



Iowa Department of Transportation

SPECIAL PROVISIONS FOR CONTRACTOR FURNISHED BORROW

Linn County
NHSX-100-1(77)--3H-57

Effective Date
January 22, 2014

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Make the following revisions to the Standard Specifications:

2102.02, D, Borrow.

Replace the title and article:

Borrow Material Suitability.

1. Select Treatment Material.

a. Cohesive Soils.

Meet all of the following requirements:

- 1) 45% or less silt size fraction.
- 2) 110 pcf (1750 kg/m³) or greater density (AASHTO T 99 Proctor Density or Materials I.M. 309).
- 3) Plasticity index greater than 10.
- 4) A-6 or A-7-6 soils of glacial origin.

b. Granular Soils.

Meet all of the following requirements:

- 1) 15% or less silt and clay.
- 2) 110 pcf (1750 kg/m³) or greater density (AASHTO T 99 Proctor Density or Materials I.M. 309).
- 3) Plasticity index, 3 or less.
- 4) A-1, A-2, or A-3 (0).

c. Special Backfill Material Material.

Meet the requirements of Section 4132.

d. Modified Subbase Material.

Meet the requirements of Section 4123.

2. Suitable Soils.

- a. Ensure all soils provided for the construction of embankments meet the requirements below. They are suitable when moisture control or moisture and density control is designated.
 - 1) 95 pounds per cubic foot (1500 kg/m^3) or greater density (AASHTO T 99 Proctor Density or Materials I.M. 309).
 - 2) AASHTO M 145-94 index of less than 30.
 - 3) Liquid Limit (LL) less than 50.
- b. Soils not meeting these requirements are considered unsuitable soils, regardless of classification.
- c. When placing soil below water, use clean granular material.

3. Unsuitable Soils.

Place in the work only as specified by Standard Road Plan EW-102. Use in the work will be according to the definitions in Table 2102.02-1:

Table 2102.02-1: Uses for Unsuitable Soils

| Definition | Use |
|--|--|
| 1. Peat or Muck. 2. Soils with a plasticity index of 35 or greater. 3. A-7-5 or A-5 having a density less than 85 pcf (1350 kg/m^3) (AASHTO T 99 Proctor Density or Materials I.M. 309). | Slope Dressing Only. |
| 1. All soils other than A-7-5 or A-5 having a density of 95 pcf (1500 kg/m^3) or less (AASHTO T 99 Proctor Density or Materials I.M. 309). 2. All soils other than A-7-5 or A-5 containing 3.0% or more carbon. | Type C placement placed 3 feet (1 m) below top of subgrade in fills. |
| 1. A-7-6 (30 or greater). 2. Residual clays (overlying bedrock), Paleosols, gumbo, and gumbotils regardless of classification. | Type B placement placed 5 feet (1.5 m) below top of subgrade in fills. |
| 1. Shale. 2. A-7-5 or A-5 soils having a density greater than 86 pcf (1351 kg/m^3) but less than 95 pcf (1500 kg/m^3) (AASHTO T 99 Proctor Density or Office or Materials I.M. 309). | Type A placement placed in layers 5 feet (1.5 m) below top of subgrade in fills (Alternate layers to consist of suitable soils or Type C placement soils). |

2102.03, F, Borrow.

Replace the article:

1. General.

- a. Unless provided otherwise in the contract documents, when the quantity of material required for embankments is not available within the limits of the roadway cross sections or specific borrow areas as indicated, make up the deficiency from borrow areas the Contracting Authority provides and defines on the plans or furnish equivalent material from alternate borrow areas (in lieu of plan borrows) or Contractor furnished borrow.
- b. The following definitions apply to this specification:
 - 1) **Designated Borrow Areas.**
A general term for borrow areas the Contracting Authority provides; including mandatory and optional borrow areas.
 - a) **Mandatory Borrow Areas.**

An area provided by the Contracting Authority from which the Contractor is expected to obtain borrow material and to operate in the area according to the contract documents. Mandatory borrow areas will be designated in the contract documents.

b) Optional Borrow Area.

An area provided by the Contracting Authority from which the Contractor may obtain borrow material. If so obtained, the Contractor is expected to operate in the area according to the contract documents. Borrow areas are optional borrow areas unless specifically designated as mandatory borrow areas.

2) Alternate Borrow Areas.

An area outside the highway right-of-way provided by the Contractor from which the Contractor may obtain borrow material in lieu of designated borrow areas and to be used according to the contract documents.

3) Contractor Furnished Borrow.

A general term for borrow material provided by the Contractor. The type of material shall be as specified in the contract documents. If the type of material is not specified, provide Suitable Soils. Contractor may elect to provide Select Treatment Material in lieu of Suitable Soils. Unsuitable Type A, B, and C materials, with the exception of shale and residual clays, will be allowed. Place these unsuitable materials as specified in Standard Road Plan EW-102.

- c. Upon completion of designated borrows, excavate borrow areas that are sufficiently regular in cross section to permit accurate measurement. Carefully blend to natural land forms and avoid unnecessary damage to the land. Do not turn natural drainage of surface water on to adjoining owners. Use diligence in draining the surface water in its natural course or channel. Complete excavation consistent with the existing natural drainage conditions or as shown in the contract documents.
- d. Where a mandatory borrow area is designated in the contract documents, it is mandatory that borrow material be obtained from the borrow location designated and in accordance with the borrow design on the contract documents, unless permission is obtained from the Engineer to obtain borrow from another location.
- e. Unless the contract documents designate borrow areas as mandatory borrow areas, borrow areas will be considered optional borrow areas. The Contractor has the option of either using the optional borrow areas or proposing to furnish equivalent material from alternate borrow areas.
- f. Do not place the estimated edge of water for a pond borrow closer than 100 feet (30 meters) from any public right-of-way. A pond borrow is a borrow that has the intention of excavation below the natural ground and leaving a body of water for a designated purpose.
- g. Refer to Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B for separation criteria for hazardous wildlife attractants on or near airports.

2. Contactor's Plan for Alternate Borrow or Revisions to Designated Borrow.

- a. Submit a plan to the Engineer for use of proposed alternate or designated borrow intended to be used in a manner different from that shown in the contract documents. Also, sample the proposed alternate borrow areas by core drilling or test pits. When the Contracting Authority determines it is necessary, sample in the presence of the Engineer. Test samples and provide results and verification samples to the Contracting Authority
- b. The submission for use of alternate borrow areas shall include all such areas necessary or contemplated for completion of the planned work.
- c. Approval of materials and their use will be based on AASHTO M 145-94 and includes the following:
 - 1) Select Treatment Materials.**
 - a) The Engineer's approval is required for all soils required for select subgrade treatments. The Contractor may elect to substitute with special backfill material or modified subbase material at one-half the required rate at no additional cost to the Contracting Authority. If special backfill material or modified subbase material

is used in lieu of select material, ~~the Contractor shall~~ provide for suitable surface and subsurface drainage of this material and provide suitable soils in lower portion of original subgrade treatment layer at no additional cost to the Contracting Authority.

(1) Cohesive Soils.

Meet the requirements of Article 2102.02, D, 1, a.

(2) Granular Soils.

Meet the requirements of Article 2102.02, D, 1, b.

