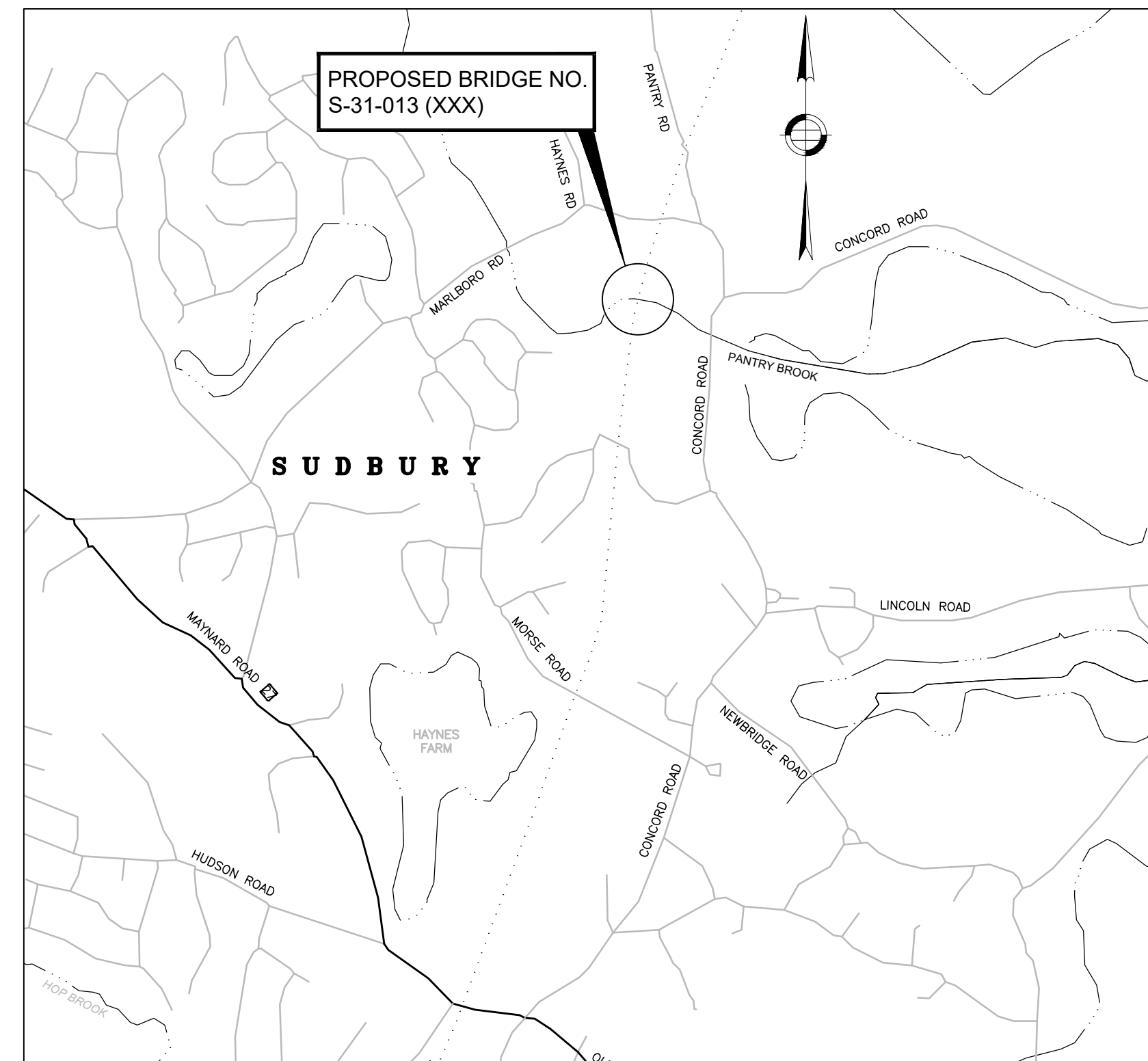


**KEY PLAN**  
SCALE: 1"=10'-0"



**LOCUS**  
SCALE: 1"=1200'-0"

| GENERAL NOTES   |                 |               |
|---|-----------------|---------------|
| PROJECT FILE NO.:   | XXXXXX          |               |
| PROJECT DESCRIPTION:  | PROPOSED BRIDGE |               |
| BRIDGE DESIGN LOADING:  | H10             |               |
| SURVEY:   | SURVEY INFO     |               |
| ELEVATION REFERENCE:  | NAVD OF 1988    |               |
| TRAFFIC DATA  |                 |               |
| DESIGN YEAR   | ROADWAY OVER    | ROADWAY UNDER |
| AVERAGE DAILY TRAFFIC - PRESENT                                     | N/A             | N/A           |
| AVERAGE DAILY TRAFFIC - DESIGN YEAR                                 | N/A             | N/A           |
| DESIGN HOURLY VOLUME  | N/A             | N/A           |
| DIRECTIONAL DISTRIBUTION  | N/A             | N/A           |
| TRUCK PERCENTAGE - AVERAGE DAY                                      | N/A             | N/A           |
| TRUCK PERCENTAGE - PEAK HOUR  | N/A             | N/A           |
| DESIGN SPEED  | 18 MPH          | N/A           |
| DIRECTIONAL DESIGN HOURLY VOLUME                                    | N/A             | N/A           |
| BENCH MARK: #98, N: 2973228.466' E: 681133.936'<br>EL=130.880' MSTN |                 |               |

**DESIGN**

IN ACCORDANCE WITH THE 2017 AASHTO LRFD BRIDGE DESIGN SPECIFICATION AND THE 2009 AASHTO LRFD GUIDE SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES WITH INTERIM SPECIFICATIONS THROUGH 2015 FOR H10 VEHICULAR OR 90 PSF PEDESTRIAN LOADINGS..

