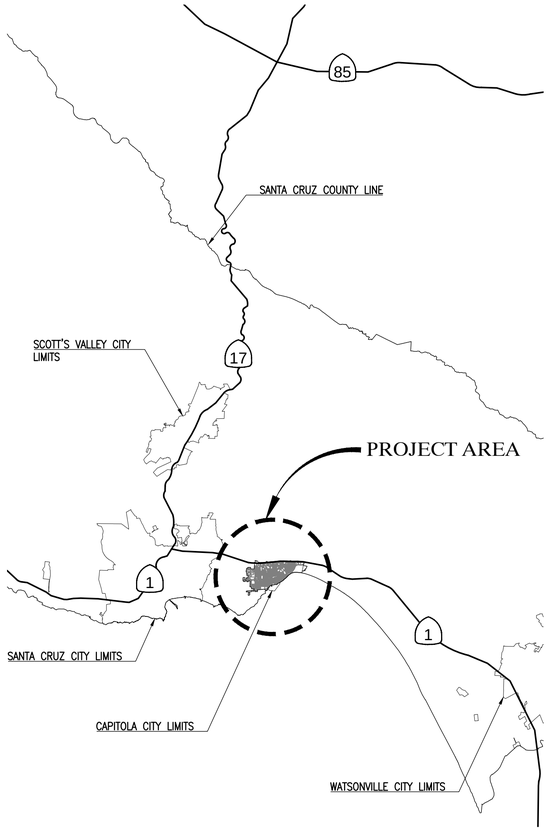
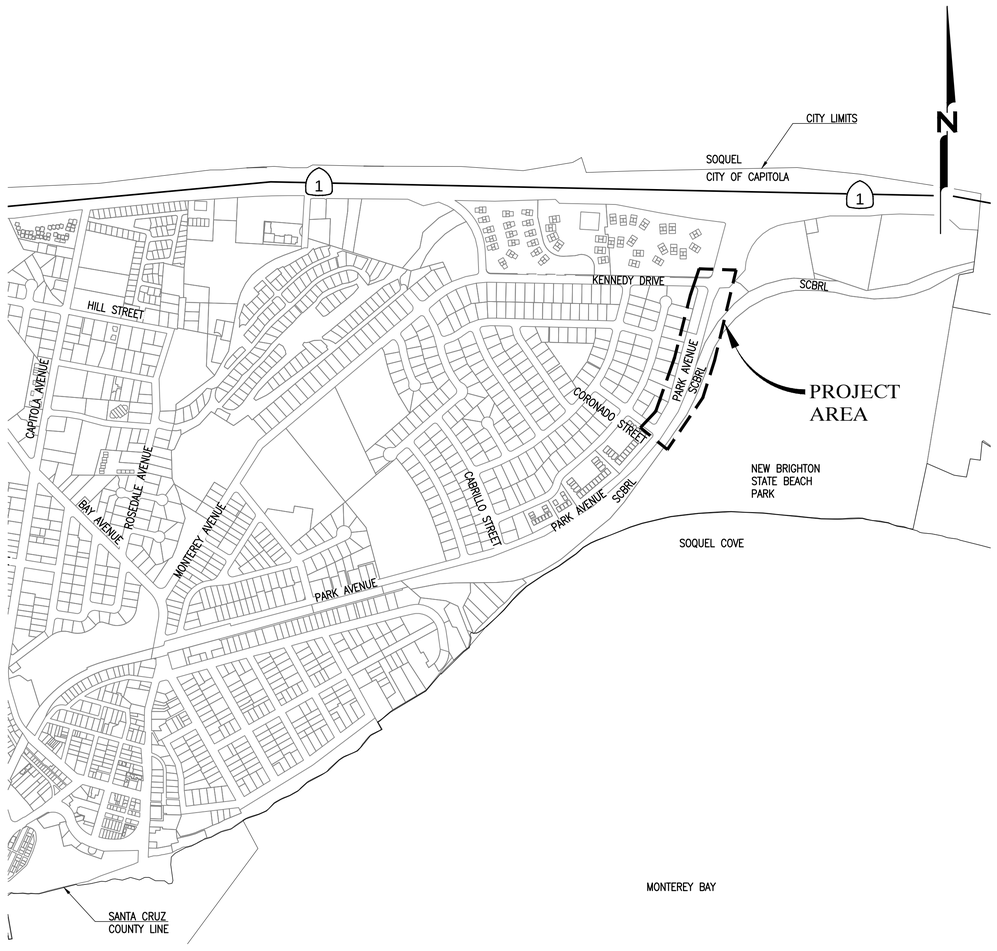
CITY OF CAPITOLA
RECONSTRUCT STORM DAMAGED BIKE PATH AND SHOULDER ON PARK AVE.
FEDERAL NO. ER-32L0(346)



LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

SHEET INDEX		
SHEET NO.	DRAWING NO.	SHEET TITLE
1	G1	TITLE SHEET
2	G2	NOTES, LEGEND, AND ABBREVIATIONS
3	C1	SLOPE REPAIR PLAN
4	C2	ENGINEERED REPAIR SLOPE

PREPARED UNDER THE DIRECTION OF:

JIM BUI, P.E.
PROJECT ENGINEER, NCE

07/10/2019
DATE

APPROVED BY:

STEVEN JESBERG, P.E.
PUBLIC WORKS DIRECTOR, CITY OF CAPITOLA

07/10/2019
DATE

FINAL PLANS ISSUED FOR CONSTRUCTION
DATE:07-10-2019

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REGISTERED PROFESSIONAL ENGINEER
JIM BUI
NO. C 86467
CIVIL
STATE OF CALIFORNIA
07/10/2019

RECONSTRUCT STORM DAMAGED BIKE PATH AND SHOULDER ON PARK AVE.

FEDERAL NO. ER-32L0(346)

