50		MH	inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	inorganic clays of high plasticity, fat clays	
			OH	organic clays or organic silts of medium to high plasticity	
HIGHLY ORGANIC SOILS			Pt	peat or other highly organic soil, organic content greater than 0%	
				trash, all-landfill refuse (not a part of unified soil classification system)	

SAMPLE TYPES:

- MODIFIED CALIFORNIA SAMPLE
- DISTURBED SLEEVE
- UNSUCCESSFUL SLEEVE
- SHELBY TUBE
- STANDARD PENETRATION
- STANDARD PENETRATION NO RECOVERY
- ROCK or SOIL CORE
- B BULK SAMPLE
- 2-INCH MODIFIED CALIFORNIA SAMPLE
- UNSUCCESSFUL 2-INCH SLEEVE

WATER LEVEL:

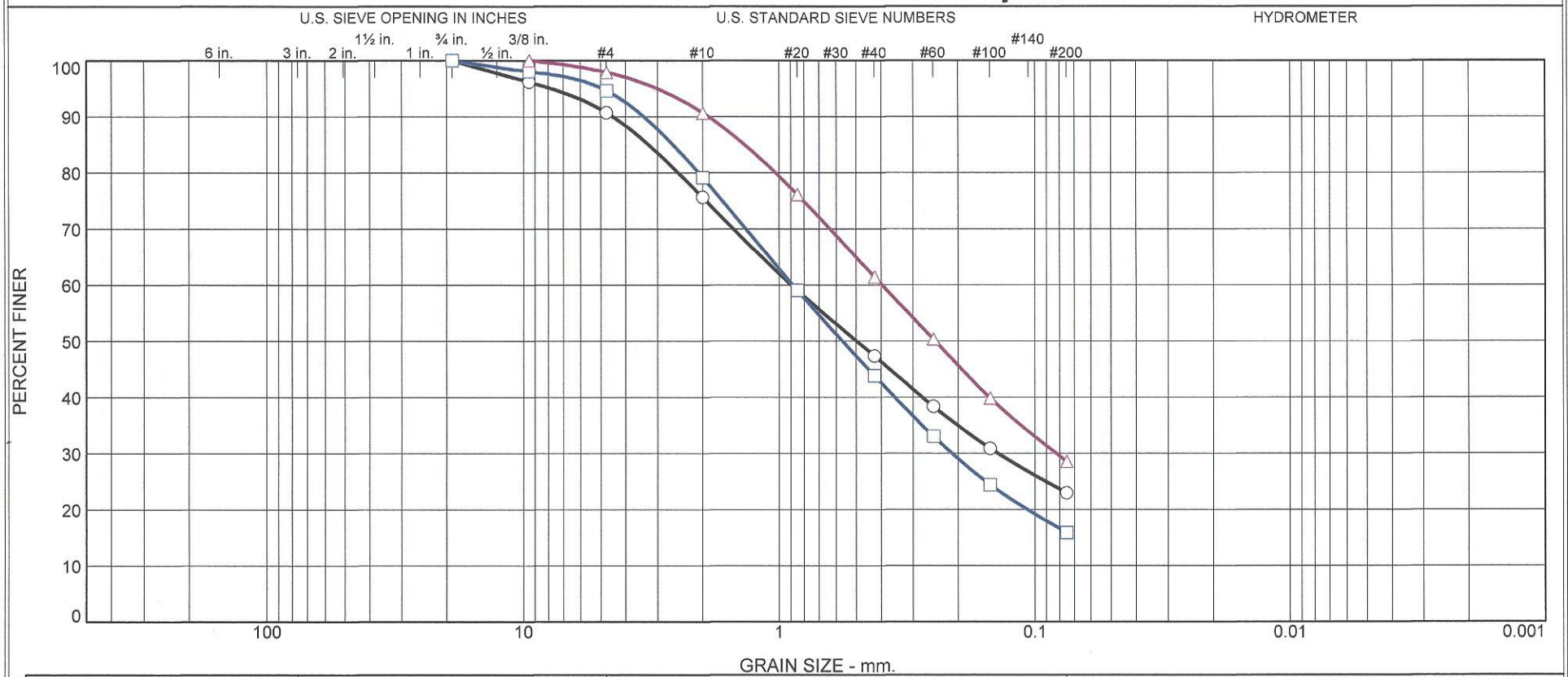
- STABILIZED or PARTIALLY STABILIZED GROUNDWATER LEVEL
- UNSTABILIZED GROUNDWATER LEVEL
- SEEPAGE LEVEL

GEOTECHNICAL CONSULTANTS, INC.
500 Sansome Street, Suite 402
San Francisco, CA 94111

LEGEND TO LOGS

PLATE A - 2

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	9.3	15.1	28.3	24.3	23.0	
□	0.0	0.0	5.4	15.5	35.3	28.0	15.8	
△	0.0	0.0	2.1	7.3	29.2	32.9	28.5	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○		GTC-B-8	3.5-4'		SM	Dark gray silty SAND w/organics.			
□		GTC-B-9	4.5-5'		SM	Dark brown silty SAND w/organics.			
△		GTC-B-10	3-3.5'		SC	Light gray clayey SAND.			

Client Geotechnical Consultants,Inc.

Project CAWD Carmel Meadow Gravity Sewer

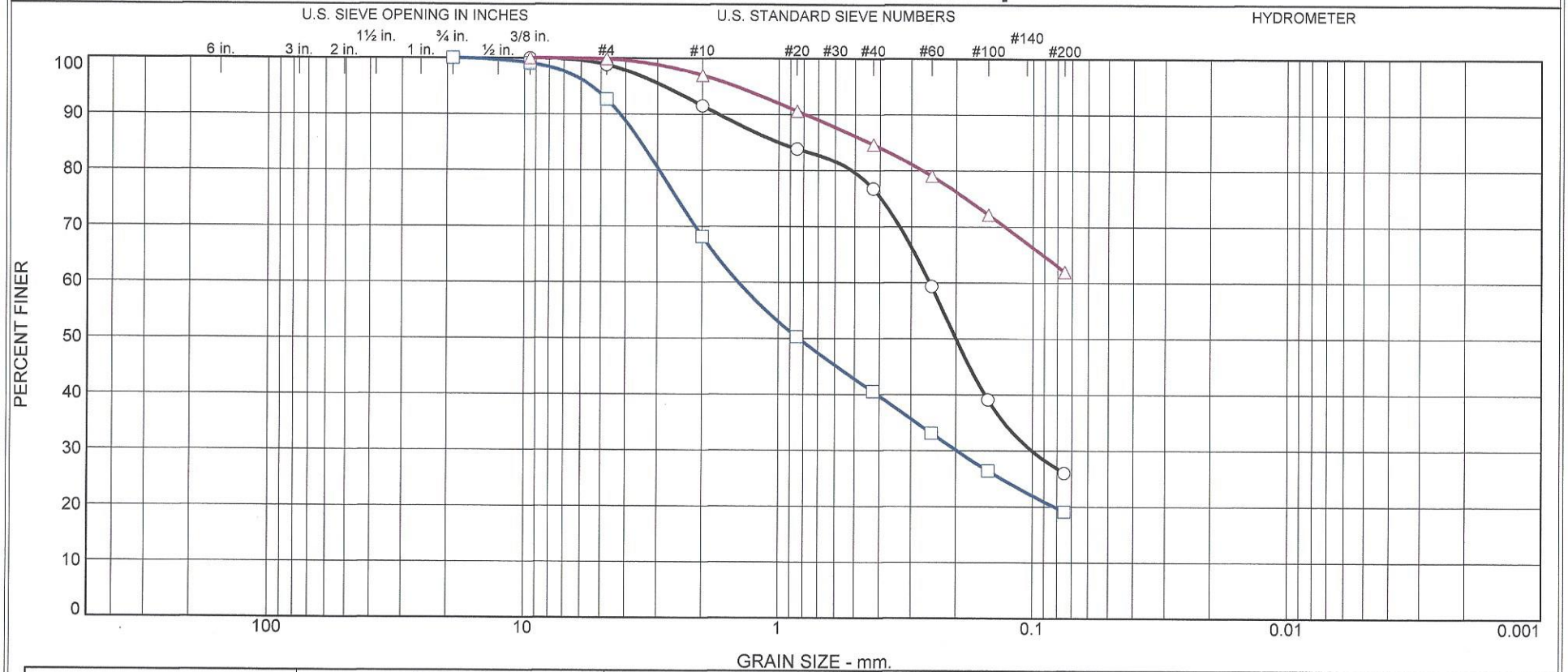
Project No. SF13041 Figure

Soil Mechanics Lab

Oakland, California

Tested By: ○ MA □ MAQ △ MA

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.2	7.3	14.8	50.7	26.0	
□	0.0	0.0	7.4	24.5	27.6	21.4	19.1	
△	0.0	0.0	0.2	2.9	12.3	22.7	61.9	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○		GTC-B-11	2.5-3'		SM	Dark brown silty SAND-Micaceous.			
□		GTC-B-12	1.5-2'		SM	Dark gray silty SAND.			
△		GTC-B-13	1.5-2'		CL	Dark brown sandy CLAY.			

Client Geotechnical Consultants,Inc.

Project CAWD Carmel Meadow Gravity Sewer

Project No. SF13041 Figure

Soil Mechanics Lab

Oakland, California

Tested By: MA

ATTACHMENT 4

ENGEO 2023 REPORT

Project No.
22985.000.001

June 8, 2023

Rachél Lather, PE
Principal Engineer
Carmel Area Wastewater District
3945 Rio Road
Carmel-By-The-Sea, CA 93922

Subject: Carmel Meadows Gravity Sewer
Carmel Area Wastewater District (CAWD)
Carmel-By-The-Sea, California

GEOLOGIC SITE RECONNAISANCE

Dear Ms. Lather:

We are pleased to provide this letter summarizing the findings and conclusions of our geologic site reconnaissance of May 10, 2023, for the Carmel Meadows gravity sewer pipeline alignment. The pipeline is generally parallel to Ribera Road between Mariposa Drive and Calle La Cruz in Carmel, California. The purpose of our services was to assess the geologic conditions in the vicinity of the existing gravity sewer system and provide an opinion of rehabilitation strategies.

As outlined in our proposal dated April 7, 2023, our scope of work completed for this study included review of available relevant data, published information, and historical aerial photographs, performing a site reconnaissance, and preparing this summary letter.

Our current study considered the following documents.

- ENGEO (Practicing as Geotechnical Consultants, Inc.). 2013. Geotechnical Memorandum, Carmel Meadows Gravity Sewer, Carmel, California. June 14, 2013. Project No. SF13013.
- ENGEO (Practicing as Geotechnical Consultants, Inc.). 2014. Geotechnical Report, Carmel Meadows Gravity Sewer, Carmel, California. March 25, 2014. Project No. SF13041.
- SRT Consultants. 2019. Letter Report: Carmel Meadows Feasibility Study, Carmel-By-The-Sea, California. August 27, 2019.
- Kennedy/Jenks Consultants, Inc. 2023. Letter Regarding: Carmel Meadows Gravity Sewer, Carmel-By-The-Sea, California. March 3, 2023.

PROJECT BACKGROUND

The pipeline segment of our study consists of an approximately 2,000-foot section, located to the northeast and downslope from Ribera Road between Mariposa Drive and Calle La Cruz. The Carmel River and Carmel River Lagoon are located downslope of the alignment to the northeast.

In 2013, we assessed the overall geotechnical stability of the sewer pipeline and evaluated suitable construction techniques to rehabilitate or replace foundation supports based on site access, terrain, and anticipated subsurface conditions (Reference 1). We followed up our 2013 study with a 2014 geotechnical exploration and report (Reference 2) for the proposed sewer improvements at the site, which included replacement of approximately 1,050 feet of existing ductile iron sewer pipe, with elevated segments of the pipe supported on new foundations. Our geotechnical exploration consisted of seven borings drilled between approximately 4 to 10 feet bgs using a limited-access drill rig.

We understand that CAWD initially determined that the best alternative to maintain the serviceability of the sewer was to remove and replace the sewer along the current alignment; however, that replacement project did not move forward due to permitting and monitoring requirements related to the Carmel River Lagoon. However, we also understand that no improvements have been made since that time, other than yearly maintenance activities. Additionally, the unprecedented storms of 2022/2023 may have caused further instabilities along the sewer alignment.

REGIONAL GEOLOGY AND SEISMICITY

The sewer pipeline is generally situated within a relatively thin mantle of surficial soil and colluvium that is underlain at shallow depths by the Cretaceous porphyritic granodiorite of Monterey (Kgdp) (Clark et al., 1997). This rock is relatively strong with joint sets.

The Monterey coastal region is considered to be seismically active due to the presence of nearby active faults. Numerous small earthquakes occur every year in the region and large (greater than Moment Magnitude 7) earthquakes have been recorded and can be expected to occur in the future.

The pipeline alignment is in the vicinity of three known active faults. The San Gregorio fault zone, Sur Region section is located about 3.6 miles west (offshore). The southern end of the potentially active Cypress Point fault is located approximately 400 feet east of the northern end of the alignment. This fault has not been well studied but is a Quaternary-aged dextral reverse fault. The Hatton Canyon fault, the closest fault segment of the Seaside-Monterey section of the Monterey Bay Tularcitos fault zone is located approximately 2.3 miles northeast of the alignment. This fault zone is a complex, generally northwest-striking zone of up to a 9-mile width with dextral, dextral-reverse, and thrust faults with known Holocene displacement.

SITE OBSERVATIONS

The existing sewer pipeline is an approximately 2,000-foot-long, 6-inch diameter ductile iron pipe and is routed along the side slopes of hilly terrain. The approximately 60- to 80-foot-high hill consists of slope gradients up to 1:1 (horizontal:vertical) and slopes down north/northeast from the rear of the properties along Ribera Road to the Carmel River. The slope is densely vegetated with trees, grasses, and other plant undergrowth. Depending on the local topography, the various sections of the pipeline are either at-grade or partially buried, above-grade or completely buried below-grade. The lengths of the elevated sections range from approximately 40 feet to 180 feet. Through these elevated portions, the pipeline is supported on welded steel C-channel sections founded on 12-inch by 19-inch by 30-inch (width x length x height) concrete footing foundations. We observed ten manholes along the pipeline and have designated them consistent with CAWD identifiers in this letter. We present the locations of the various observed manholes in Figures 1A through 1C.

We provide a brief discussion and summary of our observations below in Table 1. We provide the locations of the observation numbers in Figures 1A through 1C.

TABLE 1: Summary of Observations

Observation No. 1	**Location: Approximately 100 feet west of S609**
	We observed a corrugated metal storm drainpipe at the rear property limits of 2741 Calle La Cruz. We were unable to locate the discharge point of the outlet. If the storm drain discharges near the top of the trail, it could produce excess surface water runoff which could lead to erosion of surficial soil, and/or rock along the joint planes.
Observation No. 2	**Location: Between S609 and S615**
	The outer edge of the maintenance trail appears to have been constructed by cutting material from the inner side of the trail and placing along the outside edge of the trail. The trail appears to have been constructed with seemingly minimal compactive effort, if at all, considering we were able to push a probe 6 to 12 inches with low to moderate effort in the fill along the outer edge of the trail. The pipeline at this segment partially passes through the fill material as indicated by the two manhole locations on either side. The fill wedge is unstable and may be prone to slope creep and displacement, which could cause damage to the sewer line.

Observation No. 3 **Location: East of S615**

The elevated pipeline is supported by C-channel sections on concrete footings. The footings appear to be situated within a landslide (Figure 1B and Section A-A' in Figure 2). Porphyritic granodiorite (Kgdp) is exposed within the landslide scarp at this location. Adverse joint sets within the bedrock at this location form wedges and blocks susceptible to sliding and toppling. These joint sets appear to be the primary controlling factor for the landslide at this location. We did not observe significant tilt or displacement of the pipeline footings suggesting that minimal slope movement may have occurred in this area over the last 70 years. However, due to the presence of adverse joint sets in the bedrock, the slope has a relatively high potential for future failures. Future episodes of slope movement could displace and damage the footings supporting the elevated pipeline and the pipeline.

Observation No. 4 **Location: S608**

We observed head scarps on both the northeastern and southwestern side of manhole S608. The sewer line along this segment could be damaged if slope failures occur in the future.

Observation No. 5 **Location: West of S622**

We observed the pipeline and its corresponding footing to be damaged west of manhole S622. The sewer line is bent approximately 7 degrees at the sewer line pipe joint (as measured with a field compass). The corresponding footing is tilted and leaning down slope approximately 20 degrees out of plumb (as measured with the "Measure" application on an iPhone). The footing is located in an active landslide that is episodically moving down slope (see Figure 1C and Section B-B' in Figure 2). We observed the damage to the pipeline is directly related to the downslope movement of the landslide at this location. The pipeline appears to have maintained its service despite the damage. This section of the pipeline has a high potential for further damage due to the active landslide.

Observation No. 6 **Location: West of T601**

We observed the pipeline and its corresponding footing to be damaged west of manhole T601. The pipeline is bent at the pipe joint and the corresponding footing is tilted and leaning down slope. The footing is located in an active landslide that is episodically moving down slope (see Figure 1C and Section C-C' in Figure 2). The observed damage to the pipeline is related to the downslope movement of the landslide. This section of the pipeline has a high potential for further damage due to the active landslide.

Observation No. 7 **Location: T601**

We observed a crack in the exposed concrete at the pipe penetration at manhole T601. The crack is open and roughly 1 inch wide. The crack does not appear to have formed recently due to observed weathering of the concrete and the presence of vegetation in the crack. This damage is most likely related to previous episodes of slope movement. The pipeline and the manhole have a high potential for further damage in the event of future slope failure.

Observation No. 8 **Location: West of T602**

We observed a landslide and erosional gully west of manhole T602. We did not observe damage to the pipeline. However, we did observe the downslope corner of the footing was undermined and no longer supported. This area is susceptible to further erosion and slope movement in the future. Further slope movement could undermine the footings and pipeline.

Observation No. 9 **Location: Between T602 and T648**

We observed a slight bend in the pipeline near the base of a tree between manholes T602 and T648. The bend appears related to the growth of the tree at this location. Future tree growth will likely cause additional distress and further damage to the sewer line pipe.

SUMMARY OF FINDINGS

The following is a summary of our findings from our site reconnaissance.

- The current pipeline alignment crosses a number of active landslides.
- Evidence of distress to the pipeline, manholes and pipeline supports are visible at several locations where active landslides are present.
- The downslope portion of a concrete footing supporting the pipeline is undermined in at least one location.
- Adverse joint sets are visible within bedrock exposed above the pipeline and form potentially unstable wedges and blocks that could fail downslope and damage the pipeline.
- The pipeline passes through a potentially unstable fill wedge that could fail and cause damage to the pipeline.
- The pipeline is highly susceptible to earthquake-induced landslides considering the pipeline crosses a number of landslides in steep hillside terrain, coupled with the relatively high seismic activity of the Monterey coastal region.

CONCLUSION AND RECOMMENDATIONS

Based on the findings from our document review and site reconnaissance, it is our opinion that the pipeline is susceptible to damage in localized areas along the alignment. As discussed, the pipeline traverses steep hillside terrain with numerous active landslides that show evidence of recent movement. At a number of these locations, the pipeline shows evidence of distress related to slope movement and soil creep. Downslope soil movement resulting from soil creep and landslides will continue to occur along the alignment and the potential for significant movement and catastrophic damage to the pipeline is high given the soil conditions and steep slopes along the alignment. In addition, the pipeline is located in a seismically active area, and we consider the potential for earthquake-induced landslides along the alignment to be high.

In our 2013 study (Reference 1), we provided three strategies to reduce the risk of pipeline failure due to slope movements briefly described as follows.

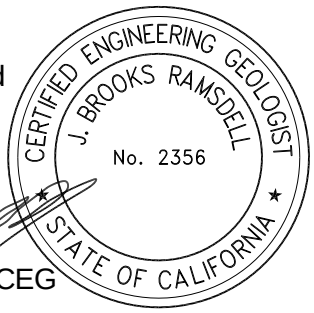
- Avoid slope movement
  - Reroute the pipeline or
  - Bury the pipeline
- Stabilize the hillside to reduce the risk of slope movement to a serviceable threshold
- Design the pipeline and/or foundation systems to accommodate and/or resist slope movement to a serviceable threshold

These strategies provided in our 2013 study (Reference 1) continue to remain applicable from a mitigation standpoint. However, we understand that the permitting and monitoring requirements to allow heavy construction equipment at the site may be cost prohibitive and can have schedule impacts on CAWD's operations. Therefore, we understand that the strategies to stabilize and reconstruct the pipeline along the existing alignment may not be viable from an operability standpoint. Given this, we recommend that the sewer pipeline be moved to a more geologically stable area to prevent catastrophic damage to the sewer pipeline which could lead to an extended interruption in service and/or sewage spills into the surrounding areas potentially impacting the Carmel River and Carmel Lagoon downslope.

If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated



J. Brooks Ramsdell, CEG

Jeanine T. Ruffoni, GE

G. 'Neel' Neelakantan, PHD, GE

kw/jbr/jtr/nn/ar

Attachments: Selected References
Figures 1 through 2

SELECTED REFERENCES

1. ENGEO (Practicing as Geotechnical Consultants, Inc.). 2013. Geotechnical Memorandum, Carmel Meadows Gravity Sewer, Carmel, California. June 14, 2013. Project No. SF13013.

2. ENGEO (Practicing as Geotechnical Consultants, Inc.). 2014. Geotechnical Report, Carmel Meadows Gravity Sewer, Carmel, California. March 25, 2014. Project No. SF13041.

3. Kennedy/Jenks Consultants, Inc. 2023. Letter Regarding: Carmel Meadows Gravity Sewer, Carmel-By-The-Sea, California. March 3, 2023.

4. SRT Consultants. 2019. Letter Report: Carmel Meadows Feasibility Study, Carmel-By-The-Sea, California. August 27, 2019.

5. Clark, J.C., Dupré, W.R., and Rosenberg, L.I. 1997. Geologic Map of The Monterey and Seaside 7.5-Minute Quadrangles, Monterey County, California: A Digital Database. United States Geological Survey (USGS). Open File Report 97-030. Scale 1:24,000.

FIGURES

FIGURES 1A – 1C: Alignment Site Plan
FIGURE 2: Cross Sections

CARMEL RIVER &
CARMEL RIVER LAGOON

S609

S607

Kgdp OUTCROP

1

Kgdp outcrop

10 15 20 25 30 35 40 45 50 55 60 65 70 75 80

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- MANHOLE
- BURIED PIPE
- EXPOSED PIPE
- NOT VISIBLE PIPE
- RESIDENTIAL STORM DRAIN OUTLET
- (1) OBSERVATION NUMBER
- LANDSLIDE SCARP
- LANDSLIDE
- BORING (GTC, 2014)
- EROSIONAL GULLY
- C C' CROSS SECTION

N

0 40
FEET

BASE MAP SOURCE: NEAR MAP AERIAL DATED: 5-19-2022

ENGEO
Expect Excellence

ALIGNMENT SITE PLAN
CARMEL MEADOWS GRAVITY SEWER
CARMEL-BY-THE-SEA, CALIFORNIA

PROJECT NO.: 22985.000.001	FIGURE NO. 1A
SCALE: AS SHOWN	
DRAWN BY: KW	CHECKED BY: JBR

ORIGINAL FIGURE PRINTED IN COLOR

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CARMEL RIVER &
CARMEL RIVER LAGOON

FILL WEDGE

2

3

4

A'

A

S615

S616

S608

GTC-B-8

GTC-B-9

Kgdp outcrop

Kgdp outcrop

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- MANHOLE
- BURIED PIPE
- EXPOSED PIPE
- NOT VISIBLE PIPE
- RESIDENTIAL STORM DRAIN OUTLET
- (1) OBSERVATION NUMBER
- LANDSLIDE SCARP
- LANDSLIDE
- BORING (GTC, 2014)
- EROSIONAL GULLY
- C C' CROSS SECTION

N

0 40 FEET

BASE MAP SOURCE: NEAR MAP AERIAL DATED: 5-19-2022

ENGEO Expect Excellence

ALIGNMENT SITE PLAN
CARMEL MEADOWS GRAVITY SEWER
CARMEL-BY-THE-SEA, CALIFORNIA

PROJECT NO.: 22985.000.001	FIGURE NO. 1B
SCALE: AS SHOWN	
DRAWN BY: KW	CHECKED BY: JBR

ORIGINAL FIGURE PRINTED IN COLOR

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CARMEL RIVER &
CARMEL RIVER LAGOON

B'
C'
B
C
GTC-B-10
S622
GTC-B-11
GTC-B-12
GTC-B-13
GTC-B-14
T601
T602
T603
T648
5
6
7
8
9
10
15
20
25
30
35
40
45
50
55
60
65

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- MANHOLE
- BURIED PIPE
- EXPOSED PIPE
- NOT VISIBLE PIPE
- RESIDENTIAL STORM DRAIN OUTLET
- (1) OBSERVATION NUMBER
- LANDSLIDE SCARP
- LANDSLIDE
- BORING (GTC, 2014)
- EROSIONAL GULLY
- C C' CROSS SECTION

N

0 40
FEET

BASE MAP SOURCE: NEAR MAP AERIAL DATED: 5-19-2022

ENGEO Expect Excellence

ALIGNMENT SITE PLAN

CARMEL MEADOWS GRAVITY SEWER
CARMEL-BY-THE-SEA, CALIFORNIA

PROJECT NO.: 22985.000.001	FIGURE NO. 1C
SCALE: AS SHOWN	
DRAWN BY: KW	CHECKED BY: JBR

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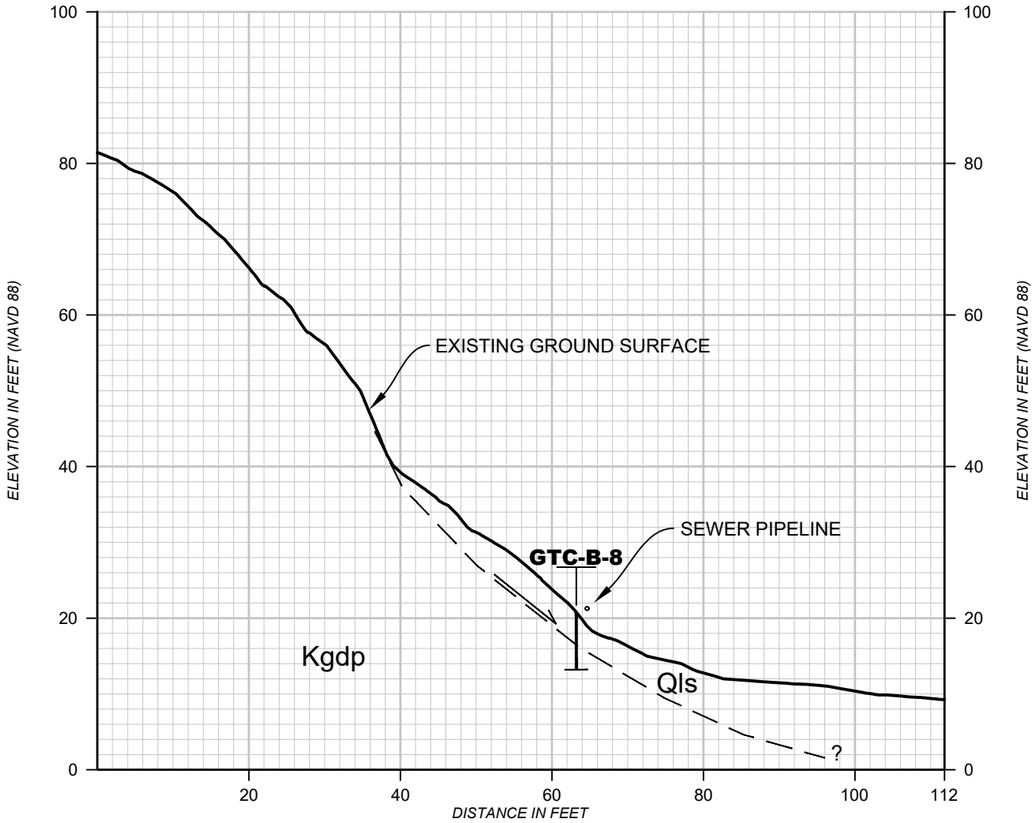
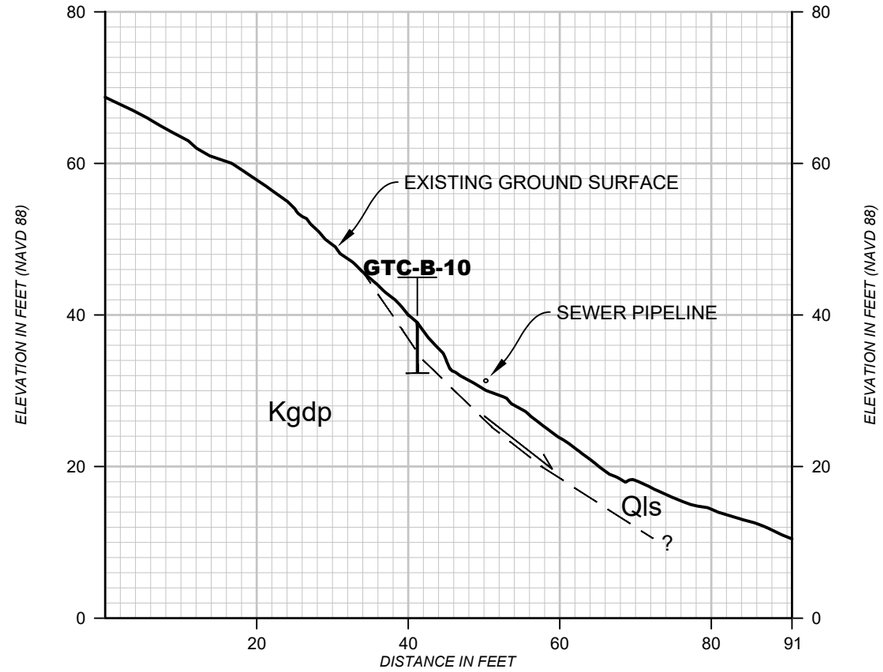


SECTION A-A'
1"=20'



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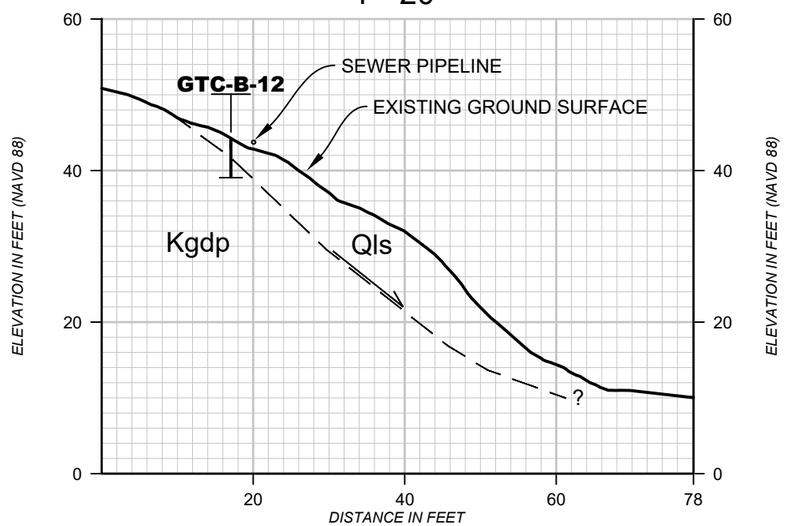
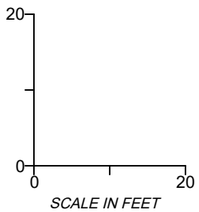


SECTION C-C'
1"=20'



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

GTC-B-12	BORING (GTC, 2014)
Qls	LANDSLIDE
Kgdp	PORPHYRITIC GRANODIORITE OF MONTEREY (CRETACEOUS)

ENGEO Expect Excellence

CROSS SECTIONS
CARMEL MEADOWS GRAVITY SEWER
CARMEL-BY-THE-SEA, CALIFORNIA

PROJECT NO.: 22985.000.001		FIGURE NO. 2
SCALE: AS SHOWN		
DRAWN BY: KW	CHECKED BY: JBR	

ORIGINAL FIGURE PRINTED IN COLOR

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ATTACHMENT 5

SPILL MAP

CAWD GIS Maps

5/24/2023, 12:27:42 PM

CAWD Service Area

Active Assets

- Air Release Valve (ARV)
- Forced Main - Flushing Inlet (FMFI)
- Flushing Inlet (FI)

- CAWD (MH)
- CAWD (Pump Station)

Mains

- CAWD

Forced Mains

- FORCED MAIN
- FM OUTFALL

Streets

APNs

1:2,000

0 0.02 0.04 0.09 mi

0 0.04 0.07 0.14 km

TiGEO

Carmel Area Wastewater District

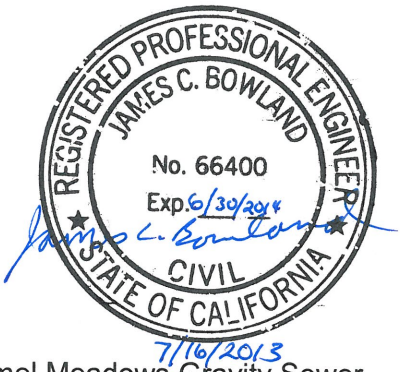
TiGEO |

ATTACHMENT 6

2013 KENNEDY/JENKS DESIGN ALTERNATIVES REPORT

16 July 2013

Final Technical Memorandum



To: Mr. Drew Lander, P.E.
Carmel Area Wastewater District

From: James Bowland, P.E. C66400

Subject: Carmel Area Wastewater District, Carmel Meadows Gravity Sewer
K/J 1399011*00

Introduction

The purpose of this technical memorandum is to provide the Carmel Area Wastewater District (District) with a gravity sewer condition assessment of the Carmel Meadows 6-inch gravity sewer and providing rehabilitation recommendations. The work is summarized as follows:

- Document both interior and exterior existing conditions of the 6-inch gravity sewer pipeline.
- Conduct a geotechnical evaluation of the pipeline footings including slope stability.
- Identify rehabilitation and/or alternative recommendations to provide a long term reliable sewer pipeline that prevents sanitary sewer overflows (SSO).

