

# Table of Contents

|  |          |
|--|----------|
| <b>Chapter 1 - Linear Soil Survey Analysis .....</b> | <b>1</b> |
| <b>1.1 Investigation .....</b>                       | <b>1</b> |
| <b>1.2 Laboratory Work.....</b>                      | <b>2</b> |
| <b>1.3 Report and Recommendations .....</b>          | <b>2</b> |
| <b>Chapter 2 - Borrow Investigations.....</b>        | <b>3</b> |
| <b>2.1 Investigation .....</b>                       | <b>3</b> |
| <b>2.2 Laboratory Work.....</b>                      | <b>4</b> |
| <b>2.3 Report and Recommendations .....</b>          | <b>4</b> |

## Chapter 1 - Linear Soil Survey Analysis

A Linear Soil Survey Analysis is conducted for roadways that are to be improved, reconstructed or realigned. The object of this analysis is to get a good representation of the soils, soil properties, groundwater conditions, and any other pertinent surface or subsurface information regarding the roadway embankment. The information shall be compiled and studied to generate a report to be used in the design and construction of the roadway. This study may lead to a more detailed and extensive study based on its findings.

### 1.1 Investigation

- Research the proposed project area.
- Conduct an onsite evaluation of the roadway with the lead man from the maintenance section and any other pertinent staff to identify any maintenance areas that may be a subgrade issue.
- Conduct an onsite review to determine any other possible geotechnical issues that need study.
- Conduct borings at the specified interval in Table 1 longitudinally along the roadway located within a 12' offset of the roadway centerline and also at any identified maintenance areas that appear to be possible subgrade problem areas. If the existing roadway is concrete with asphalt shoulders it is acceptable to conduct the borings in the asphalt shoulder.

**Table 1 - Boring Intervals**

| Project Scope          | Boring Interval               |                               |
|------------------------|-------------------------------|-------------------------------|
|                        | Urban                         | Rural                         |
| Preventive Maintenance | Identified Areas <sup>a</sup> | Identified Areas <sup>a</sup> |
| Minor Rehabilitation   | Identified Areas <sup>a</sup> | Identified Areas <sup>a</sup> |
| Structural Improvement | Identified Areas <sup>a</sup> | Identified Areas <sup>a</sup> |
| Major Rehabilitation   | 250 feet                      | 500 feet <sup>b</sup>         |
| Reconstruction         | 250 feet                      | 500 feet <sup>b</sup>         |
| New                    | 250 feet                      | 250 feet                      |

<sup>a</sup>These areas will be distress areas that are identified by the District Maintenance Forces, District Engineering Staff or the Geotechnical Engineer working on the project that appear to be possible subgrade problem areas.

<sup>b</sup>This interval may be modified to 1,000 feet if there is a sufficient amount of information available from recent studies or there is insufficient time to conduct the study.

- Borings shall be conducted with a solid stem auger to the depth specified in Table 2. These depths are based on depth below the proposed pavement.

**Table 2 - Boring Depths**

| Project Scope          | Boring Depth         |                      |
|------------------------|----------------------|----------------------|
|                        | Urban                | Rural                |
| Preventive Maintenance | 5 feet               | 5 feet               |
| Minor Rehabilitation   | 5 feet               | 5 feet               |
| Structural Improvement | 5 feet               | 5 feet               |
| Major Rehabilitation   | 5 feet               | 5 feet               |
| Reconstruction         | 5 feet               | 5 feet               |
| New                    | 10 feet <sup>1</sup> | 10 feet <sup>1</sup> |

<sup>1</sup>This depth is a minimum. A sufficient depth shall be chosen by the Geotechnical Engineer based on field conditions.

- Measure and record the depth of the existing surfacing layers and base layers to the nearest 0.25 inch.
- Collect samples for determination of field moisture contents at 1 foot intervals beginning 2 feet below the surface.
- Collect bag samples from each of the borings near the proposed subgrade depths. Multiple bag samples may be required if there is an extreme change in soils. Each bag sample shall be a minimum of 10 pounds.
- Observe the water levels or where water bearing soils are encountered.

## **1.2 Laboratory Work**

The following tests shall be run per boring or sample:

- Moisture Content (AASHTO T-265) – 1 per foot of boring
- Proctor Test (AASHTO T-99 or T-180) – 1 per bag sample
- Atterberg Limits (AASHTO T-89 & 90) – 1 per bag sample
- Particle Size Analysis (AASHTO T-88) – 1 per bag sample

## **1.3 Report and Recommendations**

Create a final report and recommendations with the following:

- Summary of Site Conditions
- Summary of drilling and laboratory testing methods
- Summary of findings (AASHTO Classifications)
- Recommendations
  - Subgrade Preparation (Length, Depth, Compaction Control)
  - Subcutting (Length, Depth, Backfilling)
  - Subgrade Drainage
  - Unsuitable Materials
  - Special Construction Methods or Directions
  - Any other observations and recommendations



- Collect bag samples from each of the borings. Multiple bag samples may be required if there is an extreme change in soils. Each bag sample shall be a minimum of 10 pounds.

## **2.2 Laboratory Work**

The following shall be run per boring:

- Moisture Content (AASHTO T-265) – 1 per foot of boring
- Proctor Test (AASHTO T-99 or T-180) – 1 per bag sample
- Atterberg Limits (AASHTO T-89 & 90) – 1 per bag sample
- Particle Size Analysis (AASHTO T-88) – 1 per bag sample

## **2.3 Report and Recommendations**

Create a final report and recommendations with the following:

- Legal description of the borrow area
- Boring locations
- Topographic features
- Summary of site conditions
- Summary of drilling and laboratory testing methods
- Summary of findings (AASHTO Classifications)
- Recommendations