

Project Specific Supplementary Quality Control Plan

Project: Preliminary Design for the Replacement and Rehabilitation of 12 Structures, New Liskeard Area
 GWP No.: 5267-11-00 Assignment No.: 5013-E-0018
 Location: Smith Creek Bridge, Site 39E-014 Highway No.: Highway 668
 Service Provider/Sub-Contractors : Terraprobe Inc.
 Specialty: Geotechnical (Structures & Embankments) Medium Complexity Date: September 16, 2016
 Soil and Rock Including Testing for Foundation Engineering Medium Complexity

| # | Phase/Task | Methodology | Deliverable | Reference Manuals | Independent Technical and Quality Control Review | | QC Review and Auditor Staff | Completion Date |
|--|---|----------------------------------|-------------|---|---|---|-----------------------------|-------------------------|
| | | | | | Procedure | Documentation | | |
| 1.0 REFERENCE DOCUMENT REVIEW | | | | | | | | |
| .1 | Project familiarization and reference document review | Same as in Generic Category Plan | | | Review start-up meeting notes, background information and any summary notes, and complete checklist | Initials on start-up meeting notes and summary notes | R. Abdul | June 15, 2015 |
| 2.0 FIELD INVESTIGATIONS AND LABORATORY TESTING | | | | | | | | |
| .1 | Site inspection | Same as in Generic Category Plan | | | Review summary notes and complete checklist | Initials on summary notes and checklist | R. Abdul | June. 19, 2015 |
| .2 | Health and Safety and Traffic Control | Same as in Generic Category Plan | | | Identify health and safety and traffic control concerns | Prepare appropriate Health and Safety and Traffic Control Plans | R. Abdul | Aug. 21, 2015 |
| .3 | Define field investigation programs. | Same as in Generic Category Plan | | | Review field instructions | Initials on field instruction sheet and checklist | R. Abdul | Aug. 21, 2015 |
| .4 | Field investigations | Same as in Generic Category Plan | | | Review field borehole logs | Initials on field borehole logs | R. Abdul | Sept. 07, 2015 |
| .5 | Laboratory testing | Same as in Generic Category Plan | | | Review laboratory test results | Initials on lab test results | J. Crowder | Oct. 16, 2015 |
| 3.0 EXTERNAL STAKEHOLDER CONSULTATION | | | | | | | | |
| .1 | Consultation with MTO, project team, etc. as applicable | Same as in Generic Category Plan | | | Review correspondence and complete checklist | Initials on checklist | R. Abdul | Throughout project life |
| 4.0 DRAFT FOUNDATION INVESTIGATION REPORT | | | | | | | | |
| .1 | Foundation Investigation Data | Same as in Generic Category Plan | | | Critical technical review | Checked and initialed calculation sheets, signatures on reports | R. Abdul | July 19, 2016 |
| <i>Milestone Quality Review No. 1</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | July 19, 2016 |
| 5.0 FINAL FOUNDATION INVESTIGATION REPORT | | | | | | | | |
| .1 | Foundation Investigation Data | Same as in Generic Category Plan | | | Critical technical review Complete checklist including items contained in Terms of Reference | Checked and initialed calculation sheets, signatures on reports | R. Abdul | Sept. 16, 2016 |
| <i>Milestone Quality Review No. 2</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | Sept. 16, 2016 |



Project Specific Supplementary Quality Control Plan

Project: Preliminary Design for the Replacement and Rehabilitation of 12 Structures, New Liskeard Area
GWP No.: 5267-11-00 **Assignment No.:** 5013-E-0018
Location: Smith Creek Bridge, Site 39E-014 **Highway No.:** Highway 668
Service Provider/Sub-Contractors : Terraprobe Inc.
Specialty: Geotechnical (Structures & Embankments) Medium Complexity **Date:** September 16, 2016
Soil and Rock Including Testing for Foundation Engineering Medium Complexity

| # | Phase/Task | Methodology | Deliverable | Reference Manuals | Independent Technical and Quality Control Review | | QC Review and Auditor Staff | Completion Date |
|--|--|---|-------------|---|--|---|-----------------------------|----------------------|
| | | | | | Procedure | Documentation | | |
| 6.0 FINAL DESIGNS | | | | | | | | |
| .1 | Design check | Same as in Generic Category Plan | | | Review foundation considerations | Initials on review / meeting notes | R. Abdul | N/A |
| .2 | Staging / Detours | Same as in Generic Category Plan | | | Review staging / detour requirements | Initials on review / meeting notes | R. Abdul | N/A |
| .3 | Constructability review | Same as in Generic Category Plan | | | Review constructability issues | Initials on review / meeting notes | R. Abdul | N/A |
| <i>Milestone Quality Review No. 3</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklist</i> | | | M. Tanos | N/A |
| 7.0 CONTRACT PACKAGE PREPARATION / REVIEW | | | | | | | | |
| .1 | Review of 60% Contract Drawings and Specifications | Same as in Generic Category Plan For "Contract Preparation" | | | Complete checklist | Signatures on memos, reports and drawings | R. Abdul | Not Applicable (N/A) |
| <i>Milestone Quality Review No. 3</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | N/A |
| .2 | Review of 90% Contract Drawings and Specifications | Same as in Generic Category Plan For "Contract Preparation" | | | Complete checklist | Signatures on reports and drawings | R. Abdul | N/A |
| <i>Milestone Quality Review No. 4</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | N/A |
| .3 | Review of Contract Drawings and Specifications Prior to Submission to Contract Tendering Section | Same as in Generic Category Plan For "Contract Preparation" | | | Complete checklist | Signatures on reports and drawings | R. Abdul | N/A |
| <i>Milestone Quality Review No. 5</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | N/A |
| .4 | Contract Foundation Investigation Reports | Same as in Generic Category Plan | | | Complete checklist | Signatures on reports and drawings | R. Abdul | N/A |
| <i>Milestone Quality Review No. 6</i> | | <i>Audit Memo/ Report</i> | | <i>Review Procedures/ Complete Checklists</i> | | | M. Tanos | N/A |