This Memorandum is divided into three sections:

1. Summary of field work,
2. Condition assessment of the gravity sewer line, and
3. An analysis of alternatives and recommendations to provide a long-term reliable sewer pipeline that prevents SSOs.

1.0 Summary of Field Work

Site Survey

The site was surveyed by Mr. Mike Sutter with Baseline Consulting. The gravity sewer was surveyed from the start of the 6-inch gravity sewer at the end of Mariposa Court to the Calle La Cruz pump station. The above grade portion of the Calle La Cruz force main was also surveyed. The surveyor used the water level marker in the lagoon as the basis of elevation control.

The survey included a 20-foot wide topographic survey, rim and invert elevations on the manholes, exposed pipe joints, and the location of the exposed pipe support footings. A hard copy of the survey is provided in Appendix A – Carmel Gravity Sewer Survey. An electronic copy of the survey was transmitted to the District via email on 12 June 2013.

Geotechnical Investigation

The geotechnical investigation included a site walk and analysis by a Geotechnical Engineer to assess the existing conditions along the pipeline route. The geotechnical engineer investigated the existing soil, foundation conditions, and mapped the movement of the footings and pipe over the last 60 years. The geotechnical engineer's technical memorandum is attached to this TM as Appendix B – Geotechnical Investigation Technical Memorandum.

In summary, the geotechnical engineer observed misalignment in each section of aerial pipe examined. The movement of the foundations varies throughout the alignment and is dependent on the localized foundation conditions. The geotechnical engineer recommended a combination of foundation anchoring devices and slope stabilization techniques to be used if the pipe was replaced in its current alignment, including:

1. Underpinning piers,
2. Rock bolts,
3. Micro piles, and
4. Plate piles (for slope stabilization),

Of the three foundation anchoring alternatives the rock bolt option is most feasible due to the limited site access. Rock bolts up to 3-inches in diameter are feasible to be installed with hand operated drills. Micro piles would not be feasible because a track or truck mounted drill equipment is required to install them. Underpinning piers would also have questionable feasibility due to the size of the equipment needed for installation.

The only area where significant slope movement was observed was along Reach 4, between MH S622 and MH S616. To minimize slope movement, the geotechnical engineer recommended either rebuilding the slope with a properly keyed-in fill slope or installing plate piles in the existing slope.

2.0 Condition Assessment

The condition assessment of the Carmel Meadows Gravity Sewer consisted of video taken by District staff of the interior of the 6-inch gravity sewer, and a visual inspection of the exterior of the pipeline, manholes, foundations, and pipe supports.

Exterior Corrosion

Very little exterior corrosion was found on the 6-inch ductile iron pipeline. The extent of oxidation found can be attributed to surface rust and is very typical of ductile iron pipe of this age. This surface rusting requires no remedial action.

The framing support structures composed of painted 2-inch by 3-inch c-channel that are part of the aerial portions of the pipeline were also examined. We found in general that they were in good to poor condition depending on their location and the amount of soil and plant matter over the footings. Several of the welded connections were rusted through (failure is not imminent) on the cross bracing. Anchor bolts are rusted so severely that they are no longer able to be unfastened without cutting off the anchor bolts below the nuts.

Manhole Condition

The manholes observed are the brick and mortar type with a cast iron frame and cover. While manhole condition was not part of this condition assessment, it was noted that the frames had severe corrosion that includes extensive rust flaking off the frame. This did not affect the functionality of the manholes. We also observed some softening and degradation of the grout used to line the manhole sections. A vertical crack requiring repair was observed on manhole T601.

Pipe Condition

The 6-inch sewer was cleaned prior to closed circuit television (CCTV) inspections completed by the District on the accessible portions of the pipeline. The video was coded during the CCTV investigation by District staff and also reviewed and coded by Kennedy/Jenks using NASSCO's Pipeline Assessment and Certification Program. A summary of the findings is included in Table 1 – Video Investigation Findings, and shown in Figure 1 Summary of 6-inch Gravity Sewer Condition Assessment. As summarized in Table 1 below, several portions of the pipeline were found to be fully submerged or the camera vehicle encountered blockages causing a number of portions of the pipeline not to be accessible to CCTV inspection. The camera vehicle was advanced until it was unable to proceed due to grit build-up or presence of other obstructions in the invert of the pipe.

Technical Memorandum

Table 1: Video Investigation Findings

Upstream MH	Downstream MH	Length of CCTV'd, FT	Length per Mapbook	Footage	Defect Code	Defect Description
S607	S609	230.9	240	0	AMH	Access Point Manhole
				3.4	MMC	Material Change
				17 - 63	MCU	Camera Underwater
				104.7	TFA	Factory Tap Active
				111-116.7	MCU	Camera Underwater
				148.9	RPLD	Point Repair Localized pipe liner defective
				227.6	MMC	Material Change
				229-230.9	DA	Deposits Attached
				230.9	AMH	Access Point Manhole
S609	S615	142.3	305	0	AMH	Access Point Manhole
				37.9	JO	Joint Offset
				120.7	MMC	Material Change
				121-142.3	MCU	Camera Underwater
				142.3	OBZ	Obstacle/Obstruction Other
S615	S618	144.3	185	5.1	AMH	Access Point Manhole
				72-90.4	MCU	Camera Underwater
				90.4		Corrosion
				108-116.5	MCU	Camera Underwater
				144-149.4	MCU	Camera Underwater
				149.4	OBZ	Obstacle/Obstruction Other
S622	S616	25.8	115	0	AMH	Access Point Manhole
				25.8	OBZ	Obstacle/Obstruction Other
T601	S622	116.7	Not Provided	0	AMH	Access Point Manhole
				22.5	CS	Crack Spiral
				31.9	CL	Crack Longitudinal
				116.7	AMH	Access Point Manhole
T602	T601	183.4	185	117.4	CS	Crack Spiral
				131.8	CL	Crack Longitudinal
				183.4	AMH	Access Point Manhole
T603	T648	12.3	178	10.5	AMH	Access Point Manhole
				22.8	DAZ	Deposits Attached Other

Typical defects found in gravity sewer systems include debris build up, roots, grease, cracks (light to severe) and broken pipe. Only 622 linear feet (LF) of the total 1,300 were accessible by the camera vehicle. From the video that was obtained the sewer appeared to be in good condition with a few cracks and general grit accumulation throughout. Areas that appeared in the CCTV inspection to have cracks in the pipe wall were investigated on the exterior of the pipe. This investigation failed to locate cracks on the exterior, leading to an opinion that the pipe is sound. What appear to be cracks on the interior may be formations created by scum accumulation.

Foundation Condition

During the geotechnical engineers site visit the existing foundations were probed to determine the condition of the foundation and the underlying soil. In general we found that the existing foundations were constructed on native soil. Several of the foundations had void spaces beneath them on the down slope side. The concrete of the existing foundations appeared to be in good condition and did not show signs of deterioration that often include flaking or loss of integrity. The most severe issue with the foundations is the corrosion of the C-channel supports at the foundation connections caused from long term rusting. The saddle supports at the top of the elevated supports also exhibited signs of corrosion, although it appears to be limited to surface rust. The level of corrosion observed on the C-channels would be greatly reduced if soil and plant matter was removed from the tops of the foundations.

3.0 Alternatives Analysis

For this evaluation, four alternatives were compared for the rehabilitation or replacement of the existing 6-inch diameter pipeline to structurally stabilize the pipeline, provide reliable sewer service to the Carmel Meadows service area, and reduce the possibility of a sanitary sewer spill or overflow. Figure 2 identifies the proposed alternative alignments. A more detailed description of each alternative is provided below.

The four alternatives selected are:

1. Performance of spot repairs to the existing pipeline,
2. Removal and replacement of the existing pipe in current location,
3. Installation of a lift station and companion force main through existing streets, and
4. Construction of a new sewer using Horizontal Directional Drilling (HDD).

Alternative 1 – Spot Repairs to the Existing Gravity Sewer

This alternative would consist of repairing the highest risk areas of the pipeline. The work would include the following:

- Removal of trees that are deflecting the sewer and realigning this pipeline to its original location,
- Repair of damaged manholes,
- Replacement of aerial crossing supports to return the sewer to horizontal line and vertical grade.

This alternative would maintain the existing sewer in its current alignment. The aerial crossing supports would be repaired and the sewer relocated to correct current line and grade problems. The foundations that exhibit the greatest movement and risk of failure would be replaced and secured with rock anchors.

Summary of spot repairs:

1. Replacement of pipe: 0 linear feet.
2. MH repair: Reline 10 existing manholes assuming 3-feet to from the lid to the invert.
3. Removal of trees: Assume 15 oak trees that would require mitigation.
4. Replacement of pipe supports and footings, including rock anchors: Assume 10 supports of the existing 21 would be replaced.

Alternative 2 – Removal and Replacement of Pipe in Place

This alternative would remove the entire section of pipe from manhole T603 to manhole S615 where the pipe transitions from aerial to buried. The pipe would be replaced with new restrained joint pipe and engineered foundation supports within the current alignment.

Summary of removal and replacement:

1. Removal and replacement of pipe: Removal and replacement of approximately 1,300 LF of ductile iron pipe. Replace with restrained joint ductile iron pipe between MH T603 and MH S615.

2. Replacement of Manholes: Assume all eight manholes in the section between MH T603 and MH S615 would be replaced with precast manholes, approximately three feet in depth.

3. Replacement of Pipe supports: Replace all existing aerial pipe supports. Assume 20 pipe supports with footings, incorporating four rock bolts to anchor each.

4. Removal of trees: Assume 15 oak trees would be removed and require mitigation.

5. Slope stabilization: Stabilize side slopes with plate piles; assume 200 LF of slope, 20-feet in width. If easements can be acquired, a wider area of slope stabilization is recommended.

Alternative 3 – New Lift Station and Force Main

This alternative would include the installation of a lift station at the location of Manhole T608 and a force main pipeline along Ribera Road to the Calle La Cruz wet well. This alternative would re-direct the sewer line to slope downhill from manhole T604 to T608 and replace the aerial section between S618 and S615, to convey sewer from MH S617.

Summary of lift station and force main:

1. Lift station: Assume a duplex system comprised of Flyght submersibles. Two Flyght pumps would be installed in a 4-foot diameter by 15 foot deep lift station; requiring 2 horsepower pumps. Pumps would be sized for 25 gpm at 60 feet of total dynamic head.

2. Force main: Assumes a 2,230 linear foot alignment of 4-inch diameter HDPE pipe that would require a 4-foot wide pavement restoration.

3. Gravity Sewer: Rebuild 160 linear feet of sewer from T604 to T608, and replace the aerial sewer from MH S618 to MH S615.

Alternative 4 – Horizontal Directional Drill (HDD)

This alternative would include a 2,000 linear foot HDD from MH T608 to the Calle La Cruz wet well. The alignment would be a straight line beneath existing private property to the wet well. This alternative would include re-sloping the sewer line to drain downhill from T604 to T608 and replacement of the aerial section from S618 to S615, to convey sewer from MH S617.

Summary of HDD:

1. HDD: Assume 2,000 LF of HDD through granitic bedrock.

2. Property acquisition: Obtain 22 subterranean utility easements for the proposed alignment.

3. Pipe Material: Assume a 6” diameter DR 9 HDPE or equivalent fusible PVC pipeline.

4. Gravity Sewer: Rebuild 160 linear feet of sewer from T604 to T608, and replace the aerial sewer from MH S618 to MH S615.

Alternatives Analysis

An alternatives analysis was conducted to help select the preferred alternative for the Carmel Meadows 6-inch sewer pipeline project. The following items were considered:

1. Cost,

2. Constructability,

3. Public Impact,

4. Environmental Impact,

5. Estimated Life Expectancy, and

6. Operation and Maintenance.

Cost

A conceptual level estimate of probable construction cost was prepared for each alternative using manufacturer’s quotes, data from recent similar projects bid in the area, construction cost guides and previous experience. A standardized construction cost template was utilized to ensure each alternative was evaluated using the same metrics. A component of the cost not easily quantified is the constructability of each alternative. The constructability of each alternative was evaluated separately. The detailed cost estimate information for each individual alternative is presented in Appendix C. The estimate of probable construction costs for each alternative are summarized below in Table 2. The estimates include local sales tax on materials, contractor overhead and profit at 15%, and a 30% estimating contingency.

Table 2: Estimated Pipeline Alternative Project Costs

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cost	$158,603	$427,735	$536,941	$2,355,823

- **Alternative 1 –** Alternative 1 is the least expensive alternative because it does not require the removal and replacement of the existing pipe and manholes.
- **Alternative 2 –** Alternative 2 is similar to alternative 1, but costs more since it includes the replacement of all of the manholes and replacing the existing pipe with restrained joint pipe.
- **Alternative 3 –** This alternative is the third most expensive for capitol cost and is even more expensive when factoring in the annual O&M costs of approximately $21,000 per year for operating and maintaining a pump station.
- **Alternative 4 –** This alternative is the most expensive alternative due to the easement acquisition and the high cost for horizontal directional drilling through bedrock.

Due to the high capitol and O&M cost of Alternative 3 and the high cost of Alternative 4, these two alternatives are fatally flawed resulting in removal from any further analysis.

Non-Cost Related Criteria

The non-cost related evaluation criteria are compared for Alternative 1 and Alternative 2 in Table 3 – Non-Cost Related Criteria.

Table 3: Non-Cost Related Criteria

Criteria	Alternative 1	Alternative 2
Constructability	Does not include pipe and manhole replacement therefore easier to construct than Alternative 2.	Includes pipe and manhole replacement, making it more difficult to construct.
Public Impact	Less impact due to shorter construction duration.	More impact due to longer construction duration.
Environmental Impact	Reduced construction impact, however increased risk of SSO due to non-restrained joint pipe.	More construction impact but significantly less risk of future SSO's due to restrained joint pipe.
Estimated Life Expectancy	5 to10 years; considering the pipe and manholes are at the end of their useful life and will need to be replaced or rehabilitated.	50 Year design life (minimum).
Operation and Maintenance	Higher due to continued use of older pipe and manholes. Will require continued weekly inspections.	Less than Alternative 2, due to new restrained joint pipe and manholes.

Conclusions and Recommendations

After considering the non-cost related criteria both Alternative 1 and 2 have desirable aspects for selection. The differences between the alternatives are the use of new restrained joint pipe and new manholes for Alternative 2. To meet the Districts objective to prevent future SSO's and provide a long term solution we recommend Alternative 2 for the following reasons:

1. Modern foundation stabilization and slope stabilization techniques will mitigate the risk of the pipeline moving or failing in the future.

2. Restrained joint pipe will be less susceptible to failure due to future pipe movement.

3. It will provide a long term solution and a reliable sewer pipeline.

Attachments: Figure 1 – Summary of 6-inch Gravity Sewer Condition Assessment

Figure 2– Alternative Alignments
Appendix A – Carmel Gravity Sewer Survey
Appendix B – Geotechnical Investigation Technical Memorandum
Appendix C – Alternative Analysis Cost Estimate

Figures

Carmel Gravity Sewer

PIPE LINER DEFECTIVE @148.9'

CORROSION @ 90.4'

SIGNIFICANT SLOPE MOVEMENT OBSERVED

SPIRAL CRACK @ 22.5'
LONGITUDINAL CRACK @ 31.9'

MANHOLE T601 VERTICAL CRACK

SPIRAL CRACK @ 117.4'
LONGITUDINAL CRACK @ 131.8'

CALLE LA CRUZ

RIBERA RD

PRADERA RD

MEADOW WAY

ARRIBA WAY

CUESTA WAY

HILL CREST CIR

PACIFIC OCEAN

0 225

APPROXIMATE SCALE IN FEET

Kennedy/Jenks Consultants

CARMEL AREA WASTEWATER DISTRICT
CARMEL MEADOWS GRAVITY SEWER

SUMMARY OF 6-INCH GRAVITY SEWER CONDITION ASSESSMENT JULY 2013

(FWY) 1399011\FIG-01

FIGURE 1

Kennedy/Jenks Consultants

CARMEL AREA WASTEWATER DISTRICT
CARMEL MEADOWS GRAVITY SEWER

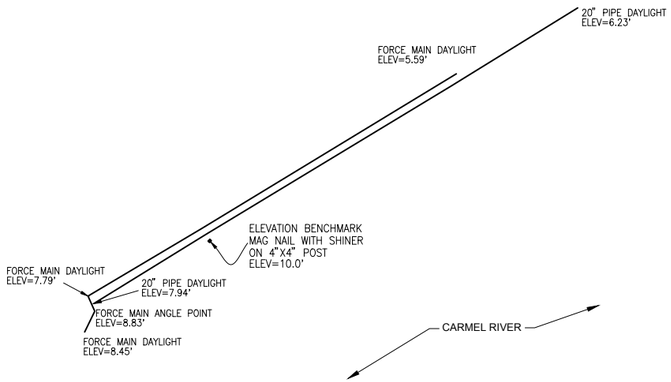
ALTERNATIVE ALIGNMENTS
JULY 2013

(FWY) 1399011\FIG-02

FIGURE 2

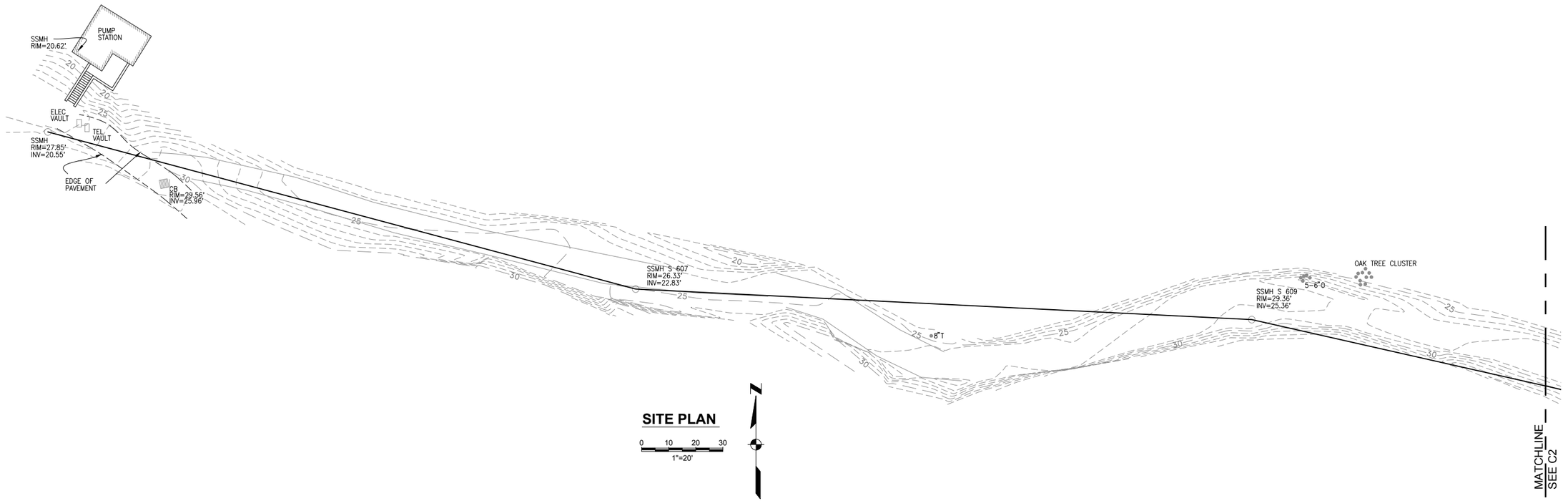
Appendix A

Carmel Gravity Sewer Survey



PANEL 1

PANEL 2



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CARMEL MEADOWS GRAVITY SEWER

CARMEL AREA WASTEWATER DISTRICT
CARMEL, CALIFORNIA

Kennedy/Jenks Consultants

10850 GOLD CENTER DRIVE, SUITE 350, RANCHO CORDOVA, CALIFORNIA

SITE SURVEY BY BASELINE CONSULTING

FILE NAME 1399011_C-01

JOB NO. 1399011_00

DATE JULY 2013

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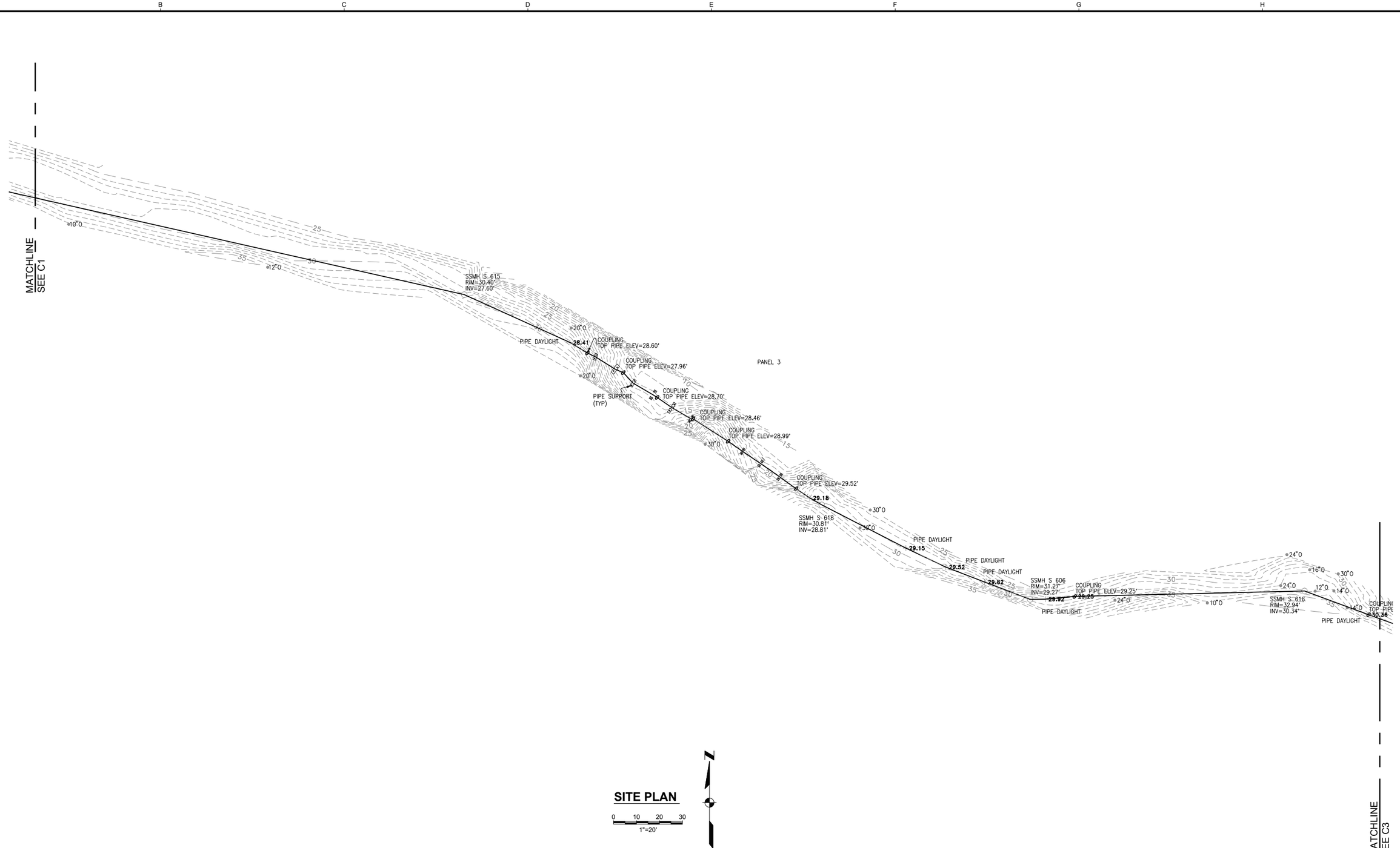

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CARMEL MEADOWS GRAVITY SEWER

CARMEL AREA WASTEWATER DISTRICT
CARMEL, CALIFORNIA

Kennedy/Jenks Consultants

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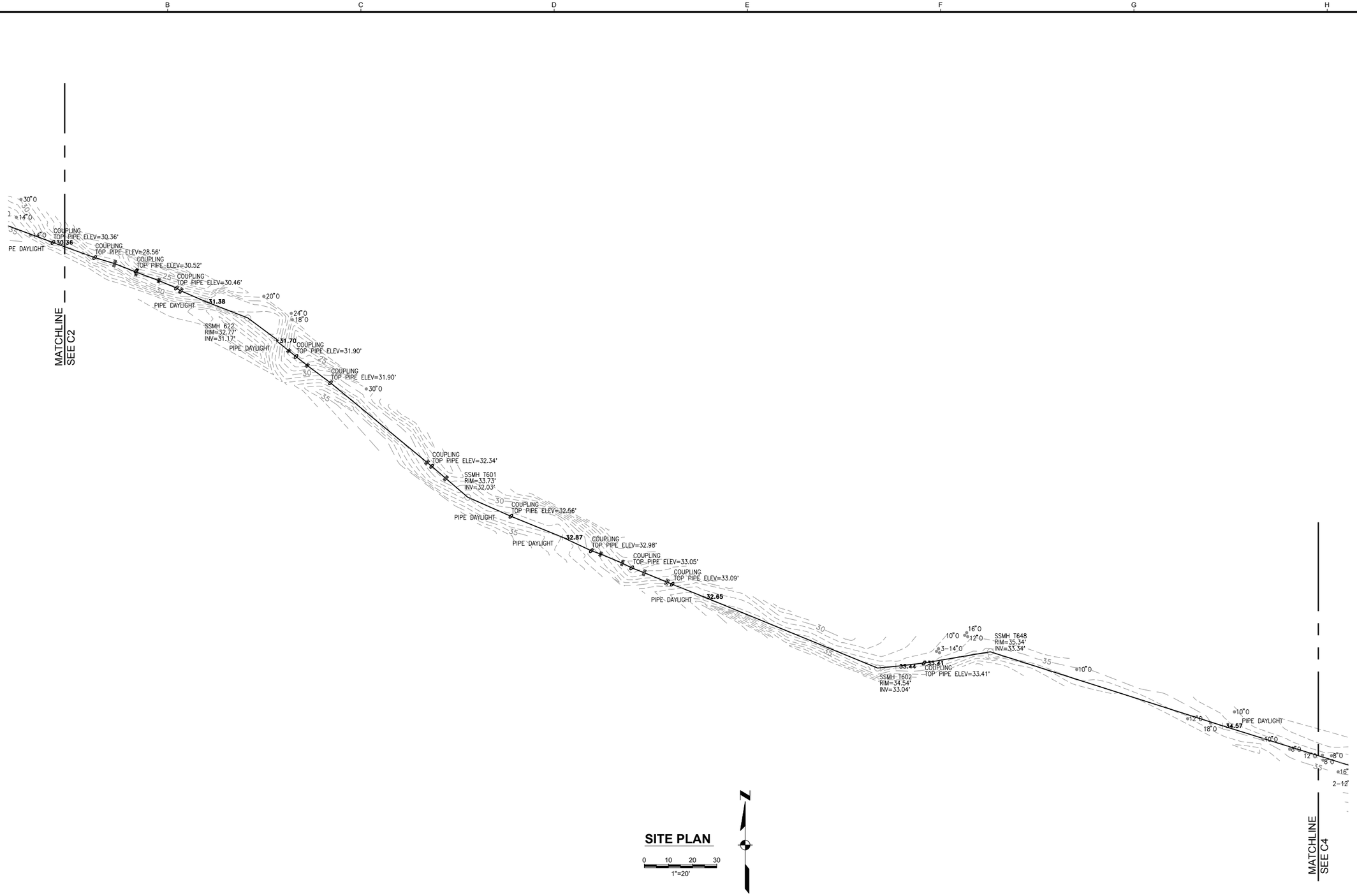

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CARMEL MEADOWS GRAVITY SEWER

CARMEL AREA WASTEWATER DISTRICT
CARMEL, CALIFORNIA

Kennedy/Jenks Consultants
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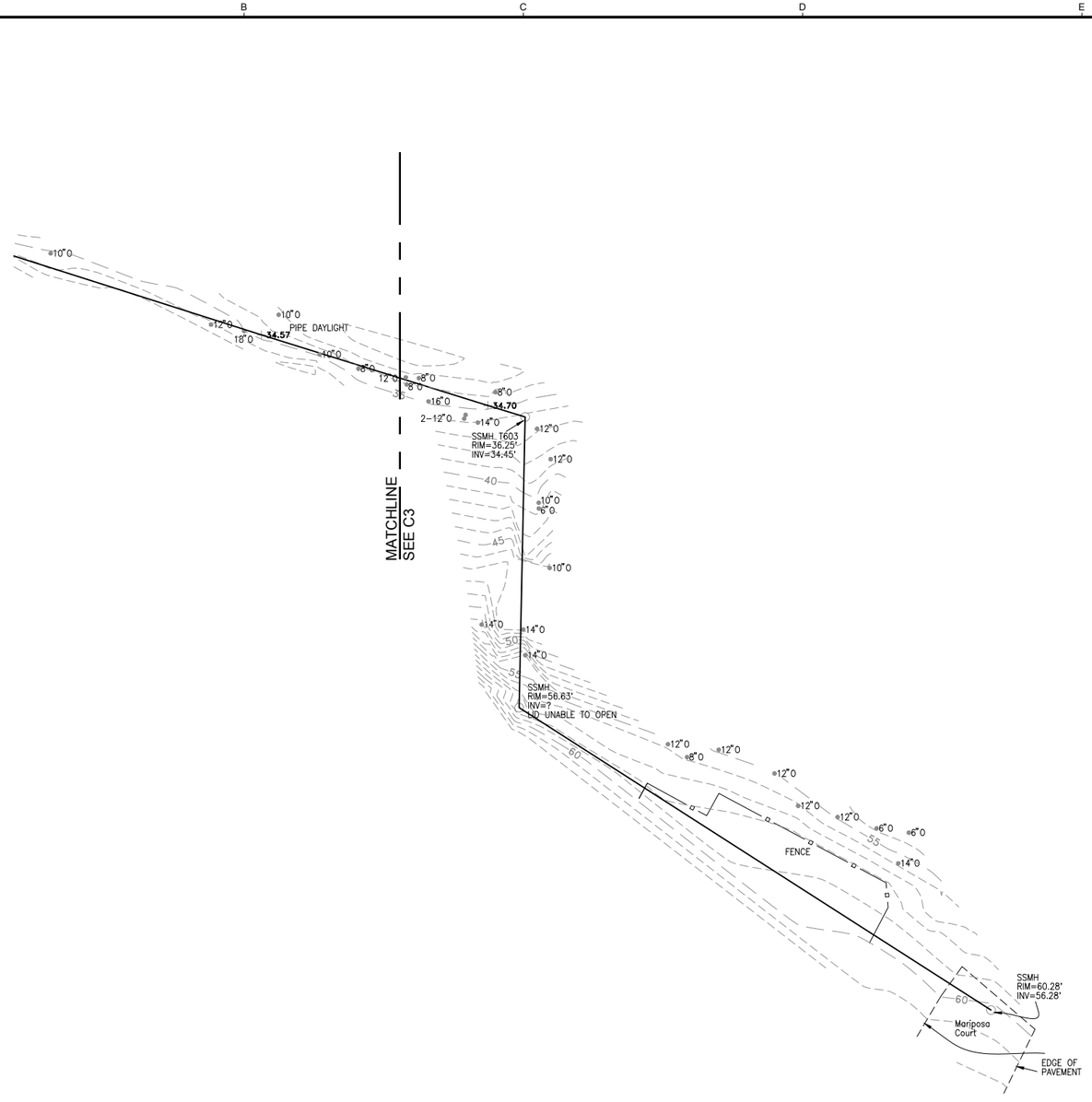

SITE PLAN

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CARMEL MEADOWS GRAVITY SEWER

CARMEL AREA WASTEWATER DISTRICT
CARMEL, CALIFORNIA

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Appendix B

Geotechnical Investigation Technical Memorandum

GEOTECHNICAL CONSULTANTS, INC.
Geotechnical Engineering • Geology • Hydrogeology

James Bowland, P.E.
Kennedy/Jenks Consultants, Inc.
116 Lupfer Avenue, Suite B
Whitefish, MT 59937

June 14, 2013
Project No. SF13013

Subject: Geotechnical Memorandum
Carmel Meadows Gravity Sewer
Carmel, California

Dear Mr. Bowland:

We performed a geotechnical evaluation of the Carmel Meadows gravity sewer located to the northeast and downslope from Ribera Road between Mariposa Drive and Calle La Cruz in Carmel, California. Our services were performed in accordance with our proposal dated February 19, 2013. Our services consisted of background review of geologic maps, geotechnical site reconnaissance and discussion of repair strategies with Mr. James Bowland of Kennedy/Jenks Consultants on May 14, 2013, discussion of repair strategies with local engineering contractors specializing in similar foundation systems, and preparation of this geotechnical memorandum. The purposes of our services were to assess the geotechnical stability of the gravity sewer pipeline, and to evaluate suitable construction techniques to rehabilitate or replace foundation supports based on site access, terrain and anticipated subsurface conditions.