(3) Special Backfill Material.

Meet the requirements of Section 4132.

(4) Modified Subbase Material.

Meet the requirements of Section 4123.

- b) Use select treatment sources with sufficient uniformity and size to assure that complete individual treatment areas will be constructed with similar material. Substitution of treatment types (cohesive, granular, special backfill, or modified subbase material) will be allowed only with the Engineer's permission.

2) Suitable Soils.

Meet the requirements of Article 2102.02, D, 2.

3) Unsuitable Soils.

Meet the requirements of Article 2102.02, D, 3.

4) Other Materials.

Place materials not covered above as required by Standard Specifications.

d. The Engineer may decline approval of an alternate borrow area when:

- 1) Necessary clearances cannot be obtained prior to the time scheduled for commencement of work.
- 2) Restrictions attached to clearances will delay or interfere with scheduled completion of work or may result in less than necessary quantities of required borrow materials.
- 3) Contractor's plan for use of borrow areas, including Contractor's verification of quantity and quality of required material, is not sufficient to assure availability of required material.
- 4) Contractor's proposed plans fail to meet requirements of the contract documents.

e. The Engineer will be allowed time to evaluate each alternate borrow area. If the clearance is not obtained within 30 calendar days, the proposed use of that borrow area may be rejected. During this evaluation period, the Contractor will not be charged for working days the Contractor does not work because the Contractor cannot use the borrow area.

f. The maximum allowance for each contract is not to exceed 30 working days. This allowance will not apply to work for which an intermediate completion time is specified. It will be given only when the delay will not interfere with others authorized to work on the project. It does not increase the Engineer's responsibility to provide coordination.

g. The Contracting Authority will not be responsible for damages due to a delay in approval of an alternate borrow area or when approval of an alternate borrow area is declined.

3. Contractor's Plan for Contractor Furnished Borrow

a. General.

- 1) Approval of materials for use as Contractor Furnished Select Treatment Materials will be based on Article 2102.02, D, 1.
- 2) The Contractor may elect to substitute with special backfill material or modified subbase material as shown in the contract documents at no additional cost to the Contracting Authority. If special backfill material or modified subbase material is used in lieu of select material, provide for suitable surface and subsurface drainage of this material and provide suitable soils in lower portion of original subgrade treatment layer at no additional cost to the Contracting Authority.
- 3) The Engineer may decline approval of a contractor furnished borrow(s) when:
 - a) The Contractor's submittal fails to meet Proposed Borrow Report requirements.

- b) The Contractor's plan for use of borrow areas, including quantity and quality of required material, is not sufficient to assure availability of required material.

b. Sampling and Testing

1) Total Project Quantity of Contractor Furnished Borrow Greater than 10,000 Cubic Yards (7650 m³).

Sample and test the proposed contractor borrow areas and submit Proposed Borrow Report as specified in Appendix A. When the Contracting Authority determines it is necessary, sample in the presence of the Engineer. Submit the report electronically to the Engineer. Include Iowa DOT Proposed Contractor Borrow Identification Form, sampling/field logs, and test reports. A minimum of 21 calendar days is required for review and approval by the Engineer. The Contracting Authority will not be responsible for damages or delays due to incomplete submittals or when approval of a borrow is declined.

2) Total Project Quantity of Contractor Furnished Borrow less than 10,000 Cubic Yards (7650 m³).

Sample the proposed contractor borrow areas. When the Contracting Authority determines it is necessary, sample in the presence of the Engineer. Provide verification samples to the Engineer. A minimum of 14 calendar days is required for review and approval by the Engineer.

3 4. Contractor Obtained Clearances and Permits.

Obtain necessary environmental clearances and permits, and comply with all restrictions attached to these clearances and permits for alternate borrow areas and sites where Contractor furnished borrow is obtained.

4 5. Restoration.

- a. Optional borrow areas shown on the Contractor's plan shall be left in at least as good a condition as that required by the contract documents for designated borrow areas. This applies whether all or only a part of the site or the material is used for borrow.
- b. Use and rehabilitate optional borrow areas and alternate borrow areas (unless Contractor and landowner have agreed to the final design of the alternate borrow area) so that:
 - 1) The sites can continue to be used for the purpose for which they were used prior to removal of borrow.
 - 2) The sites may still be used for those higher and more profitable or better potential uses to which the site might have been put prior to removal of borrow material.
- c. The Engineer will require restoration according to 314.12, Code of Iowa, to meet the above requirement. The overall Contractor's plan shall neither detract from nor interfere with the air, light, and view of motorists nor of adjacent landowners.

5 6. Obligations and Payment.

Use of an alternate borrow area shall not increase future obligations or total cost to the Contracting Authority. Complete all excavation from the roadway and the mandatory borrow areas.

6 7. Starting Work.

Except for exploratory purposes, do not start work and take material from an alternate borrow or a Contractor furnished borrow area until after:

- The Engineer approves the borrow proposal in writing, and
- Providing the Engineer with a written release executed by the property owner and the Contractor relieving the Contracting Authority of any and all obligations to the property owner and saving the Contracting Authority harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations.

7 8. Material Verification.

Material supplied from alternate borrow areas or Contractor furnished borrow may be verified by the Contracting Authority for compliance with these requirements. When testing by the

Contracting Authority is required, a minimum of ~~10 working~~ 14 calendar days is necessary for testing. When the Engineer orders, remove and replace material verified not in close compliance with these requirements, at no additional cost to the Contracting Authority.

2102.04, A.

Add the Articles:

8. Contractor Furnished Select Treatment.

Cubic yards (cubic meters) shown in the contract documents, adjusted by changes in available on site select treatments.

9. Embankment in Place Contractor Furnished.

Cubic yards (cubic meters) shown in the contract documents.

2102.05, A.

Add the Articles:

8. Contractor Furnished Select Treatment.

According to Article 2102.05, A, 3. Payment includes furnishing material.

9. Embankment in Place Contractor Furnished.

According to Article 2102.05, A, 3. Payment includes furnishing material.

2105.02, Materials.

Replace the article:

For topsoil furnished by the Contractor, provide material meeting the requirements of Articles 4170.09, A, 1 and 4170.09, A, 3, or strip existing topsoil from beneath template fill sections within the project limits if stripping of that topsoil is not already included as part of the project. Replace topsoil stripped from beneath template fill with an equivalent quantity of Class 10 or Embankment-in-Place material at no additional cost to the Contracting Authority.

2108.05, Basis of Payment.

Add the article:

C. Overhaul will not be paid for contractor furnished material (such as borrow or topsoil) and waste material.

APPENDIX A

CONTRACTOR FURNISHED BORROW

GENERAL

This procedure describes requirements on sampling, testing, submittal, and approval of contractor furnished borrow sites/sources where project quantity of contractor furnished borrow is greater than 10,000 cubic yards (7650 m³).

Types of borrows covered in this Appendix are:

1. Excavated, which includes:

Drainable Borrow: A drainable borrow is one that has the intention of returning the site, as close as possible, to the previous activity/use, and

Pond Borrow: A pond borrow is one that has the intention of excavation below the natural ground and leaving a body of water for a designated purpose.

2. Non-excavated, such as stockpiled material, which includes:

Closed/Existing: A stockpile that will not have material added during the course of the project, and

Open/Active: A stockpile that will have material added during the course of the project.