OWNER

CITY OF CAPITOLA INCORPORATED 1949

420 CAPITOLA AVENUE
CAPITOLA, CA 95010

NO.	DATE	DESCRIPTION

PROJECT NO: 303.08.55
DESIGNED BY: JB
DRAWN BY: JB, PS
CHECKED BY: JN DATE: 04/30/2019
DATE: 07/10/2019

SHEET TITLE

TITLE SHEET

DRAWING
G1

SHEET 1 OF 4

GENERAL NOTES

1. ALL DRAWINGS AND SPECIFICATIONS ARE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEW AND COORDINATION OF ALL DRAWINGS AND SPECIFICATIONS PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE START OF CONSTRUCTION SO THAT A CLARIFICATION MAY BE ISSUED. WORK NOT CONFORMING TO THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO EXPENSE TO THE CITY.
2. PARCEL DATA IS BASED ON PARCEL INFORMATION AVAILABLE ON SANTA CRUZ COUNTY'S GIS WEBSITE OR FROM PUBLICLY AVAILABLE RECORD DATA AT THE TIME OF THE SURVEY, AND IS NOT THE PRODUCT OF A RESOLVED BOUNDARY SURVEY. PARCEL LINES ARE APPROXIMATE AND ARE FOR INFORMATIONAL PURPOSES ONLY.
3. SPECIFIC NOTES AND DETAILS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. TYPICAL DETAILS REFER TO CALTRANS STANDARD PLANS 2018.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY LOCATIONS OF EXISTING FACILITIES AND TO IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY FIELD CONFLICTS.
5. ALL MATERIALS AND WORKMANSHIP SHALL FULLY CONFORM WITH THE ORDINANCES OF THE CITY OF CAPITOLA, THE 2018 CALTRANS STANDARD PLANS, AND 2018 CALTRANS STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED. STANDARD PLANS ARE AVAILABLE AT THE OFFICE OF THE ENGINEER.
6. CONTRACTOR SHALL MEET WITH CITY PRIOR TO START OF CONSTRUCTION. 48 HOURS NOTICE TO THE ENGINEER IS REQUIRED ON ALL INSPECTIONS.
7. CONTRACTOR IS RESPONSIBLE TO MAKE ALL ARRANGEMENTS FOR SITE INSPECTIONS AND ENSURE THAT ALL CURRENT STANDARDS FOR THE CITY OF CAPITOLA AND CALTRANS ARE FOLLOWED PRIOR TO BEGINNING ANY PHASE OF CONSTRUCTION WORK.
8. CONTRACTOR SHALL VERIFY QUANTITIES PRIOR TO START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
9. CONSTRUCTION SHALL BE LIMITED TO BETWEEN THE HOURS OF 8:00 A.M. AND 5:00 P.M., MONDAY THROUGH FRIDAY AND INSPECTION REQUESTS SHALL BE LIMITED TO NORMAL CITY BUSINESS HOURS: 8:00 A.M. TO 5:00 P.M., MONDAY THROUGH FRIDAY. ARRANGEMENTS FOR ANY OVERTIME INSPECTION SERVICES AND PAYMENTS OF FEES FOR SAME SHOULD BE MADE 48 HOURS IN ADVANCE AND ARE SUBJECT TO INSPECTION AVAILABILITY AND APPROVAL BY THE ENGINEER.
10. THE CITY IS RESPONSIBLE FOR ARRANGEMENTS TO PAY FOR ALL MATERIAL TESTING REQUIRED FOR QUALITY ASSURANCE/ACCEPTANCE OF THIS PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL MATERIAL TESTING REQUIRED BY THE ENGINEER AND QUALITY CONTROL TESTING, PER THE TECHNICAL SPECIFICATIONS, IS PERFORMED. THE ENGINEER WILL ONLY PERFORM QUALITY ASSURANCE TESTING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER 24 HOURS IN ADVANCE OF QUALITY ASSURANCE TESTING TO ALLOW THE ENGINEER TO SCHEDULE MATERIAL TESTING LAB SAMPLING OR TESTING.
11. DUST CONTROL DURING ALL PHASES OF CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN GOOD HOUSEKEEPING WITHIN THE CONSTRUCTION AREA AND STAGING AREA.
12. WATER FOR DUST CONTROL AND USE FOR COMPACTION MAY BE PURCHASED FROM THE APPROPRIATE AGENCY PRIOR TO THE START OF ANY WORK, AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PAY FOR ANY FEES OR DEPOSITS.
13. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL THE PROPOSED ROUTE(S) FOR ALL CONSTRUCTION TRAFFIC RELATED TO THE PROJECT. UPON APPROVAL, THE CONTRACTOR SHALL STRICTLY ADHERE TO THAT ROUTE(S) ONLY, UNLESS WRITTEN PERMISSION IS OBTAINED TO CHANGE THE ROUTE(S). IN ADDITION TO THE CONTRACTOR'S PROPOSED ROUTE(S), A DETOUR PLAN SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.
14. BIDDERS SHOULD NOTE THE PRESENCE OF A DENSE EUCALYPTUS GROVE SURROUNDING PARK AVENUE. AS PART OF THEIR PRE-BID INSPECTION, BIDDERS SHALL NOTE THE PRESENCE OF ANY TREES OBSTRUCTING ACCESS TO THE PROJECT SITE NOT SHOWN ON THE PLANS. BIDDER'S PRICE SHALL INCLUDE PROVISIONS FOR WORKING IN AREAS POTENTIALLY OBSTRUCTED BY EUCALYPTUS TREES, AND NO ADDITIONAL COMPENSATION IS ALLOWED.
15. THE CONTRACTOR SHALL MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES AFFECTED BY THE PROJECT THROUGHOUT THE LIFE OF THE CONTRACT AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
16. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES.
17. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICES ALERT (U.S.A.) 800-227-2600 (OR DIAL 811), TWO (2) WORKING DAYS PRIOR TO START OF ANY EXCAVATION OR DEMOLITION OF IMPROVEMENTS.
18. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL UTILITIES TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION SO THAT LINES CAN BE MARKED. CONTRACTOR SHALL EXERCISE CARE DURING EXCAVATION OR DEMOLITION, PARTICULARLY IN LOCATIONS WITH UTILITIES THAT WILL REMAIN IN SERVICE.
19. ANY DAMAGE TO THE EXISTING FACILITIES INCLUDING RAILROAD, TREES, LANDSCAPING, IRRIGATION, FENCES, WALLS, SIDEWALK, MAILBOXES, UTILITIES, AND OTHER PAVEMENT SURFACES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE. CONTRACTOR SHALL RESTORE ANY AND ALL PAVEMENT AND OTHER FACILITIES OUTSIDE LIMITS OF WORK AFFECTED BY THE CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VIDEOTAPE OR DOCUMENT EXISTING CONDITIONS PRIOR TO START OF WORK TO SUBSTANTIATE ANY PREVIOUS DAMAGE, ETC.; COPIES OF WHICH SHALL BE PROVIDED TO THE ENGINEER.
20. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT THEIR WORK AREA FROM DAMAGE.
21. SURVEY MONUMENTS SHALL ONLY BE RESET BY A REGISTERED CIVIL ENGINEER OR LICENSED LAND SURVEYOR AT THE DIRECTION OF THE ENGINEER.
22. STRIPING AND MARKINGS IN ROADWAYS SHALL BE THERMOPLASTIC.
23. TRAFFIC CONTROL DURING CONSTRUCTION SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAGGERS, AND OTHER DEVICES TO PROVIDE FOR SAFE PASSAGE OF PUBLIC VEHICULAR, BICYCLE, AND PEDESTRIAN TRAFFIC IN ACCORDANCE WITH CA MUTCD.
24. CONTRACTOR SHALL POSSESS A VALID CLASS 'A' LICENSE AT THE TIME OF AWARD OF THE CONTRACT.
25. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A 2 WEEK LOOK AHEAD SCHEDULE AT WEEKLY MEETINGS; AND DAILY SCHEDULE OF PLANNED WORK A MINIMUM OF 24 HOURS IN ADVANCE.

RAILROAD RIGHT-OF-ENTRY NOTES

1. THE CONTRACTOR SHALL NOTIFY THE SANTA CRUZ COUNTY REGIONAL TRANSPORTATION COMMISSION (RAILROAD OWNER) AND PROGRESSIVE RAIL, INC (RAILROAD OPERATOR) 10 DAYS IN ADVANCE OF CONSTRUCTION WITHIN THE SANTA CRUZ BRANCH RAILROAD RIGHT-OF-WAY.

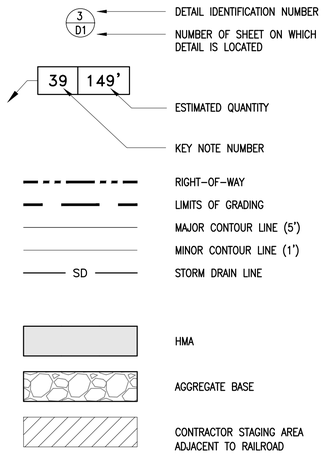
LEGEND

EXISTING FEATURES

- PARCEL LINE
- COUNTY LINE
- CITY LIMIT
- 1 — INTERSTATE OR STATE ROUTE
- EDGE OF PAVEMENT
- MAJOR CONTOUR LINE (5')
- MINOR CONTOUR LINE (1')
- SS — SEWER LINE
- SD — STORM DRAIN LINE

LEGEND

PROPOSED FEATURES



- DETAIL IDENTIFICATION NUMBER
- NUMBER OF SHEET ON WHICH DETAIL IS LOCATED
- ESTIMATED QUANTITY
- KEY NOTE NUMBER
- RIGHT-OF-WAY
- LIMITS OF GRADING
- MAJOR CONTOUR LINE (5')
- MINOR CONTOUR LINE (1')
- SD — STORM DRAIN LINE
- HMA
- AGGREGATE BASE
- CONTRACTOR STAGING AREA ADJACENT TO RAILROAD

LEGEND – PAVING DETAILS

- EXISTING AC
- EXISTING AB
- PROPOSED AC
- PROPOSED AB

ABBREVIATIONS

NOT ALL ABBREVIATIONS LISTED ARE USED IN THESE PLANS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
@	AT
APPROX.	APPROXIMATE
AVG.	AVERAGE
BMP	BEST MANAGEMENT PRACTICES
BR	BASE REPAIR(S)
CA	CALIFORNIA
CATV	CABLE/TELEVISION
C&G	CURB AND GUTTER
CB	CATCH BASIN
CF	CUBIC FEET
CIR	COLD IN-PLACE RECYCLING
CL	CENTERLINE
CLR	CLEAR
COMM	COMMUNICATION
CONC	CONCRETE
CONST	CONSTRUCT
CY	CUBIC YARD
° OR DEG	DEGREE(S)
DI	DROP INLET
ø OR DIA.	DIAMETER
DIR.	DIRECTION
DWG	DRAWING
DWS	DETECTABLE WARNING SURFACE
DW, DWY	DRIVEWAY
E	EAST
EA.	EACH
EB	EASTBOUND
EG	EXISTING GRADE
ELEC	ELECTRIC
EP	EDGE OF PAVEMENT
EL	ELEVATION
(E)	EXISTING
ES	EDGE OF SHOULDER
FH	FIRE HYDRANT
FG	FINISH GRADE
FFC	FRONT FACE CURB
FL	FLOWLINE
FT or '	FOOT, FEET
G	GAS
GV	GATE VALVE
GB	GRADE BREAK
HMA	HOT-MIX ASPHALT
ID	IDENTIFICATION
IN. or "	INCH
INT	INTERSECTION
IRWL	IN-ROAD WARNING LIGHTS
ISA	INTERNATIONAL SYMBOL OF ACCESSIBILITY
L	LEFT
LEN	LENGTH
LF	LINEAR FEET
LS	LUMP SUM
MH	MANHOLE
MAX	MAXIMUM
MDD	MAXIMUM DRY DENSITY
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N	NORTH
(N)	NEW
NE	NORTHEAST
N/O	NORTH OF
NIC	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NW	NORTHWEST
# OR NO.	NUMBER
O.C.	ON CENTER
O.D.	OUTER DIAMETER
OPP	OPPOSITE
±	PLUS OR MINUS
PT.	POINT
PCC	PORTLAND CEMENT CONCRETE
PVMT	PAVEMENT
PSI	POUNDS PER SQUARE INCH
PL	PROPERTY LINE
(P)	PROPOSED
R	RADIUS
RC	RELATIVE COMPACTION
RHMA	RUBBERIZED HOT MIX ASPHALT
ROW	RIGHT-OF-WAY
S	SLOPE, SOUTH
SCBRL	SANTA CRUZ BRANCH RAIL LINE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SE	SOUTHEAST
SF	SQUARE FOOT/FEET
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEAN OUT
STD	STANDARD
STA	STATION
SW	SIDEWALK/SOUTHWEST
SY	SQUARE YARD(S)
TBX	TELECOMMUNICATIONS BOX
TC	TOP OF CURB
TEMP	TEMPORARY
TP	THERMOPLASTIC
TYP	TYPICAL
U/G	UNDERGROUND
VG	VALLEY GUTTER
W	WATER, WEST
WL	WATERLINE
W/	WITH
WM	WATER METER
WV	WATER VALVE
WB	WESTBOUND