**NOTES:**

- APPROVAL DOES NOT INCLUDE STRUCTURAL ANALYSIS.
- DIMENSIONS OF STRUCTURAL MEMBERS ARE APPROXIMATE, AND WILL BE FINALIZED DURING THE FINAL DESIGN PHASE.
- SEE GEOTECHNICAL REPORT, DATED APRIL 2020.
- SEISMIC DESIGN CRITERIA:  
DESIGN RETURN PERIOD: 1000-YEAR  
DESIGN SPECTRA:  
 $A_s = 0.11$   $S_{D5} = 0.23$   $S_{D1} = 0.09$  SITE CLASS = D  
SEISMIC DESIGN CATEGORY (SDC) = A
- SEE HYDRAULIC REPORT, DATED APRIL 2020.
- NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

**HYDRAULIC DESIGN DATA**

DRAINAGE AREA: 2.5 SQUARE MILES  
DESIGN FLOOD DISCHARGE: 155 CUBIC FEET PER SECOND  
DESIGN FLOOD FREQUENCY: 10 YEARS  
DESIGN FLOOD VELOCITY: 2.88 FEET PER SECOND  
DESIGN FLOOD ELEVATION: 121.66 FEET, NAVD

**BASE (100-YEAR) FLOOD DATA**

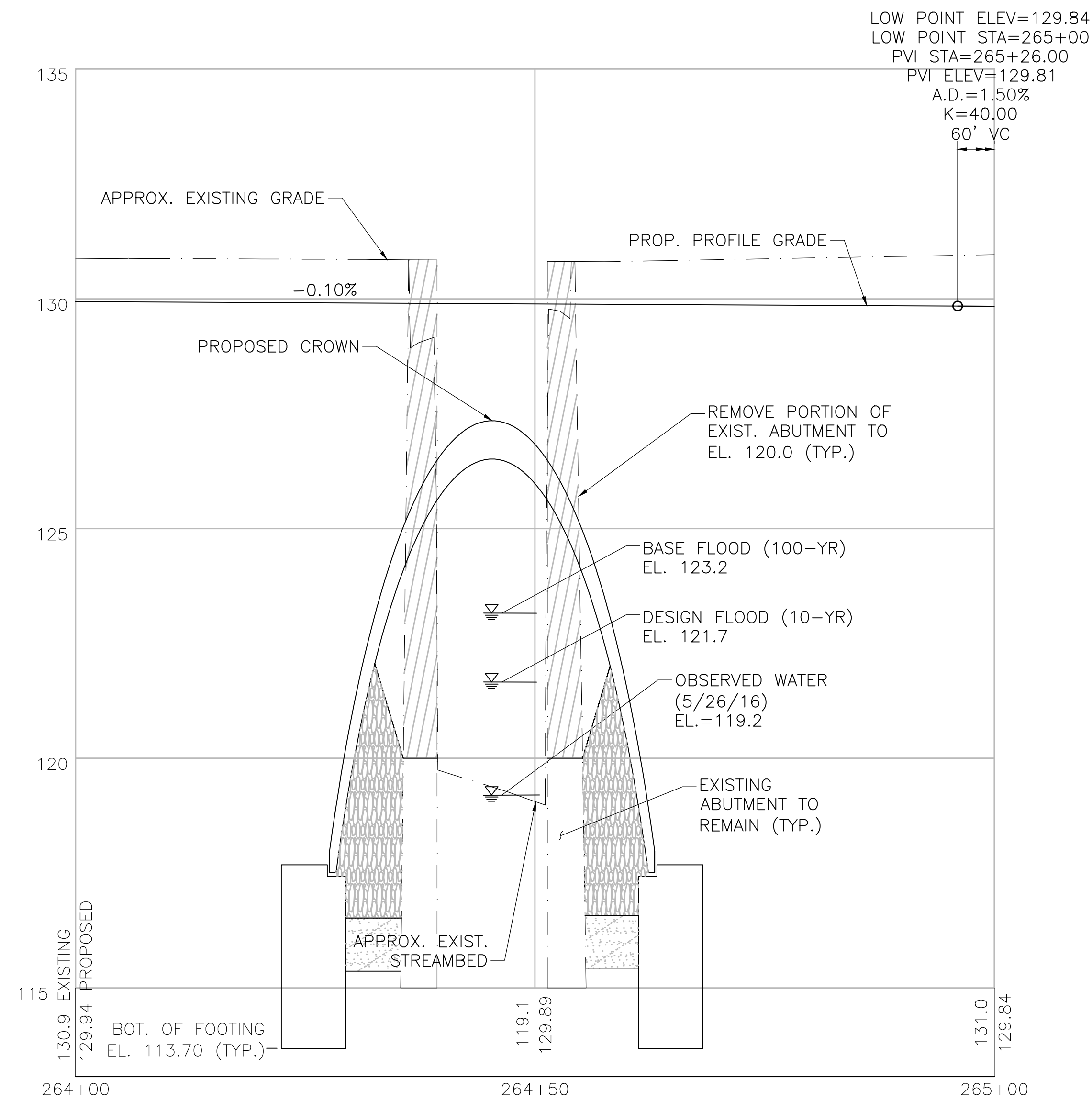
BASE FLOOD DISCHARGE: 240 CUBIC FEET PER SECOND  
BASE FLOOD ELEVATION: 123.16 FEET, NAVD

