

LEDGE REMOVAL

****From Hartford-Newbury IM 091-2(72)**

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.
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) High Scaling. High Scaling shall consist of removing loose and dilated rocks from the cut face utilizing hand removal techniques requiring the use of rope access. Methods may include but are not limited to the use of standard steel miner pry bars, pneumatic or hydraulic devices, or boulder buster techniques. Where the horizontal distance from the cut face to the existing rock face is less than 4.6 meters (15 feet), the Contractor may trim blast in lieu of or in conjunction with high scaling.
- (c) 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 Agency Geologist prior to use.

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

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 construction sequence and schedule.

- (2) Types of equipment and tools to be utilized during the proposed work.
- (3) The number of rock slope scaling crews and the numbers of qualified working supervisors and qualified scalers in each crew.
- (4) Rock removal and disposal plan for rock debris generated from the rock slope scaling work, including provisions to protect adjacent facilities.
- (5) 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. Work shall proceed according to the 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 high scaled using a suitable standard steel mine scaling rod. 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 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) 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.
- (2) Material to be salvaged off site to the Bradford Rail Yard shall meet the requirements of Subsection 706.04 for Stone Fill, Type III.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (High Scaling) to be measured for payment will be the number of hours of qualified high scaler personnel used in the complete and accepted work, as required by the Contract Documents and as authorized by the Engineer. 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.

The quantities of Special Provision (Removal of Ledge Waste Material) and Special Provision (Removal of Ledge Salvage Material) to be measured for payment will be the number of cubic meters (cubic yards) removed in the complete and accepted work, computed on a mass (weight) to volume basis in accordance with the following:

$$CM = (SW - TW) \times (3.63 \times 10^{-4}) * [\text{Metric}]$$

$$CY = (SW - TW) \times (2.13 \times 10^{-4}) * [\text{English}]$$

Where:

CM (CY) = Pay Quantity in Cubic Meters (Cubic Yards)
SW = Scale Weight of Loaded Truck in Kilograms (Pounds)
TW = Tare Weight of Truck in Kilograms (Pounds)
* = For material weight of 27 kN/m³ (174 lb/ft³)

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 waste or salvage site.

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.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (High 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, including any trim blasting performed, 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 will not be made separately, but will be considered incidental to the work under this Section.

The accepted quantities of Special Provision (Removal of Ledge Waste Material) and Special Provision (Removal of Ledge Salvage 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; for furnishing truck scales; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

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 Meter (Cubic Yard)
900.608 Special Provision (Removal of Ledge Waste Material)	Cubic Meter (Cubic Yard)
900.630 Special Provision (High Scaling)	Hour
900.630 Special Provision (Machine Scaling)	Hour