

SANTA YNEZ COMMUNITY SERVICES DISTRICT
MEMORANDUM

TO: Board of Directors
FROM: Loch Dreizler, General Manager
DATE: October 19, 2022
SUBJECT: Horizon Drive Sewer Easement Subsidence

Recommendation

Continue the discussion on the Horizon Drive sewer easement subsidence.

Policy Implications

The District has *Construction Standards for Public Sewage System Improvements*. These standards are incorporated into project construction documents and specifications.

Fiscal Implications

There is \$205,629.00 remaining from the Horizon Drive project loan fund to use for additional soil compaction tests or other Horizon Drive related projects.

Alternatives Considered

None

Discussion

See the attached chronology for the Horizon Drive sewer easement subsidence.

Board direction from the previous meeting:

- Notify the contractor of the steps the district has taken
- Solicit a proposal from soils consultant(s) to provide additional assurance by taking additional compactions samples within a safe depth of new sewer line
 - Geo-Solutions – indicated that additional compaction test may not add new information and recommended a change to the top two feet of the trench line for additional assurance.
 - Earth Systems – provided a proposal for five additional compaction samples.
- Take additional compactions samples near *Areas of Concern*, along with two or three random compaction samples for comparison (the proposal was not finalized at the time this staff report was prepared).

Attachment(s):

1. Geo-Solutions Field Density Test – Soil Compaction
2. Horizon Drive Sewer Easement Subsidence Chronology



REPORT OF FIELD DENSITY TESTS

DATE
November 29, 2021

PROJECT NO.
GS00189-1

CLIENT
Santa Ynez Community
Service District (SYCSD)
Attn: Jose Acosta
General Manager
1070 Faraday Street
Mail: PO Box 667
Santa Ynez, CA 93460

PROJECT NAME
Santa Ynez Community
Service District (SYCSD)
Horizon Drive Sewer
Horizon Drive and
Easement
Santa Ynez Area
Santa Barbara County
California

GeoSolutions, Inc. provided field density testing services during construction for the SYCSD Horizon Drive Sewer project located along Horizon Drive and adjacent easement in the Santa Ynez area of Santa Barbara County, California. The purpose of our services was to perform field density tests as requested by our client during trench backfill operations for the new sewer construction.

Field density testing was performed on an intermittent basis between September 7 and September 29, 2021, on compacted native material placed as trench backfill within the Horizon Drive easement. Specialty Construction Company of San Luis Obispo, California, performed the construction operations for the project using conventional grading equipment.

Maximum density and optimum moisture content values were determined in the laboratory in general accordance with ASTM D1557. The test results are presented in Table 1: Laboratory Test Results.

Table 1: Laboratory Test Results

Table with 4 columns: Curve ID, Soil Description, Maximum Dry Density (pcf), Optimum Moisture (%). Row 1: A, Brown Silty SAND, 117.8, 12.1

Field density tests were conducted in accordance with ASTM D6938 nuclear test methods. The attached Field Density Test Result Sheet presents a summary of the field density testing performed for the project. Approximate test locations are provided on Plate 1 - Field Density Test Location Plan. The test results summarized in this report represent moisture and density only at the locations shown on the specified date.

Thank you for the opportunity to have been of service. If you have any questions or require additional assistance, please contact the undersigned at (805) 543-8539.

Sincerely,
GeoSolutions, Inc.

