Scope of Work and Deliverables - Metro District Lighting and Signal Pole Structural Inspections

Scope of Work and Deliverables Lighting and Signal Pole Structural Inspections
The lighting inspections will include a ground-level visual inspection of key structural components (foundations, anchorages, bases, connections, light poles, etc.). Traffic signal pole inspections will include an aerial and ground-level visual inspection of key structural components (foundations, anchorages, bases, pole, connections, etc.). Upper portions of each key structural component will be visually inspected by using an aerial truck to inspect the signal pole and all structural component connection points including welds. The inspection of the outer limits of the mast arm and luminaire shaft extension can be done by using binoculars.

1. Description of Inspection Required – Lighting

The inspection will include standard lighting units as shown in the lighting plans. The inspection will not include tower, tunnel, or underpass lighting units. Luminaries mounted on light poles will not be included in the inspection.

Exhibits showing the light poles to be inspected and inspection points are included in a PDF file attached to this document (A tabular spreadsheet of the light poles to be inspected is available upon request).

MnDOT lighting plans can be viewed at the following link http://www.dot.state.mn.us/metro/trafficeng/lighting_system_layouts.html.

The light pole list and the lighting plans can be used to help determine specific locations, quantities and assess traffic control & mobilization needs.

The inspection documentation will include digital color photos of deficiencies and documentation of GPS coordinates for each inspected lighting unit.

The inspection will not interfere with ongoing MnDOT construction projects. The inspector will avoid these area(s) until construction is complete or will coordinate access with the appropriate construction project engineer. A list of construction projects and construction contacts can be found at the MnDOT website link: http://www.dot.state.mn.us/

Inspection reports, elements, definitions, numbering, and repair priority ratings should conform to the most current version of FHWA Publication “Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaries and Traffic Signals” which can be found at the following website link under “Publications”: http://www.fhwa.dot.gov/bridge/signinspection.cfm Deviations from this rating system must be approved by MnDOT.

MnDOT Standard Plates referenced in the light pole exhibit can be found at: https://standardplates.dot.state.mn.us/StdPlate.aspx

Light pole inspection descriptions will be as listed below:

**Foundations** – (Element S.01) This element includes standard foundation(s) for stand-alone lighting units that are constructed of reinforced concrete or steel. This also includes all other lighting unit mounting types: barrier mounted, bridge railings, retaining wall mounted, etc. Inspectors will remove debris or soil from the top of the footing. Visually inspect for structural considerations such as: cracking, spalling, discoloration, efflorescence, corrosion, and evidence of displacement (twisting and vertical or lateral movement). The
inspector must also note items such as potential for debris or soil collection, adjacent erosion, foundation set
too low for wet/snow/ice conditions, etc.

**Anchor Rods/Bolts** – (Element S.02) This element will include anchor rods/bolts, anchor nuts, leveling nuts
and washers. Inspectors will remove any debris or soil to allow for an adequate inspection. Visually inspect
for missing fasteners, displacement/misalignment, nicks, gouges, cracks, pitting, corrosion and
bending/tilting. If heavy corrosion is present, note if section loss is visible. Check to ensure that nuts are fully
engaged and tight, anchor rods/bolts are not loose in the foundation and that there is adequate projection of
rod/bolt above the anchor nut. Look for evidence that the structure is moving on its base, there should be no
shifting of the washers from their imprints on the base plate.

**Base, Base Plates & Pole to Base Connections** – (Element S.03) This element will include the base, base
plates & pole to base connections. Visually inspect the base, base plate, and pole to base connections for
displacement/misalignment, missing rivets, nicks, gouges, dents, weld cracks, pitting, corrosion and
bending/tilting. If heavy corrosion is present, note if section loss or holes are visible. Look for oblong anchor
holes from wear. Washers should completely cover the hole. The inspector must also note items such as base
covers that are not intact and functioning properly.