PROPOSED BORROW REPORT SUBMITTAL REQUIREMENTS

A complete investigation of each proposed borrow shall include an adequate boring layout, a field log of each boring, appropriate sampling, and complete test results. Test pits instead of borings are allowed; however, this applies only for soil layer descriptions and sampling above the water table.

Only those sites that the Contractor intends to utilize for project construction shall be submitted as proposed borrows. The proposed borrows shall collectively satisfy the borrow need for project construction.

The Engineer will inform the Contractor of the acceptance or non-acceptance of the Proposed Borrow Reports.

If the volume of available suitable soil is insufficient due to the disapproval of a borrow or borrows, the Contractor shall make a new submittal. Any new submittal shall follow the same procedure as previous submittals.

An open/active stockpile submittal will require information on the stockpile material currently in place (see submittal requirements for non-excavated borrows) and information on material that will be excavated and added to the stockpile during the course of the project (see submittal requirements for excavated borrows).

The purpose of the Proposed Borrow submittal is only for the evaluation of the site. There will be no spatial requirements, restrictions, or limitations placed on the borrow design (conceptual or final).

A complete Proposed Borrow Report for each proposed borrow shall include:

1. Completed Iowa DOT Proposed Contractor Borrow Identification Form (provided at the end of this document).

2. Aerial photo showing the location of the proposed borrow site or the location of the proposed stockpile (this includes the geospatial extent/limits of either). A marked-up recent Google Earth photo shall be sufficient.

For excavated borrows: in addition to the location of the borrow site, the aerial photo shall show the conceptual design and the location of the borings along with their identification numbers. A conceptual design is a general outline of the proposed borrow excavation limits.

For non-excavated borrows: in addition to the location of the stockpile, the aerial photo shall show the sampling locations along with their identification numbers.

a. Sample/Boring Layouts:

- i. For excavated borrows, a boring layout pattern shall spatially cover a potential borrow site to adequately identify the soil layers encountered throughout the site, and provide for sufficient profile representation. Borings shall be spaced to maximize the coverage and at intervals no greater than 400 feet (120 m) (subject to borrow shape and general outline). An example of a boring layout is provided at the end of this document.

As an example: a 40 acre (16.2 ha) (square) borrow site will typically require a minimum of nine borings.

Boring depths shall extend to a reasonable depth below the anticipated maximum excavation for both drainable and pond borrows (such as 10 feet (3 m)) to help accommodate potential material shortfalls. If additional excavation during construction is required to meet the borrow need, additional borings (with sampling and testing) are required.

- ii. For non-excavated borrows, a sampling layout pattern shall spatially cover a potential borrow site to adequately represent the site and define the composition of soil material to be encountered. Sampling shall be spaced to maximize coverage and represent the entire site. Spacing shall be no greater than 400 feet (120 m) (subject to borrow shape and general outline).

b. Samples:

- i. Loose/bulk samples of sufficient size (30 - 40 pounds (14 - 18 kg)) shall be taken, multiple times throughout the borrow site, for each soil layer encountered for excavated borrows or for each soil type for non-excavated borrows. For excavated borrows, a sample may only represent a similar layer in an adjacent boring no more than 400 feet (120 m) distant. Each sample shall be labeled with the boring ID and depth of sample, and shall be tested for mechanical analysis, determination of Atterberg limits, Munsell color comparison, percent of grain sizes, USDA textural and AASHTO classification, etc. (see Section "Laboratory test results" below). At least two samples for each predominant soil layer encountered shall be tested for Proctor density and optimum moisture.
- ii. Samples obtained prior to execution of contract shall be preserved by the Contractor. For samples obtained after execution of contract, the Engineer shall collect verification samples (split samples) from boring or test pits sampled by the Contractor. At the discretion of the Engineer, random verification samples (split samples) shall be submitted to the Central Materials Lab for verification testing.

3. Sampling/field logs:

- a. For excavated borrows, a descriptive field log of each borrow boring shall be submitted. An example is provided below. The following is the expected information for each boring in a borrow boring field log.
 - Boring ID number and GPS location (either State Plane or Lat/Long Coordinates).

- A field description of each soil layer (color, soil type, consistency, and geologic origin if possible).
 - Depth to bottom of each soil layer.
 - A notation indicating if a layer was sampled.
 - In-place moisture conditions of the soil layers.
 - Measured water table depth and amount of time between drilling and reading.
- b. For non-excavated borrows, a descriptive log of each sampling site shall be submitted. An example is provided at the end of this document. The following is the expected information for a sampling log.
- Sample ID number and GPS location (either State Plane or Lat/Long Coordinates).
 - A field description of each sample (color, soil type, and consistency) and depth.

4. Laboratory test results:

The testing of the borrow samples shall be performed by an accredited lab in accordance with Materials I.M. 208.

The test results shall be submitted in report or tabulated form. An example of a tabulated form is provided at the end of this document.

Each test report shall contain:

- Boring/Sample ID number, and GPS Location (either State Plane or Lat/Long Coordinates).
 - For excavated borrows only, depth of sample (from – to) and in units of feet (meters).
 - Atterberg Limits (AASHTO T89 and T90, or ASTM D4318).
 - Percent Gravel, Sand, Silt, and Clay (AASHTO T88 or ASTM D422).
 - Textural classification (USDA).
 - AASHTO classification (AASHTO M145).
 - Proctor density and optimum moisture, when tested (see Section “Samples” above) (AASHTO T99, ASTM D698, or Materials I.M. 309).
 - Percent Carbon Content, where applicable (Office of Materials Test Method No. Iowa 111).
 - Sieve analysis (Percent Passing) (AASHTO T88 or ASTM D422).
 - Munsell Color comparison.
5. For excavated borrows only, provide profile views through the proposed borrow. A minimum of one profile is acceptable as long as the profile reasonably depicts all borings within the borrow and within close proximity (no more than 100 feet (30 m)) from the borrow edge. These profiles may be hand drawn. The profiles shall: include the location of each boring, depict the depths of the sampling in each boring, show the general soil layers through the borings, and illustrate the extent and depth of the anticipated excavation.

PROCESSING CONTRACTOR BORROW SUBMITTALS, APPROVAL, AND ACTIVITY

This section outlines the procedures that the Engineer, Office of Construction and Materials, and Soils Design Section of the Office of Design will follow for excavated and non-excavated contractor furnished borrow.

A. Verification Sampling.

1. The Engineer will be responsible for monitoring boring/sampling activity that occurs after execution of contract. At the discretion of the Engineer, random verification samples (split samples) will be obtained from those collected by the Contractor (minimum frequency: one for every ten Contractor samples).
2. If taken, the Engineer will submit verification samples to the Central Material Laboratory of the Office of Construction and Materials, for verification testing.

3. The Central Material Laboratory will send the verification test results to Engineer, the Office of Construction and Materials, and the Soils Design Section.

B. Proposed Borrow Report.

1. The Engineer will forward the reports to the Office of Construction and Materials, and the Soils Design Section.
2. The Office of Construction and Materials, and the Soils Design Section will evaluate the quality (soil suitability) and quantity (soil type availability) of the proposed borrows.
3. The Office of Construction and Materials, and the Soils Design Section will coordinate a reply to the Engineer. The coordinated reply will include the approval or disapproval of the proposed borrows, and any applicable comments.
4. The Engineer will convey the approvals or disapprovals and any applicable review comments or requirements to the contractor.