SURVEY NOTES

GENERAL

1. FEATURES SHOWN ON THE SLOPE FAILURE AND IMMEDIATE VICINITY REPRESENT SURFACE CONDITIONS OF THE PROJECT AREA COMPILED FROM A GROUND SURVEY PERFORMED AUGUST 28, 2018. OTHER FEATURES SHOWN REPRESENT DESIGN DATA FROM THE CITY'S 2016 ROAD RECONSTRUCTION PROJECT. SURVEYOR MADE NO ATTEMPT TO DETERMINE THE EXTENT OR EXISTENCE OF UNDERGROUND UTILITIES OR OTHER FEATURES NOT SURFACE VISIBLE.

DATUM

2. HORIZONTAL DATUM IS BASED UPON THE CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD 83 AS ESTABLISHED FROM TIES TO GPS POINTS 1 & 18 AS SHOWN ON THAT CERTAIN RECORD OF SURVEY ENTITLED "SECOND ORDER CONTROL SURVEY SANTA CRUZ COUNTY" FILED FOR RECORD IN BOOK 81 OF MAPS AT PAGE 11 IN THE OFFICE OF THE SANTA CRUZ COUNTY RECORDER. COORDINATES AND DISTANCES SHOWN HEREON ARE GRID, HOWEVER THE SCALE FACTOR THROUGHOUT THE PROJECT AREA IS INSIGNIFICANT AND CAN BE IGNORED FOR ALL PRACTICAL PURPOSES.
3. VERTICAL DATUM IS BASED UPON SANTA CRUZ COUNTY BENCHMARK #233, A BRASS TAG IN THE WEST END OF A CONCRETE DITCH NEAR THE OVERSIDE DRAIN, ABOUT 30' EAST OF THE NEW BRIGHTON BEACH ACCESS ROAD AND 55' WEST OF THE CENTERLINE OF THE SOUTHERN PACIFIC RAILROAD TRACKS; ELEVATION TAKEN AS 66.91 NAVD88.

FINAL PLANS ISSUED FOR CONSTRUCTION DATE:07-10-2019

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(510) 215-3620 * Fax (510) 215-2898

REGISTERED PROFESSIONAL ENGINEER — JIM BUI — NO. C 86467 — CIVIL — STATE OF CALIFORNIA

07/10/2019

RECONSTRUCT STORM DAMAGED BIKE PATH AND SHOULDER ON PARK AVE.

FEDERAL NO. ER-32L0(346)

OWNER

CITY OF CAPITOLA — INCORPORATED 1949

420 CAPITOLA AVENUE
CAPITOLA, CA 95010

NO.	DATE	DESCRIPTION

PROJECT NO:	303.08.55
DESIGNED BY:	JB
DRAWN BY:	JB, PS
CHECKED BY: JN	DATE: 04/30/2019
DATE:	07/10/2019

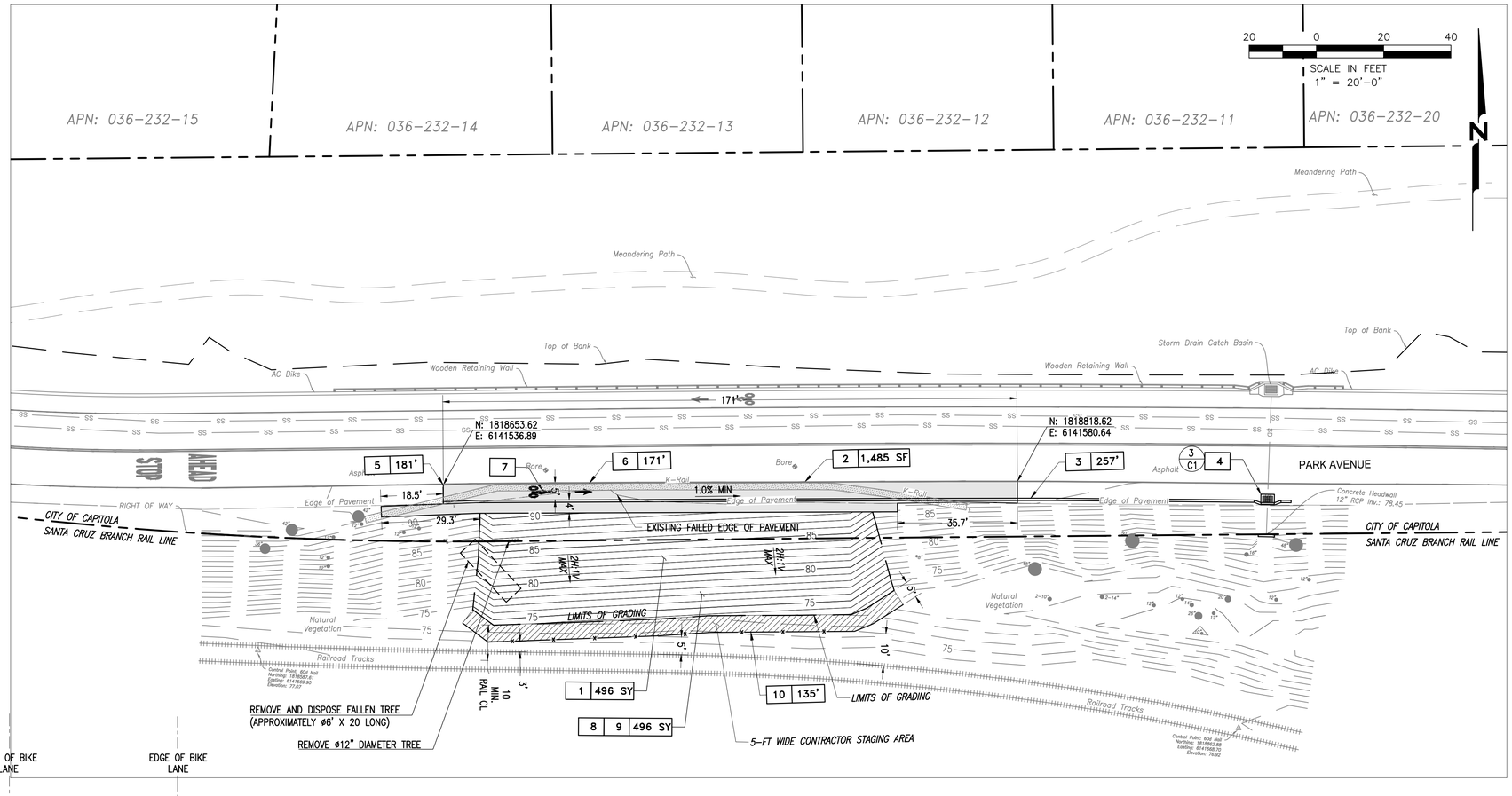
SHEET TITLE

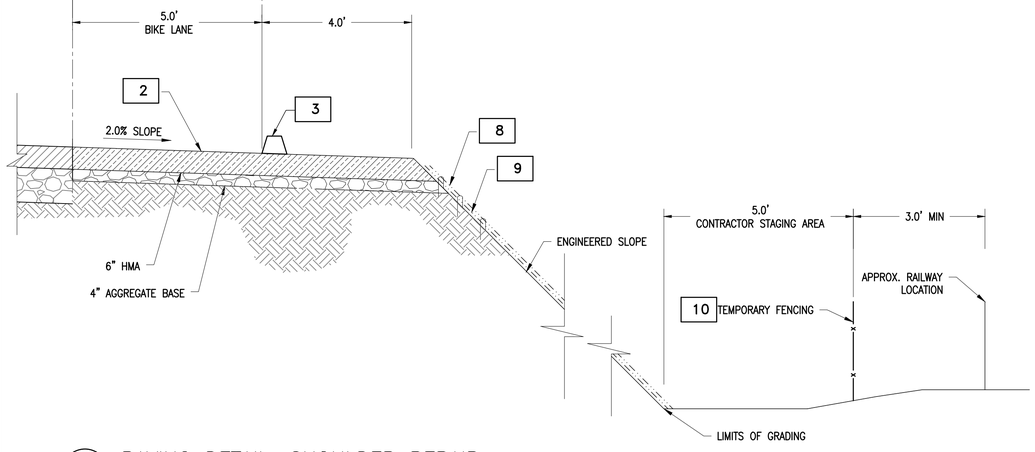
NOTES, LEGEND, AND ABBREVIATIONS

DRAWING

G2

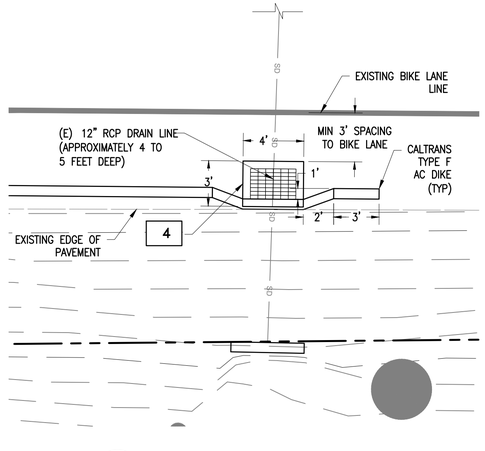
SHEET 2 OF 4





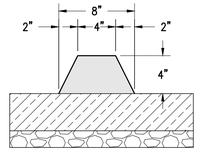
1 / C1 PAVING DETAIL: SHOULDER REPAIR

N.T.S.