**Light Poles** – (Element S.04) This element will include the light poles but will exclude the luminaries.
Visually inspect the light pole for vertical misalignment, nicks, gouges, dents, weld cracks, pitting and
corrosion. If heavy corrosion is present, note if section loss or holes are visible.

2. **Description of Equipment and Safety Requirements [Lighting]**

The Contractor will provide all equipment needed to perform the inspections. This may include, but is not limited to:

- Lockout/tagout set
- Folding ruler and/or pocket retractable tape
- 4-foot long level
- Small wire brush
- Chipping hammer
- Inspection mirror with extension and swivel head
- Pocket knife
- Clipboard
- Flashlight
- Digital color camera
- Small adjustable wrench
- Binoculars
- Shovel
- Broom
- Allen wrench set for door access
- GPS equipment

Note: The scope of work for this project includes a “ground level” inspection however other special
equipment may be needed to access lighting units mounted on retaining walls, etc. This may include:
ladder, snooper or bucket truck, or platform hydraulic lift.

If it is necessary for the successful responder to acquire equipment to perform the work required by this project,
reimbursement for the cost of the equipment will be done as follows:

- Items that will be totally consumed and of no value at the end of the project will be billed as a direct expense,
  with no profit or markup charged to the State.

Durable equipment, i.e. items that will retain utility and value at the completion of the project, will not be billed
as a direct expense but will be recovered through the successful responder’s overhead. The successful responder
will be responsible for the maintenance and upkeep of all equipment during the course of the project, and will be
responsible for replacement of equipment should it be stolen, vandalized or otherwise damaged. Durable
equipment will remain the property of the successful responder at the conclusion of this project.

The safety of the inspector(s) and adjacent traffic is of primary importance.

Contractor personnel will wear appropriate seasonal work clothes and safety gear and follow standard safety
practices.
Standard safety equipment will include: first aid kit, electrical safety equipment for working with energized circuits, work gloves, goggles or safety glasses with side shields, electrically rated composite toe boots with rubber or cork soles suitable for climbing side slopes and walking in ditches, high-visibility reflective vests for working near traffic and hard hats for working near the bucket truck. Clothing and boots should be kept free of oil and grease.

Personnel will have OSHA approved fall protection and bucket truck safety training. Electrical personnel will be responsible for OSHA approved lockout/tagout safety program.

All inspectors must be properly trained in the inspection process, applicable electrical and traffic safety procedures, and the use of all equipment.

Personnel will be trained on safety incident reporting procedures and forms.

The risk of injury and damage will be minimized by observing all applicable safety rules and practices.

Contractor will conduct weekly safety meetings and documentation.

As needed, the Contractor will provide traffic control per the latest edition of Minnesota’s “Temporary Traffic Control Zone Layouts” Field Manual, or “Lane Closure Manual” located at the following web site links:

http://www.dot.state.mn.us/trafficeng/publ/fieldmanual/index.html
http://www.dot.state.mn.us/metro/trafficeng/laneclosure/index.html

3. Inspection Report (with Maintenance recommendations), Digital Photos and GPS Coordinates [Lighting]

The Contractor will complete a MnDOT provided electronic tabular data table that includes GPS coordinates and condition rating for each element. The Contractor will provide proposed maintenance actions for each element that is inspected. The Contractor will complete a MnDOT provided electronic tabular data table and determine a condition rating for each existing element deficiency. Included with the condition rating, the Contractor will propose a maintenance action for each re-assessed element inspected previously. The Contractor will produce a report document for said data. The report document format must be accepted by MnDOT prior to commencement of field work.

The tabular inspection data should conform to the most current version of FHWA Publication “Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaries and Traffic Signals”. The tabular data table and reporting form will list pertinent inspection data: MnDOT lighting feed-point number, Trunk highway, pole number, pole location(ditch, barrier, bridge), direction of travel, mounting type, date, inspectors initials & inspector observations/comments (missing or nonfunctioning access doors will be noted.), etc.