Handwritten signature of Kelly M. Robinson

Kelly M. Robinson, PhD
Principal Engineer, GE 3118



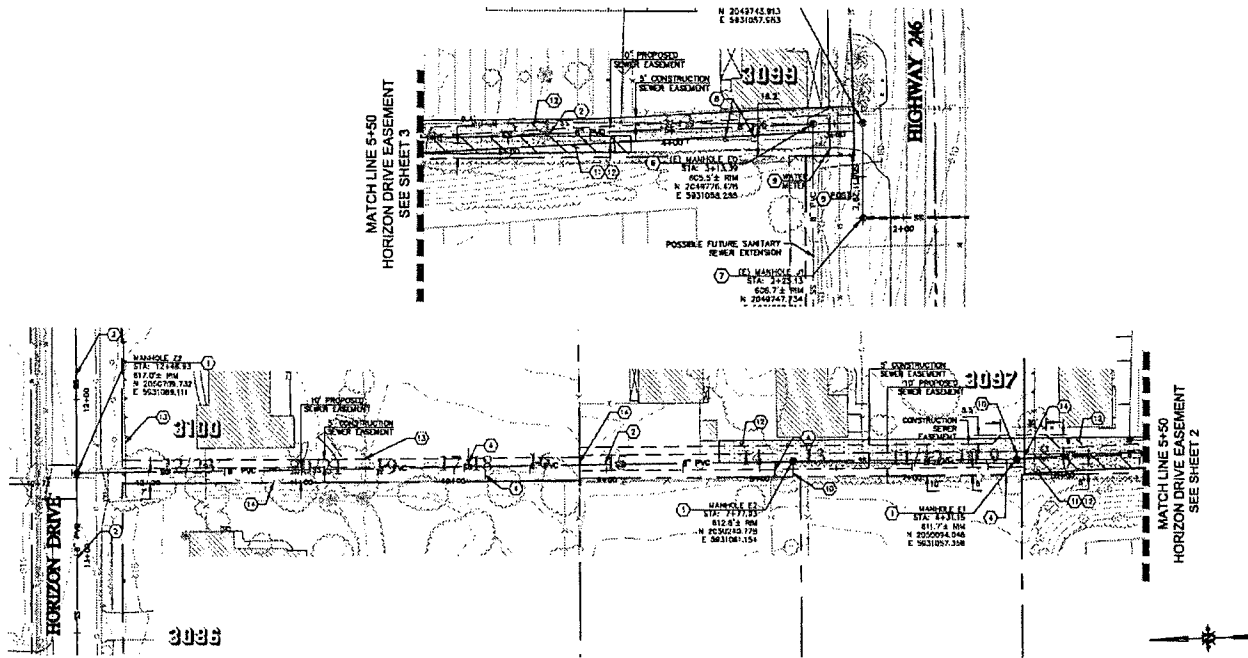
ATTACHMENTS: Field Density Test Result Sheet
Plate 1 - Field Density Test Location Plan

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220 High Street
San Luis Obispo CA 93401
805.543.8539
1021 Tama Lane, Suite 105
Santa Maria, CA 93455
805.614.6333
201 S. Milpas Street, Suite 103
Santa Barbara, CA 93103
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FIELD DENSITY TEST RESULT SHEET											
HORIZON SEWER PROJECT											
HORIZON DRIVE, SANTA YNEZ, CA											
Test Number	Test Date 2021	Approximate Test Location	Depth of Fill (feet)	Elevation (feet)	Dry Density (pcf)	Moisture Content (%)	Max Density (pcf)	Optimum Moisture (%)	Relative Compaction (%)	Tested By	Comments
1	09/07/21	Sewer Trench Backfill (Sta 3+30)	4.0'		112.7	13.0	117.8	12.1	95	CF	A Curve
2	09/07/21	Sewer Trench Backfill (Sta 4+00)	6.0'		113.0	14.2	117.8	12.1	95	CF	A Curve
3	09/08/21	Sewer Trench Backfill (Sta 4+10)	4.0'		112.5	13.1	117.8	12.1	95	CF	A Curve
4	09/08/21	Sewer Trench Backfill (Sta 4+70)	8.0'	FG	114.1	13.2	117.8	12.1	96	CF	A Curve
5	09/09/21	Sewer Trench Backfill (Sta 5+00)	4.0'		114.3	14.1	117.8	12.1	97	CF	A Curve
6	09/09/21	Sewer Trench Backfill (Sta 5+50)	8.0'	FG	112.4	12.8	117.8	12.1	95	CF	A Curve
7	09/10/21	Sewer Trench Backfill (Sta 6+00)	5.0'		112.9	13.7	117.8	12.1	95	CF	A Curve
8	09/10/21	Sewer Trench Backfill (Sta 6+30)	9.0'	FG	113.1	13.2	117.8	12.1	96	CF	A Curve
9	09/14/21	Sewer Trench Backfill (Sta 6+50)	4.0'		112.7	14.6	117.8	12.1	95	CF	A Curve
10	09/14/21	Sewer Trench Backfill (Sta 6+50)	9.0'	FG	113.8	13.8	117.8	12.1	96	CF	A Curve
11	09/16/21	Sewer Trench Backfill (Sta 7+20)	4.0'		113.1	12.3	117.8	12.1	96	CF	A Curve
12	09/16/21	Sewer Trench Backfill (Sta 7+20)	9.0'	FG	114.2	12.8	117.8	12.1	96	CF	A Curve
13	09/21/21	Sewer Trench Backfill (Sta 7+80)	4.0'		112.8	14.2	117.8	12.1	95	CF	A Curve
14	09/21/21	Sewer Trench Backfill (Sta 8+20)	9.0'	FG	113.1	13.7	117.8	12.1	96	CF	A Curve
15	09/27/21	Sewer Trench Backfill (Sta 9+00)	4.0'		114.1	12.8	117.8	12.1	96	CF	A Curve
16	09/27/21	Sewer Trench Backfill (Sta 9+50)	9.0'	FG	112.9	14.1	117.8	12.1	95	CF	A Curve
17	09/27/21	Sewer Trench Backfill (Sta 10+00)	4.0'		113.2	12.8	117.8	12.1	96	CF	A Curve
18	09/27/21	Sewer Trench Backfill (Sta 10+00)	9.0'	FG	112.8	13.4	117.8	12.1	95	CF	A Curve
19	09/28/21	Sewer Trench Backfill (Sta 10+50)	4.0'		113.1	14.2	117.8	12.1	96	CF	A Curve
20	09/28/21	Sewer Trench Backfill (Sta 11+00)	5.0'		114.3	14.1	117.8	12.1	97	CF	A Curve
21	09/29/21	Sewer Trench Backfill (Sta 11+00)	9.0'	FG	112.8	13.2	117.8	12.1	95	CF	A Curve
22	09/29/21	Sewer Trench Backfill (Sta 11+80)	4.0'		113.2	12.4	117.8	12.1	96	CF	A Curve
23	09/29/21	Sewer Trench Backfill (Sta 11+80)	9.0'	FG	113.1	12.0	117.8	12.1	96	CF	A Curve