3 / C1 CATCH BASIN

N.T.S.



SOURCE: CALTRANS STANDARD PLAN RSP A87B

4 / C1 PAVING DETAIL: HOT MIX ASPHALT DIKE

N.T.S.

GENERAL NOTES:

1. CONTRACTOR SHALL SALVAGE AND REUSE EXISTING CONCRETE K-RAIL AS NEEDED TO BE IMPLEMENTED WITH CONTRACTOR'S TRAFFIC CONTROL MEASURES, OR SALVAGE AND STOCKPILE FOR THE DURATION OF THE PROJECT.
2. AT THE END OF CONSTRUCTION OPERATIONS SALVAGED CONCRETE K-RAIL SHALL BE RETURNED TO THE CITY AT A DESIGNATED LOCATION IN THE CITY AS DIRECTED BY CITY STAFF.
3. MATERIAL STOCK PILING AND CONTRACTOR STAGING ADJACENT TO THE RAILROAD SHALL BE LIMITED TO THE FOOTPRINT SHOWN AND CLEAR OF RAIL LINE AT ALL TIMES.
4. ALL CONSTRUCTION OPERATIONS OCCURRING WITHIN TWENTY (20) FEET OF THE NEAREST RAIL SHALL REQUIRE RAILROAD FLAGGING. REFER TO RAILROAD RIGHT-OF-ENTRY REQUIREMENTS ON DRAWING G2 FOR MORE INFORMATION.

CONSTRUCTION KEYNOTES:

1. STABILIZE SLOPE AT 2H:1V MAXIMUM. SEE ENGINEERED SLOPE REPAIR ON SHEET C2. GRADING LIMITS TO REMAIN 10-FT MINIMUM FROM CENTERLINE OF RAILROAD TRACKS.
2. CONSTRUCT HMA PAVEMENT ROAD SECTION. 6-IN HMA, OVER 4-IN AGGREGATE BASE. SEE DETAIL 1/C1 BELOW.
3. CONSTRUCT AC DIKE TYPE F PER CALTRANS STANDARD PLAN RSP A87B. SEE DETAIL 4/C1 BELOW.
4. CONSTRUCT CATCH BASIN PER CALTRANS TYPE G1 DRAINAGE INLET, FRAME, AND GRATE. GRATE SHALL BE RATED FOR BICYCLE USE. FIELD FIT OVER EXISTING 12" RCP. SEE DETAIL 3/C1 BELOW.
5. SAW CUT A.C. PAVEMENT
6. STRIPE 4" THERMOPLASTIC WHITE BIKE LANE LINE
7. THERMOPLASTIC MARKER CALTRANS BIKE LANE SYMBOL WITH PERSON AND BIKE LANE ARROW.
8. NON-WOVEN EROSION CONTROL BLANKET.
9. HYDROSEED ENGINEERED SLOPE, REFER TO SPECIFICATIONS FOR SEED MIX.
10. TEMPORARY ORANGE CONSTRUCTION FENCING (4-FT HEIGHT).

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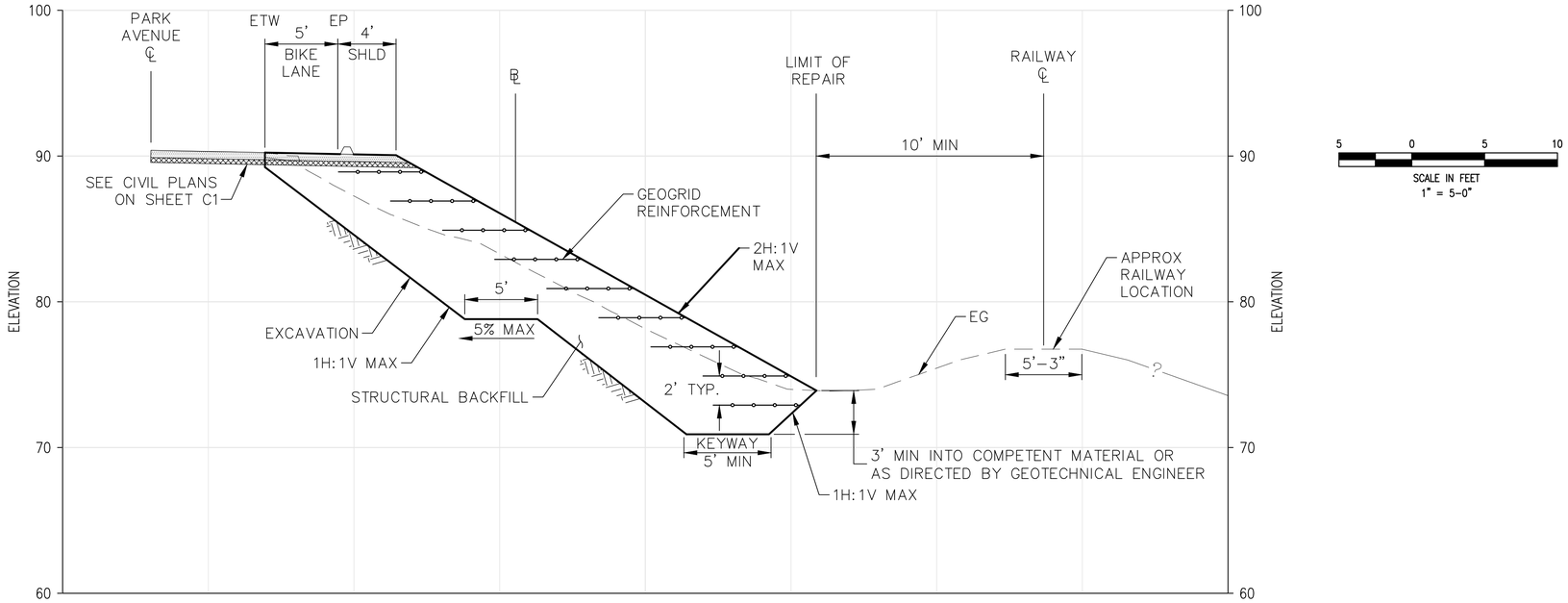
DRAWN BY:	JB, PS
CHECKED BY: JN	DATE: 04/30/2019
DATE:	07/10/2019

SHEET TITLE

SLOPE REPAIR PLAN

DRAWING C1

SHEET 3 OF 4



TYPICAL SECTION–ENGINEERED REPAIR SLOPE

5 0 5 10
SCALE IN FEET
1" = 5-0"

NOTES

1. EXCAVATION CONFIGURATION SHOWN IS APPROXIMATE. FINAL KEYWAY CONFIGURATION TO BE DETERMINED DURING CONSTRUCTION BY THE ENGINEER OR OTHER REPRESENTATIVE.

2. GEOGRID REINFORCEMENT SHALL HAVE LONG TERM DESIGN STRENGTH (LTD'S) ≥ 800 PLF. GEOGRID REINFORCEMENT SHALL BE SPACED AT 2 FT VERTICALLY AND 6 FT IN LENGTH.

3. EXCAVATION SHALL BE AS REQUIRED TO MAINTAIN 3 FT EMBEDMENT INTO COMPETENT MATERIAL.

ABBREVIATIONS:

℄ – APPROXIMATE BOUNDARY LINE (RECORD BOUNDARY DATA BY MPS)
EP – EDGE OF PAVEMENT
ETW – EDGE OF TRAVELED WAY (STRIPING)
FG – FINISHED GRADE
EG – EXISTING GRADE
SHLD – SHOULDER

REFERENCE:

TOPOGRAPHIC SURVEY COMPLETED BY MOUNTAIN PACIFIC SURVEYS (MPS) ON AUGUST 28, 2018.