SITE CONDITIONS

The existing sewer line is a 1,500-foot long, 6-inch diameter ductile iron pipe and it is routed along the sideslopes of hilly terrain. The approximately 60 to 80-foot high hill declines steeply (locally up to 1:1 slopes) toward the northeast from the rear of the properties along Ribera Road to the Carmel River. The hillslope is densely vegetated with trees, grasses and other plant undergrowth. The pipeline is predominantly buried but is elevated across five reaches where it crosses narrow, steep re-entrant valleys. The length of the elevated reaches range from approximately 34 feet to 128 feet. Through these elevated portions, the sewer line is supported on welded steel C-channel sections founded on concrete pedestal foundations. The sewer line is strapped to the C-channel sections at the support locations. Each 18.5-foot pipeline length typically has one or two support locations.

The site is underlain at shallow depths by the porphyritic granodiorite of Monterey (K_{gdp}) (Clark et al., 1997). This rock is hard and strong as evidenced at bedrock outcrops along the alignment. The bedrock is overlain by a relatively thin mantle of topsoil and colluvium.

Three faults are in the project vicinity. The San Gregorio fault zone, Sur Region section is located about 3.6 miles west (offshore). The southern end of the potentially active Cypress Point fault is located approximately 400 feet east of the northern end of the alignment. This fault has not been well studied, but is a Quaternary-aged dextral reverse fault. The Hatton Canyon fault, the closest fault segment of the Seaside-Monterey section of the Monterey Bay-Tularcitos fault zone is located approximately 2.3 miles northeast of the alignment. This fault zone is a complex, generally northwest-striking zone up to 15 km wide with dextral, dextral-reverse, and thrust faults with known Holocene displacement.

DISCUSSION

Based on discussions during the site visit, we understand that the Carmel Meadows gravity sewer has been in service for approximately 60 years. We are not aware of any incidents where the pipe needed to be repaired or replaced. Therefore, with regard to the serviceability of the existing pipeline, the system has performed well. However, it is evident from the horizontal and vertical profile of the elevated portions of the pipeline that the foundation supports have moved downslope. The maximum post-installation movement appears to be on the order of 2 feet though the movement is typically much less. The following paragraphs explain our observations of distress in a little more detail for each of the five reaches from the southeast part of the alignment to the northwest.

Reach 1 is approximately 55 feet long and is up to approximately 7 feet above the deepest point of the drainage re-entrant (Photos 1 and 2). Reach 1 is located approximately 100 feet southeast of manhole (MH) T601. The four C-channel supports range from 2.3 feet to 5.5 feet high. There are only very slight indications of foundation movement of up to approximately 2 inches. The foundations, at least at two locations, are founded on overburden soils and do not extend into bedrock. The depth to the bedrock is not known and there are no bedrock outcrops in close proximity.

Reach 2 is approximately 45 feet long with a buried manhole (MH T601) approximately midway along the reach (Photos 3 and 4). The manhole provides support for the pipeline as well as two C-channel supports and a concrete saddle in the portion of the pipe northwest of the manhole. The two C-channel supports are 1.6 and 4.5 feet high. We noted loose soil below the concrete saddle which provides little support at this location. The northwesterly pipeline joint appears to be up to approximately 6 inches out of alignment. Cracks in the concrete and brick of the manhole also indicate that some slope movement has occurred.

Reach 3 is approximately 24 feet long over a steep-sided drainage re-entrant (Photo 5), and is located located in the vicinity of MH T622. The pipe is up to 4.5 feet above the ground with the two C-channel supports at 3.2 and 3.7 feet high. The pipe is additionally

supported on a concrete saddle at the southeasterly end of the pipe. There appears to be slight movement of the elevated pipeline with the joints up to approximately 3 inches out of original alignment. Bedrock outcrops of granodiorite were observed in close proximity to this reach of the sewer line.

Reach 4 has the most noticeable post-installation movement with outward rotation of the two northwesterly foundation support locations (Photo 6). This reach is located between MH S622 and MH S616 based on GPS data collected during the site reconnaissance. The reach is approximately 65 feet long with four C-channel supports ranging from 1.3 to 2.8 feet high. The pipe is along a bench on an approximately 1 ½ to 1 (horizontal to vertical) hillside. Based on this unnatural break in slope, it appears the bench was likely created by cutting from the upslope side of the pipeline alignment and casting the soil on the downslope side. Bedrock outcrops of granodiorite were observed at either end of this reach. The fill soils along with the concrete pedestals have evidently creeped downslope. The pipeline has moved up to approximately 2 feet. One pipeline joint at the point of greatest movement is separating.

Reach 5 is approximately 128 feet long extending northwestward from MH S618 with nine C-channel supports ranging from 5.3 to 15 feet high (Photos 7 through 10). The concrete pedestal foundations are larger to accommodate the taller and wider C-channel sections. An intermediate concrete saddle in an area of higher ground has settled away from the pipe leaving one length of pipe unsupported. A manhole is located a short distance to the southeast of where the pipeline transitions from being elevated to below grade. The pipe along this reach has moved from its original location although it appears that the pipe was likely constructed with some variation in grade and horizontal alignment to accommodate the topography and elevations of the support structures. The supports do not have noticeable tilt or other similar indications of large scale movement. Due to the height of the supports, a small rotation of the concrete pedestal will have a more pronounced effect at the top of the C-channel section. Bedrock outcrops of granodiorite were observed in close proximity to this reach of the pipeline.

CONCLUSIONS AND RECOMMENDATIONS

As noted above, there has been some movement of the elevated portions of the Carmel Meadows gravity sewer since its installation approximately 60 years ago. The sewer line has performed well, however, given the steep topography through which it traverses. The rehabilitation strategy to mitigate possible future soil movement will depend on other aspects of the evaluation including whether or not the pipeline is to be replaced and the structural integrity and corrosion resistance of the C-channel sections. For example, if the pipeline is to be replaced in its entirety, it would make sense to replace the foundation systems of elevated portions of the pipeline as well to improve its future performance and reduce the risk of failure.

The sewer line along Reaches 1 and 3 exhibits the least downslope movement, and therefore we expect that these reaches have the least risk of future movement and resulting pipe failure. Conversely, Reach 4 has moved considerably and at least one joint is separating from its connection. The sewer line movement and risk of future movement for the other two reaches, Reach 2 and Reach 5, lie between these two extremes. Therefore, if a phased approach to pipeline upgrades is desirable, we recommend that Reach 4 be corrected in the near term. The other reaches do not appear to be in immediate risk of failure. All sections should be monitored periodically to document further distress until upgrades are constructed.

In broad terms, there are three strategies to reduce the risk of pipe failure due to slope movements: 1) avoid the area where slope displacement is possible either by re-routing pipeline or going underneath any vulnerable soils (i.e. bury the pipeline), 2) stabilize the hillside so that the risk of slope movement is limited, or 3) design the pipeline and/or foundation support systems so that any slope displacement can be accommodated or resisted by the structures. The existing pipeline has performed fairly well using shallow concrete pedestal foundations, which would fall within "Strategy 3" listed above.

We anticipate that the upgrades would likely focus on Strategy 3 as the most viable and least costly alternative while still providing a measurable reduction of risk of pipeline failure. However, Kennedy/Jenks and the Carmel Area Wastewater District may want to explore Strategies 1 and 2. Because of the vulnerability of the pipeline through Reach 4, consideration of a slope repair may be desirable if an access route can be constructed so that construction equipment and supplies can access the site. This repair strategy would involve rebuilding the slope underneath and below the pipe to provide a properly keyed-in fill slope that would not be prone to slope creep and erosion processes. A lower cost alternative would be to install plate piles in the existing slope to improve, but not necessarily fully arrest, future slope movement. The past performance of the pipeline along the remaining reaches indicates that slope stabilization is probably not warranted.

The possibilities for improving the pipeline and/or foundation supports (Strategy 3) are wide ranging. One may consider re-using the existing foundations, identifying which supports need replacement or underpinning, and upgrading only to the extent necessary. On the other end of the spectrum, the elevated portions of the pipe can be supported on all new foundations. These foundation improvement options can be coupled with replacing the pipe and pipe support system with something that is less affected by movement of the support system and can be easily adjusted to accommodate additional movement. The same strategies for underpinning and new foundations are relevant and consist of deepening the footings with hand excavated underpinning piers, or using drilling equipment to anchor the foundation into bedrock with rock bolts or micropiles. Although larger diameter drilled piers have been installed for pipeline support in unstable slopes, we think that the size of the equipment would preclude drilled piers as a viable foundation alternative for this project. If track-mounted drilling

equipment can access the site, the most robust and most risk averse option would be to support the elevated portions of the pipeline on a trellis or pipe saddles that are founded on a micropile-supported foundation. The micropiles would be drilled into the underlying bedrock. This micropile option would likely involve constructing new foundations rather than attempting to underpin existing shallow pedestal footings.

Based on the above discussion, the foundation improvements would likely consist of replacing the existing concrete pedestals with similar systems but extending deeper below grade to resist the earth pressures from the movement of soil overburden. The foundations should extend a sufficient distance into the bedrock to resist these earth pressures. If the depth to bedrock makes the excavation infeasible, the concrete footing can be secured into the bedrock by drilling small-diameter (approximately 3-inch diameter) rock bolts. We discussed the possible repair strategies with three local engineering contractors specializing in similar foundation systems. Due to the limited accessibility, the excavations and drilling will likely need to be conducted with hand-operated equipment including jackhammers and rotary drills. One contractor indicated larger diameter (approximately 6- to 9-inch diameter) drill holes can be constructed if within 200 feet of their diesel hydraulic power pack unit. The hard rock will likely make drilling progress slow with a high rate of drill bit wear.

The depth to bedrock is difficult to ascertain without a subsurface program consisting of test pits and/or borings. As bedrock outcrops are fairly close to the alignment at Reaches 3, 4 and 5, we anticipate that the colluvium overlying the bedrock at the support locations is relatively thin (perhaps less than about 5 feet deep). The fill and colluvium may be thicker at Reaches 1 and 2 as there were no nearby bedrock outcrops observed.

The transition between the elevated portion of pipeline and the below-grade portion should be carefully considered during development of repair strategies. The first length(s) of buried pipe can also be prone to movement and these should be adequately supported on concrete saddles embedded into the bedrock.

Also, it is important to revegetate the construction areas as soon as practicable after construction. Slopes will need temporary slope protection such as jute or coir netting until the vegetation is re-established.

The potential for and amount of future movement is dependent on additional factors including periods of intense rainfall and earthquakes. These events can lead to additional slope movement above that experienced in the past.

CLOSURE

The conclusions and recommendations presented herein are professional opinions based on geotechnical and geologic data and the project as described. The findings and professional opinions presented in this report are presented within the limits prescribed by the client, in accordance with generally accepted professional engineering and geologic practices. There is no other warranty, either express or implied.

Respectfully submitted,
GEOTECHNICAL CONSULTANTS, INC.

Deron J. van Hoff 6/14/13

Deron J. van Hoff, P.E., G.E.
Vice President

REFERENCES

Clark, J.C., Dupré, W.R. and Rosenberg, L.I., Geologic Map of the Monterey and Seaside 7.5−Minute Quadrangles, Monterey County, California: A Digital Database, USGS Open-File Report 97-30, 1997.

United States Geological Survey, 2012, Monterey Quadrangle, California, 7.5-Minute Series (Topographic), Map Scale 1:24,000.

PHOTOGRAPHS

Photo 1
Reach 1
Elevated sewer line on concrete pedestal foundation

Photo 2
Reach 1
Facing northwest

PHOTOGRAPHS

Photo 3
Reach 2
From manhole facing northwest

Photo 4
Reach 2
From manhole facing southeast

PHOTOGRAPHS

Photo 5
Reach 3
Elevated sewer line on C-channel supports

Photo 6
Reach 4
Facing northwest – outward rotation of foundation support

PHOTOGRAPHS

Photo 7
Reach 5
Elevated sewer line – facing southeast along northwestern portion of Reach 5

Photo 8
Reach 5
15-foot high supports through steep re-entrant valley

PHOTOGRAPHS

Photo 9
Reach 5
Facing northwest along northwestern portion of Reach 5

Photo 10
Reach 5
Facing southeast along southeastern portion of Reach 5

Appendix C

Alternative Analysis Cost Estimate

OPINION OF PROBABLE CONSTRUCTION COST **KENNEDY/JENKS CONSULTANTS**

Project: Carmel Meadows Gravity Sewer BH

28-Jun-13

Alternative: Spot Repairs 1399011*00

Estimate Type:
- [X] **Conceptual**
- [ ] **Preliminary (w/o plans)**
- [ ] **Design Development @** _____ **% Complete**
- [ ] **Construction**
- [ ] **Change Order**

Spec. Section	Item No.	Description	Qty	Units	$/Unit	Total
	1	Manhole Repair	10	EA	990.00	9,900
	2	Removal and mitigation of Trees	15	EA	1,978.06	29,671
	3	Replacement of Pipe Supports	10	EA	6,651.82	66,518
Total						106,089

Subtotals			106,089
Contractor OH&P	@	15%	15,913
Subtotals			122,002
Estimate Contingency	@	30%	36,601
Total Estimate of Project Cost			158,603

OPINION OF PROBABLE CONSTRUCTION COST **KENNEDY/JENKS CONSULTANTS**

Project: Carmel Meadows Gravity Sewer BH

28-Jun-13

Alternative: Removal and Replacement of Pipe in Place 1399011*00

Estimate Type:
- [X] **Conceptual**
- [ ] **Preliminary (w/o plans)**
- [ ] **Design Development @** _____ **% Complete**
- [ ] **Construction**
- [ ] **Change Order**

Spec. Section	Item No.	Description	Qty	Units	$/Unit	Total
	1	Removal and Replacement of Pipe	1,300	LF	66.33	86,235
	2	Manhole Replacement	8	EA	3,222.29	25,778
	3	Replacement of Pipe Supports	20	EA	6,651.82	133,036
	4	Removal and mitigation of Trees	15	EA	1,978.06	29,671
	5	Slope Stabilization	1,139	EA	10.00	11,390
Total						286,110

Subtotals			286,110
Contractor OH&P	@	15%	42,917
Subtotals			329,027
Estimate Contingency	@	30%	98,708
Total Estimate of Project Cost			427,735

OPINION OF PROBABLE CONSTRUCTION COST **KENNEDY/JENKS CONSULTANTS**

Project: Carmel Meadows Gravity Sewer BH

28-Jun-13

Alternative: New Lift Station and Force Main 1399011*00

Estimate Type:
- [X] **Conceptual**
- [ ] **Preliminary (w/o plans)**
- [ ] **Design Development @** _____ **% Complete**
- [ ] **Construction**
- [ ] **Change Order**

Spec. Section	Item No.	Description	Qty	Units	$/Unit	Total
	1	New Lift Station	1	EA	95,472.47	95,472
	2	4" Force Main through existing streets	2,230	LF	58.66	130,818
	3	Replace (E) Gravity Sewer	160	LF	96.00	15,360
	4	Rebuild S618 to S615	180	LF	66.33	11,940
	5	Pipe Supports	9	EA	6,651.82	59,866
	6	New Utility Service	1	LS	25,000.00	25,000
	7	Operation and Maintainence	1	Years	20,700.24	20,700
Total						359,158

Subtotals			359,158
Contractor OH&P	@	15%	53,874
Subtotals			413,031
Estimate Contingency	@	30%	123,909
Total Estimate of Project Cost			536,941

OPINION OF PROBABLE CONSTRUCTION COST **KENNEDY/JENKS CONSULTANTS**

Project: Carmel Meadows Gravity Sewer BH

28-Jun-13

Alternative: Horizontal Directional Drill (HDD) 1399011*00

Estimate Type:
- [X] **Conceptual**
- [ ] **Preliminary (w/o plans)**
- [ ] **Design Development @** _____ **% Complete**
- [ ] **Construction**
- [ ] **Change Order**

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Total
	1	HDD with 6" DR9 HDPE	2,000	LF	524.32	1,048,635
	2	Easement Acquisition	22	EA	20,000.00	440,000
	3	Replace Gravity Sewer	160	LF	96.00	15,360
	4	Rebuild S618 to S615	180	LF	66.33	11,940
	5	Pipe Supports	9	EA	6,651.82	59,866
SUBTOTAL - DIVISION _						1,575,802

Subtotals			1,575,802
Contractor OH&P	@	15%	236,370
Subtotals			1,812,172
Estimate Contingency	@	30%	543,652
Total Estimate of Project Cost			2,355,823

ATTACHMENT 7

SRT CONSULTANTS 2019 REPORT

Feasibility Study

To: Rachel Lather, P.E., Principal Engineer, Carmel Area Wastewater District
Daryl Lauer, Collection Superintendent, Carmel Area Wastewater District

From: Tim Monahan, P.E., SRT Consultants
Nina Mao, P.E., SRT Consultants

Date: August 27, 2019

Re: Carmel Meadows Feasibility Study

Background

The Carmel Meadows subdivision is located in the southern part of the Carmel Area Wastewater District's (District's) service area between the Carmel River and Carmel Bay. The homes in this neighborhood were constructed in the 1950s and are served by a system of 6-inch diameter vitrified clay pipe (VCP) gravity sewers. All of the sewage from this area flows to the Carmel Meadows Pump Station 2, where it is pumped to the District's wastewater treatment plant. Due to the topography of the area, the sewers were constructed in the back of the homes instead of in the streets. Sewage from 52 homes on the southeast portion of the subdivision on Ribera Road flows into a 6-inch ductile iron pipe that serves as an interceptor to the pump station. The interceptor is located on the banks of the Carmel River and is combination of shallow-buried pipes and aerial pipes on stilts. A section of the aerial portion of the 6-inch interceptor is shown in Figure 1.

Figure 1. Aerial Portion of the Existing Interceptor

A condition assessment was performed on this interceptor in 2013, including exterior corrosion evaluation, interior evaluation using CCTV, manhole (MH) condition inspection, and support foundation assessment. The assessment identified horizontal and longitudinal cracks, heavy corrosion, settlement, and excessive joint deflection on the interceptor. The assessment concluded that multiple reaches of the

interceptor are in immediate risk of failure due to ground subsidence along the river bank. The associated manholes were also found to have numerous deficiencies, including cracks and spalling of concrete.

The District seeks to abandon the interceptor between manholes T603 and S609 and reroute the flow upstream of this segment. One of the proposed approaches is to install a lift station near Manhole T608 and redirect the sewer line to slope downhill from T604 to T608. The District also seeks to improve the existing sewer system between manholes S601 and T604. The District retained SRT to conduct a feasibility study for the new lift station and other sewer improvements. SRT conducted a site visit with the District's engineer and lead operator, obtained record drawings, performed preliminary engineering calculations, and evaluated the feasibility of the new lift station from hydraulic, siting, and construction perspective. This report includes SRT's findings on the existing conditions of the system, feasibility of redirecting sewer flow, design criteria for the new lift station, required appurtenances, power, instrumentation, and control, and a review of the lift stations' constructability.

Modifications to the Existing Sewers

The existing sewer system will require modifications for the flow to be redirected to manhole T608. Figure 2 provides a summary of the required modifications. The following sections detail each type of the proposed modifications. The plan and profile for the existing and new systems are shown in Appendix 1.

Figure 2. System Modifications Overview

Redirect Sewer Flow (T604 – T608)

The slope of the gravity sewer between manholes T604 and T608 must be reversed. T608's rim elevation is 53 feet and its invert elevation is 4 feet below grade (elevation 49 feet). In order to redirect the flow from S604 with an 8-inch pipe at minimum slope of 0.5%, the new invert elevation at T608 will be 48.3 feet, which is approximately 10 feet below the existing grade.

Replace Existing Sewer (T607 – T604)

Due to their poor condition, the District also seeks to replace the existing 6-inch VCP pipes and manholes between manhole T604 and cleanout T607 under this project. The new pipes will be 8-inch SDR 26, and they will have the same slopes and invert elevations as the existing pipes. Cleanout T607 will be replaced with a standard manhole to receive a new sewer pipe from S619.

Install New Gravity Sewer (S619 – T607)

A new gravity sewer must be installed between cleanouts S619 and T607 to allow sewage from 2835 and 2845 Ribera Road to flow by gravity to manhole T608. Both cleanouts S619 and T607 will need to be replaced with standard manholes. A new pipe will be installed between the two manholes as shown in Figure 3. The invert elevations will remain the same as the existing cleanout invert elevations.

Figure 3. Modifications between S619 and T607

Install Residential Grinder Pump Stations

The sewer connection between S617 and S618 will be abandoned along with the downstream interceptor. Unfortunately, S617 is at a lower elevation than S619 (to the south) and S614 (to the north). Therefore,

its flow cannot be redirected by gravity sewer to either of these manholes. Pumping will be required to convey flow from 2795, 2805, 2815, and 2825 Ribera Road to either manhole S619 or S614. To achieve this, residential grinder pump stations will be required at these four homes. The discharge from the grinder pump stations can be plumbed into one common header, and the header pipe will be connected to manhole S619 as shown in Figure 4.

The proposed grinder pump stations at these homes are necessary in order to abandon the existing interceptor. Attempting to serve these homes by gravity is not recommended as it would require construction of a 6 to 8 feet deep sewer through the existing backyards. The grinder pump stations are a more practical solution; however, the ownership and maintenance of these pump stations need to be negotiated between the District and homeowners prior to construction. A possible option would be for the district to install the pump stations, provide instructions/education, and maintain them at no cost to the home owner for 3 to 5 years. After this transitional period, the residents would take ownership of the pump stations and assume responsibility for their maintenance.

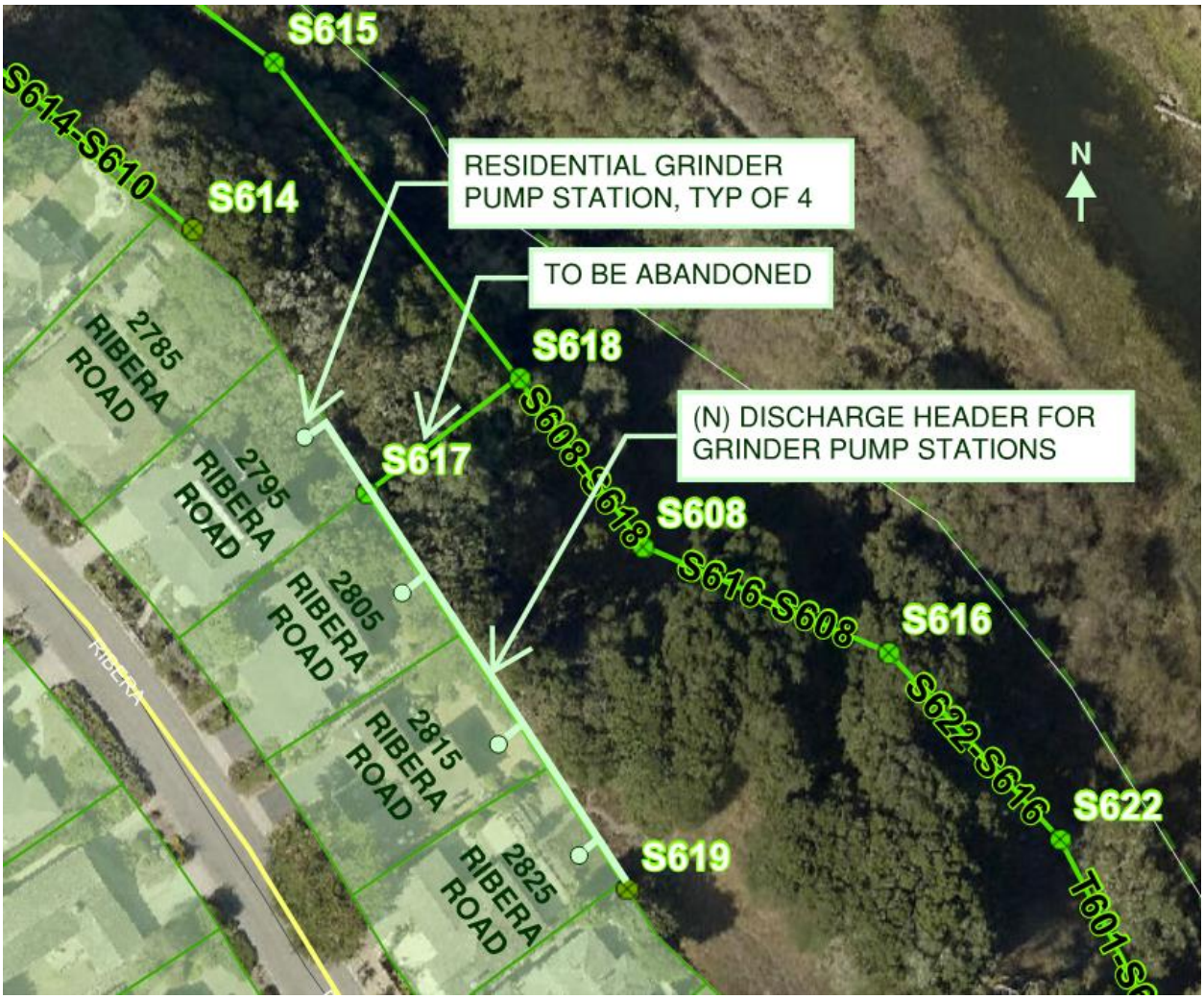


Figure 4. Residential Grinder Pump Stations Layout

Rehabilitate Existing Sewer (S609 – S614)

The existing 6-inch VCP sewer between manhole S609 and the cleanout at S614 will be rehabilitated by installing a cured in place plastic (CIPP) pipe inside the existing sewer. Alternatively, these reaches can be replaced by open-cut construction since they are shallow and depth ranges only between 2.5 to 5 feet. The condition of this pipe should be assessed before rehabilitation or replacement method is chosen. The pipe between manholes S607 and S609 needs some spot repair on the liner. In addition, the sewer from S609 to S615 needs to be plugged once the 6-inch interceptor on the river bank is abandoned.

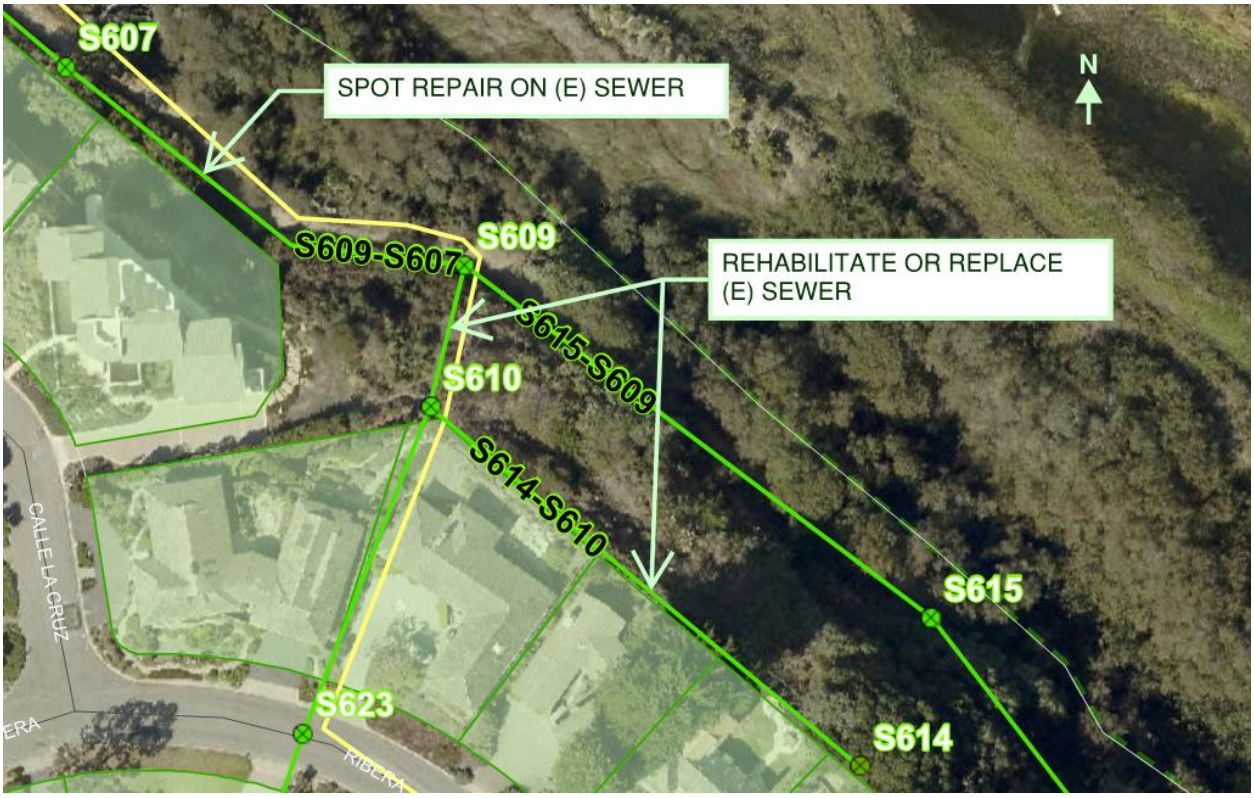


Figure 5. Rehabilitation and Repair between Manhole S607 and S614

Table 1 provides a summary of all the modifications that are required in order to reroute the flow to manhole T608.