**DESIGN AND CHECK SCOUR AREA**

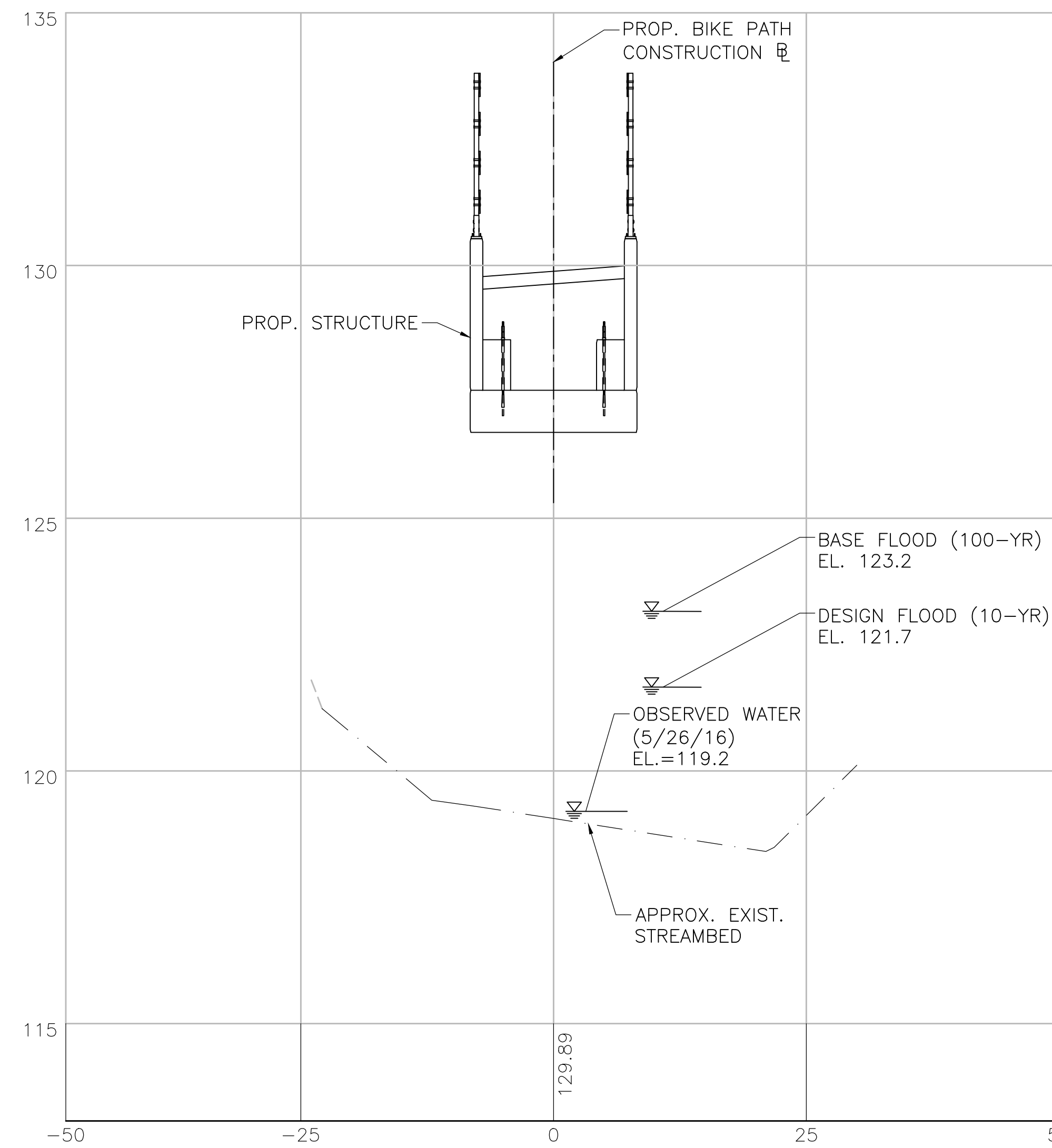
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY: 25 YEARS  
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY: 50 YEARS

**FLOOD OF RECORD**


DISCHARGE: UNKNOWN  
FREQUENCY (IF KNOWN): UNKNOWN  
MAXIMUM ELEVATION: UNKNOWN  
DATE: UNKNOWN  
HISTORY OF ICE FLOES: UNKNOWN  
EVIDENCE OF SCOUR AND EROSION: THE POTENTIAL OF UNDERMINED FOUNDATION WAS DETERMINED DURING AN FILED SURVEY IN 2016.




**PROFILE ALONG BIKE PATH**  
HORIZONTAL SCALE: 1"=10'-0"  
VERTICAL SCALE: 1" = 2'-0"



**PROFILE ALONG PANTRY BROOK**  
HORIZONTAL SCALE: 1"=10'-0"  
VERTICAL SCALE: 1" = 2'-0"



120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON MA, 02116



SKETCH PLANS OF  
PROPOSED BRIDGE  
**SUDBURY**  
PROPOSED BIKEPATH  
OVER PANTRY BROOK

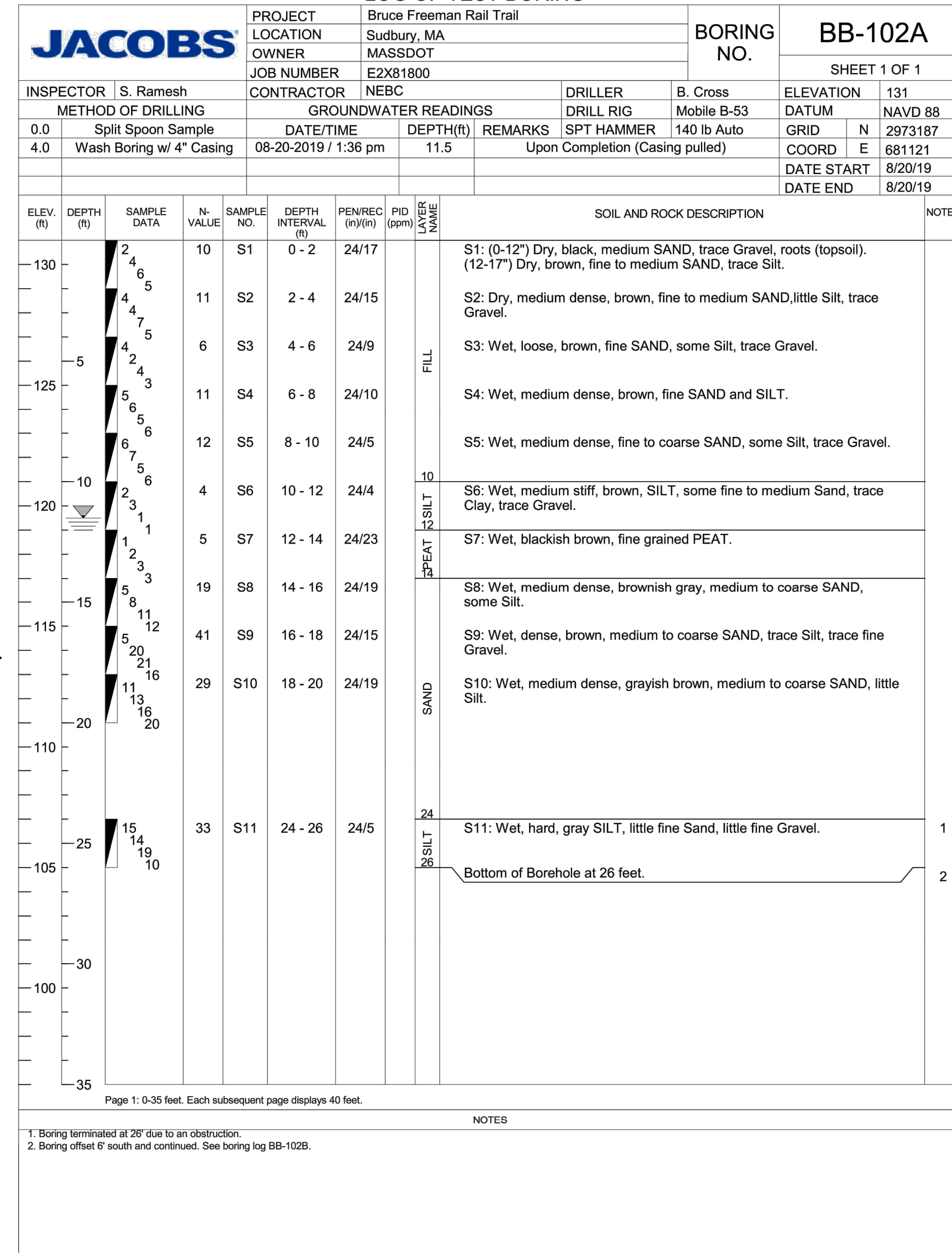
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION