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CAL ENGINEERING & GEOLOGY
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Phone: (925) 935-9771

REGISTERED PROFESSIONAL ENGINEER PAUL J. SORCI No. Civil CE 73163 No. Geo GE 3132 CIVIL STATE OF CALIFORNIA

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OWNER

CITY OF CAPITOLA INCORPORATED 1949

420 CAPITOLA AVENUE
CAPITOLA, CA 95010

NO.	DATE	DESCRIPTION

PROJECT NO: 303.08.55
DESIGNED BY: T.UZEGBU
DRAWN BY: T.UZEGBU
CHECKED BY: P.SORCI DATE: 12/18/2018
DATE: 07/10/2019

SHEET TITLE

ENGINEERED REPAIR SLOPE

DRAWING C2

SHEET 4 OF 4

CAL ENGINEERING & GEOLOGY
785 Ygnacio Valley Rd. | Walnut Creek | CA 94596
6455 Almaden Expwy., Suite 100| San José | CA 95120
23785 Cabot Blvd., Suite 321 | Hayward | CA 94545
www.caleng.com

TECHNICAL MEMORANDUM

To: Jim Bui, P.E.
Nichols Consulting Engineers (NCE)
501 Canal Boulevard, Suite I
Richmond, California 94804

From: Paul Sorci, P.E., G.E. and Mehal Vitthal, E.I.T.
Cal Engineering & Geology, Inc.
6455 Almaden Expressway, Suite 100
San Jose, California 95120

Date: February 11, 2019

RE: Design Alternatives Memorandum - Revised
Park Avenue Slope Repair
City of Capitola, California
CE&G Document 180920.001

INTRODUCTION

Cal Engineering & Geology (CE&G) has provided Nichols Consulting Engineers (NCE) with geotechnical engineering services in support of the Park Avenue Slope Repair Project. In February of 2017, several large Eucalyptus trees on the eastern side of Park Avenue in the City of Capitola fell across the road during a severe wind storm, causing damage to the slope below the roadway. The damage included over steepening the slope and damaging the roadway shoulder along the north bound lane. The damaged area measures approximately 150 feet along the roadway. The location of the Project is shown on Figure 1, Site Location Map.

The slope repair is intended to restore cross-sectional width of the roadway, including the shoulder and bike lane, for the damaged section of Park Avenue. The geotechnical engineering design services to be provided as part of this contract have included the production of this memorandum. Civil design of the selected repair are to incorporate the design recommendations within this memorandum.

CE&G's work included compiling and reviewing available pertinent geotechnical and geologic data; performing a field reconnaissance, a field exploration and laboratory testing

program, and geotechnical engineering analyses; assessing geotechnical design alternatives for the proposed improvements; and preparing this memorandum.

SITE DESCRIPTION

This site is located on the eastern side of Park Avenue in the City of Capitola, California, within the segment between Coronado Street and Kennedy Drive. The dormant Santa Cruz Branch Rail Line (SCBRL) corridor runs parallel to Park Avenue, about 45 feet downslope of the roadway. On the western side of Park Avenue is a debris catchment wall to prevent soil and vegetation from flowing onto Park Avenue. Park Avenue consists of a two-lane asphalt paved roadway with a bike lane on the west side of the road and a bike lane on the east side that is currently inoperable due to the damaged slope within the Project area. The Project area is relatively open and bounded by Park Avenue at the top of slope and raised SCBRL corridor at the slope toe. Shrubs and bushes are located within the damaged slope, while the adjacent areas contain large Eucalyptus trees.

The damaged slope is currently covered with visquine and sandbags to protect the uplifted and loose surficial soils from surface runoff and reduce potential for additional damage. Temporary concrete "K-rail" barricades are placed along the edge of roadway pavement within the limits of the damaged slope. Photo 1 below shows the current condition of the slope along Park Avenue.

Photo 1. Slope Damage Along Park Avenue, taken July 7, 2018

SITE INVESTIGATION

SITE RECONNAISSANCE

CE&G performed field reconnaissance of the site in advance of and on the day of our subsurface investigation. The reconnaissance included photographic documentation of the project site, identifying and marking safe locations for subsurface explorations, and contacting USA (Underground Service Alert) for utility markings.

SUBSURFACE INVESTIGATION

Scope of Explorations

Two geotechnical borings were drilled near the endpoints of the damaged slope, along the outboard edge of the roadway. The locations of the completed borings were marked in the field and recorded by measuring with a tape from established points of reference. The approximate locations of the borings are shown on Figure 2, Site Exploration Plan.

The geotechnical borings were drilled by Cenozoic Exploration on July 19, 2017, using a truck-mounted Simco 2400 drill rig. Surface conditions at both borings were similar, consisting of approximately 2 feet of aggregate base of the roadway. The drill rig used a 6-inch-diameter solid stem auger. Boring B-1 was drilled to a total depth of 31.5 feet below ground surface (bgs). Boring B-2 was drilled to a total depth of 41.5 feet bgs.

Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G engineer. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2487 and D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)
- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D1586)

The samplers were driven 18 inches (unless otherwise noted on the boring logs) with a 140-pound hammer, manila line, and cathead; dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM

sampler for each 6-inch interval was recorded for each sample. The results are included on the boring logs. The blow counts included on the boring logs are uncorrected and represent field values.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Hayward office for laboratory testing and storage.

Soil Conditions Encountered

Soil conditions encountered at both ends of the Project area were similar. Borings B-1 and B-2 encountered pavement sections of approximately 5 inches of asphalt concrete pavement underlain by about 15 inches of aggregate base. Fill soils beneath the pavement section generally consist of poorly graded sands of medium dense consistency underlain by fine-grain sandy silts and lean clays to depths of about 15 feet bgs. Below the fill soils, dense medium sands were encountered to approximately 27 feet bgs. Firm fat clay and very dense clayey sands extended to the maximum depths explored in Borings B-1 and B-2 at 31.5 feet and 41.5 feet bgs, respectively. Additional details of the soils encountered may be found on the boring provided in Attachment A.

Groundwater Conditions Encountered

The groundwater elevation may vary depending on the time of year, storm events, and tidal influences. The groundwater elevation was observed in Boring B-2 to be approximately 33 feet below the ground surface at the time of exploration. The groundwater elevation selected for design should consider the effects of the seasons, storm events, and tidal influences.

GEOTECHNICAL LABORATORY TESTING

Laboratory testing was performed to obtain information regarding the physical and index properties of selected samples recovered from the exploratory borings. Tests performed included natural moisture content, dry unit weight, and grain size distribution. Tests were completed in general conformance with applicable ASTM standards. The results of the laboratory tests are included in Attachment B.

DISCUSSION AND ALTERNATIVES

The eastern slope along Park Avenue was damaged due to the toppling of trees, leading to uplift of the tree root balls causing movement along the slope. Based on site reconnaissance and our subsurface investigation, the damage appears to be shallow and only extend within the upper portions of the slope. Soils within the limits of the damaged slope are likely to be

loose and susceptible to erosion. Damaged areas include segments of bike lane where the roadway pavement lost support and failed, leaving the bike lane inoperable.

Based on the results of our investigation, it is our opinion the site is geologically and geotechnically suitable for reconstructing the damaged roadway embankment. Potential repair alternatives include reconstructing the damaged areas with an engineered slope, constructing a retaining structure such as soldier pile and lagging retaining wall or mechanically stabilized earth wall (i.e. segmental block wall), and a combination of engineered slope with retaining structure at the top or toe of slope.

ENGINEERED SLOPE REPAIR

An engineered slope repair would reconstruct the damaged slope to a stable configuration. The benefit of an engineered slope repair is being able to restore the slope to its previous inclination and provide a natural looking repair.

Lose materials in the damaged areas would be excavated and suitable on-site material would be recompacted to rebuild the slope. The reconstructed slope would be benched and keyed into competent material underlying the loose surficial and subsurface material. Geosynthetics such as geotextile fabric and/or geogrid reinforcement will be required to be incorporated to provide additional resistance for slope stability and/or to provide slope face stability along steepened slopes. The rebuilt slope would conform to the adjacent slopes at each lateral margin. Erosion protection would be incorporated to prevent surficial sluffs and materials from migrating downward. The top of the rebuilt slope will likely extend laterally into the roadway shoulder/bike lane, as segments of pavement have been damaged and will need to be repaved. An Engineer from CE&G should be present during excavation operations to verify depth and limit of disturbed and loose material. A typical section schematic of a reinforced earth repair is shown on Figure 3.

RETAINING WALL REPAIR

A retaining wall repair would consist of constructing a soldier pile and lagging wall or a mechanically stabilized earth (MSE) wall. The benefit of a retaining wall structure is it would allow for a gentler slope within the existing slope area along Park Avenue when compared to the previously described engineered slope repair.

Soldier pile and lagging wall would generally consist of drilling cast-in-drilled-hole (CIDH) piles offset from the edge of pavement, installing lagging (i.e. timber or precast concrete lagging), and regrading and recompacting loose material below the wall. Based on our site reconnaissance, it is judged that overhead clearance would not pose a challenge for

constructing CIDH piles from the roadway. It is likely that the east bound lane will need to be closed during construction of CIDH piles. Constructing an MSE wall offset from the edge of pavement will require large excavations well into the roadway to place geogrid reinforced compacted fill, resulting in costlier construction and greater impact to traffic operation along Park Avenue. A typical section schematic of a retaining wall repair is shown on Figure 3.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Based on the understanding that the SCBRL will be fully cooperative with the repair efforts and that a stable slope can be constructed within the existing right-of-way, the likely preferred alternative would include rebuilding the damaged slope with an engineered reinforced-earth slope repair. The dormant SCBRL corridor can potentially be used for construction staging and temporary stockpiling of excavated soils. Constructing an engineered slope repair for this project is relatively cost effective and can be constructed using conventional construction equipment. The repair is also likely to blend with slopes adjacent to the project area when compared to a retaining wall alternative.

