

LEDGE REMOVAL

****From Townshend STP 015-1(22)**

- xx. DESCRIPTION. This work shall consist of excavating loose and dilated rock on slopes and reconstructing rock slopes, or segments of rock slopes, at shallower, more stable slope angles as shown in the Plans and as directed by the Engineer and Agency Geologist (Geologist).

The work includes high-angle construction to be completed using industrial rope access methods for rock excavation and scaling.

The work is classified as follows:

- (a) Solid Rock Excavation. Solid Rock Excavation shall consist of the removal of hard igneous, metamorphic, or sedimentary rock that requires blasting or the use of rippers. Drilling and blasting, where required for performing Solid Rock Excavation, shall be performed in accordance with DRILLING AND BLASTING of Section 900.
- (b) Trim Blasting. Trim Blasting shall consist of performing controlled blasting techniques for trim blasting large blocks from the slope face. Drilling and blasting, where required for performing Trim Blasting, shall be performed in accordance with DRILLING AND BLASTING of Section 900.
- (c) Hand Scaling. Hand Scaling shall consist of removal of loose or potentially dangerous blocks of rock on the slope by scaling of loose or dilated rock materials, hand scaling, pneumatic jacking, or hydraulic splitting.
- (d) Machine Scaling. Machine Scaling shall consist of removing loose and dilated rocks from the cut face utilizing heavy equipment. The work may be performed from the base of the cut, top of the cut, or from work pads made from scaled rock material.

Alternate methods for ledge removal shall be submitted for approval by the Engineer and Geologist prior to use.

- xx. GENERAL REQUIREMENTS. Prior to the beginning of ledge removal, all necessary clearing and grubbing in the project area shall be completed in accordance with Section 201.

Any loose material resulting from breakage and slides shall be removed and disposed of as directed by the Engineer and Geologist.

The Contractor shall not excavate or remove any material outside the limits of excavation slope and grade lines shown on the Plans unless authorized in writing by the Engineer and Geologist.

xx. SUBMITTALS.

- (a) Qualifications. Not less than two weeks prior to beginning any rock slope scaling, the Contractor shall provide qualifications of Contractor's personnel to the Engineer and the Agency's Geologist (Geologist). The Contractor shall provide written evidence that the rock slope scaling foreman and rock slope scalers have performed satisfactory work in similar capacities elsewhere for a sufficient length of time to be fully qualified to perform their duties. The foreman shall not have less than five years of demonstrated experience as a rock slope scaling foreman. The rock slope scalers shall have at least two years of demonstrated experience on similar projects.
- (b) Work Plan. Not less than two weeks prior to beginning the work, the Contractor shall submit a detailed work plan for each rock slope to be scaled. The plan shall include:
- (1) The proposed rope access methods and safety plan.
 - (2) The proposed construction sequence and schedule.
 - (3) The types of equipment and tools to be utilized during the proposed work.
 - (4) The number of rock slope scaling crews and the numbers of qualified working supervisors and qualified scalers in each crew.
 - (5) Rock removal and disposal plan for rock debris generated from the rock slope scaling work, including provisions to protect adjacent facilities.
 - (6) Traffic interruptions and controls requested.

Work shall not begin until the submittals have been approved in writing by the Engineer and Geologist.

- (c) Field Reports. The Contractor shall submit a field report on a daily basis to the Engineer and Geologist for approval. The field report shall include weather information, work area, a brief description of work performed that day, description and cause of any delays, and number of man-hours and equipment hours for that day for each pay item.

xx. CONSTRUCTION REQUIREMENTS.

- (a) General. All material from previous activities shall be removed from the ditch line prior to beginning trim blasting. No other ledge removal activities shall take place during trim blasting operations.

Work shall proceed according to the approved Work Plan and schedule submitted by the Contractor prior to the beginning of work.

Rock slope scaling shall be conducted on rock slopes identified on the Plans and as directed by the Engineer and Geologist in accordance with the Contractor's Work Plan.

The use of power equipment, such as backhoes, excavators, cranes or lifts, etc., shall be approved by the Engineer and Geologist prior to use.

If the scaling activities have the potential of endangering adjacent facilities, the Contractor shall provide appropriate protective devices, in accordance with the Contractor's Work Plan, prior to beginning the scaling work.

- (b) Scaling Requirements. Slopes identified on the Plans shall be scaled at such frequency as required to remove all hazardous loose rock or over-hangs.

Slopes shall be scaled using a suitable standard steel mine scaling rod, bar, and hand placed jacks as approved by the Engineer and Geologist. Other methods such as machine scaling, hydraulic splitters, or trim (cushion) blasting may be used in lieu of, or to supplement, hand scaling upon approval of the Engineer and Geologist.

Rock slope scaling shall start at the top of the slope and work shall proceed downward toward the highway, removing all loose rock blocks as the work progresses.

The new rock face will be inspected by the Engineer and Geologist to determine whether or not the rock slope scaling has been completed. If other rock blocks are identified that require removal, the Contractor shall continue to scale the slope until the scaling has been completed to the satisfaction of the Engineer and Geologist.