Table 1. Summary of Improvements/Changes to the Existing System

Manhole		Pipe		Modification
Down-stream	Up-stream	Size (inches)	Length (feet)	
T604	T608	6	160	New 8” SRD26 sewer sloped from T604 to new lift station Abandon sewer to MH T603
T605	T604	6	278	New 8” SRD26 sewer sloped from T605 to T604 Replace MH 604
T606	T605	6	200	New 8” SRD26 sewer sloped from T606 to T605 Replace MH 605

Manhole		Pipe		Modification
Down-stream	Up-stream	Size (inches)	Length (feet)	
T607	T606	6	82	New 8” SDR26 sewer sloped from T607 to T606 Replace MH T606
S619	T607	6	110	New 8” SDR26 sewer sloped from S619 to T607 Replace cleanout at T607 with new MH
S617	S619	6	140	Abandon existing pipe in place Install residential grinder pump stations: 1. 2795 Ribera Road 2. 2805 Ribera Road 3. 2815 Ribera Road 4. 2825 Ribera Road Install 2-inch common discharge header pipe to serve four new residential grinder pump stations to send accumulated flow to manhole S619
S610	S614	6	272	CIPP or replace in kind
S609	S610	6	75	CIPP or replace in kind
S607	S609	6	238	Spot repair – liner defect. Plug sewer to upstream MH S615
S601	S607	6	224	None

Carmel Meadows Lift Station

The proposed lift station will be a duplex submersible pump station located at the end of the Mariposa Drive. It will collect flow from the 52 homes shown in Figure 6 and pump it through a 2-inch force main to the Highlands Force Main (FM) on Ribera Road. The following sections detail the proposed features of the new lift station.

Figure 6. Sewershed for the New Lift Station at Mariposa Drive

Lift Station Site

Mariposa Drive has a 60-ft wide public right of way. The existing manhole T608 is located at the end of this street. There is approximately 12 feet between T608 and the boundary of the next property (APN 243-051-020-000). The new lift station will likely be located to the northeast of T608 due to construction sequencing. The District obtained records from Monterey County illustrating that Mariposa Court (now Mariposa Drive) was dedicated to public use in 1961 (Appendix 2). In addition, the assessor's map shows an area east to the Mariposa Court delineated with dash lines as shown in Figure 7. Based on SRT's initial inquiry with the County's Planning Department, the dashed area may have merged with the larger, adjacent property (APN 243-051-020-000) in 1961. SRT is obtaining further verification with the County's Department of Public Works.

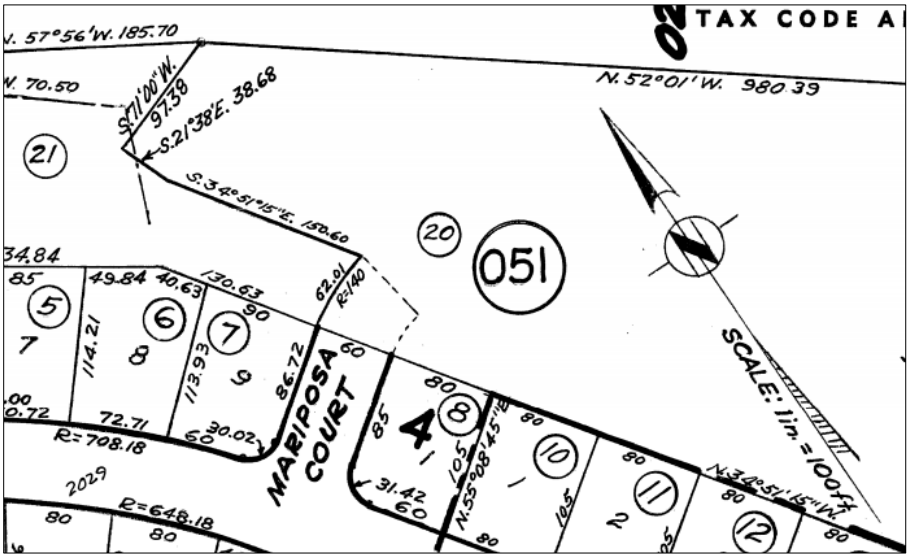


Figure 7. Assessor's Map for APN 243-051-020-000

If the area on the east end of Mariposa Court is confirmed to be public right of way, the new lift station and its appurtenances can be located in this area as shown in Figure 8. The advantage of this siting is that construction in the paved road can be avoided and impact to the adjacent residents will be minimized. A potential drawback to this location is that it might be an environmentally-sensitive area due to its proximity to Carmel River, which would result in a longer permitting process and more mitigation requirements during construction.

Figure 8. New Lift Station Location and Layout Alternative 1

Alternatively, the lift station and its valve vault can be located in the paved section of Mariposa Court, and the lift station control panel can be located in the grass area near the property boundaries (Figure 9). This siting and layout could avoid potential right-of-way issues and construction in what might be an environmentally-sensitive area.

Figure 9. New Lift Station Location and Layout Alternative 2

Lift Station Design

The new lift station will be a duplex submersible packaged pump station. Design criteria used for sizing the lift station are included in Table 2.

Table 2. Summary of Lift Station Design Criteria

Description	Criteria
Average Dry Weather Flow	70 gallons/ day/ household
Average Wet Weather Flow	90 gallons/ day/ household
Peaking Factor	4
Infiltration and Inflow (I/I)	500 gallons/day/acre
Total Number of Homes in the Sewershed	52
Highlands Force Main Pressure at Point of Connection	20 psi
Minimum Slope of Gravity Sewer Pipes	0.5%
Minimum Velocity in Force Main	2 ft/second
Maximum Velocity in Force Main	8 ft/ second
Maximum Pump Starts per Hour	6

Pump Sizing and Selection

Based on the design criteria, the design flow for the pump station is 30 gpm, and the total dynamic head is approximately 60 feet. This would ensure that the pump station has capability to handle peak flow and also provides sufficient pressure to pump into the Highlands Force Main. Both pumps are recommended to be constant-speed grinder pumps in order to reduce the solids size and prevent clogging in the force mains. The catalog sheet for a proposed pump model is attached in Appendix 4.

Force Main Size and Material

The new force main from the lift station will have a 2-inch diameter to provide a velocity of 3 feet/second in the pipe. The force main is recommended to be butt-fused HDPE buried in Mariposa Drive with a tracer wire for future locating. The new force main will connect to the existing Highlands Force Main (a 4-inch HDPE pipe) at the intersection of Mariposa Drive and Ribera Road.

Lift Station Appurtenances

Based on the pump station design flow, the required wet well storage volume is 225 gallon in order for the pumps to have no more than 2 starts per hour. The internal diameter for the wet well will be 4 feet, and the total depth of the wet well is just over 13 feet. Table 3 lists critical levels and elevations for the wet well's design and operation.

Table 3. Proposed Wet Well Set Point Elevations

Setpoint Description	Elevation
RIM Elevation	58.0 feet
Invert In Elevation	51.3 feet
High Level Alarm	50.8 feet
Lag Pump On	50.3 feet
Lag Pump Off	50.0 feet
Lead Pump On	49.8 feet
Lead Pump Off	47.4 feet
Low Level Alarm	46.9 feet
Pumps' Center Line	45.9 feet
Wet Well Bottom	44.9 feet

The wet well is recommended to be made of fiberglass. Although precast concrete wet wells are commonly used, concrete is susceptible to corrosion caused by hydrogen sulfide gas. Fiberglass wet wells are lighter, easy to construct, and superior in terms of corrosion resistance. The calculated buoyancy of the wet well will be countered by casing at the concrete collar around the base.

The guide rails for the pumps will be stainless steel. The level inside wet well will be measured by an ultrasonic level transmitter. There will be two float switches for high-level and low-level alarms to provide backup for the ultrasonic level indication.

Check valves and isolation valves will be located in a separate vault from the lift station for easy operation and maintenance. The discharge pipe from each pump will each have a dedicated set of isolation valves and check valves. All the valves will be located inside the new valve vault and the headers will be combined together by a manifold in the vault and leave the vault as one 2-inch force main. Figure 10 depicts an

example of this configuration. Although a round valve vault is shown in this figure, its exact shape and depth will be determined during final design.

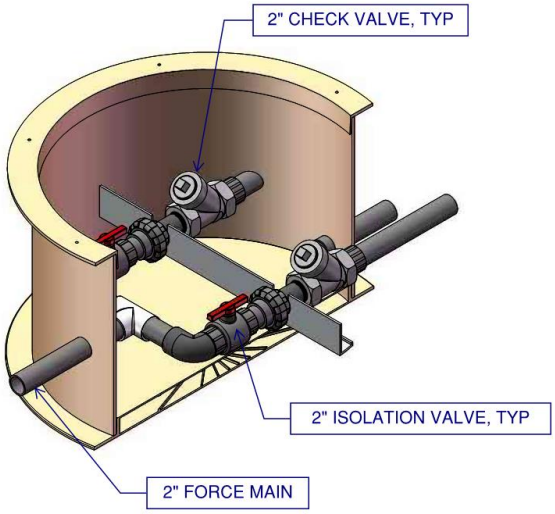


Figure 10. Proposed Valve Vault Layout

Electrical, Instrumentation and Control

The new lift station will require 3-phase 480-volt power. A new pump station control panel will provide power to the pumps and controls. Local control will include a human-machine interface (HMI) similar to the Carmel Meadows 1 lift station.

The instrumentation for the pump station will include an ultrasonic level indicator/transmitter and two float switches. The pumps will turn on and off based on wet well level set points. The two float switches will serve as backup in case that ultrasonic level transmitter fails. Signals from the control panel will be transmitted through wireless network. Catalog cut sheets for a similar lift station control panel is included in Appendix 4.

Constructability

Sewer service to the homes in Carmel Meadows must remain operational at all times. However, replacing existing sewer lines with open-cut construction will require temporarily interruption of service. In addition, two cleanouts (S619 and T607) will need to be replaced with manholes. Trenching, excavation, and other construction activities behind the homes on Ribera Road will need to be coordinated with the homeowners. Coordination and notification to the residents should be a high priority for the District.

Construction Sequencing

Suggested construction sequence for the new lift station and sewer lines is as follows:

1. Rehabilitate the existing system and install new sewer pipes between S609 and T604
2. Build lift station and its appurtenances (T608 and T604 will remain as is)
3. Construct force main between lift station and Highland FM
4. Test new lift station piping and equipment

5. Replace T608 with a deeper manhole and replace the sewer pipe between T608 and T604 to reverse flow direction
6. Connect T608 to the new lift station

Engineer's Opinion of Probable Construction Cost

The engineer's opinion of probable cost for this project is summarized in Table 4. This includes 35% contingency for planning level cost estimate, but excludes soft costs (e.g. project management, environmental regulation, geotechnical investigations, engineering design, and construction management).

Table 4. Engineer's Opinion of Probable Construction Cost

Item No.	Description	Unit	Quantity	Unit Price	Total
1	Replace Existing Sewer	LF	560	$ 250	$ 140,000
2	Install New 8" HDPE Sewer	LF	270	$ 250	$ 67,500
3	CIPP Existing Sewer	LF	347	$ 200	$ 69,400
4	Install Residential Grinder Pump Station	EA	4	$ 20,000	$ 80,000
5	Spot Repair Existing Sewer	LS	1	$ 15,000	$ 15,000
6	Replace Existing Manholes	EA	6	$ 5,000	$ 30,000
7	Procure and Install New Lift Station and its Appurtenances	EA	1	$ 150,000	$ 150,000
8	Install New 2" HDPE Force Main and Connect to Existing	LF	135	$ 300	$ 40,500
			Contingency	35%	$ 207,340
				Grand Total	**$ 799,740**

Permitting

Carmel Meadows is located in the coastal zone according to California Coastal Commission's delineation. Therefore, this project will be covered under the requirements of County of Monterey's Local Coastal Program (LCP). A Coastal Development Permit (CDP) or an Exemption from Coastal Development Permit (CDX) will be required for construction in coastal zones. SRT recommend that the District apply for the CDX first since this project consists mainly of replacement and rehabilitation of an existing system. If a CDX can be granted, the rest of the permitting process will be greatly simplified.

If a CDX cannot be granted, this project would need to go through CDP application process, which involves conducting a biological resources assessment, environmental impact review, public hearing, and other steps. Obtaining a CDP is a time-consuming process, therefore it is recommended that the District contact the Monterey County Planning Department as early as possible in the design process.

Next Steps

The next step of this program will include detailed surveying for the project area and performing a limited geotechnical investigation at the proposed lift station location. Next a conceptual design can be developed

which will allow the District to initiate discussions with the Planning Department regarding the CDX/CDP. If this project qualifies for a CDX, final design can begin after conceptual design. If this project requires a CDP, further assessments will need to be performed. Some of the detailed design could progress in parallel with the CDP application, but the design package could only be finalized after the conditions for CDP are received.

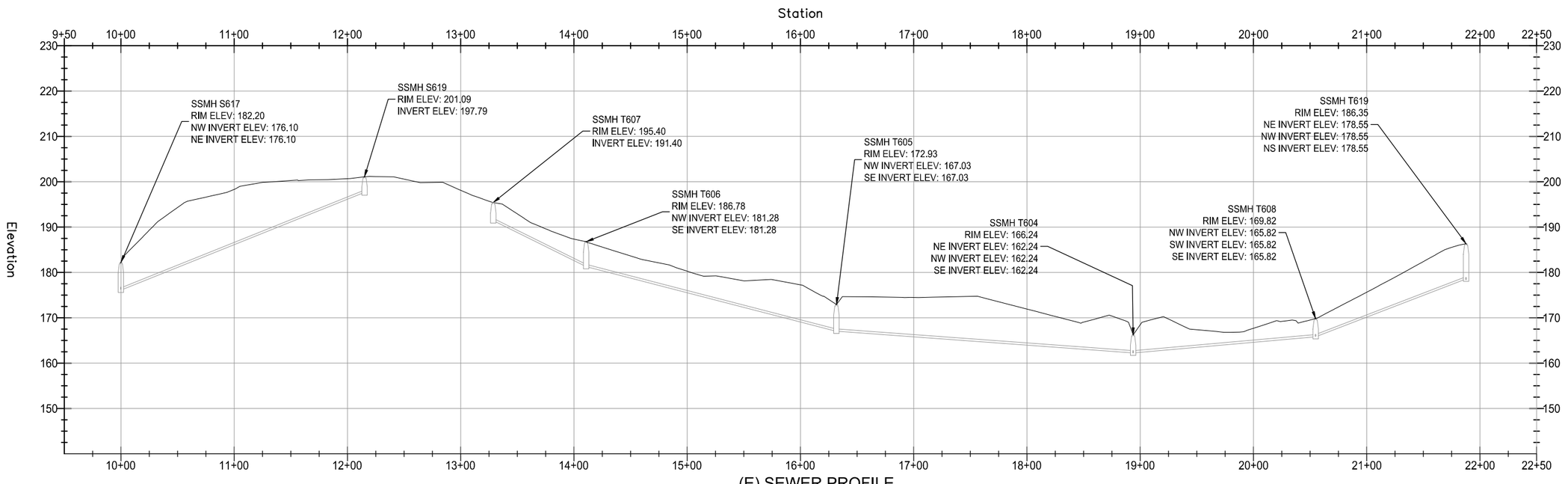
References

- Kennedy Jenks Consultants, Inc. (2013). Carmel Area Wastewater District, Carmel Meadows Gravity Sewer K/J 1399011*00
- Carmel Area Wastewater District. (2011). Highlands Force Main Pressure
- Carmel Area Wastewater District. (2019). Sanitary Sewer Standard Plans and Specifications Ordinance 2019-02
- California Coastal Commission. (1977). Coastal Zone Boundary Map – Monterey County

Appendix 1 – Plan and Profile of Existing and New Sewer between Manhole T607 and T608

NOTES:
1. SURVEY PERFORMED BY BESTOR ENGINEERS IN MAY 2019
2. ELEVATIONS ARE RELATIVE TO ARBITRARY POINT AT 5698.9140 N, 10788.9173 E (ELEV. 200.00)

(E) SEWER PLAN
SCALE: 1" = 50'



(E) SEWER PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE 1" = 10'

VERIFY SCALE
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
-	100% DESIGN SUBMITTAL	06/2019	---

NOT FOR CONSTRUCTION

SRT consultants
90 New Montgomery Street,
Suite 905
San Francisco, CA 94105
Ph 415.776.5600
Fx 415.776.5200

Carmel Area Wastewater District
3945 Rio Rd, Carmel-By-The-Sea, CA 93922
(831) 624-1248

CARMEL MEADOWS LIFT STATION FEASIBILITY STUDY

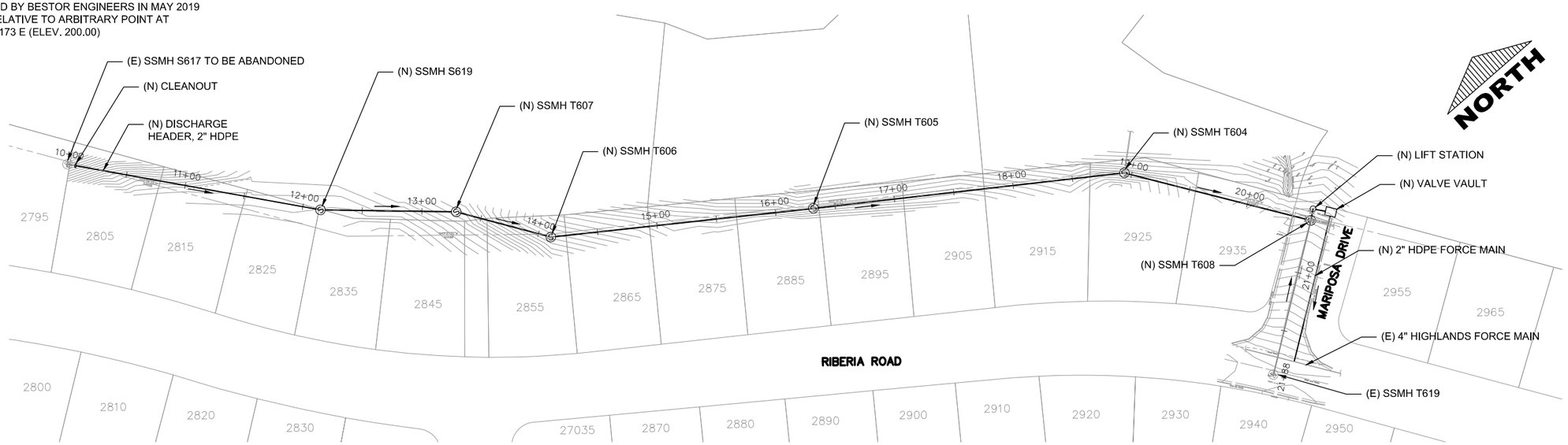
EXISTING SEWER MAIN PLAN AND PROFILE

DATE	JUN 2019
SCALE	AS SHOWN
DESIGN	N. MAO
DRAWN	J. NAVARRO
CHECK	T. MONAHAN
SHEET	1 OF 2

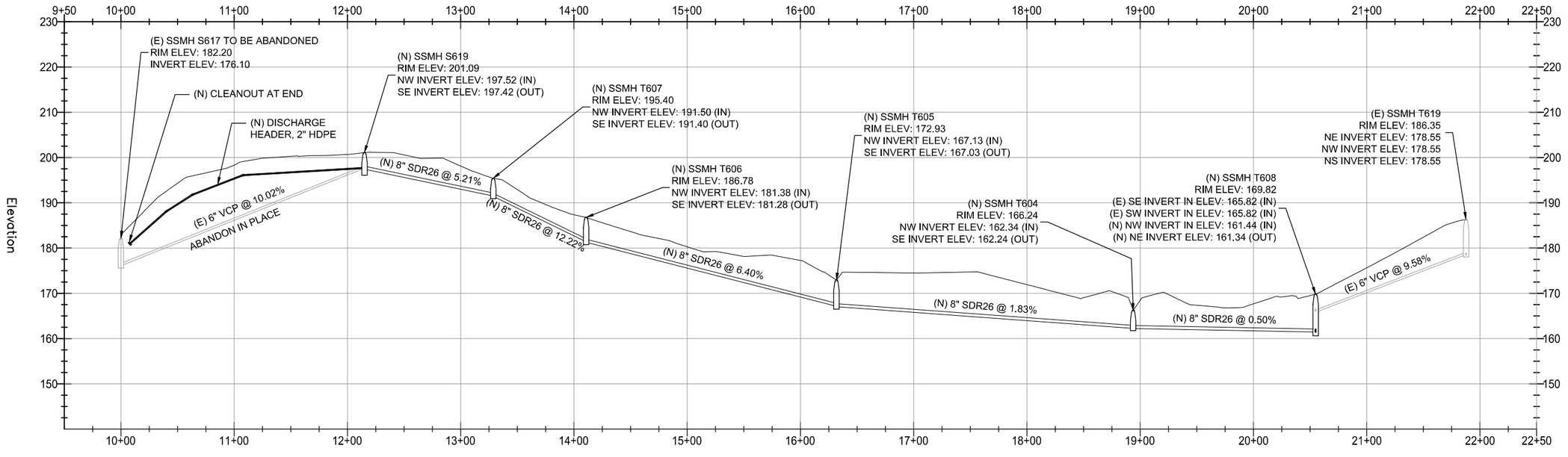
C01

DRAWING NAME: \\Newserver\srt\01-PROJECTS\CAWD\2019 Wastewater Pump Stations\02_Tasks\CAD\SHEETS\C01.dwg
PLOT DATE: Jun 28, 2019 - 5:26pm PLOTTED BY: Christine

NOTES:
1. SURVEY PERFORMED BY BESTOR ENGINEERS IN MAY 2019
2. ELEVATIONS ARE RELATIVE TO ARBITRARY POINT AT 5698.9140 N, 10788.9173 E (ELEV. 200.00)



(N) SEWER PLAN
SCALE: 1" = 50'



(N) SEWER PROFILE
HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE 1" = 10'

VERIFY SCALE
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
-	10% DESIGN SUBMITTAL	06/2019	--

NOT FOR CONSTRUCTION

SRT consultants
90 New Montgomery Street, Suite 905
San Francisco, CA 94105
Ph 415.776.5600
Fx 415.776.5200

Carmel Area Wastewater District
3945 Rio Rd, Carmel-By-The-Sea, CA 93922
(831) 624-1248

CARMEL MEADOWS LIFT STATION FEASIBILITY STUDY

PROPOSED SEWER MAIN PLAN AND PROFILE

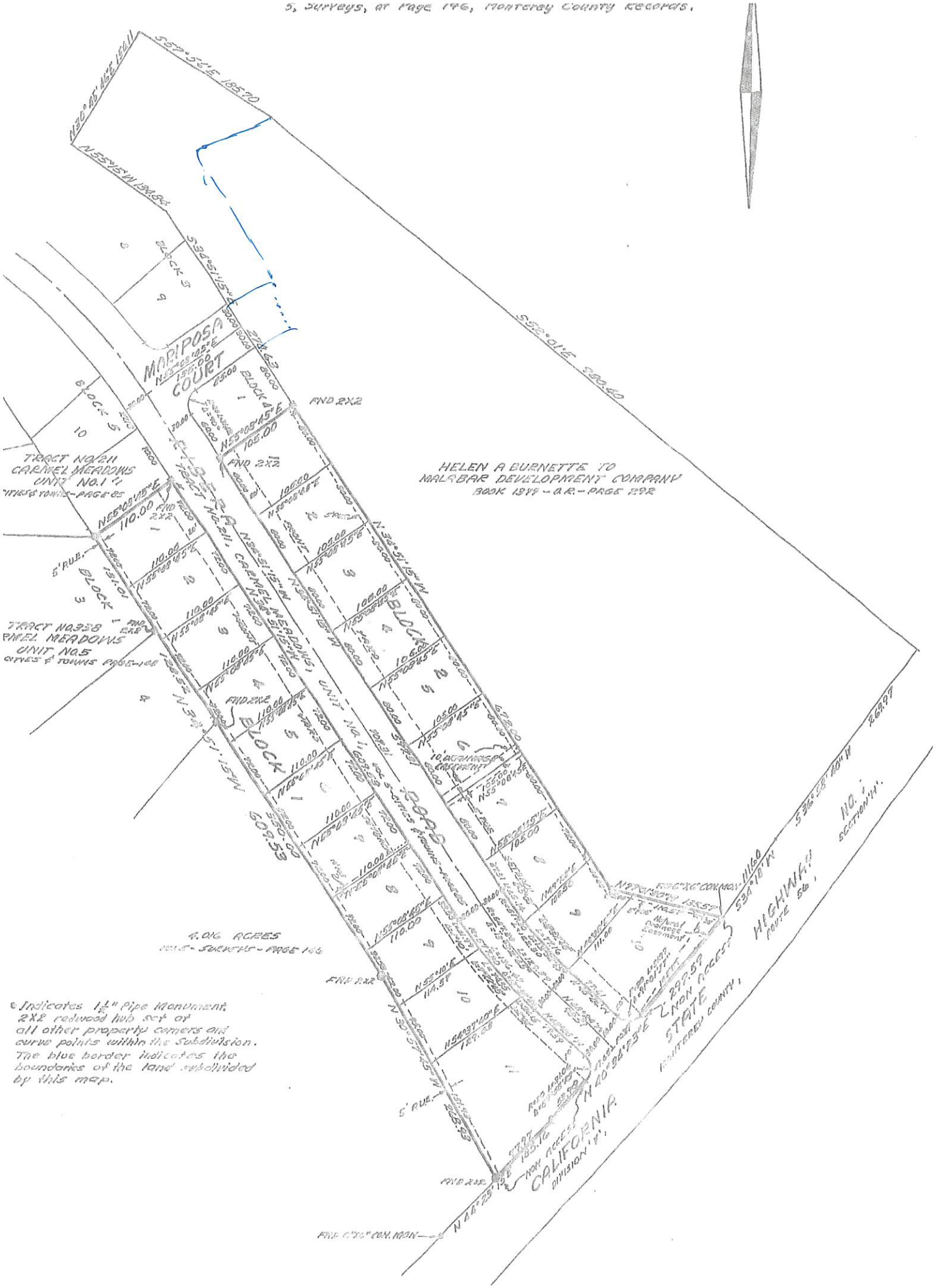
DATE	JUN 2019
SCALE	AS SHOWN
DESIGN	N. MAO
DRAWN	J. NAVARRO
CHECK	T. MONAHAN
SHEET	2 OF 2

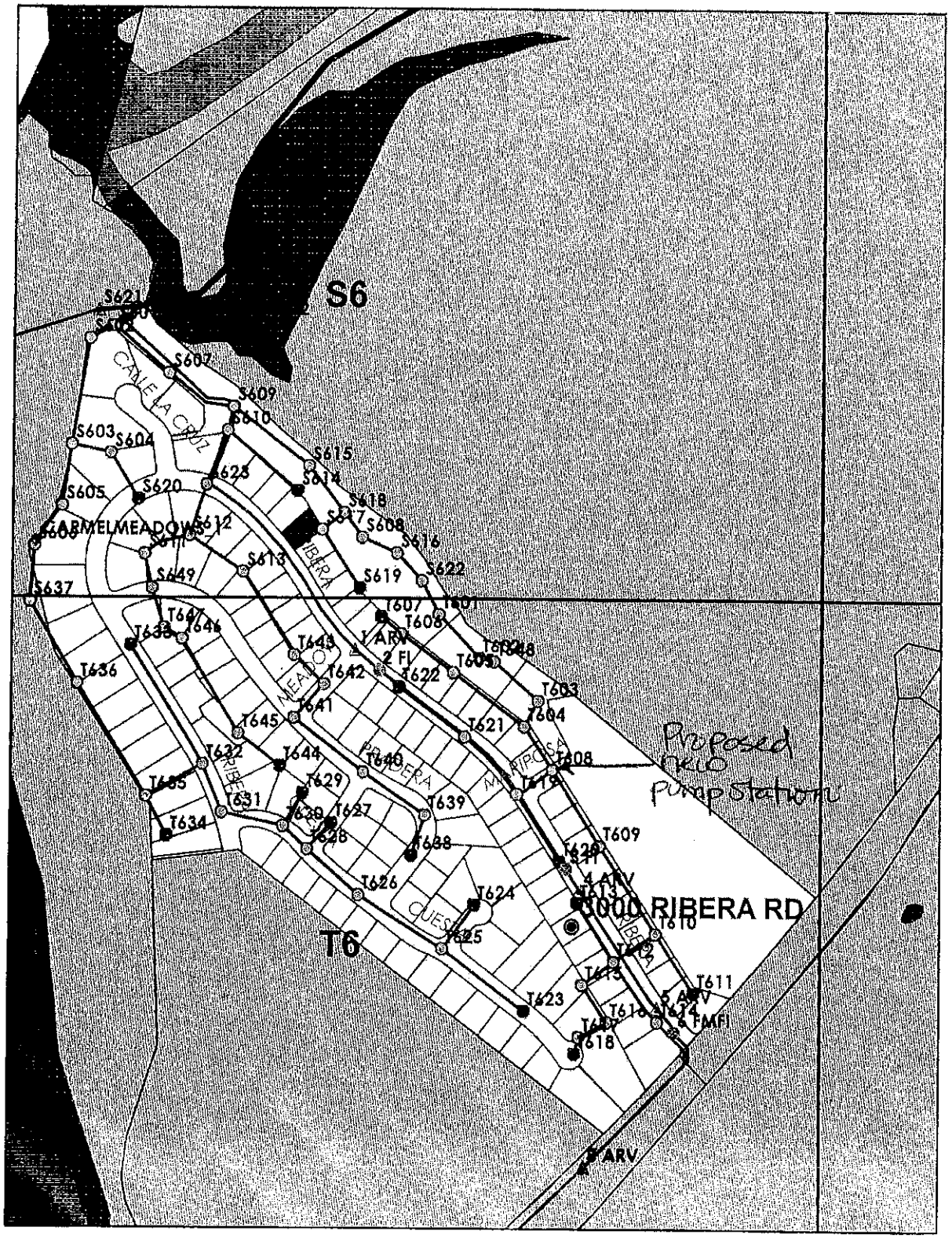
C02

DRAWING NAME: \\Newserver\srt\01-PROJECTS\CAWD\2019 Wastewater Pump Stations\02_Tasks\CAD\SHEETS\C02.dwg
PLOT DATE: Jun 28, 2019 - 5:25pm PLOTTED BY: Christine

Appendix 2 – Right-of-Way Records

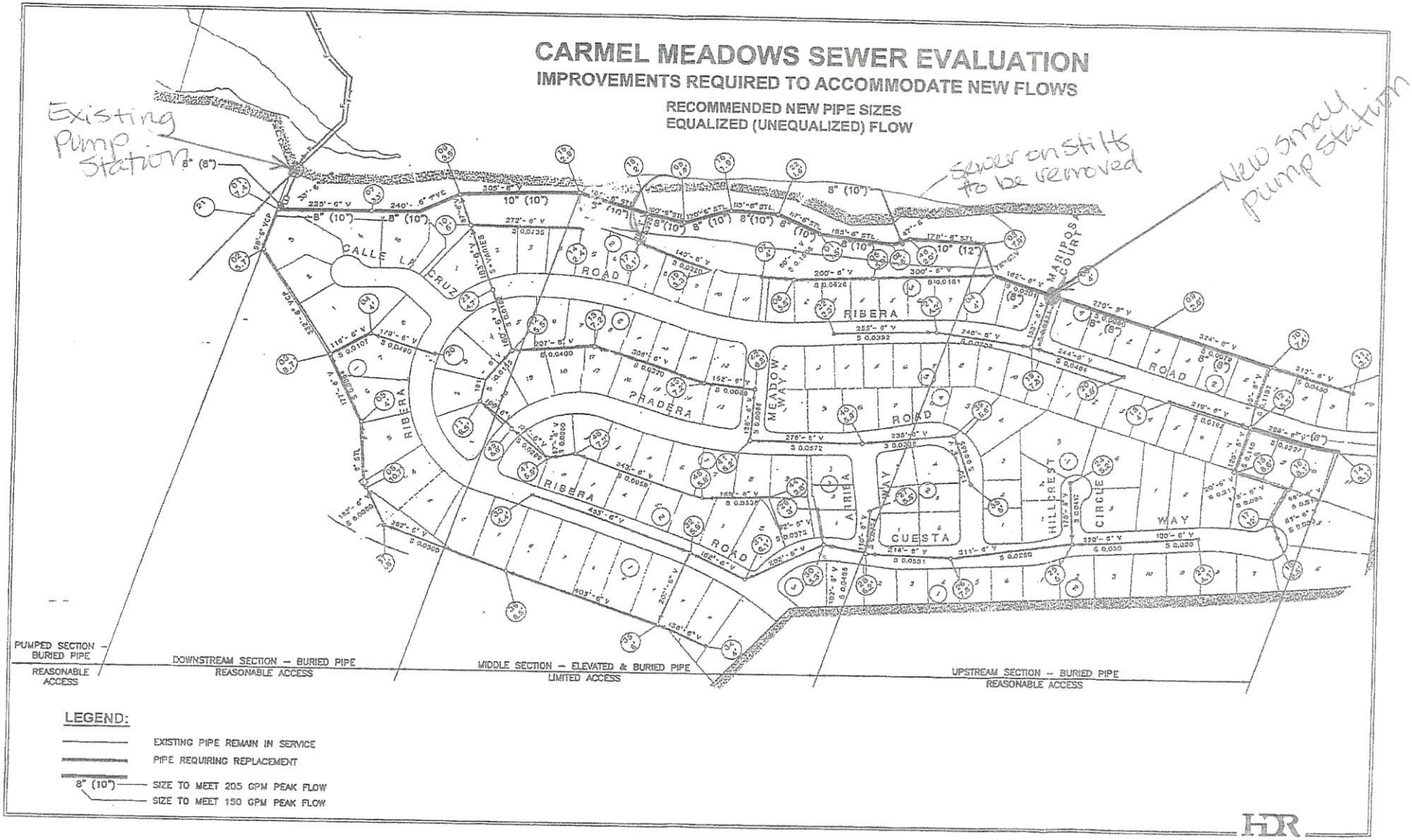
5, Surveys, at Page 176, Monterey County Records.





