

Operations and Maintenance Plan

Amendment for Rear Maintenance Access Road to Transmission Corridor

**140R Main Street Solar Array
Newbury, Massachusetts**

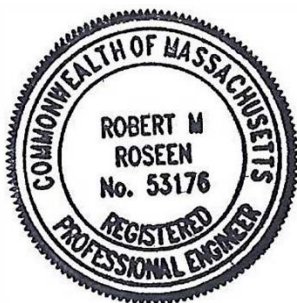
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OPERATION AND MAINTENANCE PLAN

This Plan is for a limited access maintenance gravel roadway for periodic (annual) access to the point of interconnection with the NGRID transmission corridor pursuant to 310 CMR 10.53(3)(d) & (e). This plan covers the rear maintenance access road and infrastructure elements only, and does not include any of the solar facilities or stormwater management elements approved prior. This plan is an amendment to the existing solar facilities Operations and Maintenance Plan. The contract responsibilities in the operation and maintenance of the solar photovoltaic system will be finalized by the system owner, Standard Solar.

1. Site Description

This plan covers the rear maintenance access road and wetland bridge crossing to provide access to the solar facility interconnection with the NGRID transmission corridor. The gravel road length is 1,175 ft by 12 ft wide with 20 ft bumpouts for passing located approximately every 300 ft.

This rear maintenance road is for an existing 2.795 megawatt (mW) ground mounted solar facility completed in 2021 at 136/140R North Main Street in Newbury, Essex County, Massachusetts, MADEP Amended Final Order of Conditions # 050-1163. The completed project was approved by the Town of Newbury by Special Permit on May 16, 2018. This plan alters none of the conditions of the Special Permit with the exception of the additional access road in the rear of the facility.

The road lies within an access easement included in a Conservation Restriction amendment has been drafted and approved by the Greenbelt Essex County Land Trust, the grantee and executor of the trust. The amendment includes the addition of a 0.976-acre easement for the maintenance access road.

The following plan outlines the typical Operation and Maintenance services to be included in the O&M contract for the project.

2. Erosion Control

The site shall be inspected for evidence of erosion and rilling on any slopes. If slopes are degraded, they can reduce water quality and/or divert water to unintended areas. Areas will be reseeded, revegetated, and stabilized with stone as necessary to achieve vegetative stabilization, stable slopes, and erosion prevention.

The maintenance of the vegetation on site shall be per the recommendation outlined in the Revegetation Plans Sheet C-3.1 and 3.2.

3. Vegetation Management and Emergency Access

Growth of trees or other vegetation along roadways shall be maintained in a manner to provide clear access and prevent damage for emergency vehicles as per conditions of approval and MA Fire Code 527 CMR 18.2.3.4.1.1 with no less than 3' encroachment to travel path. That includes limbing of trees and removal of vegetation to a width of 18 ft, 3 ft on either side of the 12 ft access road, to a height of 13'6". In actuality, the road will be cleared initially to 28 ft width.

Fertilizer and pesticides use is prohibited within the solar array and access roads.

4. Gravel Access Roads

Gravel roads should be stable enough that very little sediment is released during weather events. Maintenance will be required as needed to avoid erosion to the roadway or roadbed. Inspections of the roadway will check for rill erosion in the road or along the shoulders, and areas of poor drainage resulting from subgrade settlement or poor compaction.

4.1.Maintenance:

Inspect roadways a minimum of once per year. Maintenance is required when:

- Erosion of the roadway or shoulders is identified
- Clean out roadside ditches when they become clogged with sediments or debris, to prevent ponding, bank overflows, and road washouts
- Fill in areas of erosion or settlement with clean washed stone. If erosion is along shoulder, ensure shoulder is properly revegetated

5. Winter Maintenance and De-Icing Restrictions

5.1.Winter Road Maintenance

Winter road maintenance is limited to plowing the gravel road to provide maintenance personnel and fire department access. Plowing and snow removal will occur when snow accumulation is in excess of 8 inches, as per condition of approval.

Snow stockpiling will be limited to the edge of the road, bumpouts, and at the end of the road.

No de-icing chemicals will be used on the road or on the bridge.

5.2. Winter Bridge Maintenance

Snow removal from the bridge deck is best accomplished by plowing or shoveling snow from the bridge deck. Non-corrosive traction aids such as sand may be used on the deck surfaces.