The contractor will supply the electronic file(s) in the most current MnDOT versions of Microsoft Access, Word and/or Excel file format as applicable.

The condition of each element will be rated using the following system:

**Condition Rating: 0**
Description: Not applicable
Feasible Action: None

**Condition Rating: 1**
Description: Element performs intended function with high degree of reliability (Good).
Feasible Action: None

**Condition Rating: 2**
Description: Element performs intended function with small reduction in reliability (Fair).
Feasible Action(s): Do nothing, Repair, or increase inspection frequency (monitor).

**Condition Rating: 3**
Description: Element performs intended function with significant reduction in reliability (Poor).
Feasible Action(s): Repair or replace within specified time frame.

**Condition Rating: 4**
Description: Element does not perform intended function with any degree of reliability (Critical).
Feasible Action(s): Immediate repair or replacement.

At a minimum, digital color photos will be provided for items with recommendations to repair, replace or increase the inspection frequency. Other photos will be provided at the discretion of the inspector (for items such as: minor rust, adjacent erosion, high water or ice dams, etc.). Digital color photos will be labeled with the MnDOT lighting feed-point and pole numbers and date. (for cross referencing and electronic filing purposes) Electronic files will be labeled in such a way to allow MnDOT to cross reference the proper feed-point and pole number quickly and efficiently.

The Contractor will collect location coordinates for each lighting or signal pole inspected using a GPS receiver capable of sub-meter accuracy. The collected coordinates should be accurate to less than one meter. Coordinates will be measured from the street side of the lighting unit or under the mast arm side of the signal pole. If it is physically impossible or a more suitable location to measure the coordinates is identified elsewhere on the lighting unit, the non-standard location must be identified in the report.

All locations will be differentially corrected 2D points using a minimum of 5 satellites.

The geographic (x & y) coordinates will be collected in the 1996 adjustment to the UTM15N North American Datum (NAD 1983).

GPS data must be to sub meter accuracy and will have no more than 10% error in attribute accuracy. Data that is not sub meter accuracy may be rejected and the contractor would be responsible to repeat the data collection.

4. **Description of Inspection Required [Signal Poles]**
The inspection will include Non-mast arm, Truss mast arm, Mono-Lever mast arm, and Tubular Signal Bridge styles of traffic signal poles as shown in the signal plans. The inspection will **not** include pedestals or push button stations.

Exhibits showing the traffic signal poles to be inspected, inspection points and mast arm hinge plates are included in a PDF file attached to this document (a tabular spreadsheet of the signal poles to be inspected is available upon request).

MnDOT signal plans can be viewed at the following link:

The list of signal poles and the signal plans can be used to help determine specific locations, quantities and assess traffic control & mobilization needs.

The inspection documentation will include digital color photos of deficiencies and documentation of GPS coordinates for each traffic signal pole unit.

The inspection will not interfere with ongoing MnDOT construction projects. The inspector will avoid these area(s) until construction is complete or will coordinate access with the appropriate construction project engineer. A list of construction projects and construction contacts can be found at the MnDOT website link: http://www.dot.state.mn.us/inspection-projects.

Inspection reports, elements, definitions, numbering, and repair priority ratings should conform to the most current
version of FHWA Publication “Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires and Traffic Signals” which can be found at the following website link under “Publications”: [http://www.fhwa.dot.gov/bridge/signinspection.cfm](http://www.fhwa.dot.gov/bridge/signinspection.cfm) Deviations from this system must be approved by MnDOT.

MnDOT Standard Plates referenced in the signal pole exhibit can be found at: [https://standardplates.dot.state.mn.us/StdPlate.aspx](https://standardplates.dot.state.mn.us/StdPlate.aspx)

Signal pole inspection descriptions will be as listed below:

**Foundations** – (Element S.01) This element includes standard foundation(s) for stand-alone, and wall or bridge mounted traffic signal pole units. Inspectors will remove debris or soil from the top of the foundation. Visually inspect for structural considerations such as: cracking, spalling, discoloration, efflorescence, corrosion, and evidence of displacement (twisting, vertical or lateral movement). The inspector must also note items such as presence of grout, potential for debris or soil collection, adjacent erosion, foundation set too low for wet/snow/ice conditions, etc.