RedZone® ROBOTICS

2/8/2019


CARMEL MEADOWS SEWER EVALUATION
IMPROVEMENTS REQUIRED TO ACCOMMODATE NEW FLOWS
RECOMMENDED NEW PIPE SIZES
EQUALIZED (UNEQUALIZED) FLOW
Existing Pump Station
Sewer on stilts to be removed
New small pump station
CALLE LA CRUZ
RIBERA ROAD
PRADERA ROAD
MEADOW WAY
ARRIBA WAY
CUESTA HILLCREST CIRCLE WAY
MARIPOSA COURT
PUMPED SECTION – BURIED PIPE
REASONABLE ACCESS
DOWNSTREAM SECTION – BURIED PIPE
REASONABLE ACCESS
MIDDLE SECTION – ELEVATED & BURIED PIPE
LIMITED ACCESS
UPSTREAM SECTION – BURIED PIPE
REASONABLE ACCESS
LEGEND:
EXISTING PIPE REMAIN IN SERVICE
PIPE REQUIRING REPLACEMENT
8" (10") SIZE TO MEET 205 GPM PEAK FLOW
SIZE TO MEET 150 GPM PEAK FLOW
HDR

243-051-021

RECORDING REQUESTED BY

LAW OFFICES OF
ZAD LEAVY & ROBIN JEPSEN

AND WHEN RECORDED MAIL TO:

LAW OFFICES OF
ZAD LEAVY & ROBIN JEPSEN
3788 Via Nona Marie, #300
Carmel CA 93923

Joseph F. Pitta
Monterey County Recorder
Recorded at the request of
Attorney

RALICIA
12/30/2002
13 19:54

DOCUMENT: 2002123300

Titles: 1/ Pages: 3

Fees . . . 14.00
Taxes . . .
Other . . .
AMT PAID 014.00

Quitclaim Deed

APN's: 243-051-020 & 243-051-021

The undersigned Grantor(s) declare(s) under penalty of perjury that the following is true and correct:
Documentary transfer tax is $ ZERO - NO CONSIDERATION

☐ Computed on full value of property conveyed, or

☐ Computed on full value less value of liens and encumbrances remaining at time of sale.

☒ Unincorporated area: ☐ City of _____, and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

THE BIG SUR LAND TRUST, a California nonprofit public benefit corporation,

hereby **REMISE(S), RELEASE(S) AND FOREVER QUITCLAIMS** to

PORTOLA CORPORATION, a California corporation,

the following described real property in the County of Monterey, State of California:
See Exhibit A attached hereto and incorporated by reference.

Dated December 19, 2002

THE BIG SUR LAND TRUST, a California nonprofit public benefit corporation

By _____
KENT EVANS, President

By _____
MARTHA MCMAHON ZELUS, Secretary

STATE OF CALIFORNIA
COUNTY OF Monterey) ss.
On December 19, 2002 before me

_____, a Notary Public in and for said State, personally appeared
KENT EVANS & MARTHA MCMAHON ZELUS
personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

ZAD LEAVY
Notary Public-California
Monterey County
My Comm. Expires Jan 11, 2003

Mail tax statements to party shown on following line (or if none shown, to address above):
PORTOLA CORPORATION, c/o ROBERT A. CRIVELLO, 25050 RIO VISTA DRIVE, CARMEL CA 93923

03510 VOL. 5 PG 85

TRACT NO. 211

CARMEL MEADOWS — UNIT No. 1

BEING A PORTION OF THE RANCHO SAN JOSE Y SUR CHIQUITO
IN THE COUNTY OF MONTEREY
MAY 1951

BRYAN & MURPHY CIVIL ENGINEERS
BERKELEY, CALIF

We hereby certify that we are the owners of, or have some right, title or interest in and to, the real property included within the subdivision shown upon this map, and that we are the only persons whose consent is is necessary to pass a clear title to said property, and we consent to the making of said map and subdivision as shown within the colored border lines and hereby dedicate to public use all the land designated as RIBERA ROAD, CALLE LA CRUZ, PEADERA WAY, MEADOW WAY, and MARIPOSA COURT.

We also hereby dedicate for public use easements for public utilities under, on or over those certain strips of land lying between the rear lines and/or side lines of lots and the lines designated as "5' Easement for Drainage" and "Reserve 5' Wide", as shown upon said map, within said subdivision, such strips of land to be kept open and free from buildings and structures of any kind.

MALABAR DEVELOPMENT COMPANY, INC.

Kenneth F. Jones
President

Franklin P. Williams
Secretary

State of California }
County of Monterey } ss.

On this 8th day of May, in the year one thousand nine hundred and fifty-two, before me, R.J. Ready, a Notary Public in and for the County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared KENNETH F. JONES and FRANK P. WILLIAMS known to me to be the President and Secretary of the corporation described in and, that executed the within instrument and also known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County of Monterey the day and year in this certificate first above written.

Notary Public in and for the County of Monterey, State of California.

My Commission Expires . . .

I, FRANCIS E. BRYAN, Registered Civil Engineer, hereby certify that this map correctly represents a survey made under my direction during May 1951; that the survey is true and complete as shown; that the monuments will be set in such positions and at such time as stipulated in bond filed in office of County Surveyor, May 2, 1956, and will be sufficient to enable the survey to be retraced.

The bearing of the westerly line of California State Highway right-of-way, official designation, "Division I", Monterey County, Route 56, Section H", as shown in the Grant Deed of EUNICE A. BAILEY et. al. to HELEN A. BURNETTE, dated February 4, 1949, and filed in Book 1183 at page 383 of the official records of the County Recorder of the County of Monterey, State of California on January 25, 1950 as N 43° 19' 20" E was taken as the basis of bearings shown upon this map.

All distances and dimensions are shown in feet and decimals thereof.

The blue border indicates the boundaries of the land subdivided by this map.

Francis E. Bryan
Registered Civil Engineer
Registration Certificate No. 6131

MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corporation, trustee under that certain Deed of Trust dated March 28, 1952, made by MALABAR DEVELOPMENT COMPANY a corporation to MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corporation, trustee, for Helen A Burnette, as beneficiary, and recorded May 7, 1952, in Book 1379 at page 299 in official records of the County Recorder of Monterey County, California; and Helen A. Burnette consent to the making and filing of the within map, and join in the offer to dedicate those parcels of land offered for dedication to public use as shown upon the within map.

IN WITNESS WHEREOF, the undersigned, MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, as trustee, has caused its corporate name to be hereunto subscribed by its Vice President and attested by its Asst Secretary, thereunto duly authorized and its corporate seal to be hereunto affixed this 8th day of May 1952, and also the undersigned, Helen A. Burnette, as beneficiary has caused her name to be hereunto affixed this 8th day of May 1952.

MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corporation, trustee

by Nelson Faulkner, Vice-President by E.J. Brians, Asst Secretary

Helen A. Burnette

State of California }
County of Monterey } ss.

On this 8th day of May, in the year one thousand nine hundred and fifty-two, before me, P.J. Ready a Notary Public in and for the County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared Nelson Faulkner, and E.J. Brians known to me to be the Vice President and Asst Secretary of the corporation described in and that executed the within instrument, and also known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County of Monterey the day and year in this certificate first above written.

Notary Public in and for the County of Monterey, State of California.

My Commission Expires

State of California }
County of Monterey } ss.

On this 8th day of May, 1952, before me, P.J. Ready, a Notary Public in and for the County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared Helen A. Burnette, known to me to be the person described in and whose name is subscribed to the within instrument and acknowledged to me that she executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County of Monterey the day and year in this certificate first above written.

Notary Public in and for the County of Monterey, State of California.

My Commission Expires

I, CHESTER DUDLEY, County Surveyor of Monterey County, hereby certify that I have examined this map; that the subdivision as shown thereon is substantially the same as it appeared on the tentative map, and any approved alterations thereof, as approved by the Monterey County Planning Commission, on February 25, 1951; that all the provisions of the California "Subdivision Map Act" as amended and of Monterey County Ordinance No. 546, applicable at the time of the approval of said tentative map, have been complied with, and this map is technically correct.

Chester Dudley
County Surveyor, Monterey County, California

MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corporation, trustee under that certain Deed of Trust dated March 28, 1952, made by MALABAR DEVELOPMENT COMPANY, INC, a corporation to MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corp, trustee, for ARDEN ESTATES', INCORPORATED, as beneficiary, and recorded May 7, 1952, in Book 1379 at page 331 in official records of the County Recorder of Monterey County, California, and ARDEN ESTATES, INCORPORATED, a corporation, consent to the making and filing of the within map, and join in the offer to dedicate those parcels of land offered for dedication to public use as shown upon the within map.

IN WITNESS WHEREOF, the undersigned, MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, as trustee, has caused its corporate name to be hereunto subscribed by its Vice-President and attested by its Asst Secretary, thereunto duly authorized and its corporate seal to be hereunto affixed this 8th day of May 1952, and also the undersigned, ARDEN ESTATES, INCORPORATED, a corporation, as beneficiary, has caused its corporate name to be hereunto subscribed by President and attested by its Secretary-Treasurer thereunto duly authorized and its corporate seal to be hereunto affixed this 8th day of May 1952.

MONTEREY COUNTY TITLE AND ABSTRACT COMPANY, a corporation, trustee

by Nelson Faulkner, Vice-President by E.J. Brians, Asst Secretary

ARDEN ESTATES, INCORPORATED

by Franklin P. Williams, President by Stephen F. Williams, Secretary-Treasurer

State of California }
County of Monterey } ss.

On this 8th day of May, in the year one thousand nine hundred and fifty-two, before me, R.J. Ready a Notary Public in and for the County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared NELSON FAULKNER, and E.J. BRIANS, known to me to be the Vice-President, and Asst. Secretary of the corporation described in and that executed the within instrument, and also known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County of Monterey the day and year in this certificate first above written.

Notary Public in and for the County of Monterey, State of California.

My Commission Expires

State of California }
County of Monterey } ss.

On this 8th day of May, in the year one thousand nine hundred and fifty-two, before me, R.J. Ready, a Notary Public in and for the County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared FRANK P. WILLIAMS and STEPHEN F. WILLIAMS known to me to be the President and Secretary-Treasurer of the corporation described in and that executed the within instrument, and also known to me to be the persons who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal in the County of Monterey the day and year in this certificate first above written.

Notary Public in and for the County of Monterey, State of California.

My Commission Expires

I, EMMET G. MCMENAMIN, Clerk of the Board of Supervisors of Monterey County, State of California, hereby certify that said Board approved the within map on the 13th day of May, 1952, and accepted on behalf of the public, all parcels of land offered for dedication for public use, in conformity with the terms of the offer of dedication.

Emmet G. McMenamin
County Clerk and Ex-Officio Clerk of the Board of Supervisors of the County of Monterey, State of California

by
Deputy

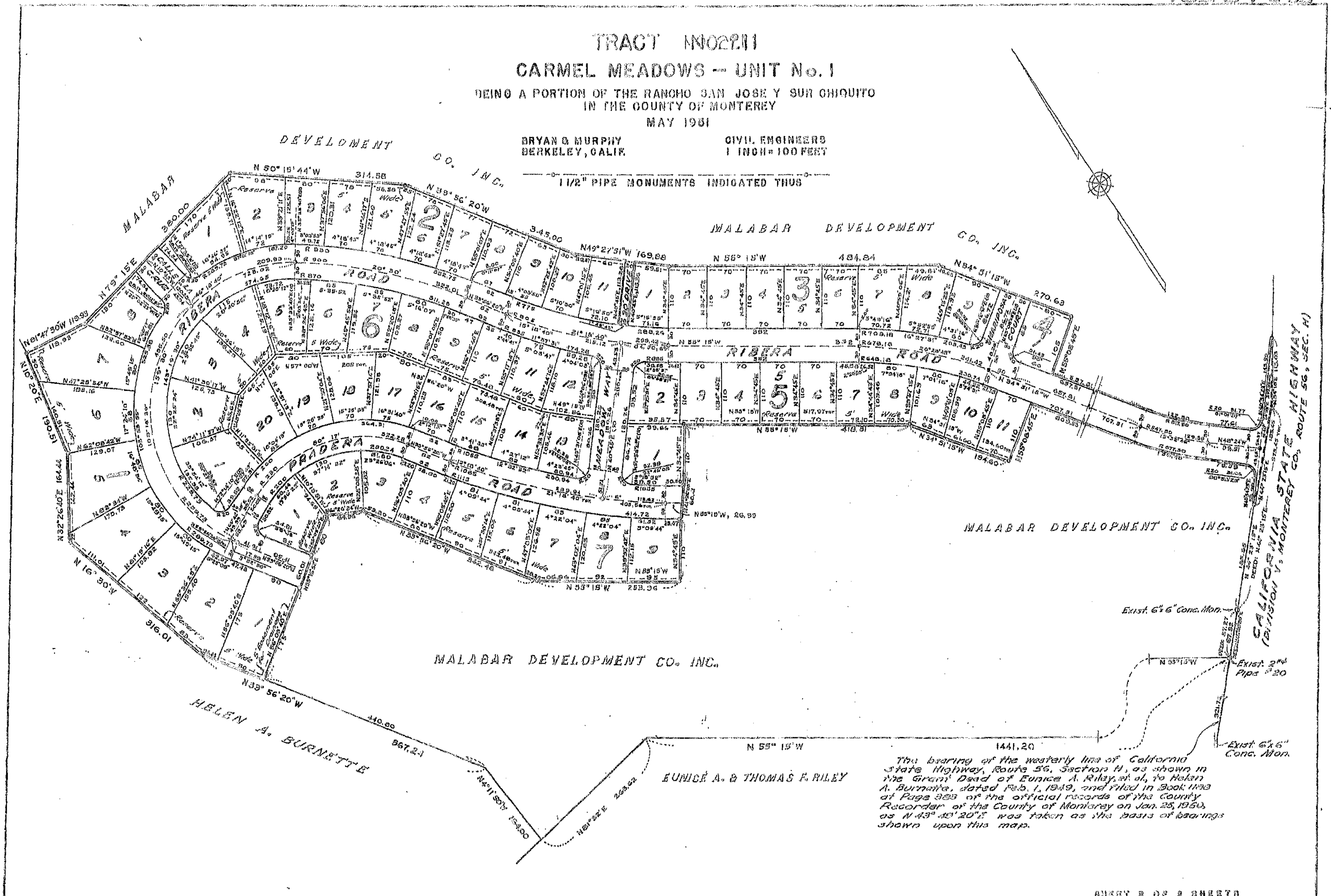
Filed for record at the request of EMMET G. McMENAMIN this 14 day of May, 1952, at 22 min. past 3 P.M., in Volume 5 of Cities & Towns, at page 35, Records of Monterey County, California.

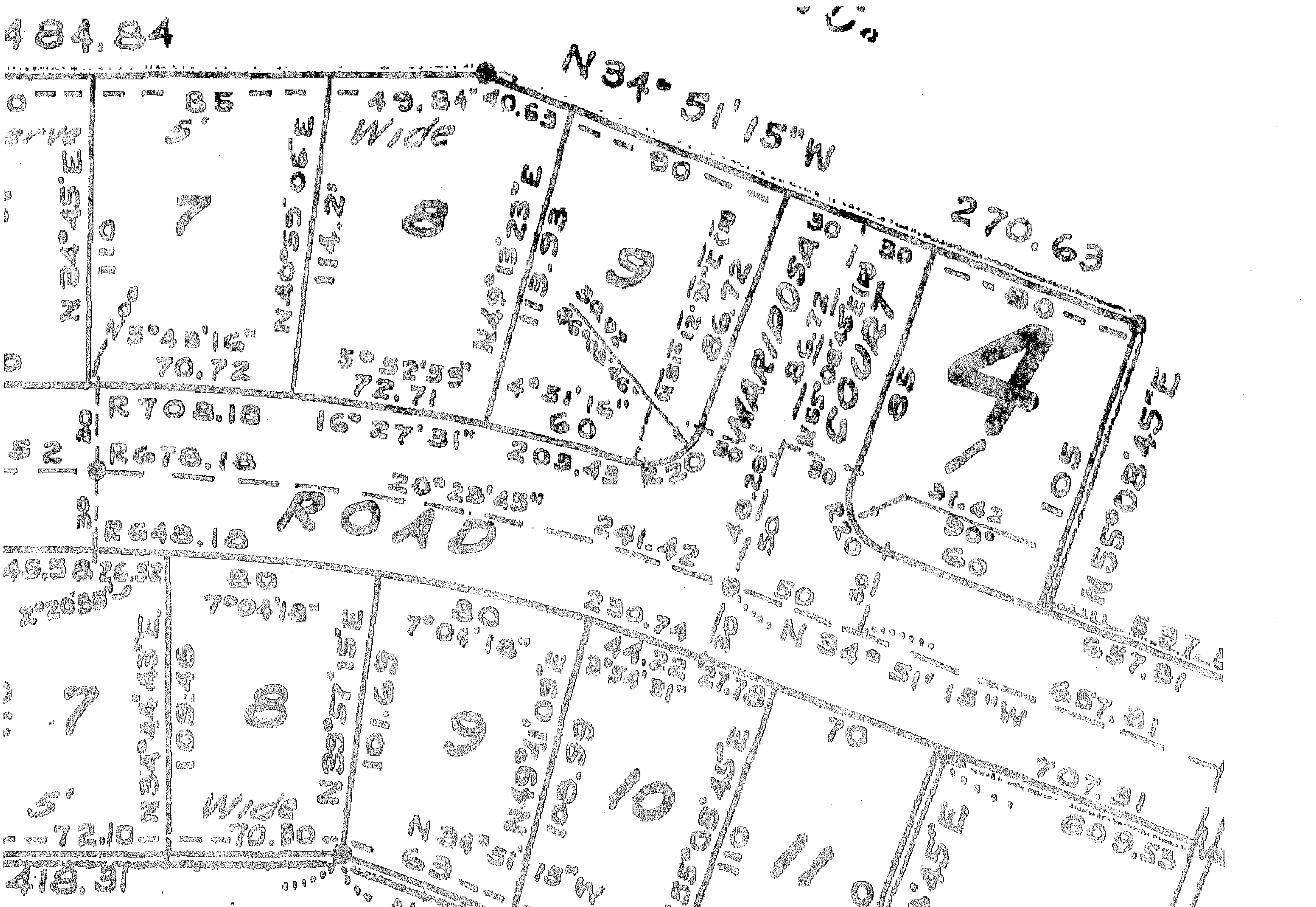
John E. Wallace
County Recorder

by R. Causley
Deputy

SHEET NO. 1 OF 2 SHEETS

3-11-52


TRACT No. 211
CARMEL MEADOWS – UNIT No. 1
BEING A PORTION OF THE RANCHO SAN JOSE Y SUR CHIQUITO
IN THE COUNTY OF MONTEREY
MAY 1951
BRYAN & MURPHY
BERKELEY, CALIF.
CIVIL ENGINEERS
1 INCH = 100 FEET
1 1/2" PIPE MONUMENTS INDICATED THUS
MALABAR DEVELOPMENT CO. INC.
MALABAR DEVELOPMENT CO. INC.
MALABAR DEVELOPMENT CO. INC.
MALABAR DEVELOPMENT CO. INC.
RIBERA ROAD
PRADERA ROAD
MEADOW WAY
HELEN A. BURNETTE
EUNICE A. & THOMAS F. RILEY
CALIFORNIA STATE HIGHWAY
(DIVISION V, MONTEREY CO., ROUTE 56, SEC. H)
Exist. 6"x6" Conc. Mon.
Exist. 2" Pipe
Exist. 6"x6" Conc. Mon.
N 55° 15' W 1441.20
N 39° 56' 20" W
The bearing of the westerly line of California State Highway, Route 56, Section H, as shown in the Grant Deed of Eunice A. Riley, et al, to Helen A. Burnette, dated Feb. 1, 1949, and filed in Book 1193 at Page 383 of the official records of the County Recorder of the County of Monterey on Jan. 25, 1950, as N 43° 40' 20" E was taken as the basis of bearings shown upon this map.
SHEET 2 OF 2 SHEETS



484.84
N 34° 51' 15"W
270.63
49.84'
40.63
85
5'
Wide
7
8
9
4
N 34°45'E
N 40°55'06"E
114.2
N 49°15'23"E
113.93
5°48'16"
70.72
5°52'59"
72.71
4°51'16"
60
R 708.18
16°27'31"
209.43
R 678.18
R 648.18
ROAD
20°25'45"
241.42
MARIPOSA
COURT
105
N 55°08'45"E
60
290.74
N 34° 51' 15"W
657.81
44.22
27.18
80
7°04'16"
7
8
9
10
11
70
N 34°45'E
103.46
N 39°57'15"E
101.69
N 49°11'05"E
5'
Wide
72.10
70.80
N 34°51' 15"W
63
707.81
609.53
418.31

I, Clayton B. Neill, Registered Civil Engineer, hereby certify that this map correctly represents a survey made under my direction during Dec., 1960; that the survey is true and complete as shown; that the monuments are of the character and occupy the positions indicated (or will be set in such positions) and at such time as stipulated in Bond filed in the office of the County Surveyor, March 1st, 1962, and are (or will be) sufficient to enable the survey to be re-traced.

Clayton B. Neill.
Registered Civil Engineer of the State of California. Reg. No. 424

I, E. W. DeMars, Secretary of the Monterey County Planning Commission, hereby certify that I have examined this map; that the subdivision as shown hereon is substantially the same as it appeared on the tentative map, and any approved alterations thereof as approved by the Monterey County Planning Commission on, November 11th, 1960; that all the provisions of the California "Subdivision Map Act", as amended and of Monterey County Subdivision Ordinance applicable at the time of the approval of said tentative map, have been complied with.

E. W. Mars
Secretary, Monterey County Planning Commission, County of Monterey, State of California.

I, Bruce W. McClain, County Surveyor of Monterey County, hereby certify that I have examined this map; that the subdivision as shown hereon is substantially the same as it appeared on the tentative map, and any approved alterations hereof as approved by the Monterey County Planning Commission, on November 11th, 1960, that all the provisions of the California "Subdivision Map Act" as amended and of Monterey County Ordinance No. 836, applicable at the time of the approval of said tentative map, have been complied with, and this map is technically correct.

Bruce W. McClain
County Surveyor, Monterey County, California.

I, EMMET G. McMENAMIN, Clerk of the Board of Supervisors of Monterey County hereby Certify that said board approved the within map on the 30th day of JANUARY, 1961, and accepted on behalf of the public, all parcels of land and abutter's rights of access offered for dedication for public use, in conformity with the terms of the offers of dedication.

By EMMET G. McMENAMIN
County Clerk and Ex-Officio Clerk of the Board of Supervisors of the County of Monterey, State of California.

By Della V. Fering
Deputy

(9548)

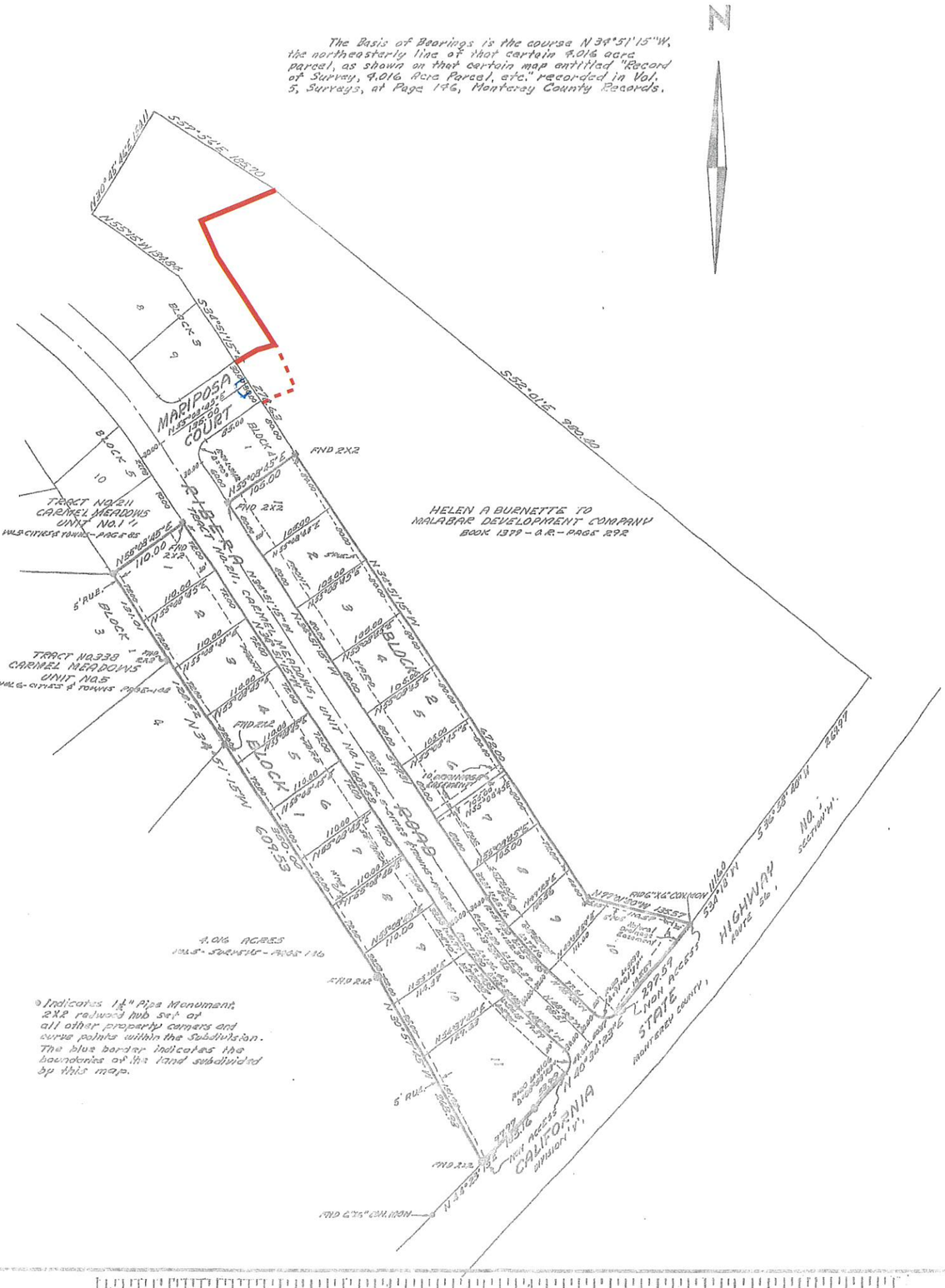
Filed for record at the request of Bruce W. McClain this 31st day of January, 1961, at 10 minutes past 10 o'clock A.M. in Volume 7 of Cities & Towns at page 31, Records of Monterey County, California.

Emmet G. McMenamin
County Recorder

By Blanche Richardson
Deputy

Fee $ 5.00

The Basis of Bearings is the course N 34°51'15"W, the northeasterly line of that certain 4.016 acre parcel, as shown on that certain map entitled "Record of Survey, 4.016 Acre Parcel, etc." recorded in Vol. 5, Surveys, at Page 196, Monterey County Records.



● Indicates 1½" Pipe Monument 2X2 redwood hub set at all other property corners and curve points within the Subdivision. The blue border indicates the boundaries of the land subdivided by this map.

We hereby certify that we are the owners of, or have some right, title or interest in and to, the real property included within the subdivision shown upon this map, and that we are the only persons whose consent is necessary to pass a clear title to said property, and we consent to the making of said map and subdivision as shown within the colored border lines.

We also hereby dedicate for public use all drainage and/or utility easements shown by dotted lines under on or over those certain strips of land as shown on said map, such strips of land to be kept open and free from buildings and structures.

We hereby dedicate to the County of Monterey our abutter's rights of access to and from the street (or highway) over those boundaries of or in this subdivision marked and designated "Non Access".

THE ACREAGE DEVELOPMENT COMPANY, A COPARTNERSHIP

By Fermin A. Goya partner

By Myron E. Ebinger, Jr. partner

STATE OF CALIFORNIA)
(ss.
County of Monterey)

On this 28 day of December, 1960, before me, G Greenwood, a Notary Public in and for said County of Monterey, State of California, residing therein, duly commissioned and sworn, personally appeared Fermin A. Goya and Myron E. Ebinger, Jr., partners known to me to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same as partners.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

G Greenwood
Notary Public in and for the County of Monterey, State of California.
My Commission Expires June 11, 1961

ENGINEERING OFFICE OF CLAYTON B. NEILL
BOX LL CARMEL CALIFORNIA

TRACT NO. 381

CARMEL MEADOWS UNIT NO. 7

A SUBDIVISION OF A PORTION OF RANCHO SAN JOSE Y SUR CHIQUITO MONTEREY COUNTY, CALIFORNIA

PREPARED FOR
THE ACREAGE DEVELOPMENT COMPANY

SCALE: 1"=100" W.O. 1715 DECEMBER 1960

Appendix 3 – Assessor's Map for APN 243-051-020-000

02 TAX CODE AREA

COUNTY OF MONTEREY
ASSESSOR'S MAP
BOOK 243 PAGE 05

051

052

053

054

POR. of LOT 2 of SUB. A of LOT 4

SCALE: 1 in. = 100 ft.