RECOMMENDATIONS

Cal Engineering & Geology is providing the following geotechnical design recommendations based on the data collected as part of our exploration and presented in this memorandum.

Prior to commencement of the earthwork operation, the site should be cleared and grubbed of existing vegetation. Prior to placement of fill materials, loose soil and vegetation should be removed from the areas to receive fill. All depressions created by tree and stump removal and demolition of existing structures should be excavated to firm soil. All fills shall be founded on firm competent soil.

Temporary Construction Slopes

In preparation of bank remediation, excavation of the over steepened slopes created by the bank slope failure should have temporary construction slopes no steeper than 1h:1v. Temporary construction slopes being completed to 1h:1v or flatter should be completed before keyway excavation is performed. This is to ensure global slope stability.

Consideration should be given to the sequence of construction activities. We currently anticipate the following sequence of activities:

1) Excavate existing slope and layback to maximum 1h:1v with intermediate benches;
2) Excavate and compact keyway foundation;
3) Build reinforced-earth slope by placing successive layers of fabric and compacted soil.

Staging of construction materials should be located a safe distance from the top of the slope failure, as the additional loads may decrease the stability of the slope. Stockpiles should be located along the bottom of slope, adjacent to the SCBRL corridor to ensure stability of the embankment slopes during construction.

Permanent Slope Repair

Permanent engineered slope repair is to consist of a reinforced-earth repair slope with a keyway at the toe of the bank slope. The embankment keyway footing should extend a minimum of 3 feet into competent native materials.

The reinforced slope is to be constructed using on-site materials generally consisting of sands, sandy silts, and lean clays. The material removed during excavation is anticipated to consist of these soils. Imported soil for use in construction of the reinforced slope should be primarily granular and should meet the following requirements:

- Free of organic matter, deleterious substances, debris and rocks or lumps larger than 3 inches in greatest dimension; no more than 15 percent of the rocks or lumps should be larger than 1-½ inches;
- At least 20 percent finer than No. 200 U.S. Standard Sieve.
- Plasticity index less than 20 percent;

Materials shall be compacted to a relative compaction of 90 percent of ASTM D1557. Materials shall be spread evenly and compacted in uniform lifts not exceeding 8 inches in un-compacted thickness. Engineered fill shall be reinforced with a high-density polyethylene (HDPE) uniaxial geogrid, consisting of Tensar UX1100 or equivalent. Geogrid shall be placed such that the strength direction of the geogrid is oriented into the embankment.

Surface drainage along the roadway is to be incorporated into the project plans where appropriate. A curb is recommended to reduce the potential for runoff to reach the slope face along the slope repair. Surface runoff should be collected and routed along the outboard shoulder of roadway to new or existing drop inlets that discharge away from the repair area.

LIMITATIONS

We have employed accepted geotechnical engineering procedures, and our professional opinions and conclusions are made in accordance with generally accepted geotechnical engineering principles and practices. This standard is in lieu of all other warranties, either expressed or implied.

Paul Sorci, P.E., G.E.
Senior Engineer

Mehal Vitthal, E.I.T.
Project Engineer

Attachments

Attachment A – Exploration Boring Logs

Attachment B – Laboratory Testing Results

BASEMAP REFERENCE

1. BASEMAP FROM ESRI (SANTA CRUZ ORTHO 2016 3IN, 7/23/2016).
2. STREET CENTERLINES FROM CALTRANS CALIFORNIA ROAD SYSTEM, DOWNLOADED ON 05/21/2018.

0 0.25 0.5 1
MILES

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PARK AVENUE SLOPE REPAIR
BETWEEN CORONADO ST. AND KENNEDY DR.
CAPITOLA, CALIFORNIA

SITE LOCATION MAP

180920	FEBRUARY 2019	FIGURE 1

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BASEMAP REFERENCE

1. ORTHOIMAGERY FROM ESRI, (SANTA CRUZ ORTHO 2016 3IN, 7/23/2016).
2. PARCELS FROM COUNTY OF SANTA CRUZ GIS DATABASE, ACCESSED ONLINE 08/03/2018.

LEGEND

B-2 BORING LOCATION BY CE&G, DRILLED 7/17/2018

0 25 50 100 FEET

N

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PARK AVENUE SLOPE REPAIR
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CAPITOLA, CALIFORNIA

SITE EXPLORATION PLAN

180920	FEBRUARY 2019	FIGURE 2

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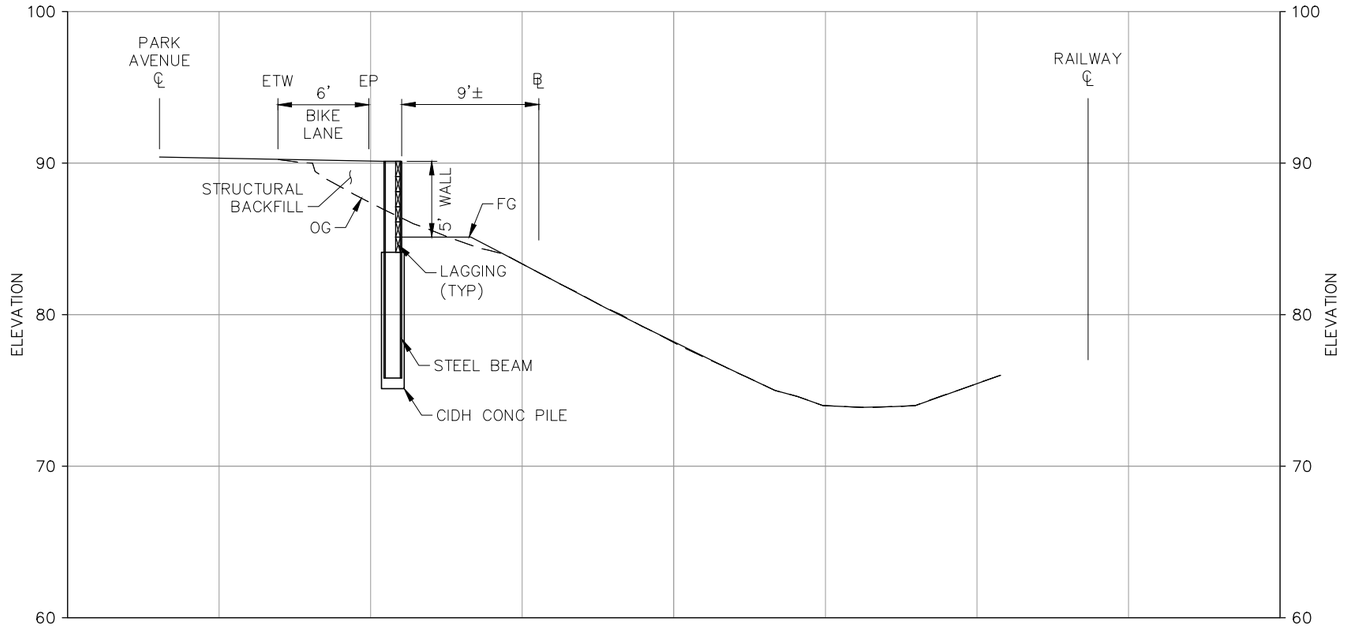
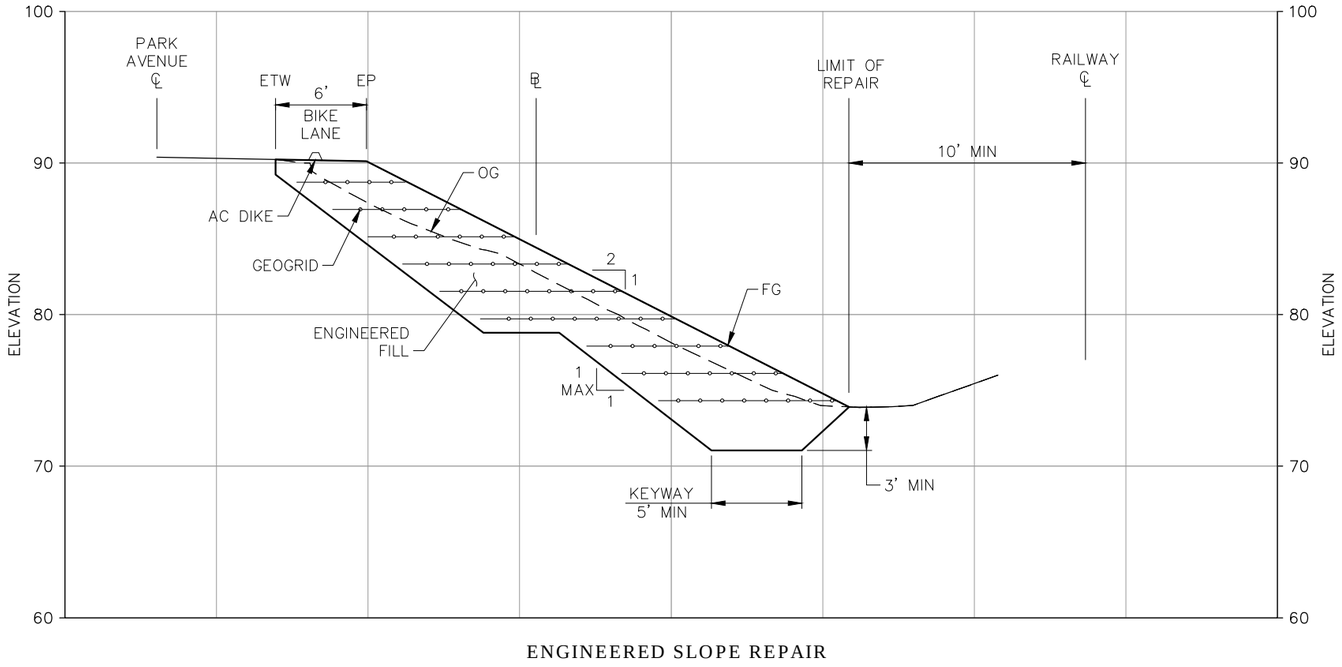