|  |              |
|--|--------------|
| APPROVED BY                                | DATE         |
| STRUCTURAL ELEMENTS:<br><i>[Signature]</i> | 6/25/2020    |
| TITLE: State Bridge Engineer               |              |
| HIGHWAY ELEMENTS:<br><i>[Signature]</i>    | Jun 26, 2020 |
| TITLE: Deputy Chief Engineer               |              |

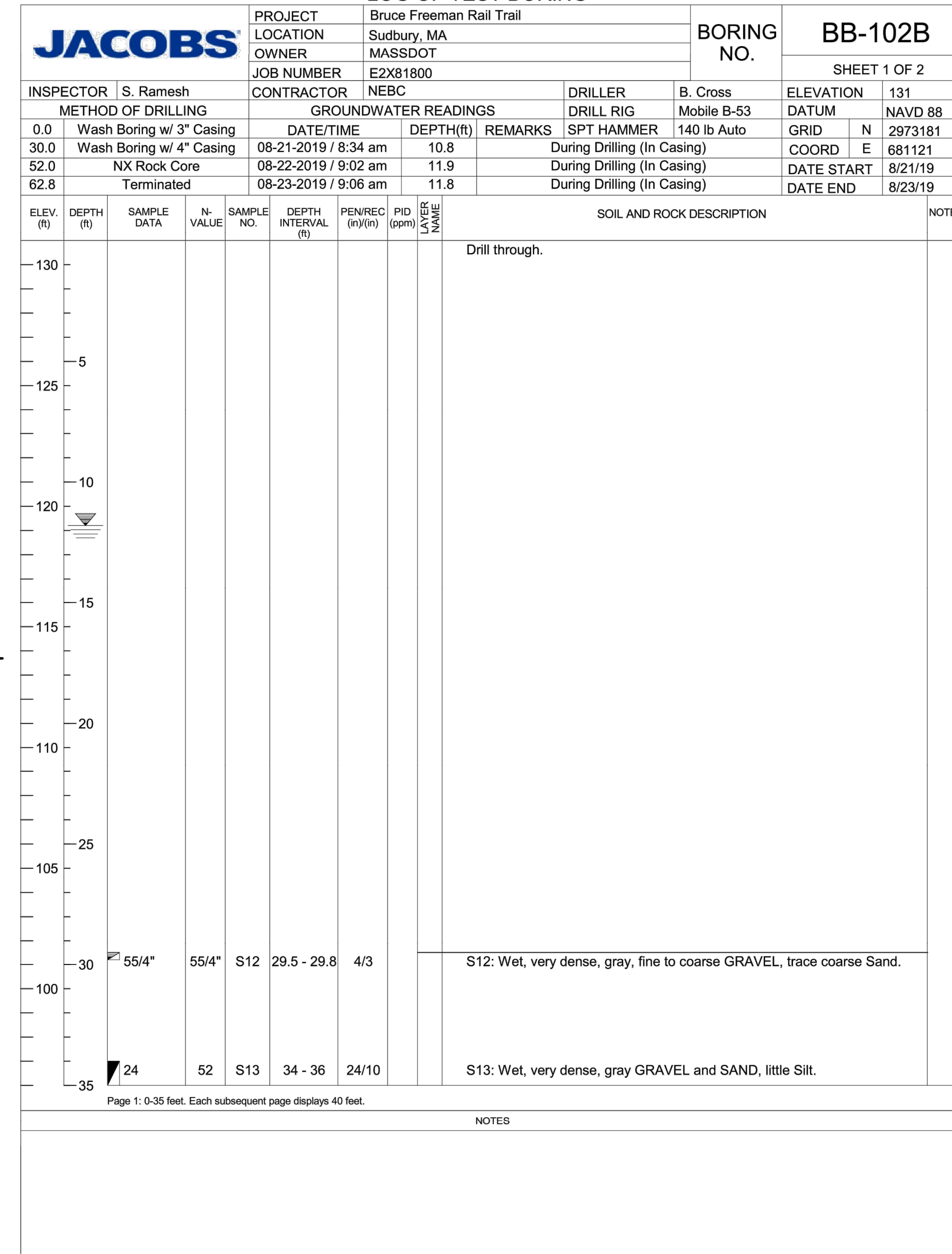
BORING NOTES:

SEE SHEET 2 FOR BORING NOTES.

