

**SOIL CLASSIFICATION**

AASHTO

|    |                                   |
|----|-----------------------------------|
| A1 | Gravel and Sand                   |
| A3 | Fine Sand                         |
| A2 | Silty or Clayey Gravel and Sand   |
| A4 | Silty Soil - Low Compressibility  |
| A5 | Silty Soil - Highly Compressible  |
| A6 | Clayey Soil - Low Compressibility |
| A7 | Clayey Soil - Highly Compressible |

**ROCK QUALITY DESIGNATION**

| R.O.D. (%) | ROCK DESCRIPTION |
|------------|------------------|
| <25        | Very Poor        |
| 25 to 50   | Poor             |
| 51 to 75   | Fair             |
| 76 to 90   | Good             |
| >90        | Excellent        |

**SHEAR STRENGTH**

| UNDRAINED SHEAR STRENGTH IN P.S.F. | CONSISTENCY |
|------------------------------------|-------------|
| <250                               | Very Soft   |
| 250-500                            | Soft        |
| 500-1000                           | Med. Stiff  |
| 1000-2000                          | Stiff       |
| 2000-4000                          | Very Stiff  |
| >4000                              | Hard        |

**CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY**

| DENSITY (GRANULAR SOILS) |                  | CONSISTENCY (COHESIVE SOILS) |                  |
|--------------------------|------------------|------------------------------|------------------|
| N                        | DESCRIPTIVE TERM | N                            | DESCRIPTIVE TERM |
| <5                       | Very Loose       | <2                           | Very Soft        |
| 5-10                     | Loose            | 2-4                          | Soft             |
| 11-24                    | Med. Dense       | 5-8                          | Med. Stiff       |
| 25-50                    | Dense            | 9-15                         | Stiff            |
| >50                      | Very Dense       | 16-30                        | Very Stiff       |
|                          |                  | 31-60                        | Hard             |
|                          |                  | >60                          | Very Hard        |

**COMMONLY USED SYMBOLS**

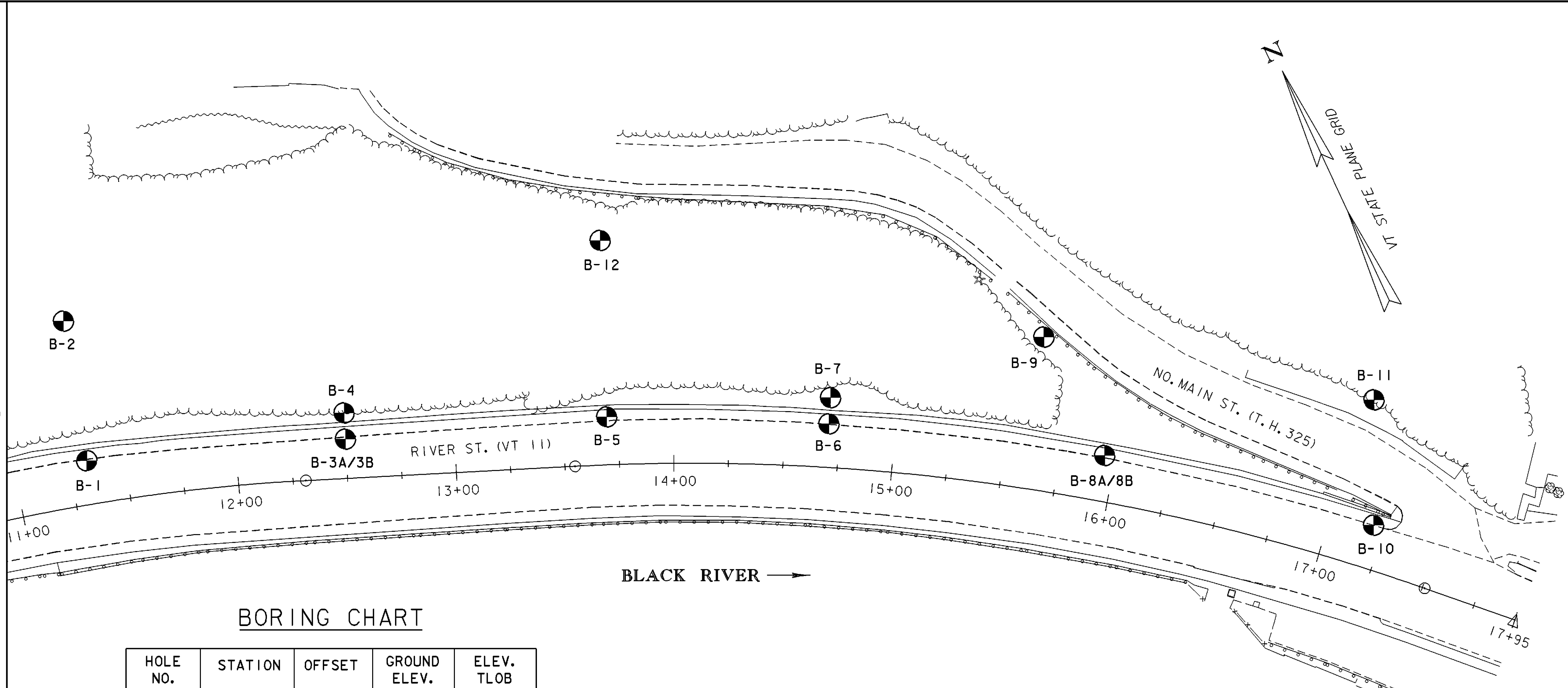
- ▼ Water Elevation
- ⊕ Standard Penetration Boring
- ⊕ Auger Boring
- ⊕ Rod Sounding
- S Sample
- N Standard Penetration Test
- Blow Count Per Foot For:
- 2" O.D. Sampler
- 1 3/8" I.D. Sampler
- Hammer Weight Of 140 Lbs.
- Hammer Fall Of 30"
- VS Field Vane Shear Test
- US Undisturbed Soil Sample
- B Blast
- DC Diamond Core
- MD Mud Drill
- WA Wash Ahead
- HSA Hollow Stem Auger
- AX Core Size 1 1/8"
- BX Core Size 1 3/8"
- NX Core Size 2 1/8"
- M Double Tube Core Barrel Used
- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index
- NP Non Plastic
- w Moisture Content (Dry Wgt. Basis)
- D Dry
- M Moist
- MTW Moist To Wet
- W Wet
- Sat Saturated
- Bo Boulder
- Gr Gravel
- Sa Sand
- Sl Silt
- Cl Clay
- HP Hardpan
- Le Ledge
- NLTD No Ledge To Depth
- CNPF Can Not Penetrate Further
- TLOB To Ledge Or Boulder
- NR No Recovery
- Rec. Recovery
- %Rec. Percent Recovery
- ROD Rock Quality Designation
- CBR California Bearing Ratio
- < Less Than
- > Greater Than
- R Refusal (N > 100)

