

**OHIO DEPARTMENT OF TRANSPORTATION****OFFICE OF GEOTECHNICAL ENGINEERING****PLAN SUBGRADES  
Geotechnical Bulletin GB1**

Instructions: Enter data in the shaded cells only.

(Enter state route number, project description, county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

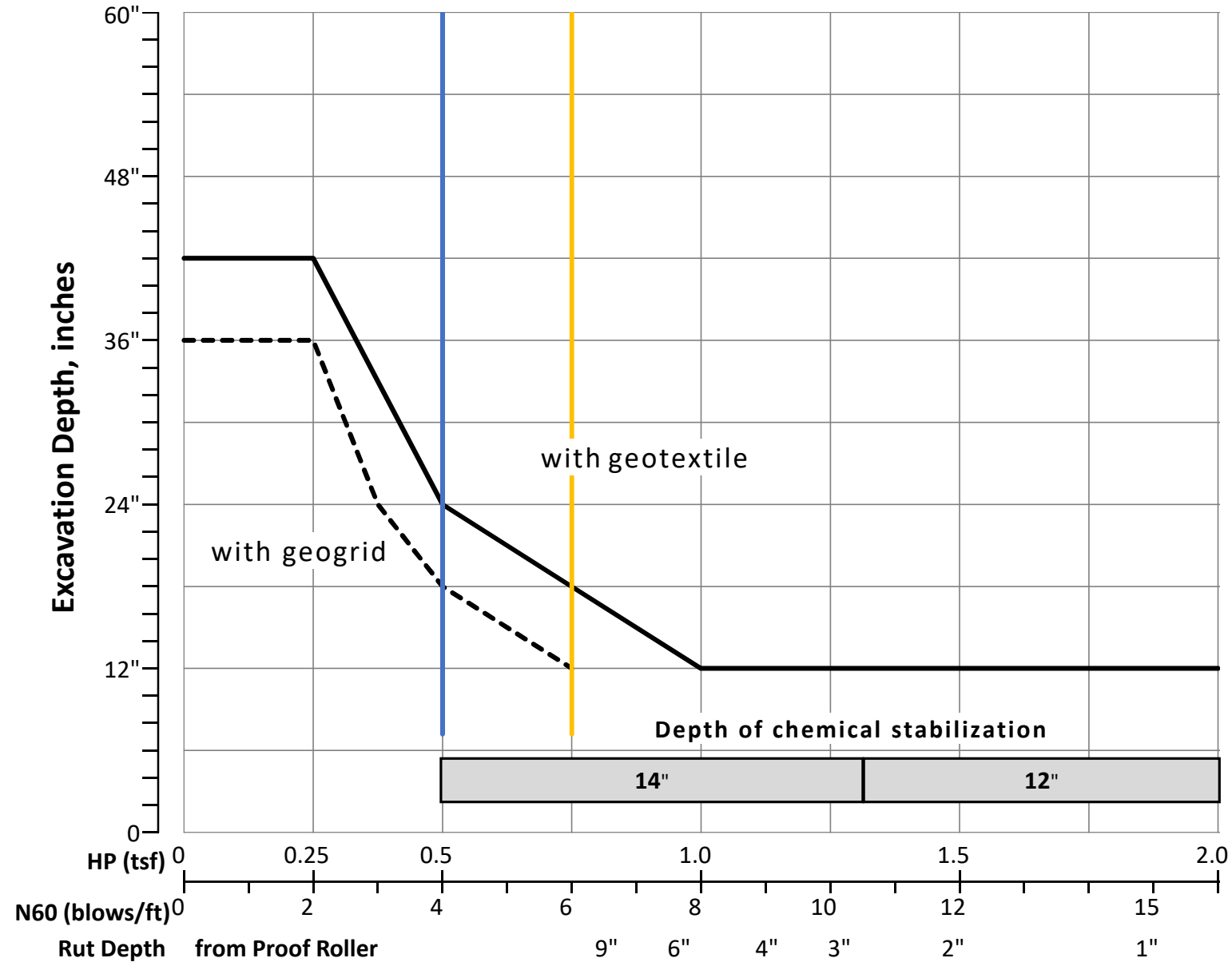
**<COUNTY-ROUTE-SECTION>****<PID>****<PROJECT DESCRIPTION - roadway length, number of bridges/culverts, type and length of other structures, type and length of geohazard>****<GEOTECHNICAL CONSULTANT>**Prepared By: **<NAME>**Date prepared: **<MM/DD/YYYY>****<CONTACT NAME>****<CONTACT ADDRESS>****<CONTACT ADDRESS>****<CONTACT ADDRESS>****<BUSINESS TELEPHONE>****<EMAIL ADDRESS>****NO. OF BORINGS: 1**

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL.	Cut Fill
1	B-001-0-18	CENTERLINE OF I-70	343+51	88	Lt	CME 850R Tracked \05	81	962.5	961.0	1.5 C





GB1 Figure B – Subgrade Stabilization



**OVERRIDE TABLE**

Calculated Average	New Values	Check to Override
	0.50	<input checked="" type="checkbox"/> HP
	6.00	<input checked="" type="checkbox"/> N60L

Average HP —  
 Average N<sub>60L</sub> —

The subgrade analysis workbook consists of five worksheets. Each worksheet functions independently. In all of the worksheets the fields are color coded as follows:

- Every yellow highlighted field indicates a field to be entered by the user.
- Every salmon field is to indicate a problem/issue.
- Every gray or green field is a heading/informational field.