SOLDIER PILE & LAGGING WALL REPAIR



ENGINEERED SLOPE REPAIR

REFERENCE:

TOPOGRAPHIC SURVEY COMPLETED BY MOUNTAIN PACIFIC SURVEYS (MPS) ON AUGUST 28, 2018.

ABBREVIATIONS:

℄ – APPROXIMATE BOUNDARY LINE (RECORD BOUNDARY DATA BY MPS)
EP – EDGE OF PAVEMENT
ETW – EDGE OF TRAVELED WAY (STRIPING)
FG – FINISHED GRADE
OG – ORIGINAL GRADE

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PARK AVENUE SLOPE REPAIR
BETWEEN CORONADO ST. AND KENNEDY DR.
CAPITOLA, CALIFORNIA

CONCEPTUAL TYPICAL SECTIONS

180920	FEBRUARY 2019	FIGURE 3

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Attachment A. Exploration Boring Logs

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

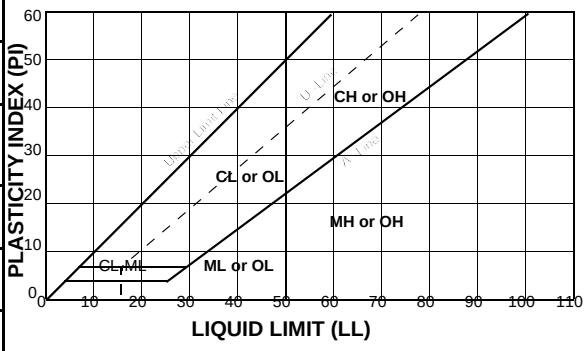
Field Identification			Group Symbols	Typical Names	Laboratory Classification Criteria	
Coarse-Grained Soils More than 50% of material is retained on the No. 4 sieve.	**Gravels** More than 50% coarse fraction retained on the No. 4 sieve	**Clean Gravels** < 5% Fines	**GW**	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_U = D_{60} \div D_{10} \geq 4$ and $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) \geq 1$ & ≤ 3	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	$C_U = D_{60} \div D_{10} < 4$ and/or $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) < 1$ & > 3	
		Gravels with Fines >12% Fines	**GM**	Silty gravels, poorly graded gravel-sand-silt mixtures	Fines classify as ML or MH	If fines classify as CL-ML, use dual symbol GC/GM
			GC	Clayey gravels, poorly graded gravel-sand-clay mixtures	Fines classify as CL or CH	
	Sands More than 50% coarse fraction passes the No. 4 sieve	**Clean Sands** < 5% Fines	**SW**	Well-graded sands, gravelly sands, little or no fines	$C_U = D_{60} \div D_{10} \geq 6$ and $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) \geq 1$ & ≤ 3	
			SP	Poorly graded sands, gravelly sands, little or no fines	$C_U = D_{60} \div D_{10} < 6$ and/or $C_C = (D_{30})^2 \div (D_{10} \times D_{60}) < 1$ & > 3	
		Sands with Fines >12% Fines	**SM**	Silty sands, poorly graded sand-silt mixtures	Fines classify as ML or MH	If fines classify as CL-ML, use dual symbol SC/SM
			SC	Clayey sands, poorly graded sand-clay mixtures	Fines classify as CL or CH	
Fine-Grained Soils More than 50% of material passes the No. 200 sieve.	**Identification Procedures on Percentage Passing the No. 40 Sieve**					
	Silts & Clays Liquid Limit less than 50%		**ML**	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands with slight plasticity		
			CL	Inorganic clays of low to medium plasticity, gravelly, sandy, and/or silty clays, lean clays		
			OL	Organic silts, organic silty clays of low plasticity		
	Silts & Clays Liquid Limit greater than 50%		**MH**	Inorganic silts, micaceous or diatomaceous fine sandy/-silty soil, elastic silts		
			CH	Inorganic clays of high plasticity, fat clays		
			OH	Organic clays of medium to high plasticity		
HIGHLY ORGANIC SOILS			**PT**	Peat and other highly organic soils		

CLASSIFICATION OF GRAVELS & SANDS WITH 5% TO 12% FINES REQUIRES DUAL SYMBOLS
GW/GM or GP/GM: Gravel/Silty Gravel
GW/GC or GP/GC: Gravel/Clayey Gravel
SW/SM or SP/SM: Sand/Silty Sand
SW/SC or SP/SC: Sand/Clayey Sand

PLASTICITY CHART

For Classification of Fine-Grained Soils and Fine-Grained Fraction of Coarse-Grained Soils

Equation of "A"-Line: PI = 4 @ LL = 4 to 25.5, then PI = 0.73 × (LL – 20)
Equation of "U"-Line: LL = 16 @ PI = 0 to 7, then PI = 0.9 × (LL – 8)



KEY TO SAMPLER TYPES AND OTHER LOG SYMBOLS

CS	California Standard Sampler
CM	California Modified Sampler
SPT	Standard Penetration Test Sampler
SHL	Shelby Tube Sampler
BU	Bulk Sample
LL	Liquid Limit of Sample (ASTM D-4318)
PI	Plasticity Index of Sample (ASTM D-4318)
Q_U	Unconfined Compression Test (ASTM D-2166)

▽	Depth at which Groundwater was Encountered During Drilling
▼	Depth at which Groundwater was Measured After Drilling
PP	Pocket Penetrometer Test
PTV	Pocket Torvane Test
–#200	% of Material Passing the No. 200 Sieve Test (ASTM D-1140)
PSA	Particle-Size Analysis (ASTM D-422 & D-1140)
C	Consolidation Test (ASTM D-2435)
TXUU	Unconsolidated Undrained Compression Test (ASTM D-2850)

KEY TO SAMPLE INTERVALS

CS	Length of Sampler Interval with a CS Sampler
⊠	Length of Sampler Interval with a CM Sampler
⊓	Length of Sampler Interval with a SPT Sampler
SHL	Length of Sampler Interval with a SHL Sampler
BU	Bulk Sample Recovered for Interval Shown (i.e., cuttings)
⊥	Length of Coring Run with Core Barrel Type Sampler
NR	No Sample Recovered for Interval Shown

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UNIFIED SOIL CLASSIFICATION SYSTEM AND KEY TO BORING LOG

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KEY TO SYMBOLS

CLIENT NCE **PROJECT NAME** Capitola Park Avenue Slope Repair

PROJECT NUMBER 180920 **PROJECT LOCATION** Capitola, CA

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


ASPHALT: Asphalt


CH: USCS High Plasticity Clay


CL: USCS Low Plasticity Clay


GM: USCS Silty Gravel


GP: USCS Poorly-graded Gravel


GW: USCS Well-graded Gravel


GW-GC: USCS Well-graded Gravel with Clay


GW-GM: USCS Well-graded Gravel with Silt


MH: USCS Elastic Silt


ML: USCS Silt


OH: USCS High Plasticity Organic silt or clay


SC: USCS Clayey Sand


SM: USCS Silty Sand


SP: USCS Poorly-graded Sand


SW: USCS Well-graded Sand


SW-SC: USCS Well-graded Sand with Clay

SAMPLER SYMBOLS


California Modified Sampler


Shelby Tube


Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION


Water Level at Time Drilling, or as Shown


Water Level at End of Drilling, or as Shown


Water Level After 24 Hours, or as Shown

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BORING NUMBER B-1

CLIENT NCE
PROJECT NAME Capitola Park Avenue Slope Repair
PROJECT NUMBER 180920
PROJECT LOCATION Capitola, CA
DATE STARTED 7/19/2018 **COMPLETED** 7/19/2018
GROUND ELEVATION 90 ft **DATUM** NAVD 88 **HOLE SIZE** 6" in.
DRILLING CONTRACTOR Cenozoic Drilling
COORDINATES: **LATITUDE** 36.9807 **LONGITUDE** -121.9383
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY A. Landivar **CHECKED BY** K. Loeb
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. cathead
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	Asphalt Pavement									
	Poorly graded SAND (SP): brown, moist, dense, medium coarse, trace fines, trace gravel up to 0.5" [Fill?]									
	Well graded SAND (SW): brown, moist, medium dense, fine sand, cementation	CM	9-11-27							
	SILT w/ sand (ML): yellow, dry, very hard, low plasticity									
5		CM	10-13-11		101	11				
	Sandy SILT (ML): yellow, dry, very hard, low plasticity, fine sand	CM	10-24-46		72	28				
10	becomes moist, hard, fine to medium sand	CM	21-44-50/3"		73	26				56
15	Poorly graded SAND w/ Silt (SP-SM): olive yellow, very dense, moist, medium sand, trace of fines									
	becomes yellowish brown, dense	CM	18-30-40		98	7				13
20		SPT	12-13-14							
25	1.5" greenish black sand lens	SPT	12-9-14							
	Fat CLAY (CH): dark blueyish gray, moist, firm, high plasticity									
30	2" Sand lens at the bottom of the sample	SPT	12-11-19							

Bottom of borehole at 31.5 ft. Borehole backfilled with cement grout.