C. Borrow Excavation/Use.

The Engineer will monitor the use of the borrow material. If there are questions concerning quality of borrow material, the Engineer will request verification samples to determine material suitability and acceptable use.

IOWA DOT PROPOSED BORROW IDENTIFICATION FORM

Date _____

Project Number _____

County _____

Project Description _____

Contractor _____ Phone _____

1. Borrow ID#: _____
2. Location (Legal Description): _____

3. Size (acres (hectares)): _____
4. Type:

| | |
|---|--|
| <input type="checkbox"/> Drainable borrow | <input type="checkbox"/> Stockpiled Borrow – Closed/Existing |
| <input type="checkbox"/> Pond Borrow | <input type="checkbox"/> Stockpiled Borrow – Open/Active |
| <input type="checkbox"/> Other _____ | |
5. Estimated quantities (in cubic yards (cubic meters)):

Class 10 (suitable) _____

Select _____

Unsuitable _____
6. Name, address, phone number, and email of contact person from Contractor if additional information is required: _____

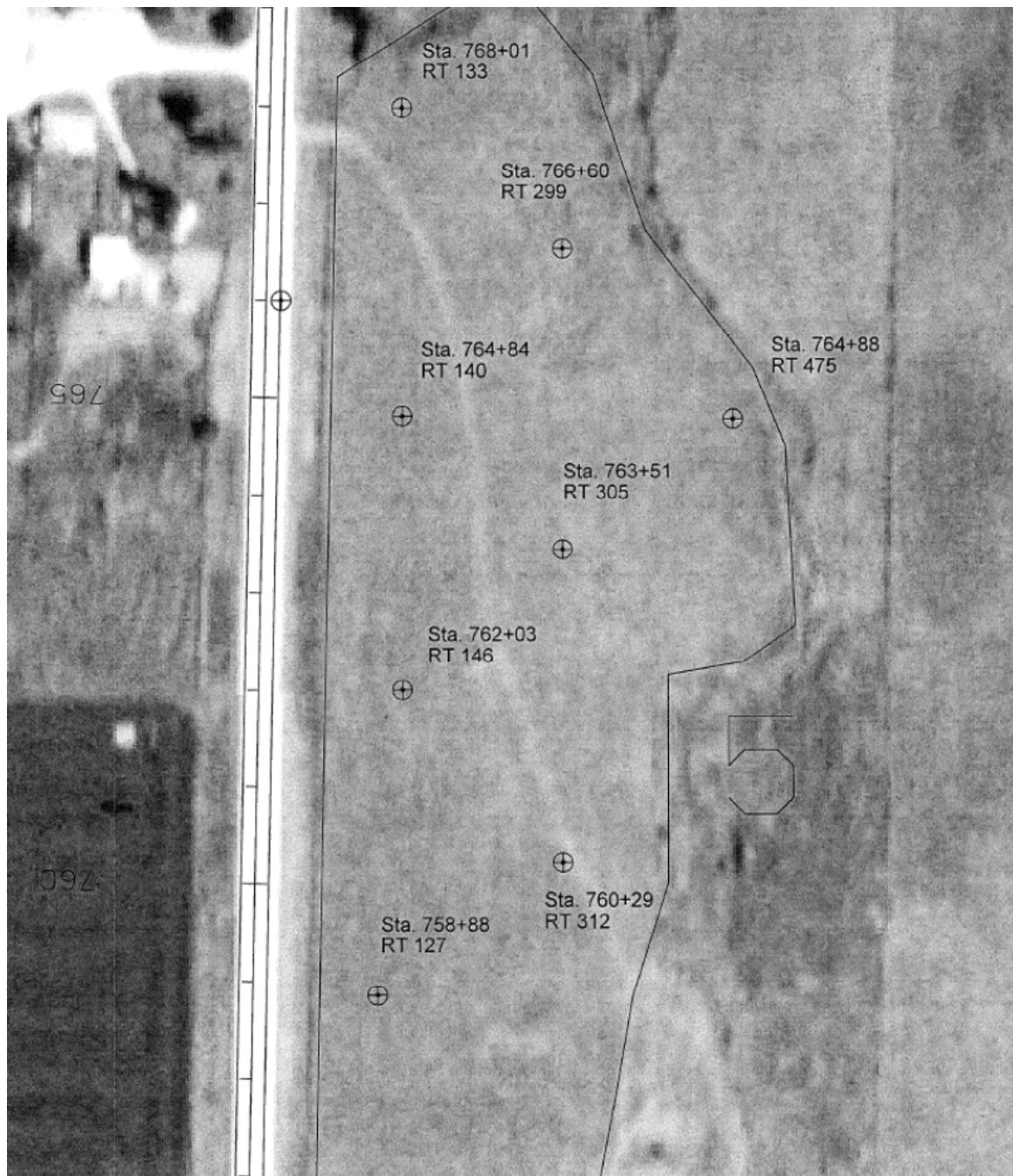
Attachment: ☐ Proposed Borrow Report

Office of Construction & Materials _____ Date _____

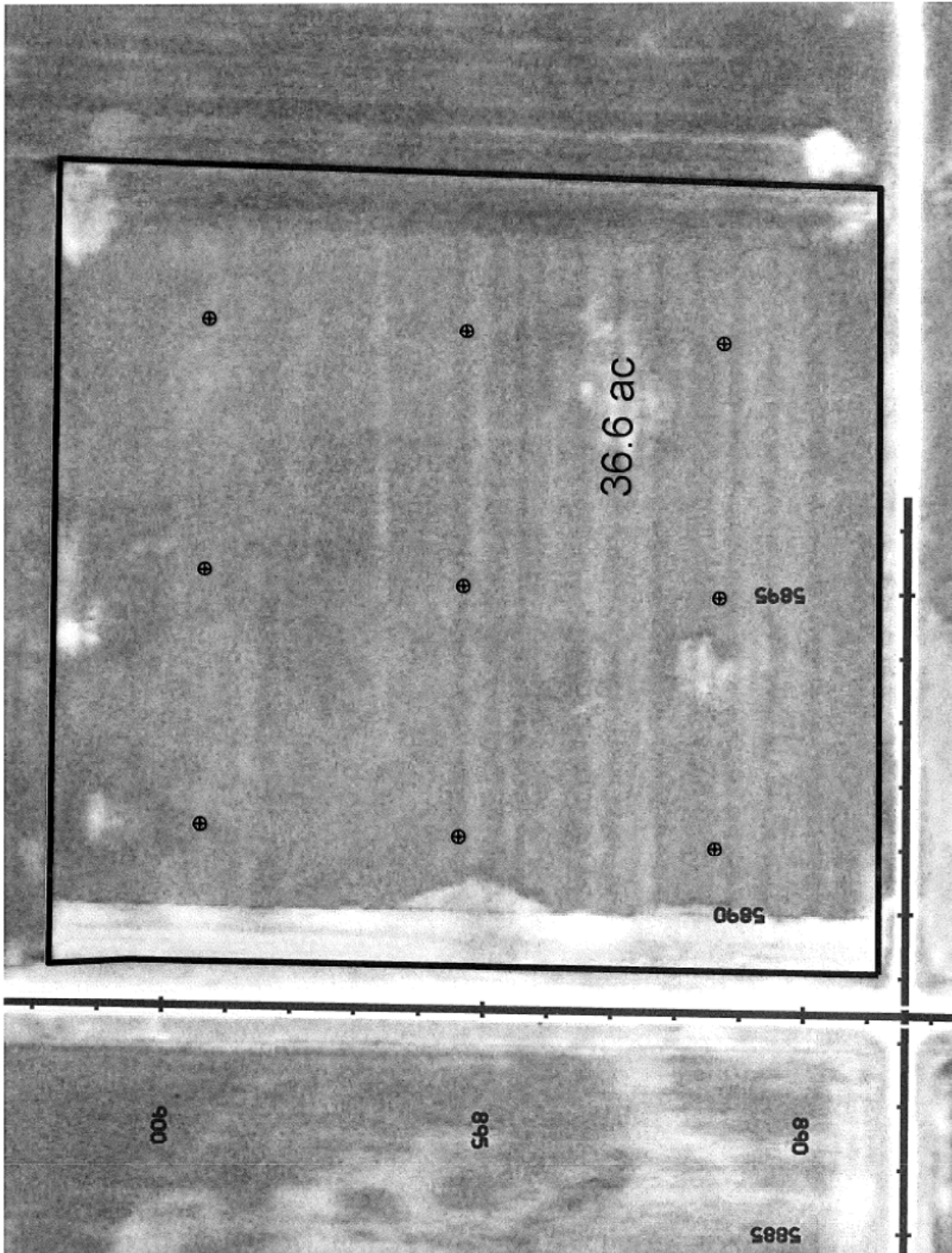
Office of Design, Soils Design _____ Date _____