| COLOR |              |
|-------|--------------|
| blk   | Black        |
| bl    | Blue         |
| brn   | Brown        |
| dk    | Dark         |
| gry   | Gray         |
| gn    | Green        |
| lt    | Light        |
| or    | Orange       |
| pnk   | Pink         |
| pu    | Purple       |
| rd    | Red          |
| tn    | Tan          |
| wh    | White        |
| yel   | Yellow       |
| mitc  | Multicolored |

**DEFINITIONS (AASHTO)**

- BEDROCK (LEDGE)** - Rock in its native location of indefinite thickness.
- BOULDER** - A rock fragment with an average dimension > 12 inches.
- COBBLE** - Rock fragments with an average dimension between 3 and 12 inches.
- GRAVEL** - Rounded particles of rock < 3" and > 0.075" (#10 sieve).
- SAND** - Particles of rock < 0.075" (#10 sieve) and > 0.0025" (#200 sieve).
- SILT** - Soil < 0.0025" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.
- CLAY** - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

- VARVED** - Alternate layers of silt and clay.
- HARDPAN** - Extremely dense soil, cemented layer, not softened when wet.
- MUCK** - Soft organic soil (containing > 10% organic material).
- MOISTURE CONTENT** - Weight of water divided by dry weight of soil.
- FLOWING SAND** - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
- STRIKE** - Angle from magnetic north to line of intersection of bed with a horizontal plane.
- DIP** - Inclination of bed with a horizontal plane.



**BORING CHART**

| HOLE NO. | STATION | OFFSET   | GROUND ELEV. | ELEV. TLOB |
|----------|---------|----------|--------------|------------|
| B-1      | 11+33   | 20' LT.  | 443.0        | 429.0      |
| B-2      | 11+33   | 85' LT.  | 529.5        | 429.9      |
| B-3A/3B  | 12+50   | 18' LT.  | 441.0        | 422.5      |
| B-4      | 12+50   | 30' LT.  | 458.0        | 427.0      |
| B-5      | 13+70   | 22' LT.  | 439.0        | 432.5      |
| B-6      | 14+70   | 20' LT.  | 437.0        | 422.0      |
| B-7      | 14+70   | 32' LT.  | 451.0        | 433.0      |
| B-8A/8B  | 15+95   | 21' LT.  | 435.5        | 431.0      |
| B-9      | 15+60   | 70' LT.  | 473.7        | 422.2      |
| B-10     | 17+20   | 20' LT.  | 435.0        | 414.6      |
| B-11     | 17+04   | 75' LT.  | 463.7        | 423.2      |
| B-12     | 13+70   | 103' LT. | 506.5        | 437.5      |

**BORING PLAN**

SCALE: 1" = 30'-0"

**GENERAL NOTES**

- The subsurface explorations shown herein were made between 04/18/2001 and 05/05/2001 by M & W Soils Engineering.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign Inc. and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgement was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgement by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
- Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.

**BORING INFORMATION SHEET (1)**

|   |                         |
|---|-------------------------|
| PROJECT NAME: SPRINGFIELD               | PLOT DATE: 17-AUG-2004  |
| PROJECT NUMBER: STP 016-2 (10)S         | DRAWN BY: G. ROY        |
| FILE NAME: 00b124/Structures/sbl24b01.i | CHECKED BY: R. WHITCOMB |
| DESIGNED BY: G. ROY                     | SHEET 26 OF 72          |