LEGEND: FG - finish base grade



FIELD DENSITY TEST LOCATION PLAN
SYCSD Horizon Drive Sewer
Horizon Drive and Easement
Santa Ynez Area
Santa Barbara County
California

GeoSolutions, Inc.
220 High Street
San Luis Obispo, CA 93401
(805) 543-8539

PLATE 1

Horizon Drive Sewer Easement Subsidence Chronology

3 Months	November 17, 2021	Board Approved Notice of Completion	
	December 14, 2021	Rain and groundwater build-up, caused soil subsidence at the easement (Solvang reporting 3.4")	
	January 2022	Staff reviewed and discussed project plans and documentation: <ul style="list-style-type: none"> District Contractor, District Engineer, District Geotechnical Consultant, District Staff and the District's Construction Manager (CM) reviewed the subsidence The conclusion was that subsidence likely resulted from several factors, including the trench's depth, width, and local soil characteristics Working with the property owners and Specialty Construction, an approach for repairing the subsidence was developed 	
5 Months	February 14 – 18, 2022	Specialty Construction repaired the surface soil subsidence <ul style="list-style-type: none"> Specialty Construction Inc. performed warranty work to address the subsidence The District's construction manager observed the repairs and determined warranty work completed on February 18 	
	March 16, 2022	Board Meeting <ul style="list-style-type: none"> "The District's engineer stated the warranty work did not need additional compaction testing." "The Board consensus was to have staff bring back options at the next meeting with costs and options for compaction testing." 	
	April 20, 2022	Board Meeting <ul style="list-style-type: none"> No costs and options for compaction testing presented to Board 	
	May 18, 2022	Board Meeting <ul style="list-style-type: none"> No costs and options for compaction testing presented to Board 	
	June 15, 2022	Board Meeting (Mike LeBrun's final meeting) <ul style="list-style-type: none"> District Engineer Report: <i>Sewer Line Settlement Investigative Techniques</i> <ul style="list-style-type: none"> Up to 10% additional settlement could still occur at some point, and the project can still meet specification requirements." The board directed staff to soak the trench line to see if there is any settlement from Mrs. Larsons' (Horizon Drive) to HWY 246. Staff to bring a report back to the Board at the July meeting. 	
	July 20, 2022	Board Meeting (New General Manager on staff for nine days) Board Motion: <ul style="list-style-type: none"> Flood (Soaker Hose) the soil from Horizon Drive to 246 to verify compaction on easement Goal: determine if additional, potential subsidence by soaking the construction trench line 	
	July 22, 2022	Soaker Project Begins (Logistics, Soaking began on August 2, 2022)	
	2 Months	August 17, 2022	New GIMs First Presentation to Board with Soaker Graphics <ul style="list-style-type: none"> No additional subsidence from the soaker hose experiment Some "Areas of Concern," but nothing definitive determined Contact district consultants to help interpret "Areas of Concern."
		August 18, 2022	GIM and Supervisor met the District's Project Manager who was confident that the project was completed according to specifications but recommended speaking with the Soils Engineer.
		August 23, 2022	GIM and Ops Supervisor met on-site with the Soils Engineer who concluded that it was unlikely that subsequent settlement would occur as the soil has consolidated. All compaction testing during construction exceeded specifications (see attached).
September 21, 2022		Board Meeting (labor negotiations same evening) GIM's Second Presentation to Board <ul style="list-style-type: none"> See the Project Manager and Soils Engineer's comments above Additional Board Direction <ul style="list-style-type: none"> Notify the contractor of the steps the district has taken Contact consultant to provide additional assurance by taking additional compactions samples within a safe depth of the sewer line Take additional compactions samples near Areas of Concern, along with some random compaction samples 	
2 Months	October 19, 2022	Board Meeting <ul style="list-style-type: none"> Geo-Solutions – indicated that additional compaction test will likely not add new information but recommended a modification for the top two feet of the trench line to provide additional assurance Earth Systems – revising a proposal for five additional compaction samples. 	
	November 17, 2022	Warranty Expires 12 months after Board approved Notice of Completion on November 17, 2021	