Resident Construction Engineer _____ Date _____

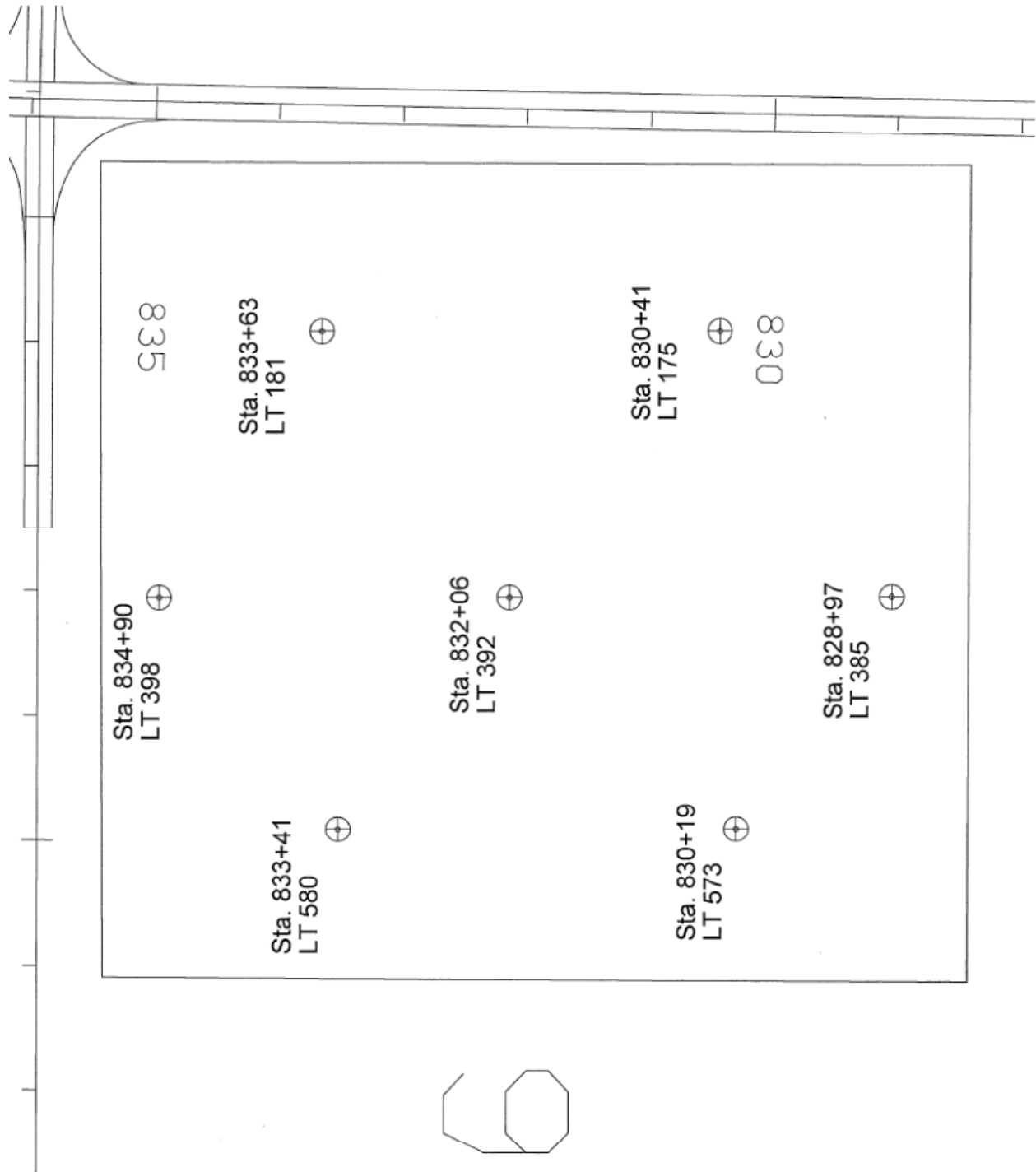
EXAMPLES: BORING LAYOUT, SAMPLING/BORING LOG, LABORATORY RESULTS, AND
PROPOSED CONCEPTUAL DESIGN AND PROFILES



Example of boring layout



Example of boring layout



Example of boring layout

Date 4/15/2011

Project # NHS-141-1(025)--3H-31 Borrow (Stockpile)

| Boring ID | GPS(x,y,z) | Sample or Referral | Depth | Layer | Description |
|-------------|----------------|--------------------|-------|-------|--------------------------|
| M-0022 | X: 4270090.23 | Sample | 0.5 | A | Dark Brown Silty Loam |
| Borrow 1 | Y: 3650678.897 | Sample | 15.4 | B | Gray to Brown Sandy Clay |
| Location 8 | Z: 900.5 | | | | |
| M-0023 | X: 4269290.588 | M-0022-A | 0.4 | A | Dark Brown Silty Loam |
| Borrow 1 | Y: 3650678.999 | Sample | 12.9 | B | Brown Sandy Clay |
| Location 9 | Z: 902.4 | | | | |
| M-0024 | X: 4269690.6 | Sample | 0.5 | A | Dark Brown Silty Loam |
| Borrow 1 | Y: 3650677.004 | M-0023-B | 14.8 | B | Brown Sandy Clay |
| Location 10 | Z: 901.3 | | | | |
| | | | | | |
| | | | | | |