- (c) Removal of Ledge Salvage/Waste Material. When all scaling work is complete, all material from inside the excavation line, as shown on the Plans, and all loose material from the rock slopes outside the excavation line shall be removed from the work area. The material may be disposed of in the project area, with permits approved by the Engineer and Agency's Environmental Section.

Material can be excavated and transported with reasonable types of equipment. However, under no circumstances shall any material be pushed towards or over the cliff crest.

- (1) A volume of removed ledge material not to exceed 100 cy shall be salvaged to the State of Vermont as specified in the Contract Documents.
- (2) Material to be wasted on site shall meet the requirements of Subsection 703.05. The material, when placed in the waste area, shall be leveled and

walked in by bulldozer and need not be heavily compacted.

- xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Removal of Ledge Salvage Material) to be measured for payment will be the number of cubic meters (cubic yards) of ledge material salvaged in the complete and accepted work.

Existing ledge material in the ditch line that is salvaged will be included for measurement.

A printed load ticket, which indicates truck identification and date and time of delivery, shall be furnished to the Engineer for each load delivered to the site.

The quantity of Special Provision (Removal of Ledge Waste Material) to be measured for payment will be the number of cubic meters (cubic yards) of ledge material removed in the complete and accepted work.

The quantity of Special Provision (Trim Blasting, Truck Measurement) to be measured for payment will be the number of cubic meters (cubic yards) removed from the ledge face in the complete and accepted work.

All material from previous activities shall be cleared from the ditch line prior to commencing Special Provision (Trim Blasting, Truck Measurement). All material accumulating in the ditch line due to trim blasting operations shall be removed and measured as Special Provision (Trim Blasting, Truck Measurement) prior to commencing any other ledge removal activities. No other ledge removal activities shall take place during trim blasting operations.

Measurement for Special Provision (Trim Blasting, Truck Measurement), Special Provision (Removal of Ledge Salvage Material), and Special Provision (Removal of Ledge Waste Material) will be on a weight in pounds to a volume in cubic yards basis. The basis for the conversion from weight to volume shall be 170 lbs/ft³.

Portable scales sufficient to weigh trucks with up to ten (10) wheels shall be provided by the Contractor. Trucks having more than ten (10) wheels will not be permitted. The scales shall be certified for correct weight and sealed. Calibration shall be performed according to the manufacturer's recommendations. Storage, placement, and handling of the truck scales shall be the responsibility of the Contractor. Any damage done to the truck scales by the Contractor's operations shall be the Contractor's responsibility. Damaged scales shall be replaced or repaired to the satisfaction of the Engineer at no cost to the Agency.

When the scales are no longer needed, as determined by the Engineer, they shall remain the property of the Contractor.

In lieu of providing portable scale(s) for the project, the Contractor may utilize a local permanent truck scale(s) for

weighing trucks. Use of local scale(s) shall be approved by the Engineer prior to beginning work.

The quantity of Special Provision (Hand Scaling) to be measured for payment will be the number of hours of qualified hand scaler personnel used in the complete and accepted work, as required by the Contract Documents and as authorized by the Engineer. Hours measured will be per scaling operation used in the performance of the work, with a scaling operation consisting of 3 scalers and 1 foreman. No additional allowance will be made for premium time (overtime), and no allowance or payment will be allowed for any training, clothing, or equipment required.

The quantity of Special Provision (Machine Scaling) to be measured for payment will be the number of hours of qualified heavy equipment used in the complete and accepted work, as required by the Contract Documents and as authorized by the Engineer.

xx. BASIS OF PAYMENT. The accepted quantities of Special Provision (Removal of Ledge Salvage Material) and Special Provision (Removal of Ledge Waste Material) will be paid for at the Contract unit price per cubic meter (cubic yard). Payment will be full compensation for performing the work specified, including refining, handling, loading, transporting, and placing the specified materials; for breaking down large blocks of rock prior to removal from the site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (Trim Blasting, Truck Measurement) will be paid for at the Contract unit price per cubic meter (cubic yard). Payment will be full compensation for performing the work specified; for furnishing all materials required, including explosives; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (Hand Scaling) will be paid for at the Contract unit price per hour. Payment will be full compensation for labor hours accrued on the project in the performance of the specified work, as required by the Contract Documents and as authorized by the Engineer.

The accepted quantity of Special Provision (Machine Scaling) will be paid for at the Contract unit price per hour. Payment will be full compensation for performing the work specified; for furnishing, operating, and supervising the use of this equipment, including fuel, repairs, and attachments; and for furnishing all labor, tools, other equipment, and incidentals necessary to complete the work.

Payment for preparing and making required submittals and for furnishing truck scales will not be made separately, but will be considered incidental to the work under this Section.

Payment for Solid Rock Excavation will be made separately under Contract item 203.16.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Removal of Ledge Salvage Material)	Cubic Yard
900.608 Special Provision (Removal of Ledge Waste Material)	Cubic Yard
900.608 Special Provision (Trim Blasting)	Cubic Yard
900.630 Special Provision (Hand Scaling)	Hour
900.630 Special Provision (Machine Scaling)	Hour