ITEM 983.521 STREAMBED/BANK RESTORATION LUMP SUM

REV. 2026.10.09 (REV. DATE TO BE REMOVED BY MASSDOT CONTRACTS)

DESIGNER INSTRUCTIONS:

Coordinate with MassDOT Environmental Services Section.

MODIFY YELLOW HIGHLIGHTED SECTIONS AS APPROPRIATE based on:

- ***Size and nature of impact. Minimal impacts will not need the full specification.***
- ***Permit requirements. Coordinate changes with other special provisions as necessary.***
- ***Fluvial Geomorphologist (FGM) requirement. If FGM is deemed unnecessary (i.e., small/minimally impacted projects with simple reinstallation of stockpiled native streambed material), delete all references to FGM specialist. Consult with MassDOT Environmental Services, as necessary, for inhouse support.***

NOTE:

- ***xxx.***
- ***xxx.***

DESCRIPTION

This work shall consist of streambed/bank restoration in the areas of [permanent, temporary] stream [bed, bank] impacts associated with [water control, demolition, construction] for the [bridge replacement, culvert replacement, wall replacement, structure repair]. The streambed/bank restoration shall return the channel bed to natural conditions replicating the existing natural channel bed outside the work area in terms of material, roughness, shape, profile, and appearance. The ultimate product will, to the extent possible, replicate the function and appearance of the natural stream channel, as illustrated by the enclosed photo-documentation.

For the purposes of this Item, "Stream Bed/Bank" refers to the area located within the wetted channel, wetland or upland banks, and other related features within our project limits as shown on the project plans.

The Contractor shall coordinate with their sub-contractors to ensure all required equipment is available on-site to complete the work. The streambed/bank restoration is required to comply with environmental permits issued for the project. MassDOT Environmental Services will provide an Fluvial Geomorphologist (Geomorphologist) or Environmental Specialist to provide a pre-construction meeting (either virtual or in person) and on-site guidance and during construction of streambed/bank restoration construction, as determined by MassDOT. This ensures the restoration is constructed as shown on the Plans, as required by these Special Provisions, and in accordance with permit requirements.

WORK PROCEDURE

At least 30 days prior to the commencement of construction, the Contractor shall coordinate with David Paulson (MassDOT Wildlife & Endangered Species Unit Supervisor, (857) 262-3378 /

david.j.paulson@state.ma.us) to set up an initial virtual or in-person meeting with MassDOT's roject Manager, Geomorphologist and/or Environmental Specialist, Contractor, and Resident Engineer. At this meeting, the Geomorphologist and/or Environmental Specialist will provide an overview of the [streambed, bank] restoration work and material requirements. The Contractor should be prepared to discuss the anticipated means, methods, and schedule.

Following the initial meeting, the Contractor shall schedule a meeting to review the anticipated impacts associated with [dewatering, demolition, construction] and to discuss the streambed/bank restoration with the Geomorphologist and/or Environmental Specialist and respective parties from MassDOT within two weeks of initiating work on the streambed/bank. The Geomorphologist and/or Environmental Specialist will review the initial streambed/bank restoration and may request photographs from the Contractor as needed. The Contractor shall provide the Geomorphologist, and/or Environmental Specialist adequate access to observe, direct, and inspect the channel restoration work throughout the duration of the removal, stockpile, and reinstallation of the existing streambed material.

MATERIAL

If streambed material is excavated from the existing streambed/bank, it shall be removed and stockpiled to facilitate reinstallation and replication of the natural streambed/bank. The excavated streambed material shall also be reused to fill the voids in any proposed scour protection material.

If material such as [crushed stone, riprap, modified rock fill] is used on the streambed/bank to facilitate water control, this material must be removed from the channel. The natural streambed material shall be separated from the added material prior to reinstallation.

In the event that there is not enough available streambed material, additional streambed/bank restoration material shall be locally sourced that matches the composition of the existing native riverbed. Testing showed that the streambed is dominated by [insert surface sediment size/texture/color].

If material is being brought to the site for streambed/bank restoration, the Contractor shall provide the Geomorphologist and/or Environmental Specialist with photographs to see the material prior to the site visit and installation.

Stream Bed Material Gradation

[For a simpler project, insert a table showing percentage of particle sizing from a quadrat estimation, pebble count, sample and grain size analysis. Three examples follow.]

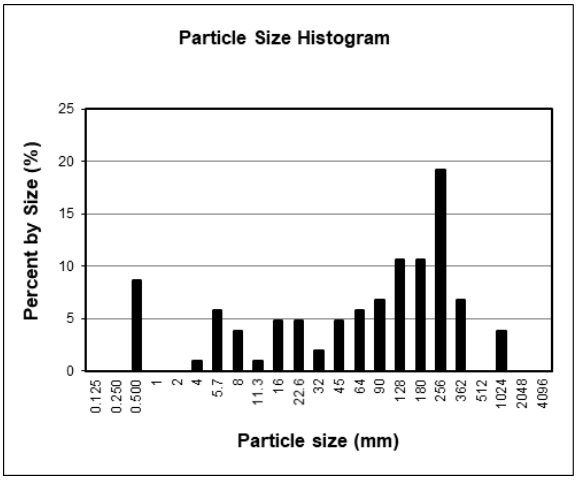
1. Approximate Stream Bed Surface Material Size Distribution from square meter quadrat estimation.