Example of stockpile sampling log

Date 7/15/2000

Borrow

Project # NHS-065-12(003)—3H-68

| Boring ID | GPS(x,y,z) | Soil Moisture | Sample or Referral | Depth | Layer | Description |
|-----------|----------------|---------------|--------------------|-------|-------|---|
| R-0296 | X: 529277.001 | Moist | Sample | 1.5 | A | Black to Brown Silty Loam (Topsoil) |
| Borrow 1 | Y: 4550344.034 | Wet | Sample | 8.5 | B | Gray to Brown Sandy Glacial Clay |
| Hole 1 | Z: 1000.35 | Wet | Sample | 16.0 | C | Gray Medium Sand |
| | | Wet | Sample | 20.0 | D | Gray Sandy Glacial Clay |
| | | Wet | Sample | 33.0 | E | Dark Gray Glacial Clay with Occasional Sand Seams |
| Comment: | | | | 2.5 | Wet | 24 Hr H2O reading |
| | | | | | | |
| | | | | | | |
| R-0297 | X: 529680.061 | Moist | R-0296-A | 2.0 | A | Black to Brown Silty Loam (Topsoil) |
| Borrow 1 | Y: 4550344.002 | Wet | Sample | 4.5 | B | Gray to Brown Sandy Glacial Clay |
| Hole 2 | Z: 1001.40 | Wet | Sample | 11.0 | C | Brown to Gray Sand with binder |
| | | Wet | R-0296-C | 25.3 | D | Gray Medium Sand |
| | | Wet | R-0296-E | 35.4 | E | Dark Gray Glacial Clay with Occasional Sand Seams |
| Comment: | | | | 2.1 | Wet | 24 Hr H2O reading |
| | | | | | | |
| | | | | | | |
| R-0298 | X: 5230079.325 | Moist | Sample | 1.2 | A | Black Silty Loam (Topsoil) |
| Borrow 1 | Y: 4550345.005 | Moist | Sample | 3.5 | B | Brown Silty Clay Loam (Loess) |
| Hole 3 | Z: 1000.30 | Wet | R-0297-B | 12.0 | C | Gray to Brown Sandy Glacial Clay |
| | | Wet | Sample | 24.6 | D | Gray to Brown Medium Sand |
| | | Wet | Sample | 30.8 | E | Dark Gray Glacial Clay with Occasional Sand Seam |
| Comment: | | | | 3.5 | Wet | 12 Hr H2O reading |
| | | | | | | |
| | | | | | | |

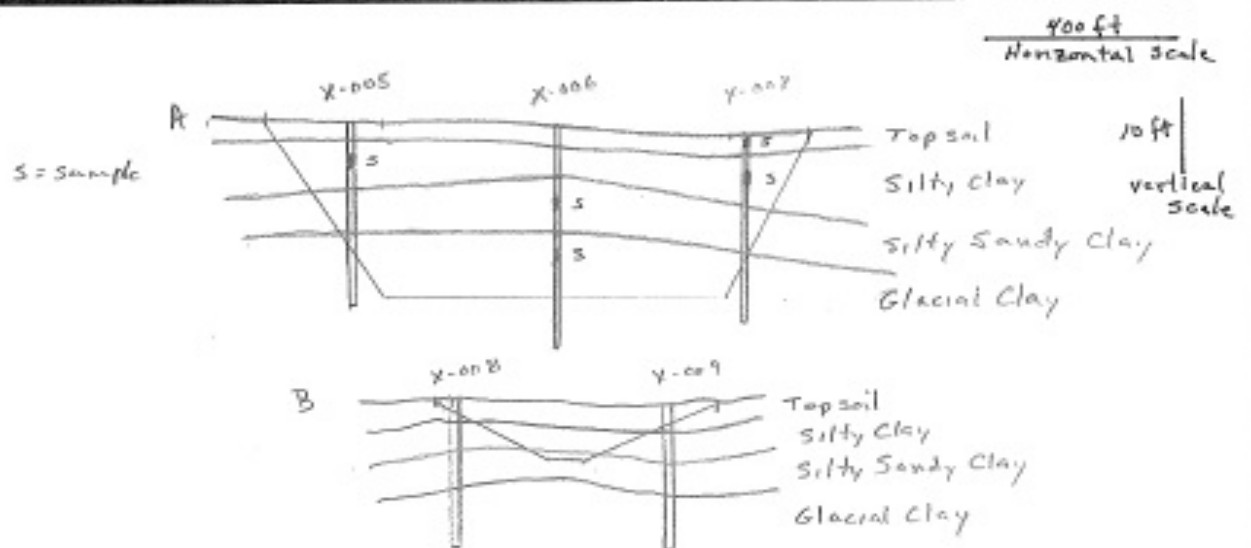
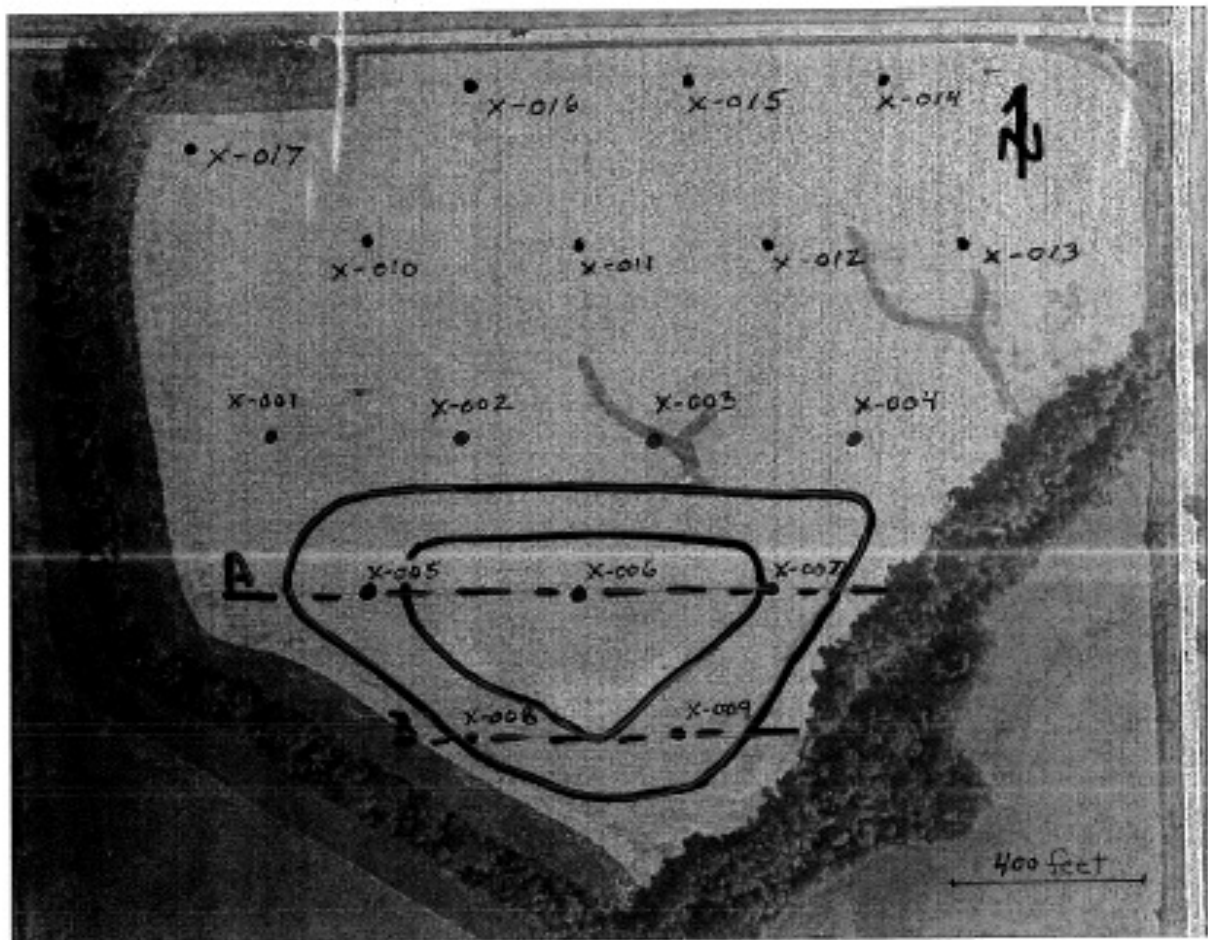
Example of boring log