RIBERA

PRADERA

CARMEL MEADOWS UNIT No. 7

CARMEL ROAD

MARIPOSA COURT

ARRIBA WAY

CUESTA WAY

HILLCREST CIRCLE

CARMEL MEADOWS DRIVE

STATE HWY. 68

N.E. PORTION OF LOT 2 OF SUB. A OF 4 CARMEL MEADOWS UNIT No. 1 BLK. 3 LOTS 3 TO 9 BLK. 4 & BLK. 5 LOTS 4 TO 11

LOT 1 OF SUB. A OF LOT 4 CARMEL MEADOWS No. 4 CARMEL MEADOWS No. 5, 6 & 7

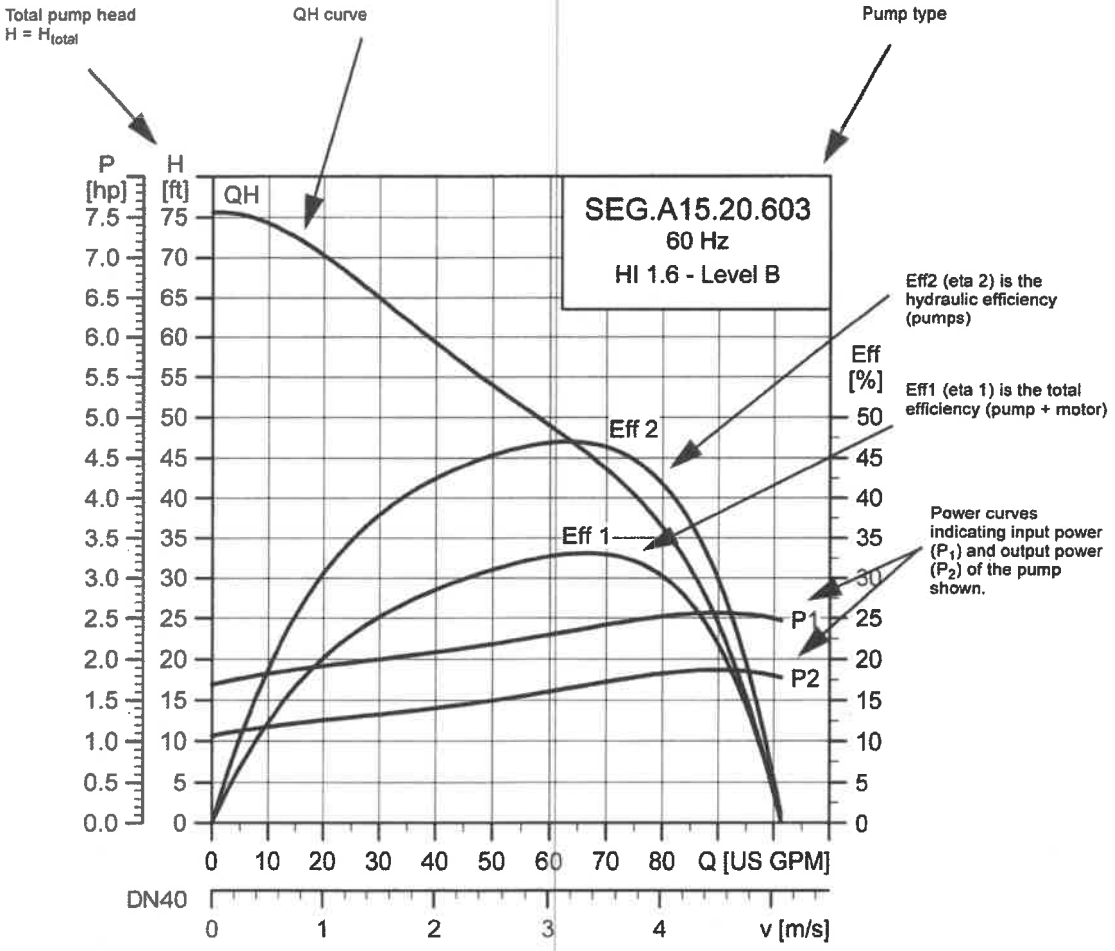
LIETZ 1104 250 9-55

Appendix 4 – Catalog Sheets for Sample Lift Station Pumps and Appurtenances

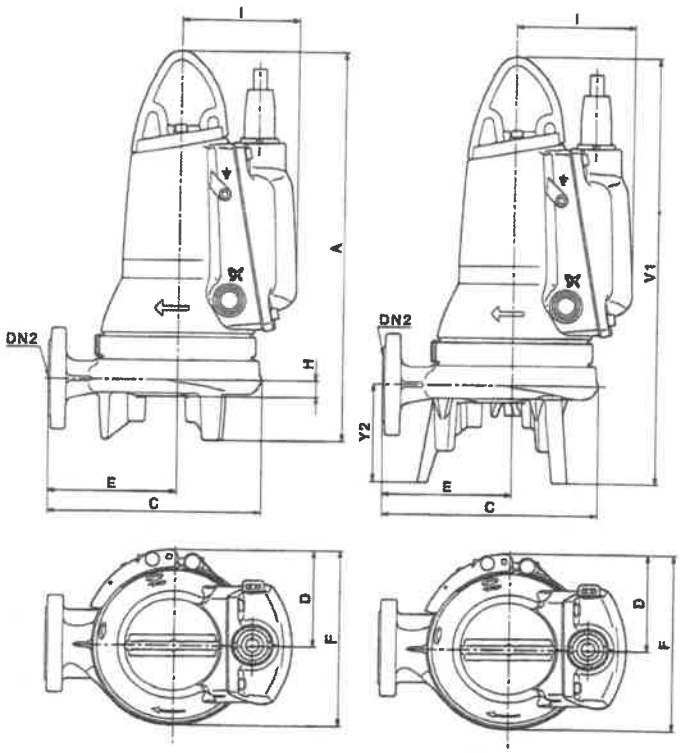
9. Curve charts

How to read the performance curves

The curves on the following pages apply to both SEG and SEG AUTO$_{ADAPT}$ pumps.



SEG AUTO$_{ADAPT}$ pumps



TM04 4851 1711

Fig. 24 Free-standing installation without or with foot extensions

	Power [hp (kW)]	A	C	D	DN2	E	F	H	I	V1	Y2
SEG.A15	2.0 (1-phase) (1.5)	18.58 (472)	9.92 (252)	3.9 (99)	1 - 1/2" (DN 40)	6.06 (154)	8.5 (216)	2.87 (73)	5.51 (140)	20.28 (515)	4.57 (116)
	2.0 (3-phase) (1.5)	17.99 (457)	9.92 (252)	3.9 (99)		6.06 (154)	8.5 (216)	2.87 (73)	5.51 (140)	19.69 (500)	4.57 (116)
	3.0 (2.6)	20.71 (526)	11.57 (294)	4.69 (119)		6.81 (173)	10.08 (256)	2.36 (60)	6.54 (166)	22.91 (582)	4.53 (115)
	4.0 and 5.5 (3.1 and 4.0)	22.28 (566)	11.57 (294)	4.69 (119)		6.81 (173)	10.08 (256)	2.36 (60)	6.54 (166)	24.49 (622)	4.53 (115)

	Power [hp (kW)]	A	C	D	DN2	E	F	H	I	V1	Y2
SEG.A20	3.0 (2.6)	21.14 (537)	11.54 (293)	4.69 (119)	2" (DN 50)	6.81 (173)	10.08 (256)	2.36 (60)	6.54 (166)	22.91 (582)	4.53 (115)
	4.0 and 5.5 (3.1 and 4.0)	22.72 (577)	11.54 (293)	4.69 (119)		6.81 (173)	10.08 (256)	2.36 (60)	6.54 (166)	24.49 (622)	4.53 (115)

Weight table

Pumps, A15 outlet flange	Weight [lb (kg)]
SEG.A15.20.E.2.1.603	105.8 (48)
SEG.A15.20.E.2.60H	136.7 (62)
SEG.A15.20.E.2.60M	150.8 (48)
SEG.A15.30.E...	136.7 (62)
SEG.A15.40.E...	160.9 (73)
SEG.A15.55.E...	160.9 (73)
Pumps, A20 outlet flange	**Weight [lb (kg)]**
SEG.A20.30.E...	136.7 (62)
SEG.A20.40.E...	160.9 (73)
SEG.A20.55.E...	160.9 (73)

DESCRIPTION	QTY.
FIBERGLASS BASIN; 36" DIA. x 24"H x 3/8" WALL THICKNESS. EXTERIOR COLOR TORQUE TAN GEL COAT	1
FIBERGLASS LID FLANGE, 36" DIA.	1
FIBERGLASS LID, 36" DIA.	1
EYENUT, 1/2"-13 304 S.S.	3
FIBERGLASS BASIN BASE, 36" DIA	1
INLET PLUMBING, 2" SCH. 80 PVC	2
DRAIN, 3" SCH. 80 PVC	1
MALE ADAPTER; 2" SCH. 80 (MIPT x SOC)	2
BALL CHECK VALVE, 2" FLOMATIC	2
FIBERGLASS SUPPORT BRACE	1
TOE NIPPLE, 2" x 6" SCH. 80 PVC	2
UNION; 2" SCH. 80	2
DISCHARGE PLUMBING, 2" SCH. 80 PVC	2
BALL VALVE, 2" SCH. 80 PVC (SLIP)	2
STREET ELL, 2" SCH. 80 PVC	2
DISCHARGE PLUMBING, 2" SCH. 80 PVC	2
TEE, 2" SCH. 80 PVC (SLIP)	1
DISCHARGE PLUMBING, 2" SCH. 80 PVC	1

BASIN SHALL BE MANUFACTURED FROM ISOPHTHALLIC RESIN AND E GLASS REINFORCEMENT.

BASIN SHELL WALL SHALL BE MANUFACTURED BY A HELICAL FILAMENT WINDING PROCESS.

THE INTERIOR SURFACE SHALL BE A RESIN RICH LAYER OF FIBERGLASS C-VEIL OR ORGANIC SURFACE VEIL.

EXTERIOR TO BE TORQUE TAN GEL COAT.

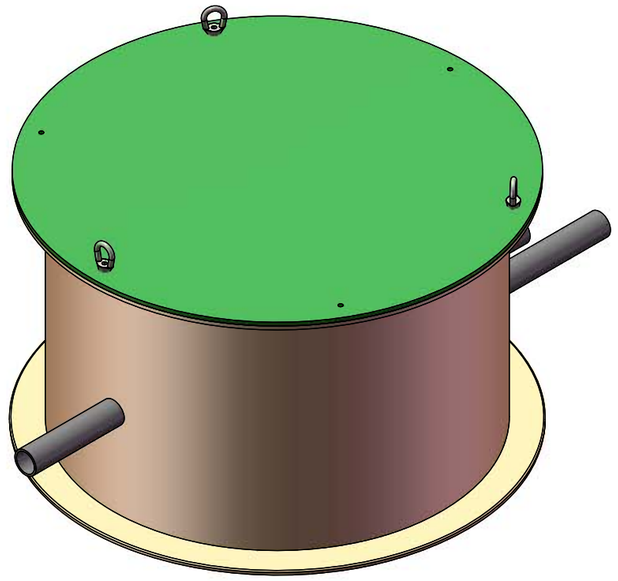
BASIN BOTTOM SHALL BE MANUFACTURED BY A CLOSED-MOLDED PROCESS. SPRAY-UP SHALL NOT BE USED.

ALL PENETRATIONS SHALL BE WATER TIGHT AND NOT JEOPARDIZE THE STRUCTURAL INTEGRITY OF THE BASIN.

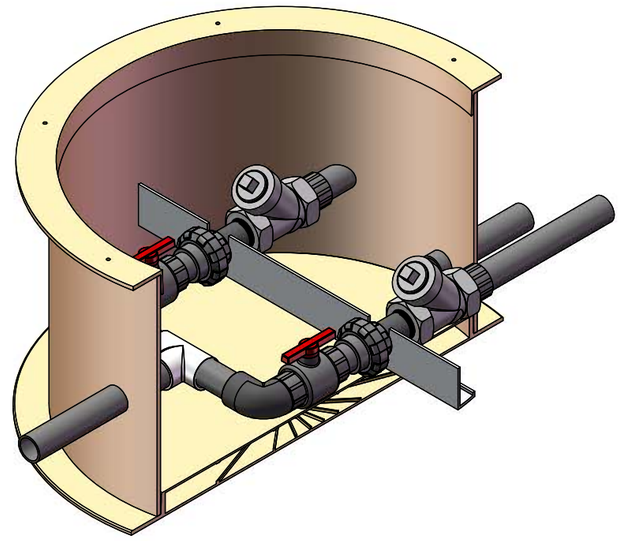
ALL FASTENERS SHALL BE 300 SERIES STAINLESS STEEL. FASTENER PENETRATIONS BELOW THE WATERLINE SHALL BE PERMANENTLY SEALED USING RESIN AND FIBERGLASS, STRUCTURAL ADHESIVE, OR OTHER APPROVED METHOD. FASTENER PENETRATIONS BELOW THE NORMAL LIQUID LEVEL SHALL NOT RELY ON MASTIC, SILICONE, OR SIMILAR SEALANT.

BASIN SHALL BE DESIGNED TO WITHSTAND BEING BURIED TO GRADE UNDER COMPLETELY SATURATED CONDITIONS, AND WITHOUT DEFORMATION THAT INTERFERES WITH THE OPERATION OF THE BASIN, INTERNAL EQUIPMENT, OR PENETRATIONS.

THE BASIN SHALL BE MANUFACTURED WITH AN INTEGRALLY MOLDED ANTI-FLOTATION FLANGE.



ISO VIEW



ISO CUTAWAY VIEW WITHOUT HATCH

CUSTOMER APPROVAL:_____DATE:_____

BY THIS SIGNATURE, CUSTOMER INDICATES THAT IT HAS REVIEWED THIS SUBMITTAL DRAWING AND FOUND THAT IT MEETS ALL OF THE DESIGNER'S FUNCTIONAL REQUIREMENTS AND/OR SPECIFICATIONS. CUSTOMER HEREBY AUTHORIZES ORENCO TO MANUFACTURE THE CUSTOM PRODUCT IN ACCORDANCE WITH THIS SUBMITTAL DRAWING.

UNLESS OTHERMISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16"
ANGULAR: MACH ± .5°
TWO PLACE DECIMAL ± .02
THREE PLACE DECIMAL ± .005

DRAWN BY: SBILLINGS	DATE: 12/21/2015	
APPROVED BY: CPALMER	DATE APPROVED: 12/18/2015	
APPROVED BY: DSIMMIE	DATE APPROVED: 12/18/2015	

PROJECT:

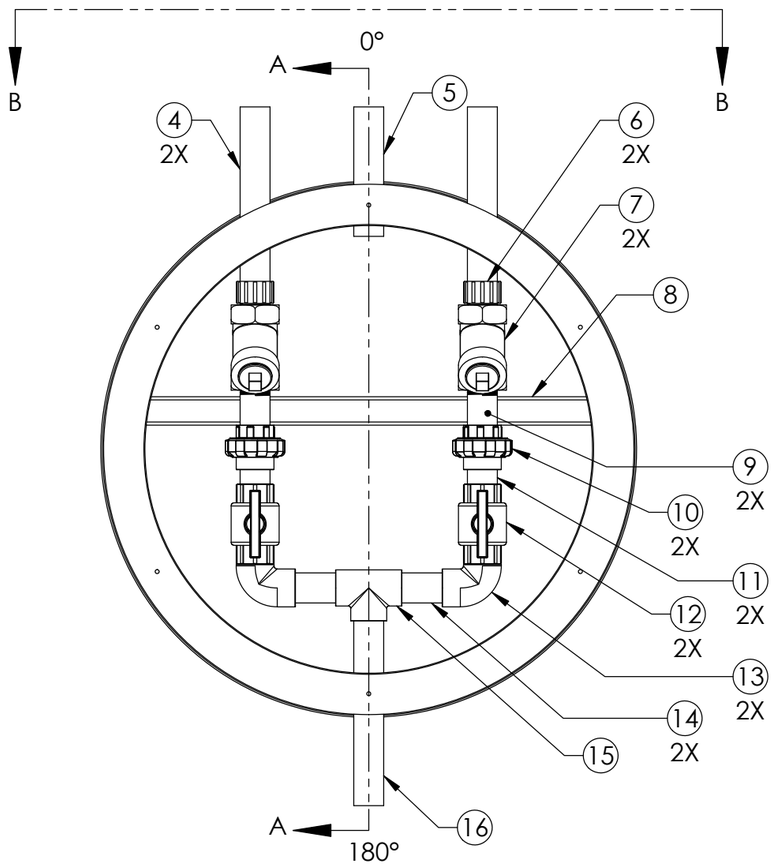
DESCRIPTION: 36" DIA. X 24"H VAULT

SHEET(S): 1 OF 2

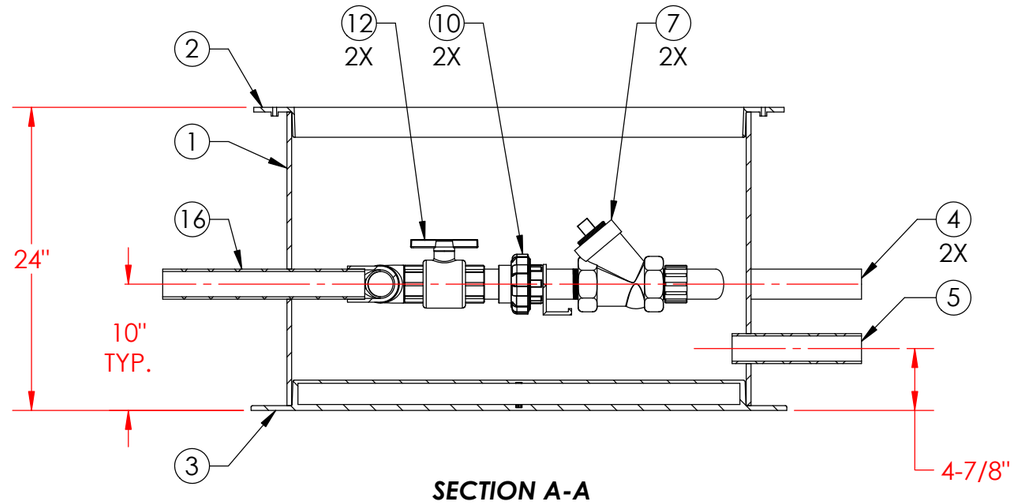
REVISION: A-01

Orenco COMPOSITES

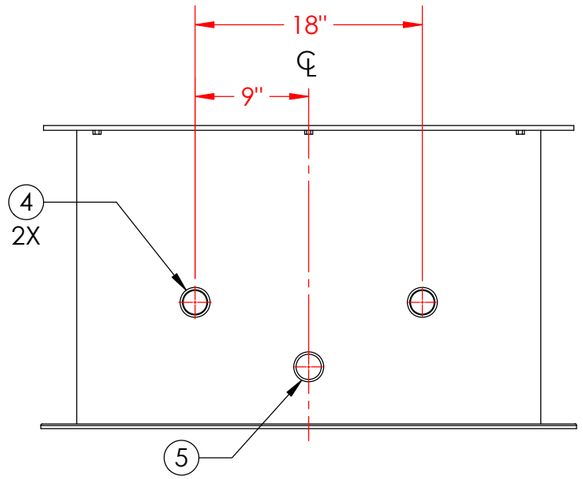
ITEM NO.	DESCRIPTION	QTY.
1	FIBERGLASS BASIN; 36" DIA. x 24"H x 3/8" WALL THICKNESS. EXTERIOR COLOR TORQUE TAN GEL COAT	1
2	FIBERGLASS LID FLANGE, 36" DIA.	1
3	FIBERGLASS BASIN BASE, 36" DIA	1
4	INLET PLUMBING, 2" SCH. 80 PVC	2
5	DRAIN, 3" SCH. 80 PVC	1
6	MALE ADAPTER; 2" SCH. 80 (MIPT x SOC)	2
7	BALL CHECK VALVE, 2" FLOMATIC	2
8	FIBERGLASS SUPPORT BRACE	1
9	TOE NIPPLE, 2" x 6" SCH. 80 PVC	2
10	UNION; 2" SCH. 80	2
11	DISCHARGE PLUMBING, 2" SCH. 80 PVC	2
12	BALL VALVE, 2" SCH. 80 PVC (SLIP)	2
13	STREET ELL, 2" SCH. 80 PVC	2
14	DISCHARGE PLUMBING, 2" SCH. 80 PVC	2
15	TEE, 2" SCH. 80 PVC (SLIP)	1
16	DISCHARGE PLUMBING, 2" SCH. 80 PVC	1



TOP VIEW



SECTION A-A



SECTION B-B

CUSTOMER APPROVAL:_____DATE:_____

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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16"
ANGULAR: MACH ± .5°
TWO PLACE DECIMAL ± .02
THREE PLACE DECIMAL ± .005

DRAWN BY: SBILLINGS	DATE: 12/21/2015	
APPROVED BY: CPALMER	DATE APPROVED: 12/18/2015	
APPROVED BY: DSIMMIE	DATE APPROVED: 12/18/2015	

PROJECT:

DESCRIPTION: 36" DIA. X 24"H VAULT

SHEET(S): 2 OF 2

REVISION: A-01

Orenco COMPOSITES

331-SV

User Manual

THREE PHASE DUPLEX
LIFT STATION CONTROL PANEL
WITH
STATIONVIEW CONTROLLER

PRIMEX
WATER SYSTEM INTEGRATOR AND CONTROLS PROVIDER
WWW.PRIMEXCONTROLS.COM

Ashland, OH

800-363-5842

WARNING!

ELECTRICAL SHOCK HAZARD

Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

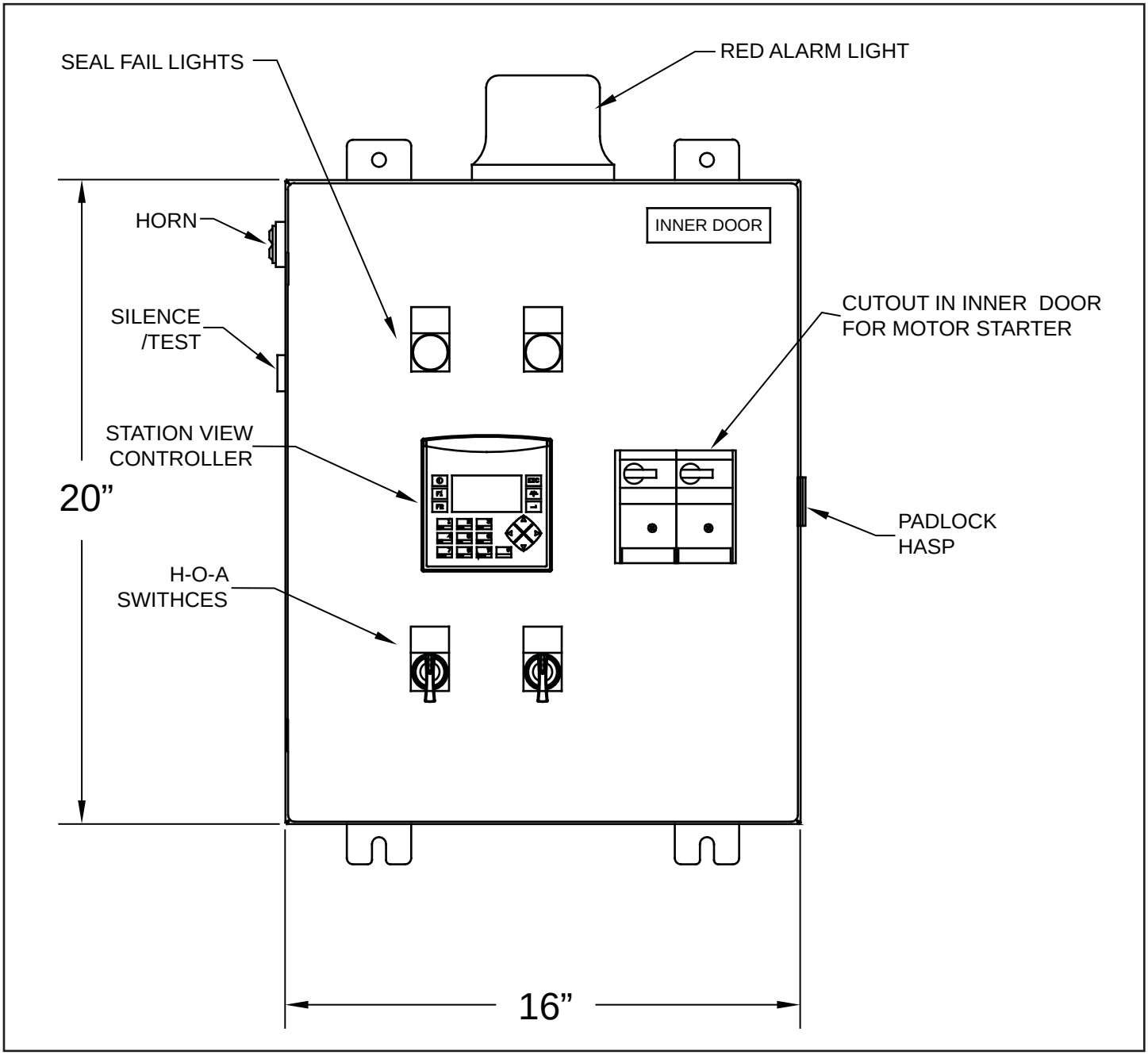
Warranty void if panel is modified.

Call factory with servicing questions.

This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes.

All conduit running from the sump or tank to the control panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. NEMA 4X enclosures are for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Check the incoming power: voltage, amperage, and phase to meet requirements of the pump motor being installed. Always check the pump nameplate for electrical requirements.



INSTALLATION INSTRUCTIONS

MOUNTING THE CONTROL PANEL

1. Determine mounting location for panel. If distance exceeds the length of either the level sensor cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of a Nema 4X junction box with liquid-tight connectors to make required connections. You must use conduit sealant to prevent moisture or gases from entering the panel. Do not mount the junction box in the wet well.

2. Determine conduit entrance locations on control panel.

3. Drill proper size holes for type of connectors being used.

   NOTE: If using conduit, be sure that it is of adequate size to pull the pump and sensor cables through.

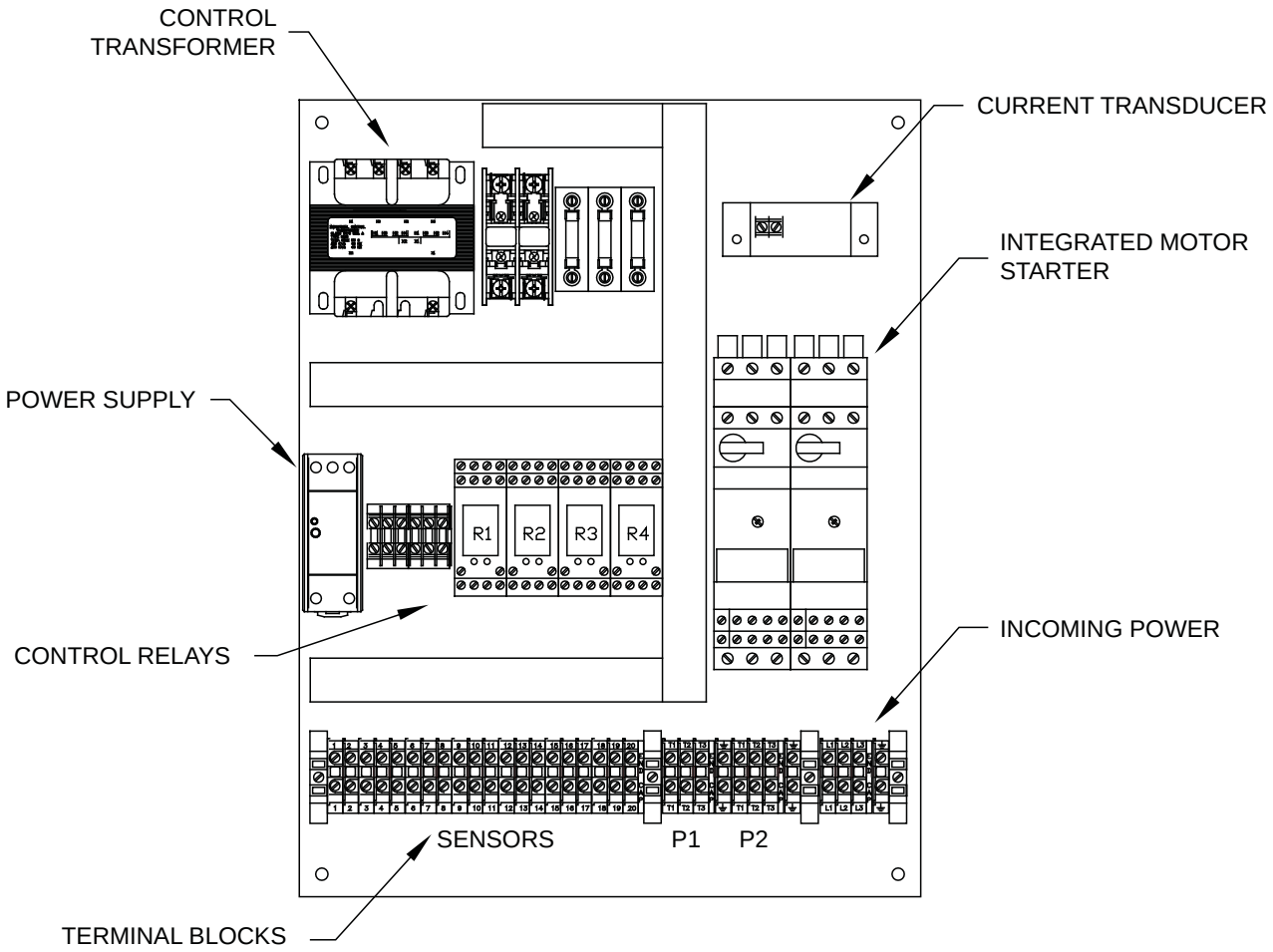
4. Attach cable connectors and/or conduit connectors to control panel.

   FOR INSTALLATION WITHOUT A SPLICE, GO TO STEP 8;
   FOR INSTALLATION REQUIRING A SPLICE, FOLLOW STEPS 6-7.

5. Determine location for mounting junction box according to state and local code requirements. Mount the junction box to proper support.

6. Run conduit to control panel or to junction box if required. Drill proper size holes for the type of conduit used. Use one conduit for float switch cables and a separate one for pump cables. Do not run pump and float cables in the same conduits.

7. Identify and label each wire before pulling through conduit into control panel and junction box. Make wire splice connections at junction box if necessary.



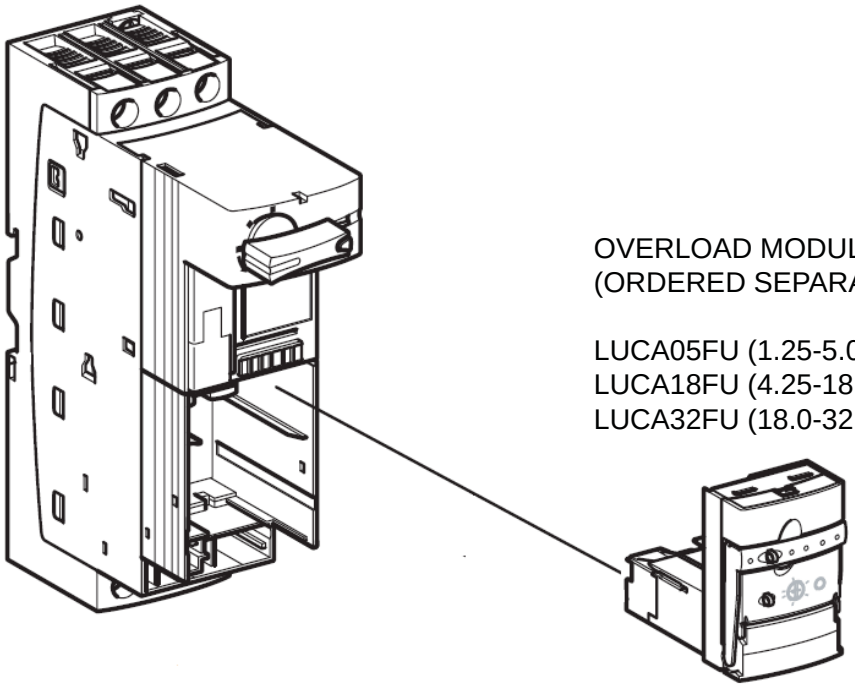
8. Firmly tighten all fittings on control panel or junction box if required.

9. In the control panel, insert the appropriate overload modules in the motor starter.

   These overload modules must be ordered separately. The control panel will not operate without overload modules.

   a) Adjust the dials to match motor full load amps.
   b) Turn motor starter switch to the ON position.

   CAUTION: Resetting the motor starter with power applied may cause the pump to run unexpectedly.



OVERLOAD MODULE
(ORDERED SEPARATELY)

LUCA05FU (1.25-5.0 FLA)
LUCA18FU (4.25-18.0 FLA
LUCA32FU (18.0-32.0 FLA)

10. Connect pump wires to terminal blocks as indicated on the provided electrical schematics.

NOTE: Three-phase motors will run in either direction. Check for proper rotation of the pump prior to final installation. To reverse the rotation, swap pump cable connections on any two terminals T1-T2-T3.

11. Connect incoming power (208/230/460 VAC, 3 phase) to the 3 position terminal block as indicated on the provided electrical schematics. Verify that the appropriate voltage tap on the transformer primary matches the incoming voltage.

CAUTION: The transformer is wired from the factory for 460VAC. If incoming power is 230VAC or 208VAC, the wire connections to the transformer must be changed for proper operation. Not doing so could result in damage.

VERIFY CORRECT OPERATION OF CONTROL PANEL AFTER INSTALLATION IS COMPLETE.