No de-icing chemicals will be used on the road or on the bridge. The use of de-icing salts should be avoided on weathering steel bridges as it accelerates corrosion and shortens the bridge and abutment lifespan. If corrosive de-icing agents are used on the structure; accelerated corrosion of members which are exposed to the agent will take place, voiding the bridge warranty and necessitating repair or replacement of affected members.

6. Gates and Keybox

Gates and signage shall be inspected annually and maintained as necessary for proper working order. This includes the 20' bar gate and no trespassing sign at the rear of the facility located in the vicinity of the transmission corridor as noted on the plans. This includes placement of boulders as needed to prevent vehicular access around barrier gate.

The bar gate at the rear of the facility is to remain locked except for maintenance activities. A keybox shall be fixed to the gate for the secure storage of keys needed for emergency access of the Newbury Fire Department, as per approval conditions.

7. Bridge

This maintenance utility bridge is a 150' x 12'8" truss connection by Continental Bridge, designed and supplied by Contech Engineered Solutions. The bridge is composed of weathering steel. Bridge design loads are in accordance with AASHTO including a uniform pedestrian live load of 90 PSF, vehicle live load H20 truck equivalent to 40,000 LBS.

Maintenance and inspection recommendations are as per the manufacturer's guidance titled *Recommendations for the Inspection and Maintenance of CONTINENTAL® Pedestrian Truss Steel Structures STEADFAST® Vehicular Truss Steel Structures EXPRESS® Continental Pedestrian Truss Steel Structures BIG R BRIDGE® Rolled Girder Steel Structures*.

The purpose of this set of recommendations is to suggest some minimum guidelines for inspection and maintenance of CONTINENTAL pedestrian truss structures in order to maintain the overall structural integrity and user safety throughout the Design Life of the structure. When the AASHTO Specifications are followed, the Design Life is defined as the "Period of time on which the statistical derivation of transient loads is based, which is 75-years."

7.1. Inspection for User Safety

- 1) Each bridge should be inspected once per year to ensure that all items of user safety are accounted for and performing properly. Those areas of special concern should be as follows:
 - a) All safety rails, handrails, rub rails, guard rails, fencing, or other types of safety features should be in place with complete structural integrity and capacity. There shall be no sharp edges or protrusions on any feature that could produce bodily or vehicular harm or be a hazard to the user.
 - b) All deck surfaces should be without gaps, cracks or projections that could create a trip hazard, impede vehicular traffic, or interfere with the user in any way. Special consideration should be given to any smooth deck surface that could also create a possible slip hazard. Contech Engineered Solutions LLC recommends some form of broom finish or grooved finish for concrete decks, or other means of providing a non- skid surface.

7.2. Structural Integrity

- 1) Each bridge should be inspected at regular intervals (once a year is recommended, but at least every other year).
- 2) The inspection should include, but not be limited to, the following:
 - a) Check the decking to ensure it is in satisfactory condition. Pay special attention to decks at their contact surfaces where they bear on steel support members.
 - b) All steel surfaces should be inspected to ensure that they are performing satisfactorily. Check for any corrosion on steel bridges, paying special attention to the following areas:
 - i) All steel below the deck, particularly the tops of girders, stringers, and floor beams supporting the deck.
 - ii) Steel structural system joints where debris or water may accumulate.
 - iii) Scupper, curb, floor drains, and other drainage systems
 - iv) Anywhere vegetation or other material may have come in contact with the steel.
 - v) Check all steel surfaces and welded and bolted connections for cracks. Pay special attention to the welded connections subject to fatigue stresses.
 - vi) Check the ends of the bridge for any damage which may have been caused by vehicular impact.

- vii) Check the integrity of concrete abutments and/or piers per AASHTO's Manual for Maintenance Inspection or the foundation engineer's recommendations. Pay special attention to scour due to water flow, if applicable.
- viii) Check anchor bolts for damage and see that they are secure. Examine all bearings to ascertain that they are functioning properly. Expansion bearings and the expansion joints at the ends of the bridge must be checked to see that they can move freely and are clear of all foreign material.
- ix) Check the bolted splices for any excessive corrosion or cracking of the steel or fasteners.
- x) Make sure all weep holes are open and clear of debris to allow for complete drainage of any moisture which may collect on the interior of HSS members (see project-specific engineering drawings for location of weep holes).
- xi) For weathering steel bridges, pay special attention to the following:
 - (1) Assurance that the patina surface of the weathering steel has formed properly and is hard and intact. The protective patina is to be considered achieved when the color is dark and uniform (chocolate brown to purple brown) and it is capable of withstanding hammering or vigorous wire brushing. Some dusty and granular deposits are to be expected during the early stages of the development of the patina. It will typically take anywhere from 2 to 5 years for the patina to develop. Patina development only occurs after several wet-dry cycles.
 - (2) The following is an indication that the patina may be in distress:
 - (a) Small flakes $\frac{1}{4}$ " in diameter indicate the initial development of a nonprotective oxide.
 - (b) Large flakes ($\frac{1}{2}$ " in diameter or greater) indicate that the steel has lost its nonprotective oxide.
 - (c) Laminar sheets or modules indicates the total loss of the nonprotective oxide, and that severe corrosion is occurring.
 - (d) Any weathering steel surface not "boldly exposed" to the atmosphere should be checked to ensure it has formed its protective oxide layer.
- 3) If problems are seen during the inspection procedure, cleaning and repair or replacement of steel bridge components may be necessary. Remedial recommendations by the individual performing the inspection, in consultation with the project foundation engineer and/or Contech Engineered Solutions LLC should be performed.