Project Specific Supplementary Quality Control Plan

Project: Preliminary Design for the Replacement and Rehabilitation of 12 Structures, New Liskeard Area
GWP No.: 5267-11-00
Location: Smith Creek Bridge, Site 39E-014
Service Provider/Sub-Contractors : Terraprobe Inc.
Specialty: Geotechnical (Structures & Embankments) Medium Complexity
Soil and Rock Including Testing for Foundation Engineering Medium Complexity

Assignment No.: 5013-E-0018
Highway No.: Highway 668
Date: September 16, 2016

**QUALITY CONTROL CHECKLIST
FOUNDATION ENGINEERING SERVICES**

**MTO NORTHEASTERN REGION
AGREEMENT NO. 5013-E-0018**

| No. | Item | Checked | Project-Specific Comments |
|-----|--|---------|---|
| 1 | Review of project documentation and available Foundation Reports. | √ | Reviewed available drawings and reports, as well as subsurface conditions in general vicinity of the site. |
| 2 | Site visit to inspect terrain and performance of existing structures and/or roads. | √ | Site visit performed by Mr. Satyajit Manani, C.E.T. |
| 3 | Location, number and depth of boreholes and any other subsurface investigations, and sample frequency. | √ | As per the RFP & Terms of Reference. Two boreholes were drilled – one at each abutment location. Boreholes were drilled to depths of 22.4 m and 22.6 m. Soil samples were obtained at 0.75 m and 1.5 m intervals and in-situ vane shear testing was performed in the silty clay deposits. |
| 4 | Determination of groundwater elevation in boreholes. | √ | Water level observed in open boreholes during drilling. A standpipe piezometer was installed in one select borehole to allow for on-going ground water monitoring. |
| 5 | Number of laboratory tests and type of laboratory tests. | √ | 20 moisture contents, 10 grain size distributions, 7 atterberg limits and 1 consolidation test were completed on selected samples out of a total of 37 recovered samples. |
| 6 | Abandonment of boreholes and site restoration. | √ | Boreholes backfilled in accordance with Ontario Regulation 903 (as amended). |
| 7 | Surveying of boreholes. | √ | Control Point HCP 104 established on site by MMM surveyors. Borehole locations and ground surface elevations referenced to HCP 104 by Terraprobe. |
| 8 | Submission of Foundation Investigation Report to MTO's Project Manager and to the MTO Foundations Section. | √ | |
| 9 | Report signed and sealed by two P.Eng.'s from Terraprobe, one of whom is the Designated MTO Foundations Contact. | √ | |
| 10 | Report in two sections: (Part A) Foundation Investigation Report, and (Part B) Foundation Design Report. | N/A | Foundation Design Report Not Required. |
| 11 | Foundation Investigation Report presents a subsurface model at the site. Report consists of factual information only. Includes sections on Site Description, Investigation Procedures, Description of Subsurface Conditions and Miscellaneous. | √ | |
| 12 | Presentation of borehole records to MTO format. | √ | |
| 13 | Presentation of Borehole Locations and Soil Strata drawings to MTO format. | √ | |
| 14 | Presentation of laboratory test result figures to MTO format. | √ | |
| 15 | Foundation Design Report presents discussion and recommendations for design with recommendations in accordance with CHBDC, pertaining to both temporary and permanent conditions of the project. | N/A | Foundation Design Report Not Required. |
| 16 | Appropriate range of alternatives considered. | N/A | Foundation Design Report Not Required. |



Project Specific Supplementary Quality Control Plan

Project: Preliminary Design for the Replacement and Rehabilitation of 12 Structures, New Liskeard Area
GWP No.: 5267-11-00 **Assignment No.:** 5013-E-0018
Location: Smith Creek Bridge, Site 39E-014 **Highway No.:** Highway 668
Service Provider/Sub-Contractors : Terraprobe Inc.
Specialty: Geotechnical (Structures & Embankments) Medium Complexity **Date:** September 16, 2016
Soil and Rock Including Testing for Foundation Engineering Medium Complexity

| No. | Item | Checked | Project-Specific Comments |
|-----|--|---------|--|
| 17 | Structure foundation design addressed including axial and lateral resistances for shallow/ deep foundations. | N/A | Foundation Design Report Not Required. |
| 18 | Embankment design addressed, including settlement and stability. | N/A | Foundation Design Report Not Required. |
| 19 | Earth/rock excavation requirements addressed. | N/A | Foundation Design Report Not Required. |
| 20 | Construction concerns addressed including any required specifications and special provisions for materials and specialized construction activities, and recommendations for methods of overcoming anticipated construction problems. | N/A | Foundation Design Report Not Required. |
| 21 | Recommended Additional Studies for Detail Design. | N/A | Foundation Design Report Not Required. |
| 22 | MTO and TPM comments addressed in final Foundation Investigation Report | √ | |

Interim Milestone Quality Review No. 2

Designated MTO Foundations Contact: _____

Michael Jensen

Foundations Project Manager: _____

Rehman Akmal

September 16, 2016

Date: _____