| County- | | Project: | | Soil Survey 'English' Final | | Report (Both Group Indexes) | | 8/1/2013 | | Page- 1 of 8 | | | | | | | | | | | | | | | |
|----------|---------|-----------|---------|-----------------------------|---------|-----------------------------|---------|----------|---------|--------------|-------|---------------------------------|-----|-------|----------|--------------|------------|-----|-----|----|----|----|-----|-----|--|
| Location | | Road: | | Job: | | Road: | | Job: | | Page- 1 of 8 | | | | | | | | | | | | | | | |
| Station | Dist. | LAYER | Lab No. | Sender | Plastic | ***** | Proctor | CAR- | Texture | AASHTO | Color | ** Sieve Analysis(% Passing) ** | | | | | | | | | | | | | |
| | | | | No. | LL | PL | GR | SA | SI | CL | Den | M | BON | Class | | | | 3/4 | 3/8 | 4 | 10 | 40 | 100 | 200 | |
| Borrow 1 | Hole 1 | 0.0-1.5 | 10-460 | R0948A | 45 | 22 | 23 | 0 | 49 | 38 | 13 | 93 | 25 | 3.8 | LO | A (New)<Old> | Black | | | | | | | | |
| Borrow 1 | Hole 1 | 1.5-12.0 | 10-461 | R0948B | 40 | 15 | 25 | 1 | 21 | 50 | 28 | 112 | 16 | | LO | 7-6(18) <8> | Gr Br | 100 | 99 | 97 | 82 | 78 | 51 | | |
| Borrow 1 | Hole 1 | 12.0-35.0 | 10-462 | R0948C | 28 | 14 | 14 | 4 | 31 | 46 | 19 | 121 | 12 | | LO | 6(6) <8> | Dark Gr | 100 | 99 | 98 | 96 | 90 | 74 | 65 | |
| Borrow 1 | Hole 1 | 35.0-40.0 | 10-463 | R0948D | 29 | 14 | 15 | 0 | 31 | 47 | 19 | | | | LO | 6(8) <8> | Dark Olive | 100 | 99 | 98 | 96 | 78 | 69 | | |
| Borrow 1 | Hole 1 | 40.0-50.0 | 10-464 | R0948E | 27 | 13 | 14 | 1 | 35 | 47 | 17 | | | | LO | 6(6) <7> | Dark Gr | 100 | 99 | 99 | 95 | 75 | 64 | | |
| Borrow 1 | Hole 3 | 35.0-50.0 | 10-465 | R0950D | 27 | 15 | 12 | 1 | 33 | 49 | 17 | | | | LO | 6(5) <7> | Dark Gr | 100 | 99 | 99 | 95 | 76 | 66 | | |
| Borrow 1 | Hole 4 | 20.0-32.0 | 10-466 | R0951C | 35 | 15 | 20 | 1 | 25 | 56 | 18 | | | | SI LO | 6(13) <12> | Lt O Br | 100 | 99 | 99 | 95 | 82 | 74 | | |
| Borrow 1 | Hole 4 | 32.0-40.0 | 10-467 | R0951D | 27 | 16 | 11 | 0 | 27 | 55 | 18 | | | | SI LO | 6(6) <8> | Olive Br | 100 | 96 | 81 | 73 | | | | |
| Borrow 1 | Hole 5 | 0.0-1.0 | 10-468 | R0952A | 34 | 17 | 17 | 10 | 33 | 37 | 20 | | | | LO | 6(7) <7> | Olive Br | 98 | 93 | 91 | 90 | 84 | 68 | 57 | |
| Borrow 1 | Hole 5 | 1.0-20.0 | 10-469 | R0952B | 29 | 14 | 15 | 3 | 29 | 47 | 21 | | | | LO | 6(7) <9> | Lt O Br | 100 | 98 | 97 | 94 | 75 | 68 | | |
| Borrow 1 | Hole 5 | 20.0-50.0 | 10-470 | R0952C | 28 | 15 | 13 | 3 | 36 | 44 | 17 | | | | LO | 6(5) <6> | Olive Br | 100 | 99 | 97 | 90 | 72 | 61 | * | |
| Borrow 1 | Hole 6 | 0.5-3.0 | 10-471 | R0953B | 43 | 15 | 28 | 0 | 28 | 43 | 29 | 107 | 18 | 1.4 | CL LO | 7-6(18) <15> | V Dk Gr | 100 | 99 | 95 | 87 | 72 | | | |
| Borrow 1 | Hole 6 | 25.0-35.0 | 10-472 | R0953E | 32 | 15 | 17 | 2 | 36 | 42 | 20 | | | | LO | 6(8) <8> | Olive Br | 100 | 99 | 98 | 88 | 70 | 62 | * | |
| Borrow 1 | Hole 6 | 35.0-50.0 | 10-473 | R0953F | 27 | 14 | 13 | 22 | 31 | 33 | 14 | | | | G LO | 6(3) <3> | Dark Gr | 94 | 88 | 82 | 78 | 71 | 55 | 47 | |
| Borrow 1 | Hole 18 | 0.0-2.5 | 10-356 | A3874A | 31 | 20 | 11 | 1 | 42 | 41 | 16 | 110 | 16 | 2.2 | LO | 6(4) <5> | V Dk Gr | 100 | 99 | 99 | 99 | 88 | 63 | 57 | |
| Borrow 1 | Hole 18 | 2.5-10.0 | 10-357 | A3874B | 31 | 16 | 15 | 2 | 30 | 47 | 21 | 117 | 14 | | LO | 6(8) <8> | Lt O Br | 100 | 99 | 98 | 92 | 78 | 68 | | |
| Borrow 1 | Hole 18 | 10.0-15.0 | 10-358 | A3874C | 35 | 16 | 19 | 4 | 26 | 48 | 22 | 116 | 14 | | SI LO | 6(11) <11> | Olive Br | 100 | 98 | 97 | 96 | 92 | 79 | 70 | |
| Borrow 1 | Hole 18 | 15.0-21.0 | 10-359 | A3874D | 29 | 15 | 14 | 4 | 33 | 44 | 19 | 120 | 12 | | LO | 6(6) <7> | Olive Br | 100 | 98 | 96 | 92 | 75 | 63 | | |
| Borrow 1 | Hole 18 | 21.0-39.0 | 10-360 | A3874E | 29 | 15 | 14 | 3 | 35 | 44 | 19 | 121 | 12 | | LO | 6(6) <7> | Dark Gr | 100 | 99 | 97 | 94 | 75 | 62 | | |