7.3.General Maintenance

Inspection and Maintenance Records must be submitted to Contech Engineered Solutions LLC with any warranty issue or claim.

Soil Clearance

- 1) Soil or dirt must not be left in contact with any steel surfaces. Adequate clearance for ventilation must be maintained between the ground and the steel. Weathering steel surfaces need to allow drying to occur after wetting, to provide for the formation of its protective patina.
- 2) If the initial construction of abutments and back slopes did not allow for adequate ventilation (approximately 18"-24"), enough soil, debris, and/or vegetation should be removed and kept cut back to allow for adequate airflow. If this is not possible, a coating designed for "ground contact" protection of steel may be applied to the members in the affected area.

Snow Removal

- 1) Because of possible accumulation of chlorides at truss joints, in the gaps between planks on structures with timber decks, on below deck members, and/or along the edges of decks where runoff occurs, the use of de-icing salts should be avoided on these structures, especially on weathering steel bridges (see Item A in the "Maintenance for Weathering Bridges" section of this document).
- 2) The best and safest way to remove snow from these bridges, as far as the issue of steel corrosion is concerned, is by shoveling or plowing snow from the bridge deck. Non-corrosive traction aids such as sand may be used on the deck surfaces; however, if corrosive de-icing agents are used on the structure; accelerated corrosion of members which are exposed to the agent will take place, voiding the bridge warranty and necessitating repair or replacement of affected members.

7.4.Maintenance for Weathering Bridges

Weathering steel is not a maintenance-free material. The following steps should help increase the life span of your bridge:

- 1) Do not use de-icing salts for snow removal. De-icing salts can severely damage the weathering steel.
- 2) Avoid retention of debris on the steel surfaces. Flush bridges at areas which accumulate debris (including salt) on a regular basis.
- 3) Prevent weathering steel from contact with soil, vegetation, masonry, or other materials so that the weathering process can proceed on a natural basis.

- 4) Steel Structures Painting Council's Report 92-08, Maintenance Coating of Weathering Steel: Field Evaluation and Guidelines provides recommendations for remedial painting of weathering steel bridges.

7.5.Maintenance for Wood Decks

At the time of installation of the wood decking, Contech Engineered Solutions LLC personnel take great strides to assure that the edges of each plank are in contact with each other so that no gaps appear between planks. All wood is stored inside, protected from the weather, prior to installation.

However, wood is a natural material that exhibits large volume changes with variations in moisture content and time, particularly in the width direction, which can cause gaps to form between the planks. Cupping and splits may also occur which need to be repaired.

Contech Engineered Solutions LLC recommends an assessment of these hazards during the User Safety Inspection with remedial action as follows:

- 1) Replace all planks that have deteriorated past a useful and safe life.
- 2) Eliminate gaps between the planks which exceed $\frac{3}{4}$ ". Eliminating the gaps should be done as follows:
 - a) Remove all deck bolts.
 - b) Remove plank hold down angles. Be sure to mark their locations for ease of reinstallation.
 - c) Slide wood planks together.
 - d) Add new plank or planks to fill up the excess space.
 - e) Reinstall plank hold down angles.
 - f) Drill new holes in wood planks.
 - g) Install new deck bolts (see shop drawings for size and material).
- 3) Replacement planks may be purchased through Contech Engineered Solutions LLC.
- 4) Over time and with exposure to the environment, wood may become smooth, particularly when wet with rain, dew, snow, sleet, ice, etc. Periodically it may be necessary to "roughen" the surface of the decking with large grit sandpaper. There are also commercially available non- skid coatings which may be applied.