**IMPORTANT:** The sequence of filling out the data needs to be followed as outlined below:

1. Cover Sheet: this worksheet is designed for the purpose of entering the project information. Enter all the following fields:

County-Route-Section	This includes the county, route, section number assigned to the project.
PID	the Project Identification Number
Project Description	See Cover Sheet for list of example details
Geotechnical Consultant	The Geotechnical Consultant performing the analysis.
Prepared By	The preparer of the subgrade analysis
Date prepared	The date the analysis is performed.
Contact Information	Name, address, telephone #, and email address
No. of Borings	Enter the total number of borings within the alignment that is being analyzed.

2. Boring Logs Entry Worksheet: this worksheet has a programming code that will run in the background every time the sheet is activated and will make the sheet unresponsive for less than a minute. The code is designed to read the total number of borings from the cover sheet and generate the needed number of fields.

- a. All yellow highlighted fields are user's entry.
- b. ODOT **has developed** a text table export from gINT (*GB 1 Borings Log Entry Tab*) that will allow for copy and paste of all highlighted fields with the exception of proposed subgrade elevation. The designer must provide a proposed subgrade elevation in order for the spreadsheet to function properly.
- c. The Cut/Fill field is a calculated field that, based on the difference between the boring elevation and the proposed subgrade elevation, will highlight the cell either gray and adds the letter "C" to the end in a cut situation or highlights the cell in light purple and adds the letter "F" to the end in a fill situation.
- d. Every duplicate boring ID will be highlighted in salmon background and red text.
- e. **IMPORTANT:** After entering all the borings' information, the user must click "Add Subgrade Analysis Entry Fields" button. This will generate all the required fields in the "Subgrade Analysis" Worksheet.

3. Subgrade Analysis Worksheet:

- a. The boring number and boring ID is read from the "Boring Logs Entry Worksheet" excluding every boring that has six feet or more of fill.
- b. All yellow highlighted fields are to be entered by the user and salmon highlighted fields indicates a problem or issue.
- c. Every sample that has a Sulfate Content greater than or equal to 3000 will be highlighted in light salmon background. Every sample that has a Sulfate Content greater than or equal to 8000 will be highlighted in darker salmon background. **Note the revised sulfate criteria in GB1 issued July 20, 2018.**

d. Unsuitable/Unstable:

- i. Unsuitable samples that are within 3 feet of the top of subgrade will be highlighted with salmon background and the class will be showing in this field.
- ii. Unstable Samples that are within 3 feet of top of subgrade will be highlighted with salmon background and text to indicate the problem as follows:

Criterion	Stabilization Need Check	Text displayed in the field
A-1-a, A-1-b, A-3, or A-3a Soil Class	No Stabilization is needed	
$HP \geq 1.875$	No Stabilization is needed	
$N_{60} \geq 15$	No Stabilization is needed	
$1.875 \geq HP \geq 1.5$ and $M_c \geq \text{Opt. } M_c + 3$	Unstable Subgrade	HP & Mc
$15 \geq N_{60} \geq 12$ and $M_c \geq \text{Opt. } M_c + 3$	Unstable Subgrade	$N_{60}$ & Mc
$HP \leq 1.5$	Unstable Subgrade	HP
$N_{60} \leq 12$	Unstable Subgrade	$N_{60}$

- iii. The field is formulated to check for HP first and check for  $N_{60}$  second.

e. Excavate and Replace (Item 204) is going to be calculated based on the subgrade depth for each sample indicating an unsuitable or unstable problem.

f. Recommendation:

- i. Geotextile Option is calculated and rounded to a multiple of 3 inches based on the subgrade depth for every sample indicating an unsuitable or unstable problem.
- ii. GEOGRID Option is only offered in case of unstable subgrade problem and if the geotextile option indicates the need to excavate greater than 12 inches.

**PLEASE NOTE: The Problem, Excavate & Replace, and Recommendation Fields are the responsibility of the Designer. These fields are being enhanced to attempt to capture the ODOT philosophy regarding the GB1 stabilization chart, but are considered still under development. If there are discrepancies between the spreadsheet output and the GB1 chart - the chart governs in conjunction with engineering judgement. Please contact Steve Taliaferro at [stephen.taliaferro@dot.ohio.gov](mailto:stephen.taliaferro@dot.ohio.gov) if you have any questions.**

**PLEASE NOTE: It is the Designer's responsibility to identify the most representative data when samples have been separated into multiple specimen (say 1.5 to 2.3 feet and 2.3 to 3.0 feet). The spreadsheet is not capable at this time of addressing this issue within a direct data export from gINT.**

4. Results Summary:

All fields in this sheet are password protected and are either calculated or read from the other worksheets.

5. Graph Worksheet:

This worksheet is designed to read the average  $N_{60L}$  and the average HP from the Cover Sheet and plot a blue line for Average HP and orange line for Average  $N_{60L}$  on GB1 Figure B – Subgrade Stabilization. The Override Table can be used to enter HP and/or  $N_{60L}$  values that are different than the calculated averages. The Override values will change the global undercut recommendation in the Results Summary.