LOG OF TEST BORING



LOG OF TEST BORING



LOG OF TEST BORING

| JACOBS             |                          | PROJECT              | Bruce Freeman Rail Trail | BORING NO.   | BB-101                      |
|--------------------|--------------------------|----------------------|--------------------------|--------------|-----------------------------|
|                    |                          | LOCATION             | Sudbury, MA              | SHEET 1 OF 2 |                             |
|                    |                          | OWNER                | MASSDOT                  |              |                             |
|                    |                          | JOB NUMBER           | E2X81800                 |              |                             |
| INSPECTOR          | S. Ramesh                | CONTRACTOR           | NEBC                     | DRILLER      | B. Cross                    |
| METHOD OF DRILLING | Split Spoon Sample       | GROUNDWATER READINGS |                          | DRILL RIG    | Mobile B-53                 |
| 4.0                | Wash Boring w/ 4" Casing | DATE/TIME            | 08-19-2019 / 8:18 am     | SPT HAMMER   | 140 lb Auto                 |
| 51.0               | NX Rock Core             | DEPTH(ft)            | 9.3                      | REMARKS      | During Drilling (In Casing) |
| 55.0               | Terminated               |                      |                          | COORD        | E 681132                    |
|                    |                          |                      |                          | DATE START   | 8/16/19                     |
|                    |                          |                      |                          | DATE END     | 8/19/19                     |

| ELEV. (ft) | DEPTH (ft) | SAMPLE DATA | N-VALUE | SAMPLE NO. | DEPTH INTERVAL (ft) | PEN/REC (in)/(ft) | PID (ppm) | SOIL AND ROCK DESCRIPTION  | NOTES |
|------------|------------|-------------|---------|------------|---------------------|-------------------|-----------|--|-------|
| 130        | 0-2        | S1          |         | 11         | 0-2                 | 24/10             |           | S1: (0-5") Top Soil Dry, medium dense, brown, medium to coarse SAND, trace Gravel. |       |
| 125        | 2-4        | S2          |         | 13         | 2-4                 | 24/18             |           | S2: Dry, medium dense, brown, medium SAND, little Gravel, little Silt.             |       |
| 120        | 4-6        | S3          |         | 10         | 4-6                 | 24/4              |           | S3: Wet, medium dense, brown, medium SAND, some Silt.                              |       |
| 115        | 6-8        | S4          |         | 13         | 6-8                 | 24/12             |           | S4: Similar to S3.   |       |
| 110        | 8-10       | S5          |         | 15         | 8-10                | 24/20             |           | S5: Wet, medium dense, brown, medium to coarse SAND, some Silt, trace Gravel.      |       |
| 105        | 10-12      | S6          |         | 8          | 10-12               | 24/10             |           | S6: Wet, medium stiff, brown SILT, some fine to medium Sand.                       |       |
| 100        | 12-14      | S7          |         | 4          | 12-14               | 24/6              |           | S7: Wet, medium stiff, brown SILT and fine SAND.                                   |       |
| 95         | 14-16      | S8          |         | 1          | 14-16               | 24/24             |           | S8: Wet, blackish brown, fine grained PEAT, trace Gravel.                          |       |
| 90         | 16-18      | S9          |         | 12         | 16-18               | 24/7              |           | S9: Wet, medium dense, blackish brown SAND and Organic Silt, trace Gravel.         |       |
| 85         | 18-20      | S10         |         | 21         | 18-20               | 24/24             |           | S10: Wet, medium dense, medium SAND, little Silt, trace Gravel.                    |       |
| 80         | 24-26      | S11         |         | 46         | 24-26               | 24/14             |           | S11: Wet, dense, fine GRAVEL and coarse Sand, little Silt.                         |       |
| 75         | 29-31      | S12         |         | 101        | 29-31               | 24/18             |           | S12: Wet, very dense, fine to coarse GRAVEL, trace Silt, trace coarse Sand.        |       |
| 70         | 34-34.3    | S13         |         |            | 34-34.3             | 5/4               |           | S13: Wet, very dense, coarse GRAVEL, trace Silt.                                   |       |

Page 1: 0-35 feet. Each subsequent page displays 40 feet.

1. Hard drilling at 32".

BOT. OF FTG.  
EL. 113.70

LOG OF TEST BORING

| JACOBS             |                          | PROJECT              | Bruce Freeman Rail Trail | BORING NO.   | BB-101                      |
|--------------------|--------------------------|----------------------|--------------------------|--------------|-----------------------------|
|                    |                          | LOCATION             | Sudbury, MA              | SHEET 2 OF 2 |                             |
|                    |                          | OWNER                | MASSDOT                  |              |                             |
|                    |                          | JOB NUMBER           | E2X81800                 |              |                             |
| INSPECTOR          | S. Ramesh                | CONTRACTOR           | NEBC                     | DRILLER      | B. Cross                    |
| METHOD OF DRILLING | Split Spoon Sample       | GROUNDWATER READINGS |                          | DRILL RIG    | Mobile B-53                 |
| 4.0                | Wash Boring w/ 4" Casing | DATE/TIME            | 08-19-2019 / 8:18 am     | SPT HAMMER   | 140 lb Auto                 |
| 51.0               | NX Rock Core             | DEPTH(ft)            | 9.3                      | REMARKS      | During Drilling (In Casing) |
| 55.0               | Terminated               |                      |                          | COORD        | E 681132                    |
|                    |                          |                      |                          | DATE START   | 8/16/19                     |
|                    |                          |                      |                          | DATE END     | 8/19/19                     |

| ELEV. (ft) | DEPTH (ft) | SAMPLE DATA | N-VALUE | SAMPLE NO. | DEPTH INTERVAL (ft) | PEN/REC (in)/(ft) | PID (ppm) | SOIL AND ROCK DESCRIPTION   | NOTES |
|------------|------------|-------------|---------|------------|---------------------|-------------------|-----------|---|-------|
| 95         | 39-41      | S14         | 79      |            | 39-41               | 24/9              |           | S14: Wet, hard SILT, trace fine Sand, trace Gravel.   | 2     |
| 90         | 44-44.8    | S15         | 68/4"   |            | 44-44.8             | 10/5              |           | S15: Wet, hard SILT, some fine Gravel, little fine to coarse Sand, trace Clay.  |       |
| 85         | 49-49.2    | S16         | 70/2"   |            | 49-49.2             | 2/2               |           | S16: Wet, very dense, coarse SAND, weathered rock fragments.  |       |
| 80         | 51-55      | RC-1        |         |            | 51-55               | 48/46             |           | RC-1: Coring time: 12, 9, 9, 10 (mins/ft)<br>Pinkish gray, hard, moderately weathered GRANODIORITE, fractures dipping at 30 degree angle.<br>Clay seam noted between 42 to 43".<br>Bottom of Borehole at 55 feet. | 3     |

Page 1: 0-35 feet. Each subsequent page displays 40 feet.