| Borrow 1 | Hole 18 | 39.0-50.0 | 10-361 | A3874F | 22 | 13 | 9 | 1 | 44 | 41 | 14 | 124 | 11 | | LO | 4(2) <4> | Dk Gr Br | 100 | 99 | 99 | 99 | 94 | 65 | 55 | |
| Borrow 2 | Hole 7 | 0.0-2.0 | 10-491 | L0018A | 57 | 23 | 34 | 0 | 11 | 59 | 30 | 87 | 29 | 4.9 | SI CL LO | 7-6(33) <19> | Black | 100 | 98 | 96 | 89 | 78 | 68 | | |
| Borrow 2 | Hole 7 | 2.0-6.0 | 10-492 | L0018B | 50 | 11 | 39 | 1 | 26 | 40 | 33 | | | 0.8 | CL LO | 6(11) <18> | Black | 100 | 99 | 98 | 93 | 80 | 73 | * | |
| Borrow 2 | Hole 7 | 6.0-12.0 | 10-493 | L0018C | 28 | 17 | 11 | 2 | 35 | 46 | 17 | | | | LO | 6(4) <6> | Dk Gr Br | 100 | 99 | 98 | 93 | 74 | 63 | | |
| Borrow 2 | Hole 7 | 12.0-40.0 | 10-494 | L0018D | 29 | 15 | 14 | 5 | 32 | 44 | 19 | | | | LO | 6(6) <7> | Dk O Gr | 100 | 98 | 97 | 95 | 89 | 73 | 63 | |
| Borrow 2 | Hole 8 | 1.5-4.5 | 10-495 | L0019B | 28 | 14 | 14 | 4 | 52 | 27 | 17 | 117 | 13 | | SA LO | 6(2) <3> | Dk Gr Br | 100 | 98 | 97 | 96 | 87 | 58 | 44 | |
| Borrow 2 | Hole 8 | 4.5-21.0 | 10-496 | L0019C | 24 | 16 | 8 | 4 | 47 | 37 | 12 | | | | LO | 4(1) <3> | Dk Gr Br | 100 | 98 | 96 | 89 | 58 | 49 | | |
| Borrow 2 | Hole 9 | 6.0-24.0 | 10-497 | L0020C | 28 | 14 | 14 | 2 | 34 | 44 | 20 | | | | LO | 6(6) <7> | Olive Br | 100 | 99 | 98 | 93 | 75 | 64 | * | |
| Borrow 3 | Hole 3 | 0.0-1.5 | 10-498 | L0023A | 36 | 21 | 15 | 5 | 44 | 41 | 10 | 109 | 17 | 2.8 | LO | 6(5) <5> | V Dk Gr | 100 | 97 | 96 | 95 | 89 | 63 | 51 | |
| Borrow 3 | Hole 3 | 1.5-23.0 | 10-499 | L0023B | 25 | 19 | 6 | 9 | 32 | 49 | 10 | | | | SI LO | 4(1) <3> | Lt O Br | 100 | 97 | 93 | 91 | 87 | 71 | 59 | |
| Borrow 3 | Hole 3 | 23.0-26.0 | 10-500 | L0023C | 27 | 19 | 8 | 1 | 23 | 63 | 13 | | | | SI LO | 4(4) <8> | Dark Gr | 100 | 99 | 99 | 95 | 84 | 76 | | |
| Borrow 3 | Hole 3 | 26.0-50.0 | 10-501 | L0023D | 19 | 16 | 3 | 5 | 53 | 34 | 8 | | | | SA LO | 4(0) <1> | Dark Gr | 100 | 99 | 95 | 80 | 55 | 42 | | |
| Borrow 8 | Hole 1 | 0.0-1.5 | 10-569 | R0982A | 48 | 23 | 25 | 3 | 35 | 43 | 19 | | | 3.3 | LO | 7-6(14) <12> | V Dk Gr | 100 | 99 | 98 | 97 | 90 | 72 | 62 | |
| Borrow 8 | Hole 1 | 1.5-16.0 | 10-570 | R0982B | 29 | 14 | 15 | 7 | 33 | 41 | 19 | 121 | 12 | | LO | 6(6) <7> | Lt O Br | 100 | 96 | 94 | 93 | 85 | 70 | 60 | |
| Borrow 8 | Hole 1 | 16.0-19.0 | 10-571 | R0982C | 22 | 13 | 9 | 4 | 54 | 30 | 12 | 124 | 11 | | SA LO | 4(1) <3> | Lt O Br | 100 | 98 | 96 | 85 | 57 | 42 | * | |
| Borrow 8 | Hole 1 | 19.0-25.0 | 10-572 | R0982D | 26 | 13 | 13 | 4 | 42 | 37 | 17 | | | | LO | 6(4) <5> | Lt O Br | 100 | 98 | 96 | 87 | 65 | 54 | * | |
| Borrow 8 | Hole 1 | 25.0-28.0 | 10-573 | R0982E | 48 | 18 | 30 | 3 | 25 | 34 | 38 | | | | CL LO | 7-6(20) <17> | Dark Gr | 100 | 99 | 98 | 97 | 91 | 79 | 72 | |
| Borrow 8 | Hole 1 | 28.0-30.0 | 10-574 | R0982F | 21 | 12 | 9 | 5 | 52 | 31 | 12 | | | | SA LO | 4(1) <3> | Lt O Br | 100 | 99 | 97 | 95 | 85 | 59 | 43 | |
| Borrow 8 | Hole 1 | 30.0-35.0 | 10-575 | R0982G | 20 | 13 | 7 | 8 | 53 | 28 | 11 | | | | SA LO | 4(0) <1> | Dk Gr Br | 100 | 97 | 92 | 78 | 54 | 39 | | |
| Borrow 8 | Hole 1 | 35.0-50.0 | 10-576 | R0982H | 24 | 12 | 12 | 9 | 37 | 38 | 16 | | | | LO | 6(3) <5> | V Dk Gr Br | 100 | 99 | 96 | 91 | 83 | 65 | 54 | |
| Borrow 8 | Hole 3 | 0.0-3.0 | 10-577 | R0984A | 48 | 24 | 24 | 0 | 28 | 53 | 19 | | | 3.6 | SI LO | 7-6(17) <14> | Black | 100 | 99 | 95 | 79 | 72 | | | |
| Station | Dist. | Layer | Lab No. | S No. | LL | PL | PI | GR | SA | SI | CL | Den | M | CRB | Texture | A (New)<Old> | Color | 3/4 | 3/8 | 4 | 10 | 40 | 100 | 200 | |

Samples bracketed by asterisks (*) meet the 'Select' criteria except for a missing proctor

Samples bracketed by asterisks (*) meet the 'Select' criteria except for a missing proctor

Example of laboratory test results



Example of Plan and Profiles