**Anchor Rods/Bolts** – (Element S.02) This element will include anchor rods/bolts, anchor nuts, leveling nuts and washers. Inspectors will remove any debris or soil to allow for an adequate inspection. Visually inspect for missing fasteners, displacement/misalignment, nicks, gouges, cracks, pitting, corrosion and bending/tilting. If heavy corrosion is present, note if section loss is visible. Check to ensure that nuts are fully engaged and tight, anchor rods/bolts are not loose and that there is adequate projection of rod/bolt above the nut. Look for evidence that the structure is moving on its base, there should be no shifting of the washers from their imprints on the base plate.

**Transformer Base, Top and Bottom Base Plates & Pole to Base Connections** – (Element S.03) This element will include the transformer base; top and bottom base plates & pole to base connections. Visually inspect all welds for cracks, displacement/misalignment, nicks, gouges, dents, member cracks, pitting, corrosion and bending/tilting. If heavy corrosion is present, note if section loss or holes are visible. Look for oblong anchor holes from wear. Washers should completely cover the hole. The inspector must also note items such as base covers that are not intact and functioning properly, terminal blocks that are badly rusted, etc.

**Traffic Signal Poles** – (Element S.04) This element will include the traffic signal poles. Visually inspect all welds for cracks, vertical misalignment, nicks, gouges, dents, member cracks, pitting and corrosion. If heavy corrosion is present, note if section loss or holes are visible.

**Mast Arm Connection and Swing-Away Hinges** – (Element S.05) This element will include the mast arm connection brackets and upper/lower swing away hinges. Visually inspect all welds for cracks, missing or loose bolts, displacement, misalignment, bending, member cracks, pitting, and corrosion.

**Mast Arm** – (Element S.06) The remainder of the mast arm will be viewed with binoculars and the inspector will note any obvious weld cracks, dents, member cracks, pitting, corrosion, etc.

**Luminaire Shaft Extension** – (Element S.13) This element will include the luminaire extension base. Visually inspect connection point for weld cracks, missing or loose bolts, and oblong holes from wear, pitting, and corrosion. The remainder of the shaft extension will be viewed with binoculars and the inspector will note any obvious dents, cracks, pitting, etc.

5. **Description of Equipment and Safety Requirements [Signal Poles]**

The Contractor will provide all equipment needed to perform the inspections. This may include, but is not limited to:

- 30Ft Bucket truck
- Retractable tape
- 4-foot long level
- Small wire brush
- Chipping hammer
- Inspection mirror with extension and swivel head
- Digital Camera
- Pocket knife
- Flashlight
- Shovel
- Adjustable wrench
- Clipboard
Binoculars    Allen wrench set for door access
Broom      Electrical hot gloves (worn during removal of energized wires)
Electrical insulating safety blanket (for covering over energized wires during inspection)
Digital color camera with flexible end for access inside the signal base
GPS equipment

If it is necessary for the successful responder to acquire equipment to perform the work required by this project, reimbursement for the cost of the equipment will be done as follows:

Items that will be totally consumed and of no value at the end of the project will be billed as a direct expense, with no profit or markup charged to the State.

Durable equipment, i.e. items that will retain utility and value at the completion of the project, will not be billed as a direct expense but will be recovered through the successful responder’s overhead. The successful responder will be responsible for the maintenance and upkeep of all equipment during the course of the project, and will be responsible for replacement of equipment should it be stolen, vandalized or otherwise damaged. Durable equipment will remain the property of the successful responder at the conclusion of this project.

The safety of the inspector(s) and adjacent traffic is of primary importance.

Contractor personnel will wear appropriate seasonal work clothes and safety gear and follow standard safety practices.