2. Boulders encountered between 36 and 37.  
3. Outer barrel of core bit broke in the borehole during drilling at 55". Could not continue boring any further.

BORING NOTES:

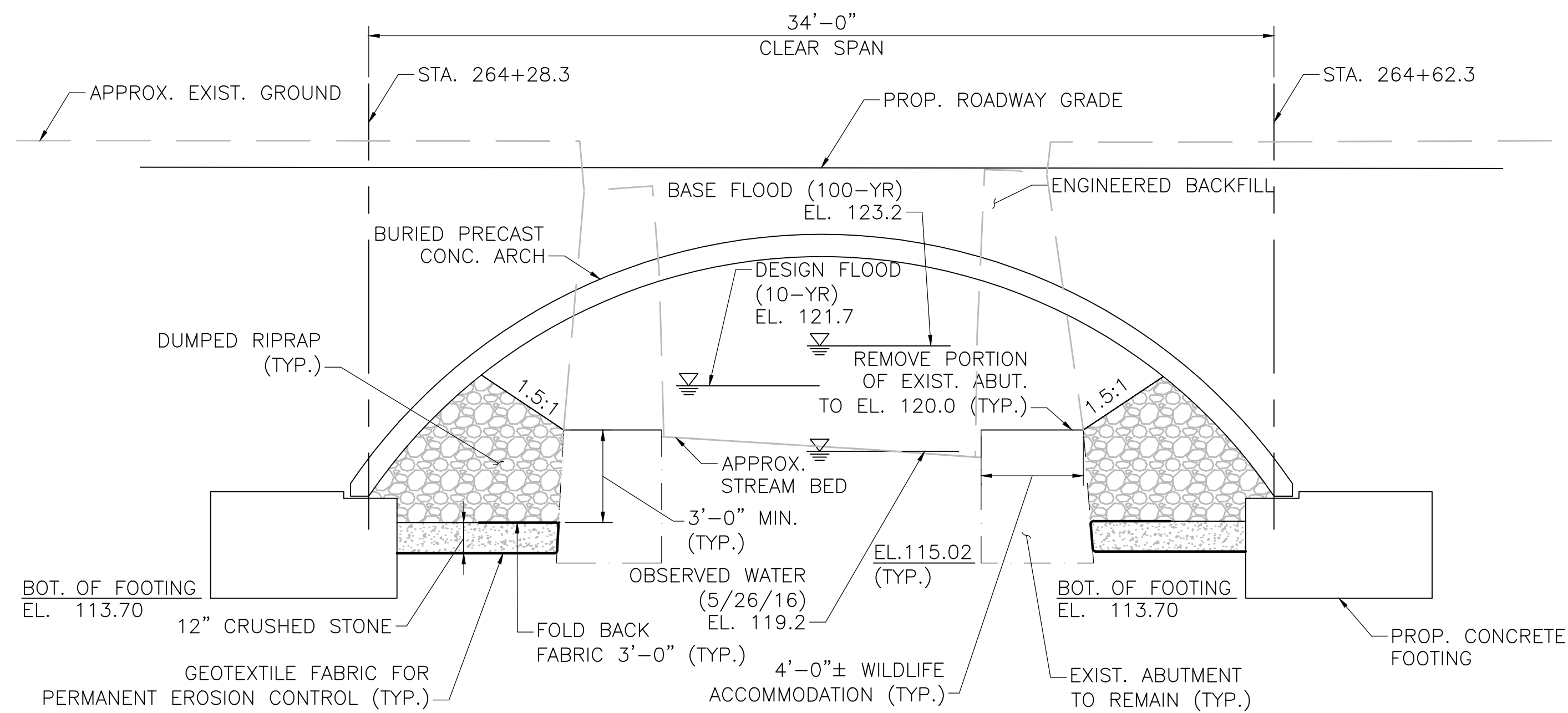
1. LOCATION OF BORINGS SHOWN ON THE PLANS THUS: ● BB-#
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 3/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. ALL BORINGS WERE MADE IN AUGUST 2019.
6. BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTOR, INC., P.O. BOX 165, DERRY, NH 03038.
7. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
8. BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.

BORING NOTES:  
SEE SHEET 2 FOR BORING NOTES.