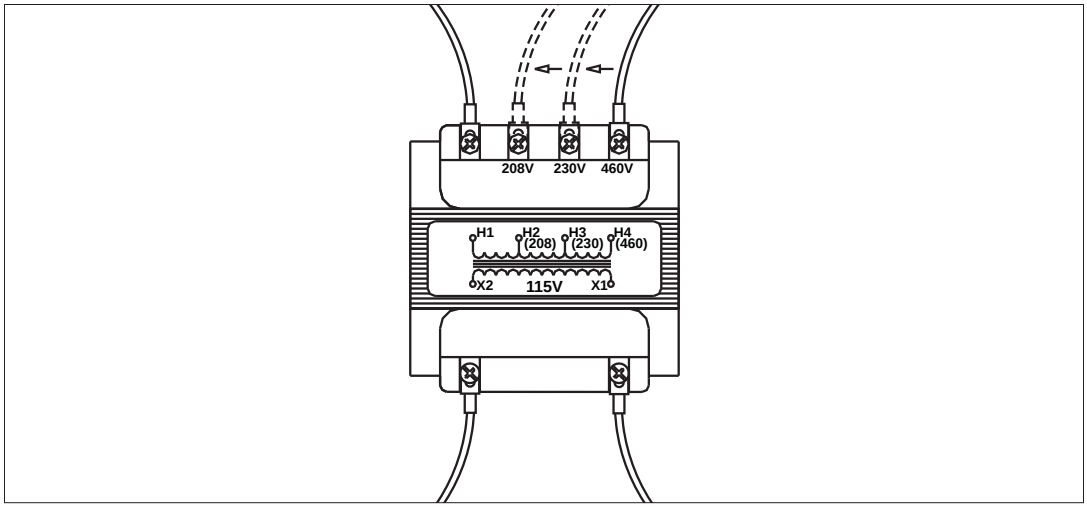


FIGURE 2 - Transformer

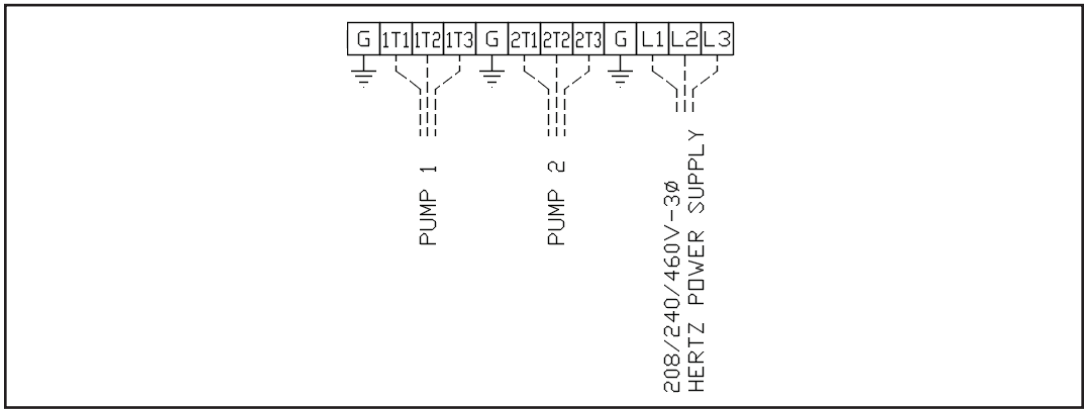


FIGURE 2A - Power Supply and Pump Wiring Diagram (3 phase)

NOTES:

1) Panel ground lugs must be connected to earth ground per NEC and Local Electric Codes.
2) Factory wiring is shown as
   Field wiring is shown as:
3) Installer must provide either an inverse time main circuit breaker or a main fusible disconnection device with dual element fuses per Table No.1.
4) Recommended tightening torques for terminals 208/230/460 volt power: 35 pound inches. 120 volt power, control & low voltage: 18 pound inches.
5) Motor thermal heat sensors are not in all motors. If the motor does not have them, a jumper must be placed between the H1-H2 and H3-H4 terminals.
6) The transformer is factory set at 460 volts. Configure in field for other line voltages.
7) Overloads are factory set to minimum setting. Overload relays to be adjusted per nameplate FLA of the motor.
8) Auxiliary high level alarm contact is rated for 3A, 30VDC / 240VAC.
9) It is possible to operate the 331-SV panel using 240VAC-1Ø power provided that all the following requirements are followed:
   - The pump is also rated for 240VAC-1Ø.
   - No external capacitor kit is required to operate the pump.
   - A #12 AWG jumper wire must be connected between L1 and L2 (user supplied).
   - Line power should be connected to terminals L1 and L2 Do not connect power to L3.
   - Pumps should be connected to terminals 1T1-1T2 and 2T1-2T2. So not connect pump wires to terminals 1T3 and 2T3.
   - Change the line side of the transformer to the proper voltage tap.

12. Single phase supply power and pump connection. (See note 9 on previous page and wiring diagram below).

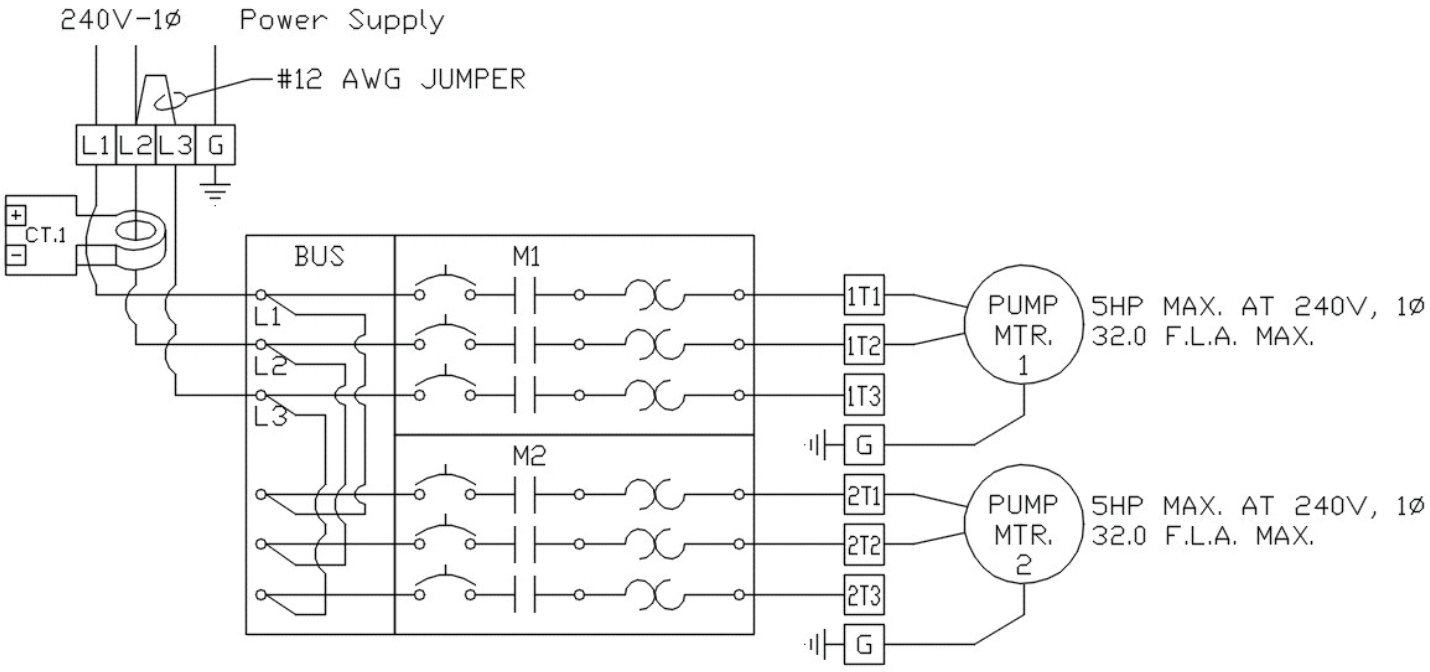


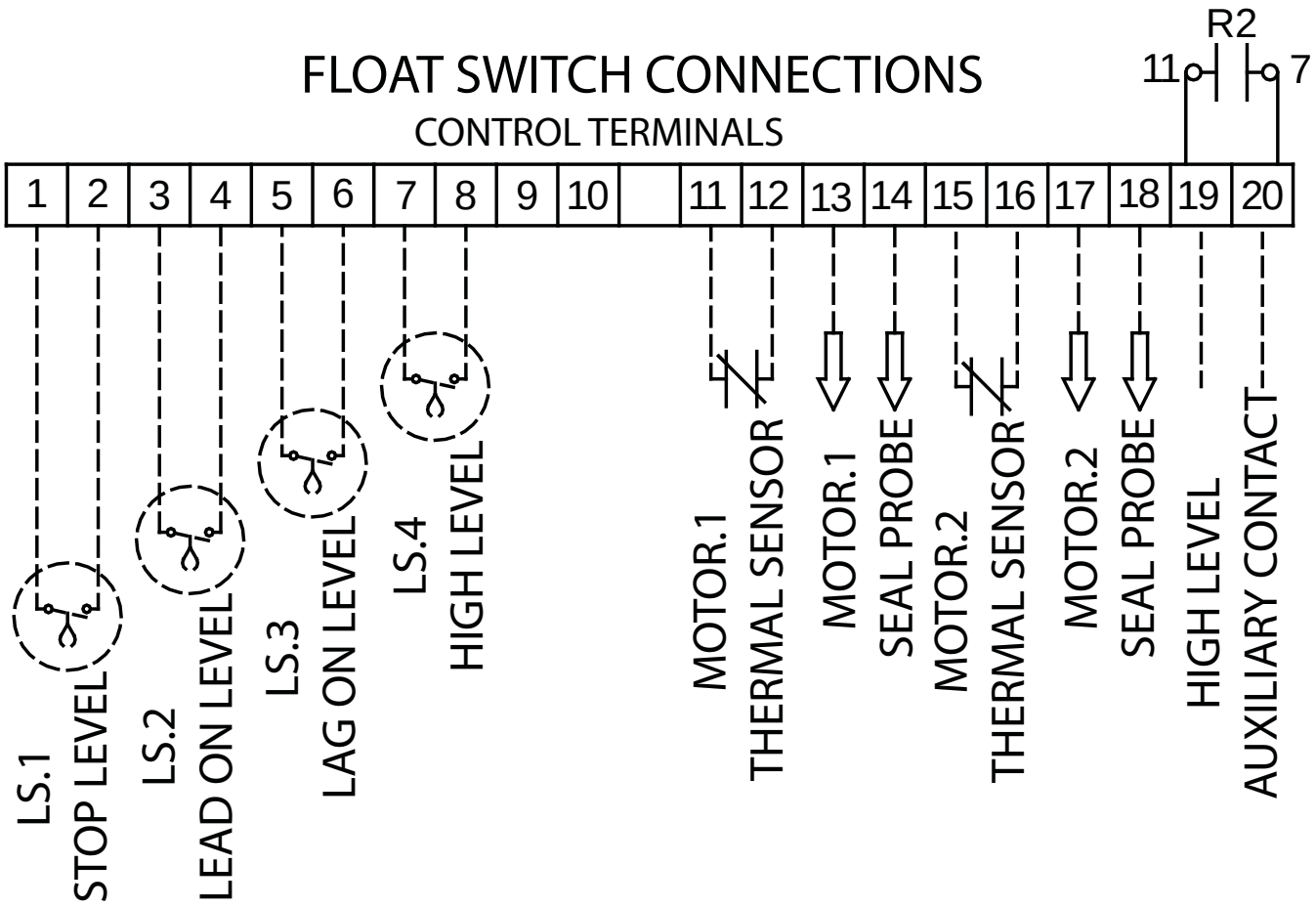
FIGURE 2B- Power Supply and Pump Wiring Diagram (Single phase)

INSTALLATION OF LEVEL SENSORS

CAUTION: If the level sensors are not mounted correctly, the pump system will not function properly.

WARNING: Turn off all power before installing level sensors in wet well. Failure to do so could result in serious or fatal electrical shock.

1. Use label kit to identify level sensors cables (stop, lead, lag, alarm, etc.). See control panel schematic for level sensor connections.
2. Determine your normal operating level.
3. Mount level sensors at appropriate levels. Be sure that floats have free range of motion without touching each other or other equipment in the basin.
4. Ensure that the level transducers cannot reach the pump.

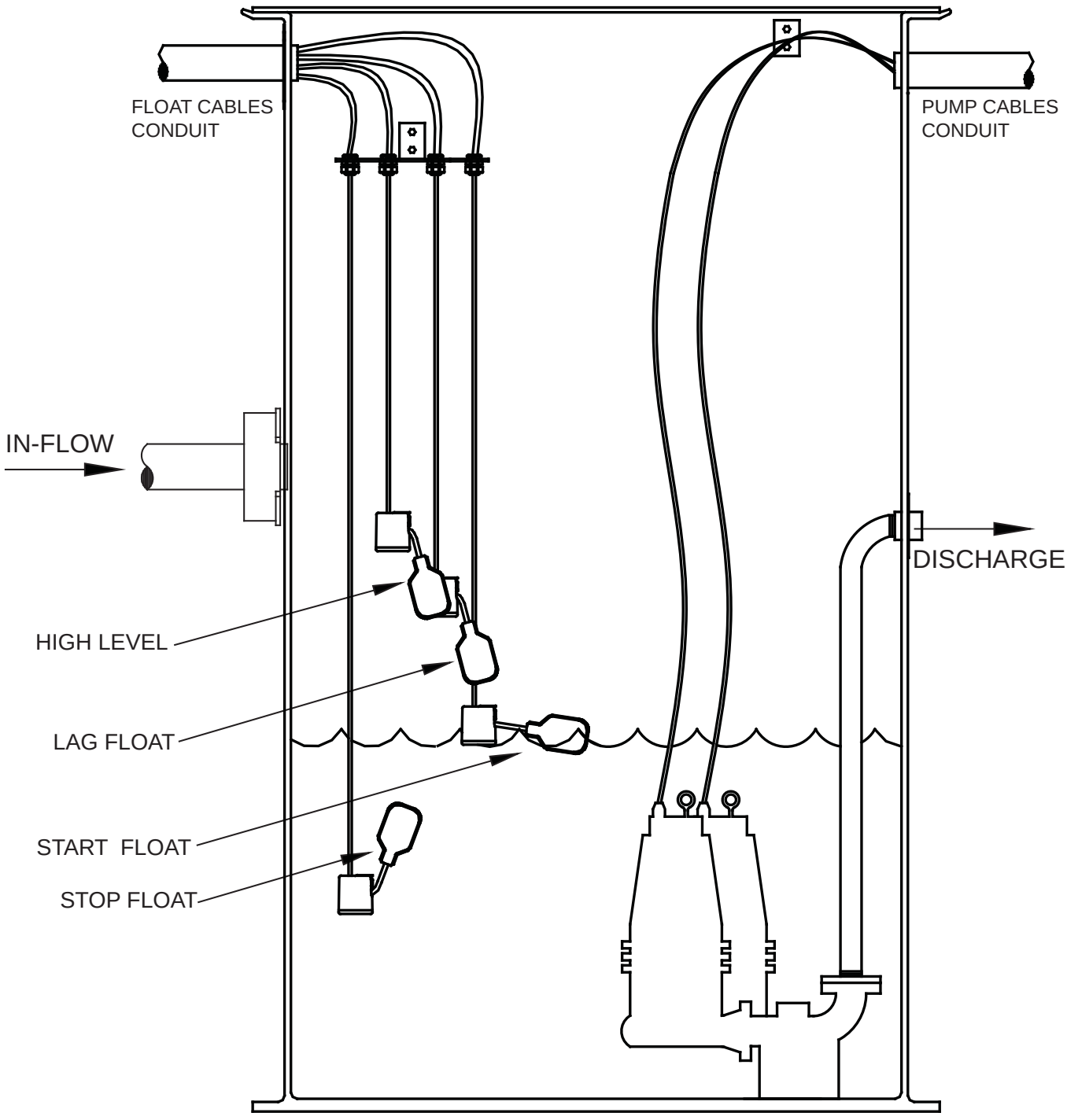


The 331 panels are designed to operate with four floats for pump sequencing. The standard float functions are common pump stop, lead pump start, lag pump start and alarm float.

FLOAT SWITCH OPERATION (IN AUTO MODE)

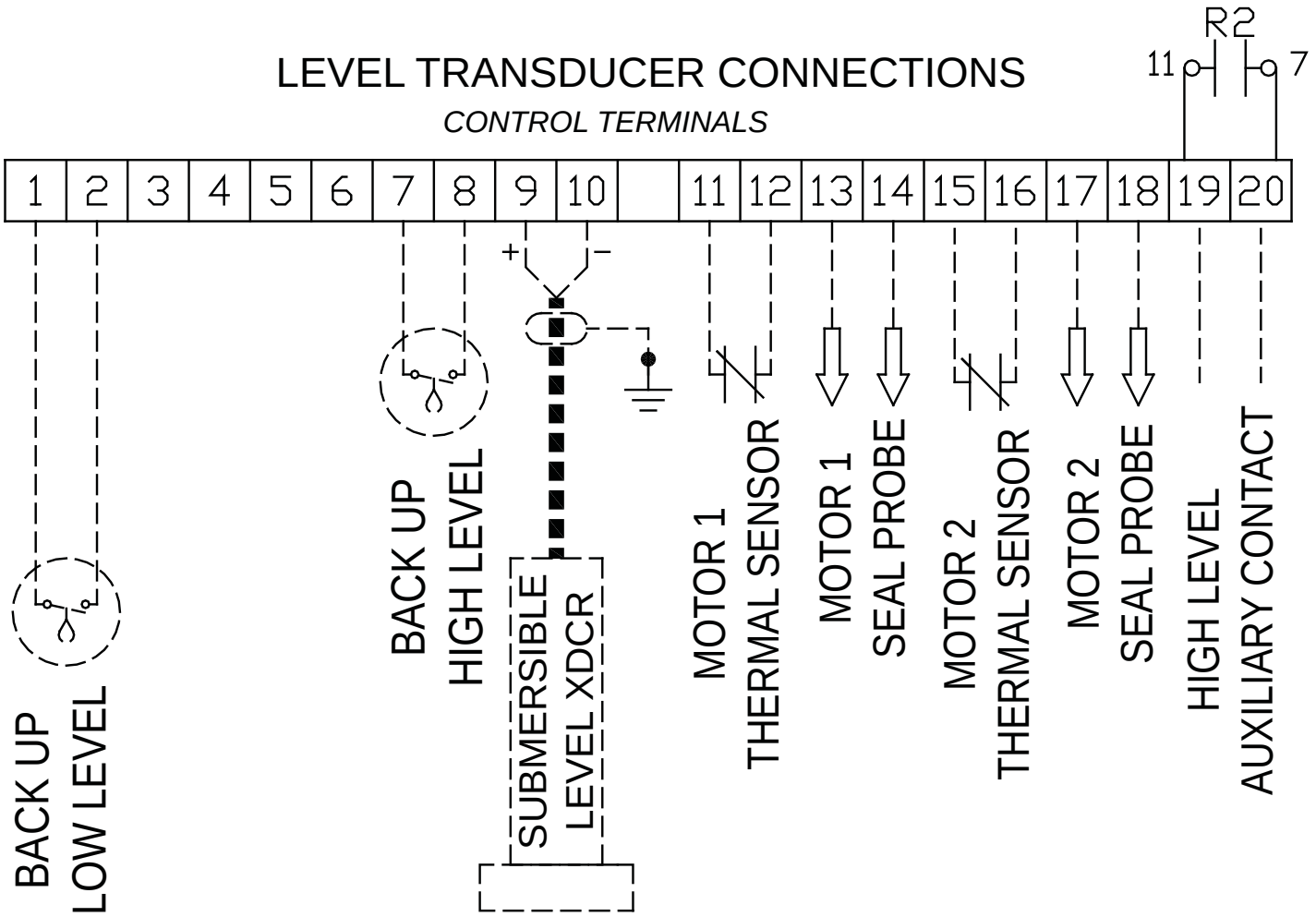
As the liquid level rises above the STOP float the pumps will remain inactive. As the level rises above the LEAD start float, the lead pump will start and remain ON until the level drops below the STOP level. If the level continues to rise past the start LEAD float and above the start LAG float, the second pump will start and both pumps will remain ON until the level drops below the STOP float.

FLOAT INSTALLATION



Typical float setup for a duplex lift station

WARNING:
Keep floats clear of pumps, pipes, and motor cables.
Ensure that floats cannot reach pump suction.
Do not run pump and float cables in the same conduit.



TRANSDUCER OPERATION (IN AUTO MODE)

As the liquid level rises above the STOP set point the pumps will remain inactive. As the level rises above the LEAD start set point, the lead pump will start and remain ON until the level drops below the STOP level. If the level continues to rise past the start LEAD and above the start LAG start set point , the second pump will start and both pumps will remain ON until the level drops below the STOP set point.

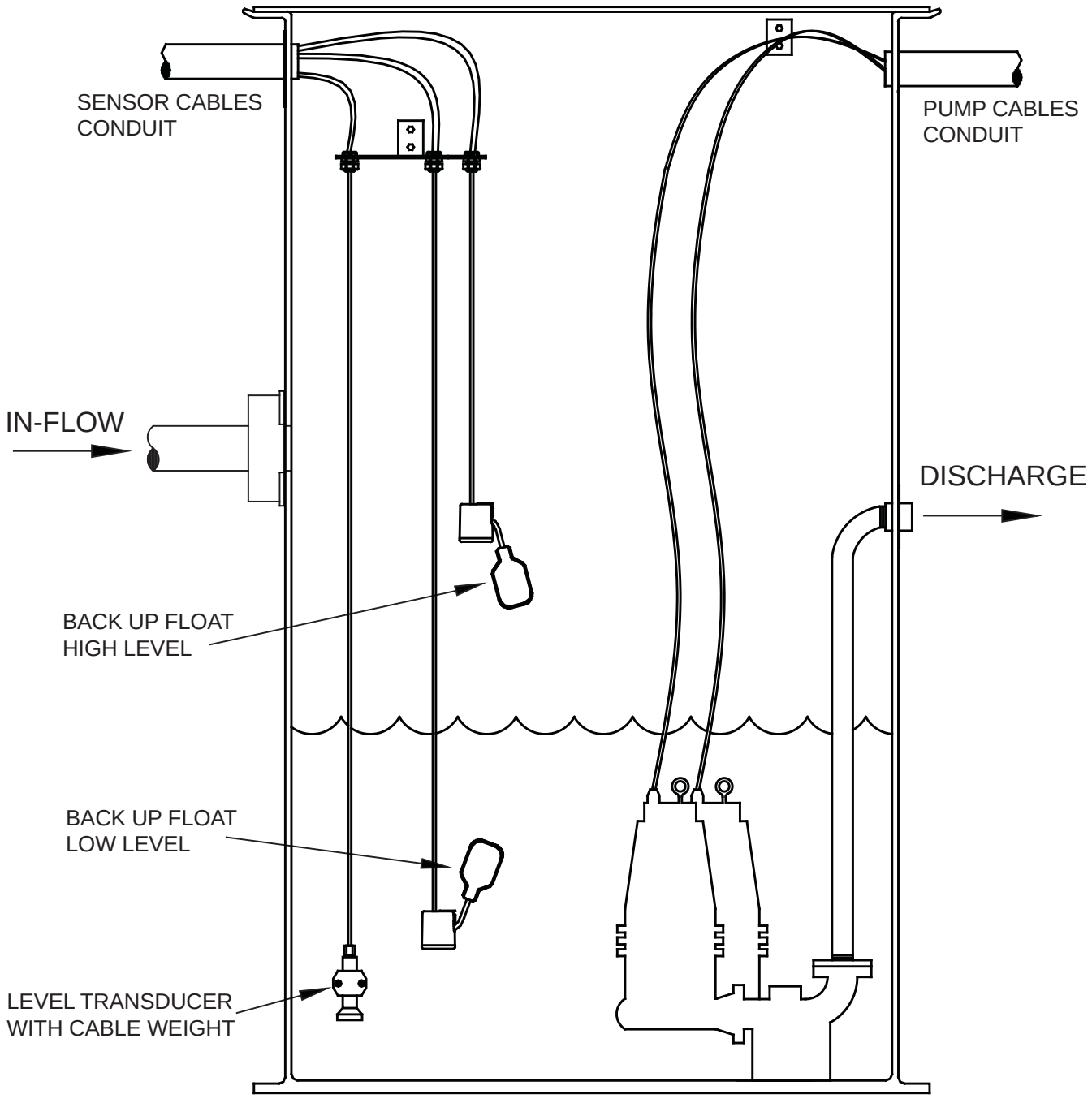
BACK UP FLOAT (IN AUTO MODE)

If the level drops below the back up LOW LEVEL float switch, pumps will stop.
As the level rises above the LOW LEVEL Float, the pumps will remain inactive until the the level rises above the LEAD start set point.
If the level rises above the back up HIGH LEVEL float switch, both pumps will start and both pumps will remain ON until the level drops below the back up LOW LEVEL float switch.

ALARM LEVELS

The alarm beacon and the horn will active on the following level conditions:
- If the level rises above the back up HIGH LEVEL float switch
- If the level rises above the HIGH LEVEL set point (transducer)
- If the level drops below the back up LOW LEVEL float switch

TRANSDUCER INSTALLATION



Typical transducer (with float back up) setup for a duplex lift station

WARNING:
Keep sensors clear of pumps, pipes, and motor cables.
Ensure that floats cannot reach pump suction.
Do not run pump and float cables in the same conduit.

ALARM OPERATION
The alarm will activate and remain ON only if the alarm float is tipped to the ON (close) position.

ALARM SYSTEM (HORN AND BEACON)
When an alarm condition occurs, a red light and a horn will be activated. If the silence push button is pressed, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset. The alarm system can be tested by pressing the same push button.

HOA SWITCH
A HAND/OFF/AUTO switch is provided for each pump. In the HAND mode, the pump will run regardless of the float switch. It will stop only if manually stopped and or an overload trip or motor thermal cutoff condition has occurred. In the OFF position, the pumps will not RUN. In the AUTO position, the pumps will only run if the float switches are activated in the correct sequence.

MOTOR PROTECTIVE SWITCH (MOTOR STARTER)
A motor protective switch is supplied for each pump to provide motor overload protection, branch circuit protection and a means to disconnect the pump. The overload dial on the starter must be set to match the motor Full Load Amps (FLA).
In the event of an overload trip, the motor protective switch must be reset by first turning the selector handle counterclockwise to the OFF position and then turning the handle clockwise to the ON position.

DRY AUXILIARY CONTACTS
Normally open - Contacts are open under normal conditions and closed when alarm condition is present. Automatically reset once alarm condition is cleared.

SEAL FAILURE CIRCUIT AND INDICATOR LIGHT
The seal fail circuit is resistance sensitive and will sense the presence of water in the pump seal chamber. When water is sensed, the control circuit will illuminate the appropriate indicator light on the control panel. If a seal fail occurs, turn off the pump and consult the pump manufacture for proper repair or maintenance.

THERMAL CUTOUT
The thermal cutout is wired in series with the magnetic contactor coil. If the pump's thermal switch opens on high temperature, the contactor will turn off and stop the pump. When the thermal switch cools and closes, the magnetic contactor will turn on if the pump is called to run.

If the pumps are not supplied with a thermal sensor, jumper wires must be placed on the terminal block from I1 to I2 and I5 to I6. Not doing so will result in the pumps not operating.

TROUBLESHOOTING

FLOAT CONTROLS
Check the floats through their entire range of operation. Clean, adjust, or replace damaged floats.

Checking the float resistance - The float resistance can be measured to determine if the float is operating correctly or is defective. Use the following procedure to measure the float resistance:

1. Isolate the float by disconnecting one or both of the float leads from the float terminals.

2. Place one ohmmeter lead on one of the float wires, and the other ohmmeter lead on the other float wire.

3. Place the ohmmeter dial to read ohms and place on the R X 1 scale. With the float in the “off” position, the scale should read infinity (high resistance). Replace the float if you do not get this reading. With the float in the ON position, the scale should read nearly zero (very low resistance). Replace the float if you do not get this reading.

NOTE: Readings may vary depending on the length of wire and accuracy of the measuring device.

FUSES
Check the continuity of the fuse. Pull the fuse out of the fuse block. With the ohmmeter on the R X 1 scale, measure resistance. A reading of infinity indicates a blown fuse and must be replaced. Replace fuse with same type, voltage and amp rating.

TRANSFORMER
The 331 panel can be configured to operate at 208VAC, 230VAC, or 460VAC. It is factory set for 460VAC operation. Check the available incoming supply voltage to the 331 control panel prior to installation. Verify that the connections on the transformer are correct and will match the available incoming voltage. Measure the voltage between terminals 27 and 28 with a voltmeter. It must read 115VAC (+/- 15%) for proper operation.

PUMPS AMPS DISPLAY
If the pump amps do not display correctly check the following:

1. Check that the jumper setting on the current transducer is correct.

2. Current monitoring is enabled in the Station View™ Controller.

PRIMEX®

WATER SYSTEM INTEGRATOR AND CONTROLS PROVIDER

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Ashland, OH 800-363-5842

ATTACHMENT 8

PINE CONE CEQA POSTING

4-8-22 Confirmation of Publication:

April 8, 2022 The Carmel Pine Cone 43A

http://pineconearchive.fileburstcdn.com/220408PC.pdf

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

In accordance with Section 15072 of the California Environmental Quality Act (CEQA) Guidelines, this notice is to inform the general public that the Carmel Area Wastewater District (CAWD) has completed an Initial Study and Mitigated Negative Declaration (IS/MND) for the replacement of sewer pipeline in the Carmel Meadows Subdivision and intends to adopt the Mitigated Negative Declaration for the project:

Project Title: Carmel Meadows Lift Station and Sewer Replacement Project

Project Location: Carmel Meadows Subdivision, between Carmel River and Carmel Bay, North of Ribera Road. APNs 243-031-017 through 243-031-034, and 243-051-001 through 243-051-008, and APNs 243-051-020 through 243-051-022

Comment Period: April 15, 2022 to May 16, 2022

Contact Person: Rachel Lather, MS, PE, District Engineer
Carmel Area Wastewater District
3945 Rio Road
PO Box 221428
Carmel, CA 93922
lather@cawd.org

CAWD proposes to use a small lift station and a series of four small residential scale sewage pumps to enable the use/reuse of accessible, and less environmentally damaging pipeline alignments through the backyards of the residences being served. A 12-inch wide trench would be dug with a small excavator to about three-feet deep, typically (maximum depth is five feet). Impacts to residential landscaping would be avoided where possible and/or restored to original or better condition. In areas where the alignment is beyond the fenced parcel, native vegetation would also be restored with native seeding and erosion best management practices installed on steeper slopes as needed. There is no expansion of sewer capacity and the new sewer line would continue to serve the same residents in the Carmel Meadows neighborhood as are served by the existing system.

The IS/MND, as well as all plans and specifications for construction, and technical memoranda shall be made available for public review at the CAWD website at www.cawd.org and at the following location:

Carmel Area Wastewater District Administrative Offices
3945 Rio Road
Carmel, CA 93923

Please submit any comments on the IS/MND to Attn: Rachel Lather via email, hand delivery or postal carrier to the above noted Contact before 5:00 PM on May 16, 2022.

A public hearing to approve said IS/MND before the CAWD Board has been scheduled for 9:00am on May 26, 2022 at the CAWD Board Chambers located at 3945 Rio Road, Carmel CA 93923

Publication dates: April 8, 2022 [PC409]

Snip of 4-8-22 proof to be published:

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Publication dates: April 8, 2022 (PC409)

ATTACHMENT 9

APRIL 20, 2022 COMMUNITY MEETING INVITATIONS

Carmel Area Wastewater District

P.O. Box 221428 Carmel California 93922 ❖ (831) 624-1248 ❖ FAX (831) 624-0811

April 4, 2022

Dear Carmel Meadows Residents:

In the upcoming months, Carmel Area Wastewater District (District) is planning to start construction on a new wastewater pump station located on Mariposa Court off of Ribera road. The sewer trunkline carries most of Carmel Meadows sewage to the treatment plant and is over 70 years old, damaged in various locations, difficult to access, and is past its useful life expectancy.