Standard safety equipment will include: First aid kit, electrical safety equipment for working with energized circuits, work gloves, goggles or safety glasses with side shields, electrically rated composite toe boots with rubber or cork soles suitable for climbing side slopes and walking in ditches, high-visibility reflective vests for working near traffic and hard hats for working near the bucket truck. Clothing and boots should be kept free of oil and grease.

Personnel will have OSHA approved fall protection and bucket truck safety training.

Electrical personnel will be responsible for OSHA approved lockout/tagout safety program.

All inspectors must be properly trained in the inspection process, applicable electrical and traffic safety procedures, and the use of all equipment.

Personnel will be trained on safety incident reporting procedures and forms.

The risk of injury and damage will be minimized by observing all applicable safety rules and practices. Contractor will conduct weekly safety meetings and documentation.

As needed, the Contractor will provide traffic control per the latest edition of Minnesota’s “Temporary Traffic Control Zone Layouts” Field Manual, or “Lane Closure Manual” located at the following web site links:

http://www.dot.state.mn.us/trafficeng/publ/fieldmanual/index.html
http://www.dot.state.mn.us/metro/trafficeng/laneclosure/index.html

6. Inspection Report (with Maintenance Recommendations) and Digital Photos [Signal Poles]
The Contractor will complete a MnDOT provided electronic tabular data table that includes GPS coordinates and condition rating for each element. The Contractor will provide proposed maintenance actions for each element that is inspected. The Contractor will complete a MnDOT provided electronic tabular data table and determine a condition rating for each existing element deficiency. Included with the condition rating, the Contractor will propose a maintenance action for each re-assessed element inspected previously. The Contractor will produce a report document for said data. The report document format must be accepted by MnDOT prior to commencement of field work.
The tabular inspection data should conform to the most current version of FHWA Publication “Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaries and Traffic Signals”. The tabular data table and reporting form will list pertinent inspection data: MnDOT system ID number, Trunk highway, Cross-street name, pole number, date, Inspector initials & inspector observations/comments (Example: missing or nonfunctioning access doors, etc.)

The Contractor will provide an electronic version of a blank template and completed tabular data table(s)/report. The contractor will supply the electronic file(s) in the most current MnDOT versions of Microsoft Access, Word and/or Excel file format as applicable.

The condition of each element will be rated using the following system:

**Condition Rating: 0**
Description: Not applicable
Feasible Action: None

**Condition Rating: 1**
Description: Element performs intended function with high degree of reliability (Good).
Feasible Action: None

**Condition Rating: 2**
Description: Element performs intended function with small reduction in reliability (Fair).
Feasible Action(s): Do nothing, Repair, or increase inspection frequency (monitor).

**Condition Rating: 3**
Description: Element performs intended function with significant reduction in reliability (Poor).
Feasible Action(s): Repair or replace within specified time frame.

**Condition Rating: 4**
Description: Element does not perform intended function with any degree of reliability (Critical).
Feasible Action(s): Immediate repair or replacement.

At a minimum, digital color photos will be provided for items with recommendations to repair, replace or increase the inspection frequency. Other photos will be provided at the discretion of the inspector (for items such as: minor rust, adjacent erosion, high water or ice dams, etc.). Digital color photos will be labeled with the, MnDOT signal system ID, trunk highway, cross-street, pole number and date. (for cross referencing and electronic filing purposes) Electronic files will be labeled in such a way to allow MnDOT to cross reference the proper, signal system ID, trunk highway, cross street and pole number quickly and efficiently.

The Contractor will collect location coordinates for each lighting or signal pole inspected using a GPS receiver capable of sub-meter accuracy. The collected coordinates should be accurate to less than one meter. Coordinates will be measured from the street side of the lighting unit or under the mast arm side of the signal pole. If it is physically impossible or a more suitable location to measure the coordinates is identified elsewhere on the lighting unit, the non-standard location must be identified in the report.