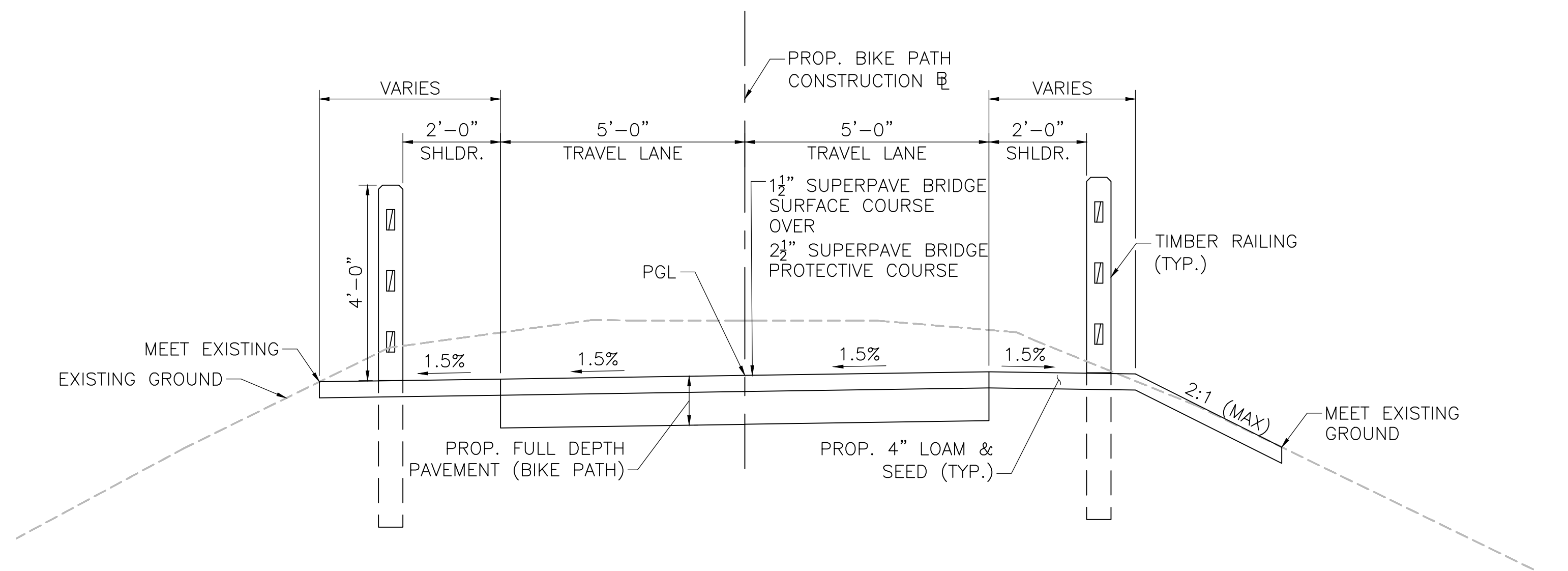
| LOG OF TEST BORING |  |            |  |             |  |         |  |            |  |                     |  |                |  |           |  |            |  |   |  |       |
|--------------------|--|------------|--|-------------|--|---------|--|------------|--|---------------------|--|----------------|--|-----------|--|------------|--|---|--|-------|
| ELEV. (ft)         |  | DEPTH (ft) |  | SAMPLE DATA |  | N-VALUE |  | SAMPLE NO. |  | DEPTH INTERVAL (ft) |  | PENREC (in/ft) |  | PID (ppm) |  | LAYER NAME |  | SOIL AND ROCK DESCRIPTION   |  | NOTES |
| 95                 |  | 31         |  | 21          |  |         |  |            |  |                     |  |                |  |           |  | GRAVEL     |  |   |  |       |
| 40                 |  | 30         |  | 53/4"       |  | 53/4"   |  | S14        |  | 39 - 39.8           |  | 10/5           |  |           |  |            |  | S14: Wet, very dense, gray, fine to coarse GRAVEL, little coarse Sand, trace Silt.  |  |       |
| 45                 |  | 18         |  | 25          |  | 34      |  | 59         |  | 44 - 46             |  | 24/21          |  |           |  | 44         |  | S15: Wet, hard, gray SILT, some Clay, trace fine Sand, trace Gravel.  |  |       |
| 50                 |  | 16         |  | 37          |  | 45      |  | 82         |  | 49 - 50.8           |  | 22/22          |  |           |  |            |  | S16: Wet, hard, gray SILT, some Clay, trace fine to coarse Sand, little Gravel.   |  |       |
| 55                 |  | RQD=57     |  |             |  |         |  | RC-1       |  | 52 - 55.8           |  | 46/46          |  |           |  | 52         |  | RC-1: Coring time: 4.5, 5, 4.5, 11 (mins/ft)<br>Wet, gray, pink grained, moderately to severely weathered, coarse grained GRANODIORITE. |  |       |
| 60                 |  | RQD=55     |  |             |  |         |  | RC-2       |  | 55.8 - 60.8         |  | 60/60          |  |           |  |            |  | RC-2: Coring time: 6, 5, 3.5, 2.5, 2 (mins/ft)<br>Similar to RC-1.  |  |       |
| 65                 |  | RQD=73     |  |             |  |         |  | RC-3       |  | 60.8 - 62.8         |  | 24/24          |  |           |  |            |  | RC-3: Coring time: 2, 3.5 (mins/ft)<br>Similar to RC-1.   |  |       |
| 62.8               |  |            |  |             |  |         |  |            |  |                     |  |                |  |           |  |            |  | Bottom of Borehole at 62.8 feet.  |  |       |

Page 1: 0-35 feet. Each subsequent page displays 40 feet.