This important upgrade to vital wastewater infrastructure will include:

- Installation of a new wastewater pump station located at the end of Mariposa Ct.
- Installation of 170 feet of 8 inch sewer in back yards using open cut method.
- Replacement of 680' of 6" VCP sewer line with 8" HDPE pipe using the trenchless method called pipebursting
- Installation of 4 residential wastewater ejector pump stations (2795 Ribera Road, 2805 Ribera Road , 2815 Ribera Road and 2825 Ribera Road)

We are hosting a virtual meeting on April 20, 2022 at 6 p.m. in order to provide an overview of what to expect. A representative from the design engineering firm will be available to explain the process of pipe line replacement, the ejector pump design and operation, and the installation of the new wastewater pumps on the four affected properties. Our District Engineer, Rachél Lather and our sewer Collections Superintendent, Daryl Lauer will lead the discussion and presentation.

In order to participate in the meeting, please click this URL to join.
https://us02web.zoom.us/j/86531808442?pwd=KzFmN3FxT0xXVFN5ZjJmakw0blBPUT09

Very truly yours,

Barbara Buikema
Barbara Buikema (Apr 4, 2022 15:38 PDT)

Barbara Buikema
General Manager
831-624-1248
downstream@cawd.org

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DRYDEN STANLEY L & GAIL D TRS
2795 RIBERA RD
CARMEL, CA 93923-9704

BESNER MICHAEL JOSEPH &
MARGARET ELLEN THOMAS TRS
2845 RIBERA RD
CARMEL, CA 939239704

STATE OF CALIFORNIA
50 HIGUERA ST
SAN LUIS OBISPO, CA 93401-5415

PORTER VERNON KEITH & LORI J TRS
19076 S REYNOLDS
DOS PALOS, CA 93620

PORTOLA CORPORATION
26050 RIO VISTA DR
CARMEL, CA 93923-8818

BAYSIDE PLAZA
3130 LA SELVA ST # 306N
SAN MATEO, CA 94403

RICCIARDI BARBARA C TR
2965 RIBERA RD
CARMEL, CA 939239766

LIGAS STEPHAN & MURPHY JEAN C
2765 RIBERA RD
CARMEL, CA 939239704

BUCKHAM W WEBER & ALICE TRS
138 MOUNTAIN VIEW CT
PHOENIX, OR 97535

WAN-STONE MICHELL FONGYING
2785 RIBERA RD
CARMEL, CA 939239704

STATE OF CALIFORNIA
50 HIGUERA ST
SAN LUIS OBISPO, CA 93401-5415

JAGGERS KURT R & SUZANNE K
JAGGERS TRS
2 BLUE OAKS CT
PORTOLA VALLEY, CA 94028

VIEILLE DEBORAH ARTZ
2815 RIBERA RD
CARMEL, CA 939239704

MOORE DAVID TR
2855 RIBERA RD
CARMEL, CA 93923-9703

BARNES SUSAN W TR
2825 RIBERA RD
CARMEL, CA 93923-9704

HILL R CARY JR & CATHERINE
VASSILLAKOS HILL TRS
2740 RIBERA RD
CARMEL, CA 93923

SCOPP DAVID W
2955 RIBERA RD
CARMEL, CA 939239766

KUSUMOTO YOICHI & DONNA Y TRS
2915 RIBERA RD
CARMEL, CA 93923

JU WERNER W & DEBORAH SHOUB TRS
371 WHITECLEM DR
PALO ALTO, CA 94306

DELUCA KENNETH T
2885 RIBERA RD
CARMEL, CA 939239703

DAHL MARY TR
2775 RIBERA RD
CARMEL, CA 93923

PORTOLA CORPORATION
26050 RIO VISTA DR
CARMEL, CA 93923-8818

BOETTCHER KAREN M TR
2925 RIBERA RD
CARMEL, CA 93923

MCGURN THOMAS O & CAROLYN O
TRS
2737 CALLE LA CRUZ
CARMEL, CA 93923

KELLER CHARLES R & CAROL J TRS
2835 RIBERA RD
CARMEL, CA 93923-9704

MC KEAN DONALD B TR
2875 RIBERA RD
CARMEL, CA 93923

LA MOTHE PIERRE DANIEL & EILEEN
MANN TRS
2865 RIBERA RD
CARMEL, CA 939239703

BOGART DANIEL R & NATALIYA A
2895 RIBERA RD
CARMEL, CA 93923

SHETH ALPESH D & GITANJALI TRS
2975 RIBERA RD
CARMEL, CA 93923

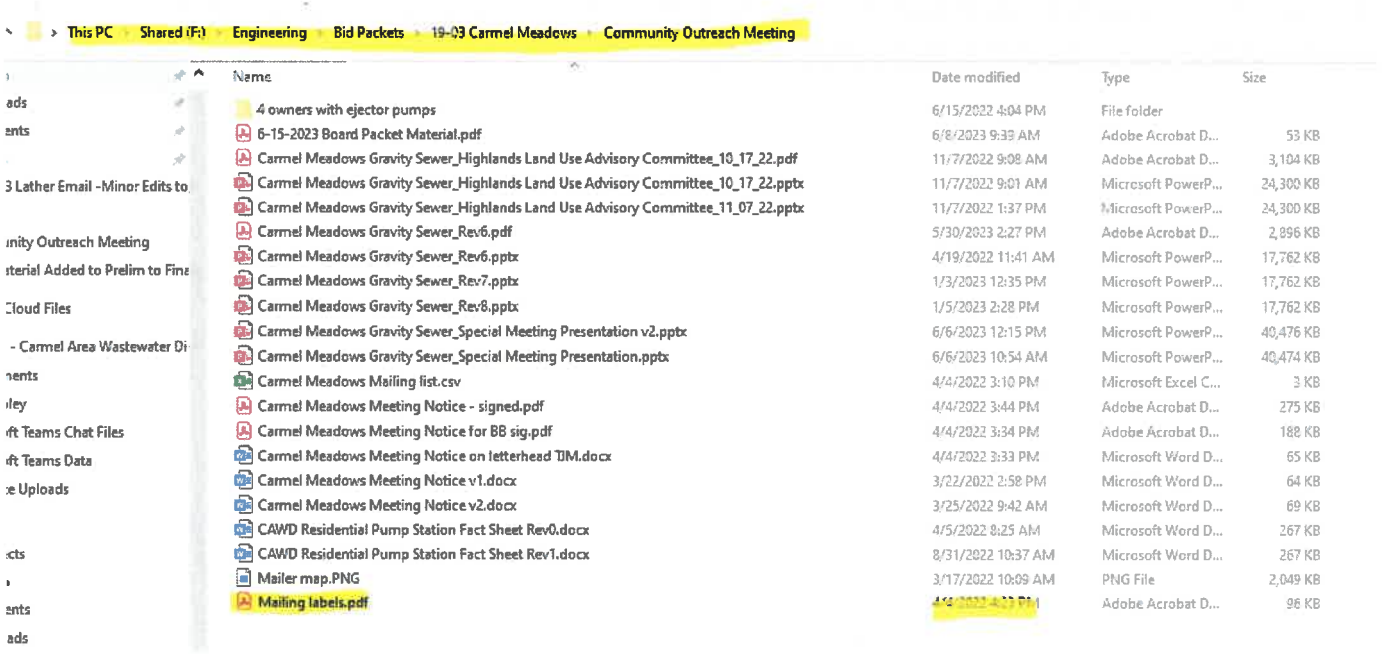
STATE OF CALIFORNIA
50 HIGUERA ST
SAN LUIS OBISPO, CA 93401-5415

Étiquettes d'adresse Easy Peel

Allez à avery.ca/gabarits

RAINWATER H GREG & SHARI TRS
6045 N SEQUOIA AVE
FRESNO, CA 93711

HERBERT MARJORIE JANE TR ET AL
2751 CALLE LA CRUZ
CARMEL, CA 93923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Engineering
Bid Packets
19-03 Carmel Meadows
Community Outreach Meeting
Name
Date modified
Type
Size
4 owners with ejector pumps
6-15-2023 Board Packet Material.pdf
Carmel Meadows Gravity Sewer_Highlands Land Use Advisory Committee_10_17_22.pdf
Carmel Meadows Gravity Sewer_Highlands Land Use Advisory Committee_10_17_22.pptx
Carmel Meadows Gravity Sewer_Highlands Land Use Advisory Committee_11_07_22.pptx
Carmel Meadows Gravity Sewer_Rev6.pdf
Carmel Meadows Gravity Sewer_Rev6.pptx
Carmel Meadows Gravity Sewer_Rev7.pptx
Carmel Meadows Gravity Sewer_Rev8.pptx
Carmel Meadows Gravity Sewer_Special Meeting Presentation v2.pptx
Carmel Meadows Gravity Sewer_Special Meeting Presentation.pptx
Carmel Meadows Mailing list.csv
Carmel Meadows Meeting Notice - signed.pdf
Carmel Meadows Meeting Notice for BB sig.pdf
Carmel Meadows Meeting Notice on letterhead TJM.docx
Carmel Meadows Meeting Notice v1.docx
Carmel Meadows Meeting Notice v2.docx
CAWD Residential Pump Station Fact Sheet Rev0.docx
CAWD Residential Pump Station Fact Sheet Rev1.docx
Mailer map.PNG
Mailing labels.pdf
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3/25/2022 9:42 AM
4/5/2022 8:25 AM
8/31/2022 10:37 AM
3/17/2022 10:09 AM
File folder
Adobe Acrobat D...
Microsoft PowerP...
Microsoft Excel C...
Microsoft Word D...
PNG File
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3,104 KB
24,300 KB
2,896 KB
17,762 KB
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188 KB
65 KB
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Barbara Buikema
Carmel by the Sea • 6 Apr 22 •

Community Meeting via Zoom regarding Carmel Meadows Sewer Replacement Project - Site Location Map

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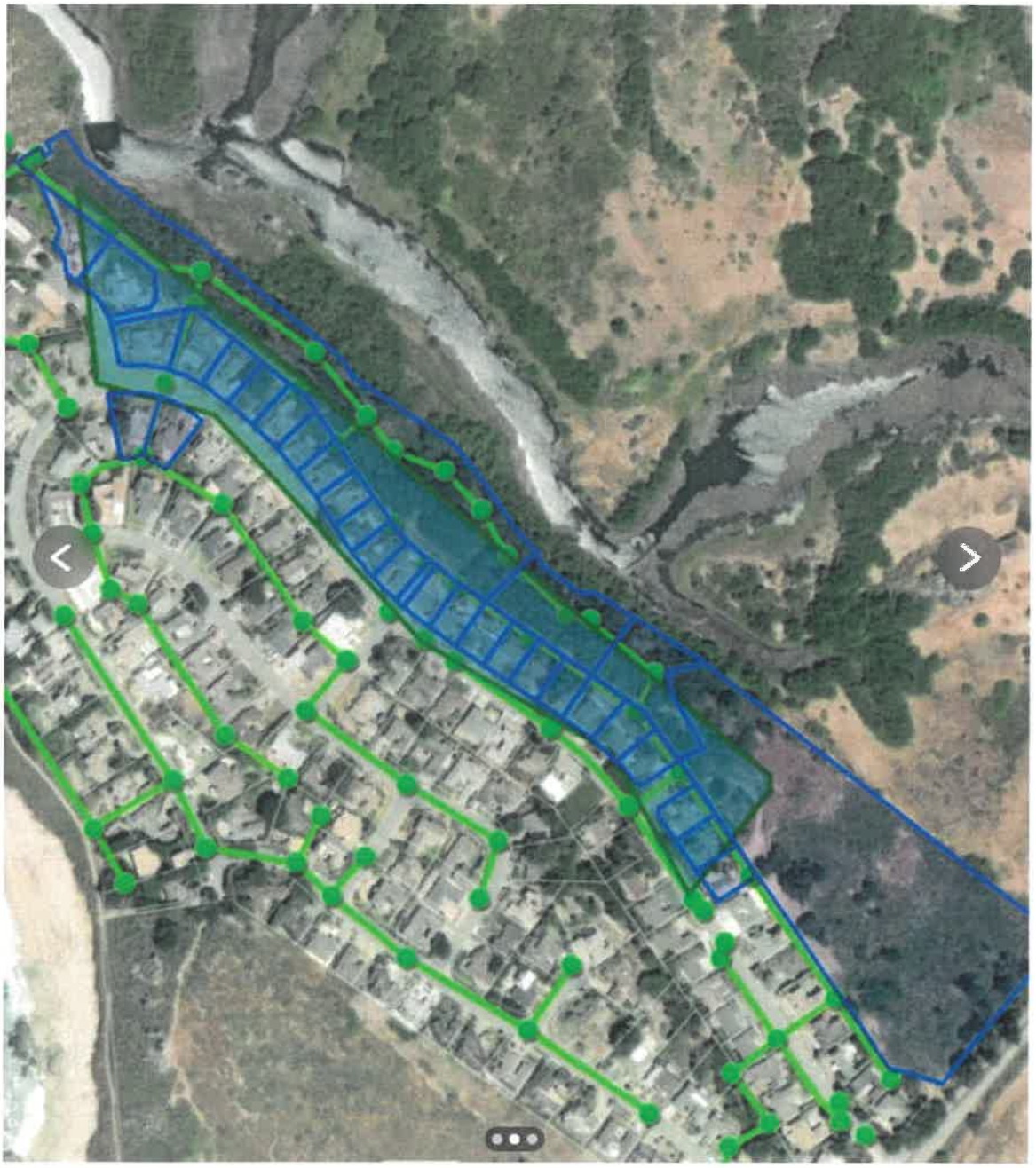
Barbara Buikema
Carmel by the Sea • 6 Apr 22 •



Community Meeting via Zoom regarding Carmel Meadows Sewer Replacement Project - Site Location Map

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Activity

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Carmel by the Sea • 6 Apr 22 •

Carmel Area Wastewater District

P.O. Box 221428 Carmel California 93922 ◆ (831) 624-1248 ◆ FAX (831) 624-0811

Barbara Buikema
General Manager
Ed Waggoner
Operations Superintendent
Robert R. Wellington
Legal Counsel

April 4, 2022

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Very truly yours,

Barbara Buikema
General Manager
831-624-1248

Community Meeting via Zoom regarding Carmel Meadows Sewer Replacement Project - Site Location Map

1 Like 1 Comment Share

ATTACHMENT 10

2022 CAWD RESOLUTION APPROVING IS/MND

RESOLUTION NO. 2022-13

A RESOLUTION APPROVING A NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION FOR THE CARMEL MEADOWS SEWER REPLACEMENT PROJECT NO. 19-03

-oOo-

WHEREAS, pursuant to Article 6 (Section 15072) of the California Environmental Quality Act (CEQA) guidelines, The Carmel Area Wastewater District (CAWD), as Lead Agency, intends to adopt a Mitigated Negative Declaration for the Carmel Meadows Sewer Replacement Project; and

WHEREAS the Notice of Intent to Adopt a Mitigated Negative Declaration will be published in the Carmel Pine Cone, filed with the Monterey County Clerk's office, and noticed in additional ways as required; and

WHEREAS, the Mitigated Negative Declaration will be submitted to the State Clearinghouse for review by State Agencies.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Carmel Area Wastewater District, does hereby approve issuing a Notice of Intent to Adopt a Mitigated Negative Declaration for the Carmel Meadows Sewer Replacement Project.

PASSED AND ADOPTED at a regular meeting of the Board of Directors of the Carmel Area Wastewater District duly held on March 31, 2022 by the following vote:

AYES:	BOARD MEMBERS: PRESIDENT WHITE, DIRECTORS: D'AMBROSIO, TOWNSEND, RACHEL AND SIEGFRIED
NOES:	BOARD MEMBERS:
ABSENT:	BOARD MEMBERS:
ABSTAIN:	BOARD MEMBERS:

Ken White, President of the Board

ATTEST:

Domine Barringer, Secretary to the Board

RESOLUTION NO. 2022-27

RESOLUTION TO ADOPT AN INITIAL STUDY/MITIGATED NEGATIVE DECLARATION (IS/MND) AND; THE MITIGATION MONITORING & REPORTING PROGRAM (MMRP) FOR THE CARMEL MEADOWS LIFT STATION AND SEWER REPLACEMENT PROJECT- #19-03

-oOo-

WHEREAS, the Carmel Area Wastewater District ("District") desires to adopt the Initial Study/Mitigated Negative Declaration ("IS/MND") and Mitigation Monitoring and Reporting Program (MMRP) for the Carmel Meadows Lift Station and Sewer Replacement Project (the "Project"), which is on file with the District Secretary to the Board and incorporated herein by this reference; and

WHEREAS, pursuant to the § 15074 California Environmental Quality Act ("CEQA"), the IS/MND was prepared for this Project; and

WHEREAS, the Project consists of replacement of the existing sewer system serving the odd number houses located at 2795 to 2955 Ribera Road. Project elements include the following: installation of a below grade sewage lift station, replacement of two sections of existing 6-inch vitrified clay pipe with 8-inch high-density polyethylene pipe, installation of a new sewer, installation of four new residential scale grinder pumps, rehabilitation of approximately 400 feet of existing sewer line, and removal of above-ground sections of the existing collector line.

WHEREAS, upon completion of the IS/MND, the District, as the Lead Agency, prepared and filed a Notice of Completion ("NOC") with the State Clearinghouse Office of Planning and Research ("SCH OPR"), for distribution to public agencies and interested parties for a public review period, commencing on April 16, 2022, and ending on May 16, 2022; and

WHEREAS, copies of the IS/MND were provided to all responsible agencies, and copies were also made available at the County of Monterey Office of the County Clerk; and

WHEREAS, the District published a Notice of Intent to Adopt an IS/MND in the local newspaper and posted a copy of the notice and IS-MND document at the Monterey County Clerk's Office, and at the District Office; and, online on the District's website; and

WHEREAS, during the public review period, the District received three (3) written comment letters on the IS/MND; and

WHEREAS, the IS/MND identifies potentially significant impacts to the environment, including but not limited to specific impacts to biological resources, cultural and tribal cultural resources, geology and soils, and noise, which impacts can and will be avoided or mitigated to less than significant levels through adoption and implementation of the mitigation measures proposed as part of the Project, the IS/MND and MMRP.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors makes the following findings as required by CEQA with respect to the proposed Project:

A. That the IS/MND was prepared in accordance with all legal requirements of CEQA, including all public notice and comment period requirements;
B. That the Board of Directors has considered the IS/MND and the opportunity to comment within the public comment period, as well as the opportunity to comment after the public comment period and prior to the date of this Resolution;
C. That the IS/MND identified all potentially significant environmental impacts of the Project, including but not limited to specific potentially significant impacts to biological resources, cultural and tribal cultural resources, paleontological resources, and noise, which impacts can and will be avoided or mitigated to less than significant levels through adoption and implementation of the mitigation measures proposed as part of the Project, IS/MND, and MMRP;
D. That the IS/MND reflects the District's independent judgment and analysis;
E. That there is no substantial evidence in the record that the Project, as mitigated, will have a significant negative effect on the environment;
F. That the administrative record is located in Carmel Area Wastewater District Office, at 3945 Rio Road, Carmel, California 93923; and

G. That the Board Secretary is designated as the location and custodian of the documents and other material constituting the record of proceedings upon which this decision is based.

NOW, THEREFORE, BE IT FURTHER RESOLVED, by the Board of Directors of the Carmel Area Wastewater District, based upon all of the oral and documentary evidence in the record, as follows:

1. That the IS/MND and the MMRP for the Project is adopted; and
2. That the District Board hereby approves the Carmel Meadows Lift Station and Sewer Replacement Project as described in the IS/MND.

PASSED AND ADOPTED by the Board of Directors of the Carmel Area Wastewater District on June 30, 2022 by the following vote:

AYES: BOARD MEMBERS: PRESIDENT WHITE, DIRECTORS: D'AMBROSIO, TOWNSEND, RACHEL AND SIEGFRIED

NOES: BOARD MEMBERS:

ABSENT: BOARD MEMBERS:

ABSTAIN: BOARD MEMBERS:

Ken White, President of the Board

ATTEST:

Domine Barringer, Secretary to the Board

ATTACHMENT 11

2022 COASTAL COMMISSION STAFF EMAIL

Carmel Highlands Sewer Realignment.

AB
Ammen, Breylen@Coastal <breylen.ammen@coastal.ca.gov>
To Rachel Lather

Reply | Reply All | Forward | ...

Thu 12/15/2022 3:45 PM

You forwarded this message on 12/21/2022 8:55 AM.

Hi Rachel,

Thank you for talking with me earlier today about the Carmel Meadows sewer realignment and the coastal resource considerations associated with the project. Given my current understanding of the proposed project and the project alternative that would replace the sewer in its existing location, Coastal Commission staff is supportive of the option that pulls the sewer line back from sensitive habitat as much as possible and minimizes the risk of any future contamination of the Carmel River. We are a regulatory/permitting agency, and in this case Monterey County is the permitting authority and has the expertise to evaluate the existing CDP application and any potential amendments to that application based on the strong protections for environmentally sensitive habitat and wetlands in the Carmel Area Local Coastal Program (LCP). Given that you have a CDP application for this project in with Monterey county, I would recommend consulting with the county if CAWD wishes to consider any amendment to that CDP. That said, if you or others at CAWD have questions about our interpretation of the LCP as it relates to this project, we can set up a meeting to discuss those questions.

Sincerely,

Breylen Ammen
Coastal Planner | Monterey County
CALIFORNIA COASTAL COMMISSION
725 Front Street, Suite 300
Santa Cruz, CA 95060
(831) 427-4863

ATTACHMENT 12

2023 CENTRAL COAST REGIONAL WATER QUALITY CONTROL BOARD LETTER

Central Coast Regional Water Quality Control Board

February 8, 2023

Rachél Lather, MS, PE
Principal Engineer
Carmel Area Wastewater District
3945 Rio Road, Carmel CA 93922
Lather@cawd.org

Via electronic mail

Dear Rachél Lather:

CARMEL AREA WASTEWATER DISTRICT, CARMEL MEADOWS SEWER MAIN PROJECT

Thank you for your inquiry regarding a review of the Carmel Area Wastewater District's (CAWD) Carmel Meadows Sewer Main project. It is Central Coast Regional Water Quality Control Board (Central Coast Water Board) staff's understanding that the existing cast iron pipe sewer line is about 60 years old and in poor condition. The pipeline is on aerial supports in an unstable and steeply sloped area that follows an alignment above a sensitive habitat (Carmel Lagoon) that flows to the ocean. This stretch of pipeline transports sewage flows from 52 residences in the Carmel Subdivision along Ribera Road. Pipeline access for maintenance, operation, repairs, and emergency response is poor.

As documented in mandatory reporting to the Central Coast Water Board, there have been 13 spills in the past 21 years on this stretch of pipeline (see Table 1 below). The latest spill was in June of this year with debris, structural problems and roots being the recurring issue. The Central Coast Water Board considers replacement of this sewer main adjacent to Carmel Lagoon a high priority.

Table1. Sewage spills from existing sewer line above Carmel Lagoon in Carmel Meadows Subdivision

Date	Manhole Location of Spill	Volume of Spill (gallons)	Cause of Spill
6/9/22	2885 Ribera Road MH S622	90	Debris, Grease, Structural Problems
5/21/21	2755 Ribera Road MH S610-S609	476	Roots

8/31/2016	2755 Ribera Road MH S610-S609	650	Roots
5/20/2016	2925 Ribera Road MH T603-T648	688	Grease and Debris
9/14/2012	S622-S616	900	Grease and Debris
1/27/2012	2805 Ribera Road S617-S618	40	Roots
12/19/2011	Ribera Road Easement S610-S609	825	Root Intrusion
8/15/2009	Ribera Road Easement S610-s609	500	Root Intrusion
4/8/2005	Ribera Road Easement S609-S607	180	Grease and Debris
7/14/2003	Ribera Road Easement S616-S608	60	Debris, Grease, Pipe Structural Problem
10/11/2002	Ribera Road Easement S616-S608	450	Debris, Grease, Pipe Structural Problem
4/21/2002	Ribera Road Easement S609-s607	50	Root Intrusion
5/2/2001	2695 Ribera Road S603-S602	300	Root Intrusion

Central Coast Water Board staff has reviewed three reports regarding the pipeline: 2019 Feasibility Study by SRT Consultants, 2013 Final Technical Memorandum by Kennedy/Jenks Consultants, and 2003 Carmel Meadows Sewer Evaluation by HDR Engineering. All three studies agreed that the pipeline is deteriorating and needs to be replaced.

There were many options to fix the unacceptable situation discussed in these reports, but it is Central Coast Water Board staff's understanding that the Carmel Highlands Land Use Advisory Committee has asked to consider the option of replacing the pipeline in the existing location abutting Carmel Lagoon (Alternative 2).

Alternative 5, on the other hand, would change an existing pipeline alignment to flow to a pump station located at an existing manhole on Mariposa Court. From there sewage would be pumped into an existing force mainline on Ribera Road that flows to the Calle La Cruz Pump Station. More detailed information regarding these two alternatives is described below.

Alternative 2 – Replace pipeline and manholes in existing location

This option would keep the pipeline location above Carmel Lagoon and includes the replacement of the entire sewer with new ductile iron pipe. This option will require the construction of a 20-foot-wide access road along the existing alignment, the removal of 15 oak trees, the construction of slope protection and stabilization, replacement of existing metal aerial supports and footings, and installation of four pin piles at each footing. The construction of a new access road would require the placement of fill and retaining walls along the downhill side of the easement and eleven manholes would be replaced with watertight polymer concrete manholes.

The existing laterals would remain connected to a backyard pipeline that flows into the existing pipeline, and root intrusion through laterals would continue to be an issue. The aerial-supported visible pipeline would continue to be vulnerable to slope instability, falling trees, sea level rise, and other impacts from climate change.

Alternative 5 – Relocate sewer to flow to Mariposa Court where sewage is pumped to existing force main in Ribera Road

The alternative project proposed by CAWD would utilize an existing pipeline in the backyards of 19 homes to direct sewage to either the Calle La Cruz Pump Station or a new pump station located in an existing manhole in Mariposa Court. This project would require four homes to connect to a new sewer line with ejector (i.e., grinder) pump systems, and existing laterals would connect to the collection pipeline. This option also includes pipe bursting of portions of the existing collection line, where feasible. This alternative project would improve access to the sewer lines, and the potential for sewage spills to the Carmel Lagoon would be greatly reduced. Additionally, minor work needed on the private property to install the ejector pumps would have de minimis effects on the environment, and the small submersible pump station at the end of Mariposa Court would only have a control panel visible to the public.

This alternative project would eliminate water quality issues associated with old leaky laterals, root infiltration into the sewer system, and grease and debris blockages that caused spills shown on Table 1. Water quality benefits of the street option and the reduced environmental impact of this project have been the basis for CAWD to consider this as the best option.

The Central Coast Water Board now includes requirements in National Pollutant Discharge Elimination System (NPDES) permits that require wastewater agencies to address threats from climate change. These requirements for the wastewater treatment

facility NPDES permits also include other infrastructure aspects such as collection systems.

The Central Coast Water Board also wants to make sure you are aware of the sanitary sewer system permit adopted on December 6, 2022, by the State Water Resources Control Board:

https://www.waterboards.ca.gov/water_issues/programs/sso/

Attachment D, sections 8.1 through 8.4, of the sanitary sewer system permit requires wastewater agencies to prioritize condition assessments for portions of their systems located in steep terrain, environmental areas more vulnerable to system failures, and components of the system more vulnerable to climate change impacts. Agencies must develop and plan to address those portions of the systems identified that need improvement. CAWD's assessment of Alternative 5 as the preferred alternative is consistent with the proposed sewer system permit as well as NPDES permit climate change requirements.

Conclusion

The Central Coast Water Board's mission is developing and enforcing water quality objectives and implementing plans that will best protect the area's waters. The plan to move the aging sewer line away from Carmel Lagoon will protect the environment and reduce or eliminate sewage spills to this water body that drains to the Monterey Bay National Marine Sanctuary at Carmel River State Beach.

The Central Coast Water Board does not support Alternative 2, because this would likely result in continued sewage spills to Carmel Lagoon and would be less protective to water quality. In Alternative 2, future spills would likely continue and a new pipe on the existing steep slope would be vulnerable to issues such as increased erosion resulting from storms strengthened by climate change. The Central Coast Water Board supports Alternative 5 as it would benefit water quality as well as CAWD and property owners by reducing liability for such future illicit discharges.

If you have any questions regarding this topic, please contact Dr. Peter von Langen at peter.vonlangen@waterboards.ca.gov or (805) 549-3688.

Sincerely,

for Matthew T. Keeling
Executive Officer

cc:

Peter von Langen, Central Coast Water Board
Leah Lemoine, Central Coast Water Board
Harvey Packard, Central Coast Water Board

ECM 213281

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ATTACHMENT 13

2023 CALIFORNIA COASTAL COMMISSION LETTER

CALIFORNIA COASTAL COMMISSION
CENTRAL COAST DISTRICT
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
PHONE: (831) 427-4863
FAX: (831) 427-4877
WEB: WWW.COASTAL.CA.GOV

June 5, 2023

Phil Angelo
Monterey County - Housing and Community Development
1141 Schilling Place, South 2nd Floor
Salinas, CA 93901

Subject: **PLN220055 (Carmel Meadows Sewer Enhancement)**

Dear Phil,

Coastal Commission staff would like to provide the following comments on CDP application PLN220055, consisting of sewer infrastructure improvements in the Carmel Meadows neighborhood including, among other things, the replacement and realignment of a section of sewer line. Currently, this section of sewer line is located partway down a steep slope between the Carmel River Lagoon and the Carmel Meadow residences, and the application materials note that the line is deteriorating and is in critical need of replacement. According to the Central Coast Regional Water Quality Control Board, this section of sewer line has spilled 13 times in the last 21 years, and twice in the last 2.5 years. Due to the location on a steep slope that drains to the Lagoon, these spills pose an unacceptable hazard to both the highly sensitive wetland/riparian ecology (including steelhead and red legged frogs) and visitors to Carmel River State Beach. As such, spills at this location are incredibly problematic from both ecological and public access perspectives.

As proposed, the project would abate these hazards by abandoning and partially removing the deteriorating sewer line, and utilizing a combination of existing sewer lines, replaced sewer lines, new sewer lines, and new pumps to both improve the physical integrity of the sewer infrastructure in this area, and pull sewer infrastructure back farther away from the highly sensitive lagoon. Coastal Commission staff is highly supportive of the project's goals as well as the decision to site sewer infrastructure farther away from the lagoon, which we believe best meets Local Coastal Program (LCP) objectives to protect sensitive coastal resources.

We understand that there is a project alternative that would include an in-kind replacement of the existing gravity sewer in its current alignment, and while that is not the project that is currently before the County, some interested parties are advocating for that project alternative. Coastal Commission staff is highly concerned about this alternative as it would result in a sewer line remaining in the middle of a steep slope adjacent to the lagoon. While replacing the sewer line in kind would be an improvement

over current conditions, any sewer line in the current alignment poses unacceptable long-term risks to coastal resources.

The Carmel Area Land Use Plan (LUP) specifically requires the water quality in the Carmel River Lagoon and the Carmel Bay be protected, and pollution sources minimized: “Point and non-point sources of pollution of Point Lobos and Carmel Bay ASBS’s, coastal streams and the Carmel River Lagoon and Marsh shall be controlled and minimized” (Policy 2.4.3.3). Regarding public access, LUP Policy 5.3.3.1.a specifically names Carmel River State Beach as one of the three most important locations for public access within the area covered by the LUP. Leaks of untreated effluent into the lagoon and coastal waters pose a significant barrier to public access at this location due to the health and safety risks associated with exposure to untreated sewage, as well as any closures that may be required to protect the public from these hazards. These LCP polices, and others, require that sewage infrastructure in this area be carefully sited and designed to minimize the risk of spills into the lagoon**.** In kind replacement of the existing sewer line in the existing alignment is incompatible with these requirements and is thus unlikely to be approvable under the LCP. It appears that the proposed project should be approved and completed as soon as possible to prevent further deterioration of the existing infrastructure and to eliminate the risk of additional spills.

Thank you for the opportunity to comment, and please notify us once a hearing date is scheduled for the application.

Sincerely,

Breylen Ammen

Breylen Ammen