All locations will be differentially corrected 2D points using a minimum of 5 satellites.

The geographic (x & y) coordinates will be collected in the 1996 adjustment to the UTM15N North American Datum (NAD 1983).

GPS data must be to sub meter accuracy and will have no more than 10% error in attribute accuracy. Data that is not sub meter accuracy may be rejected and the contractor would be responsible to repeat the data collection.
7. Company and Key Personnel Requirements
The contractor will provide qualified personnel to staff each inspection crew in order to accomplish the work associated with this project. The contractor will dedicate the appropriate number of crews to ensure that target dates are met. The contractor is also responsible to provide mobilization and traffic control as required for each inspection crew.

The Contractor’s project manager must be currently registered in the State of Minnesota as a licensed professional engineer with a minimum of 2 years experience in steel and aluminum structural design and analysis at the professional engineer level.

Each inspection crew will consist of at least two members:
- One inspector per crew must have a minimum of 2 years of structural inspection experience and be a Certified Welding Inspector (CWI) with a minimum 5 years structural fabrication experience.
- One inspector per crew must be a licensed electrician with the State of Minnesota that will be responsible for compliance with the National Electric Code (NEC). The electrician must have passed the MnDOT “Signal and Lighting Certification” training and have electrical construction or maintenance experience with lighting and traffic signal systems within the last 5 years.

The Contractor will have at least 2 years of structural inspection experience with aluminum and steel structures. Each crew will be properly trained and shall carry an instruction booklet containing at a minimum: Emergency contact procedures, MnDOT personnel contact information, Traffic control field manual, Schematic of inspection points, plan sheets and any other pertinent inspection information.

Each crew will provide instruction booklet, licenses and certifications on site upon request of MnDOT representatives.

The contractor will allot time for a ½ day training session to familiarize the inspection crew(s) with the contract inspection, data collection, documentation and electrical safety requirements.

The Contractor will report daily to MnDOT inspection representatives as to the location of inspections for that day. The Contractor will present to MnDOT’s inspection representatives a weekly progress report.

8. Standards and Specifications
For informational purposes, MnDOT Specification 2471.3 in the MnDOT Standard Specifications for Construction describes MnDOT’s fabrication requirements for structural metal.

9. Schedule
The Contractor will provide a detailed project schedule that demonstrates how the project will meet or exceed the following milestones:

- An electronic test transfer of the Contractor’s tabular inspection data to MnDOT’s Traffic data manager will be completed & approved prior to the start of inspections.
- Inspections must be completed for every traffic signal pole at a signalized intersection prior to submittal for payment.
- Inspections must be completed for all light poles within a lighting system ID prior to submittal for payment.

All contract work will be completed no later than June 30, 2017. Contract may be extended for additional work as determined by State if funding becomes available for Fiscal Year 2018.

10. Bid Items, Progress Meetings, Review and Payment
The Contractor will bid cost/plus for regular progress meetings.

The Contractor will bid a unit price (light pole or traffic signal pole units each) for work as a new inspection. The work will include all costs to provide: traffic control, mobilization, inspection personnel & equipment, GPS coordinates, digital photos, completed tabular data and inspection reports (which include maintenance recommendations). This unit price will be used to determine payment based on the final number of completed inspections.

The Contractor will bid separate unit prices for inspection of light poles and traffic signal poles. The work will include
all costs to provide: traffic control, mobilization, inspection personnel & equipment, digital photos, completed tabular data and inspection reports (which include a new maintenance recommendation). The signal and light pole unit prices will be used to determine payment based on the final number of completed inspections.

The Contractor project manager will set up and attend progress meetings with MnDOT on a monthly basis to review the proposed work schedule, make decisions on field problems or work issues, discuss maintenance recommendations and for MnDOT to accept completed work for the purpose of authorizing payment. No payment will be made for the inspection portion of the contract until the deliverables have been reviewed and accepted for that time period.

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