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BORING NUMBER B-2

CLIENT NCE
PROJECT NAME Capitola Park Avenue Slope Repair
PROJECT NUMBER 180920
PROJECT LOCATION Capitola, CA
DATE STARTED 7/19/2018 **COMPLETED** 7/19/2018
GROUND ELEVATION 90 ft **DATUM** NAVD 88 **HOLE SIZE** 6" in.
DRILLING CONTRACTOR Cenozoic Drilling
COORDINATES: **LATITUDE** 36.9809 **LONGITUDE** -121.9383
DRILLING RIG/METHOD 6-in. Solid Flight Auger
▽ **GROUNDWATER AT TIME OF DRILLING** 33.0 ft
LOGGED BY A. Landivar **CHECKED BY** K. Loeb
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. cathead
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		Asphalt Pavement									
		Poorly graded SAND (SP): brown, moist, medium dense, medium coarse, trace fines, trace gravel up to 0.5" [Fill?]	CM	7-5-9							
5		Poorly graded SAND w/ gravel (SP): yellow, dry, medium dense, medium to fine sand, gravel up to 0.5"									
		Lean CLAY (CL): brown, moist, firm, low plasticity, some roots	CM	30-26-15		101	7				
			CM	8-11-16		103	7				
10		Poorly graded SAND (SP): yellowish brown,dry to moist, medium dense, very fine sand									
		SILT w/ sand (ML): yellow, dry to moist, hard, low plasticity, very fine sand	CM	8-12-18							
15		Poorly graded SAND w/ Silt (SP-SM): olive yellow, moist to dry, very dense, medium sand	CM	18-33-50/5"		99	10				15
20			CM	24-32-50/5"							
25		Poorly graded SAND w/ clay (SP): olive yellow, moist, dense, fine sand, low plasticity clay	SPT	13-17-25							
		Fat CLAY (CH): dark blueyish gray, moist, firm, high plasticity									
30			SPT	16-23-41							
	▽										
35											

(Continued Next Page)

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BORING NUMBER B-2

CLIENT NCE **PROJECT NAME** Capitola Park Avenue Slope Repair

PROJECT NUMBER 180920 **PROJECT LOCATION** Capitola, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		Fat CLAY (CH): dark blueyish gray, moist, firm, high plasticity *(continued)* increase in moisture	SPT	15-50/5"							
40		Clayey SAND (SC): dark blueyish gray, moist, very dense, fine to medium sand, high plasticity clay	SPT	22-27-46							

Bottom of borehole at 41.5 ft. Borehole backfilled with cement grout.

Attachment B. Laboratory Testing Results

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SUMMARY OF LABORATORY RESULTS

CLIENT NCE **PROJECT NAME** Capitola Park Avenue Slope Repair

PROJECT NUMBER 180920 **PROJECT LOCATION** Capitola, CA

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	6.0	7/30/2018						ML	10.9	101.1		
B-1	8.0	7/30/2018						ML	28.0	71.8		
B-1	11.0	7/30/2018				9.5	56	ML	25.8	72.9		
B-1	16.0	7/30/2018				0.106	13	SP-SM	6.9	98.0		
B-2	6.0	7/30/2018						CL	6.6	101.3		
B-2	8.0	7/30/2018						SP	6.6	103.3		
B-2	10.0	7/30/2018						ML				
B-2	16.0	7/30/2018				0.106	15	SP-SM	10.4	99.2		

GRAIN SIZE DISTRIBUTION

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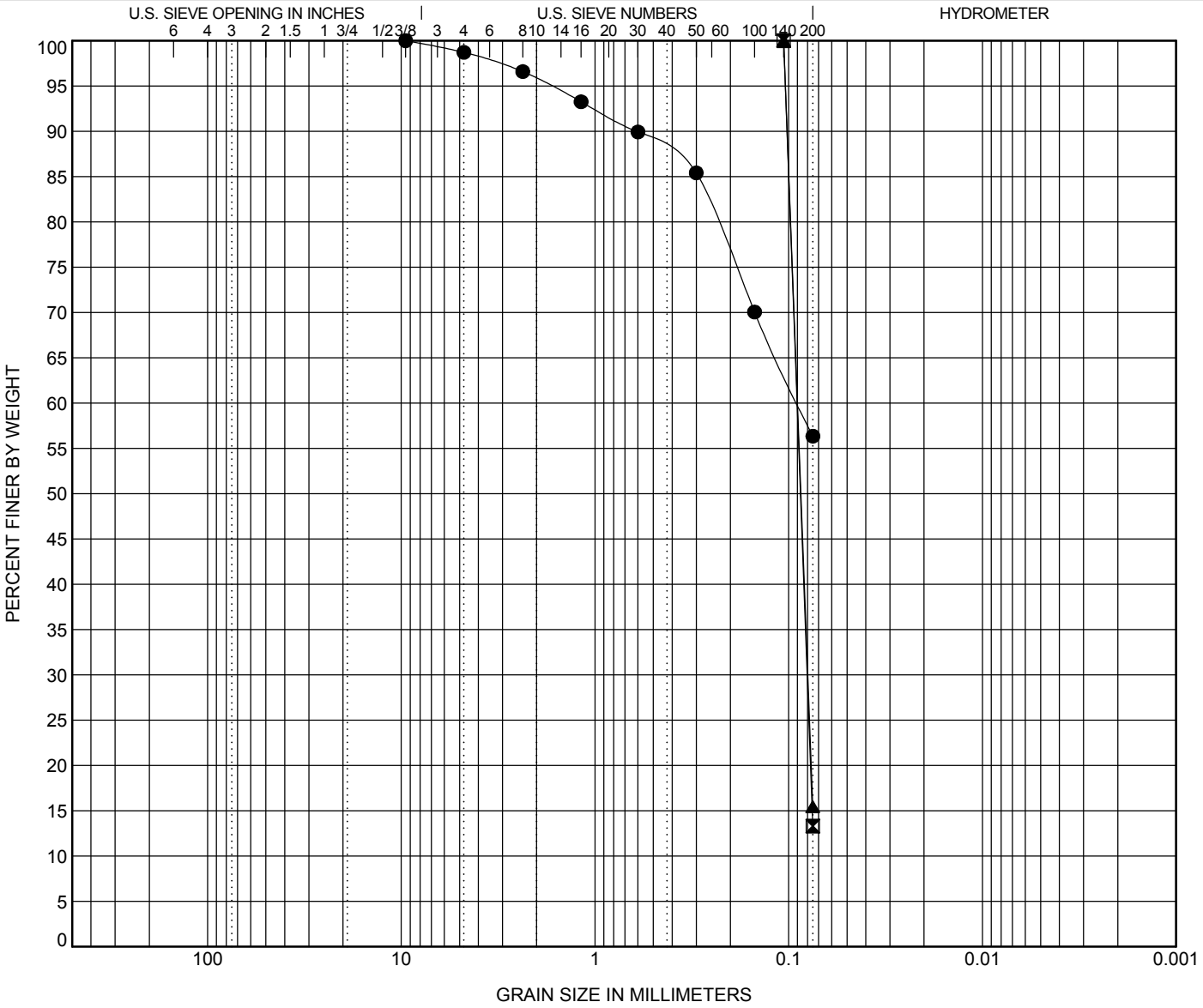
CLIENT NCE **PROJECT NAME** Capitola Park Avenue Slope Repair

PROJECT NUMBER 180920 **PROJECT LOCATION** Capitola, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**11.0**	**7/30/2018**						
⊠	**B-1**	**16.0**	**7/30/2018**						
▲	**B-2**	**16.0**	**7/30/2018**						

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**11.0**	**9.5**	**0.09**			**1.3**	**42.4**	**56.3**	
⊠	**B-1**	**16.0**	**0.106**	**0.09**	**0.08**		**0.0**	**86.7**	**13.3**	
▲	**B-2**	**16.0**	**0.106**	**0.09**	**0.08**		**0.0**	**84.6**	**15.4**	