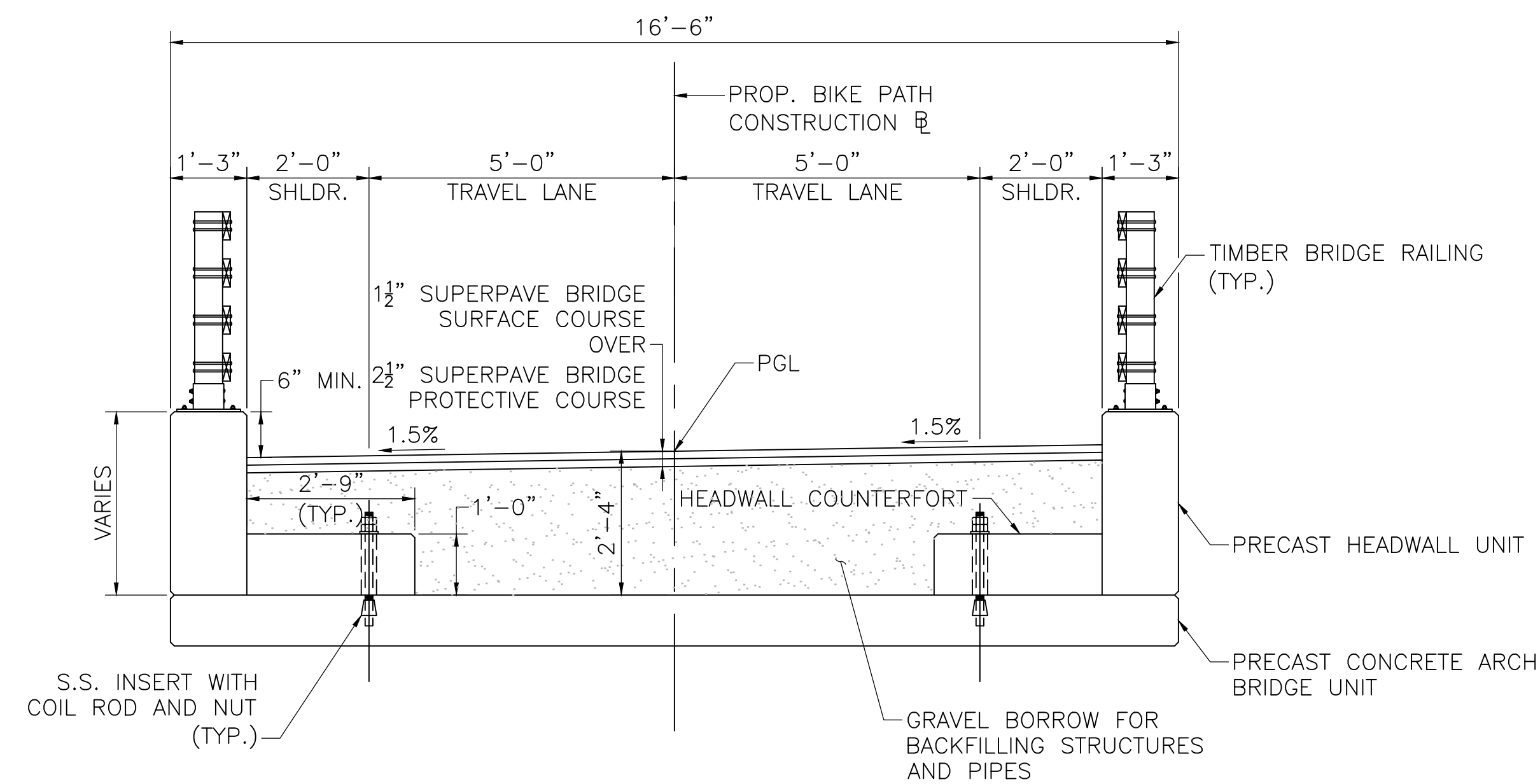
NOTES



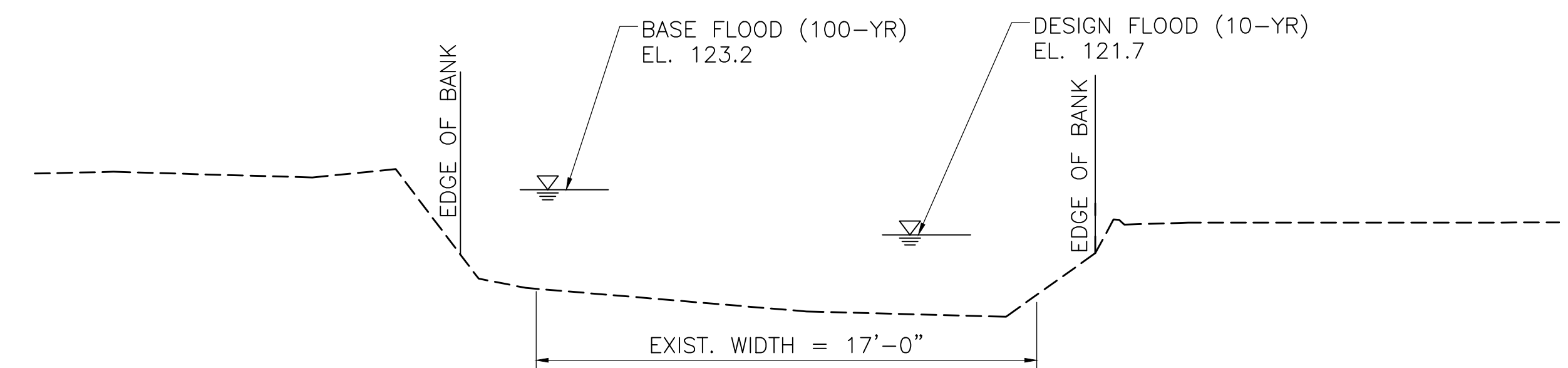
**LONGITUDINAL SECTION**  
SCALE: 1/4"=1'-0"



**APPROACH SECTION**  
SCALE: 1/2"=1'-0"



**TRANVERSE SECTION**  
SCALE: 1/2"=1'-0"



**CHANNEL APPROACH SECTION**  
SCALE: 1/4"=1'-0"

**NOTES:**

THE PRECAST CONCRETE STRIP FOOTING IS PER CONTRACTOR DESIGN. THEREFORE, THE FACTORED BEARING PRESSURE WILL BE DETERMINED BY THE CONTRACTOR. SLIDING AND OVERTURNING OF THE PRECAST STRIP FOOTING SHALL ALSO BE CHECKED IN THE CONTRACTOR'S DESIGN USING THE INFORMATION PROVIDED IN THE GEOTECHNICAL REPORT.

FACTORED BEARING RESISTANCE:

| FOOTING WIDTH (FT) | ECCENTRICITY (FT) | FACTORED BEARING RESISTANCE (KSF) |
|--------------------|-------------------|-----------------------------------|
| 4                  | 1.33              | 5.2                               |
| 6                  | 2.00              | 5.7                               |
| 8                  | 2.67              | 6.1                               |

FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.

# 001\_608164\_BFRT 25% Sketch Plans Rev 03\_Pantry Brook\_2020-06-01

Final Audit Report

2020-06-26

|                 |   |
|-----------------|---|
| Created:        | 2020-06-26  |
| By:             | Alexander Bardow (Alexander.Bardow@dot.state.ma.us) |
| Status:         | Signed  |
| Transaction ID: | CBJCHBCAABAAuGo_FSs71sDxmVWVBQXM1zicUugwHzLf        |

## "001\_608164\_BFRT 25% Sketch Plans Rev 03\_Pantry Brook\_2020-06-01" History

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(john.bechard@dot.state.ma.us) for signature  
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(lucy.manousakis@dot.state.ma.us), and Alexander Bardow (Alexander.Bardow@dot.state.ma.us)  
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