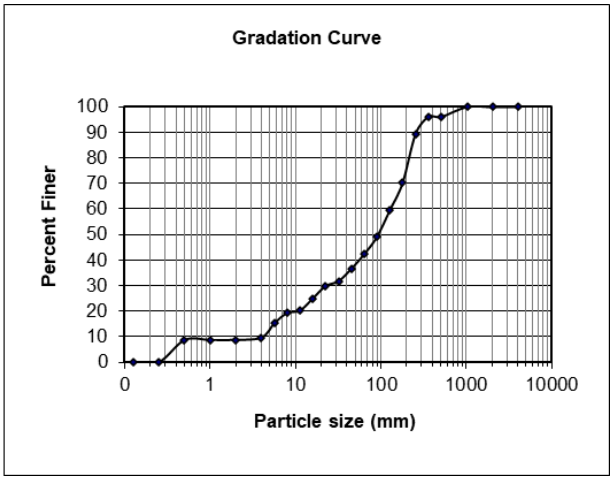
Particle*	Amount (%)
Boulder	15
Cobble	30
Coarse Gravel	30
Fine Gravel	20
Sand	5

2. Sediment sizing from field pebble count.

Stone Size (mm)	Stone Size (inches)	Particle*	% Finer
1,024	40	Medium boulder	100
256	10	Very large cobble	90
64	2.5	Very coarse gravel	42
0.5	0.02	Coarse sand	9

*(Wentworth, 1992)



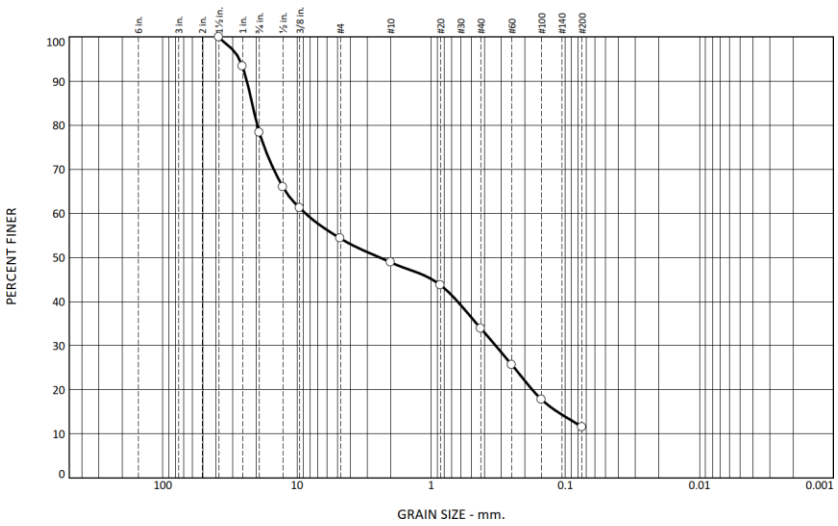


3. Sediment sizing from sampling and laboratory grain size analysis.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	21.7	24.0	5.4	15.1	22.3	11.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER
1 1/2"	100.0
1"	93.4
3/4"	78.3
1/2"	66.0
3/8"	61.2
#4	54.3
#10	48.9
#20	43.7
#40	33.8
#60	25.6
#100	17.7
#200	11.5

* (no specification provided)



The streambed material shall be approved by the Geomorphologist and/or Environmental Specialist and the Resident Engineer prior to use.

Related Items

Crushed Stone. Shall conform to the requirements of Item 156.2 Crushed Stone for Slope Treatment and shall be paid for under that item. Note that this material is not acceptable for the streambed/bank restoration.

Riprap Stone shall conform to the requirements of Item 983. and shall be paid for under that item.

Modified Rock Fill

CONSTRUCTION OF THE STREAMBED/BANK

The excavated and stockpiled streambed material (or approved material brought in) shall be installed in the channel where [temporary controls are used, impacts have taken place] and the streambed/bank is disturbed. The material shall be installed to an average thickness of 2.0 feet, with variations in thickness as necessary to replicate existing channel conditions. In coarse-bedded channels boulders often protrude through cobble and gravel sediment. Restore the natural level of channel roughness as possible. The above work aims to restore streambed/bank habitat and fish passage. The streambed materials shall be installed during normal to low-water conditions behind cofferdams in accordance with the environmental permits. [The designer may need to provide more detail on the layer thickness and roughness elements to describe the unique setting for each project.]

If voids exist, the initial placement of streambed material shall fill the voids in the underlying material. Fill voids by shaking material with the teeth of an excavator bucket, hand tamping with

metal tamping rods, and by spraying water to settle fines between large stones. Plate compactors shall not be used. The purpose of filling the voids is to prevent excessive subsurface flow during normal and low-flow conditions. The final streambed/bank shape and appearance shall be completed in the field as directed by the Geomorphologist and/or Environmental Specialist.

FINAL ACCEPTANCE

Once all material and design elements has been placed in the stream channel and approved by the fGeomorphologist and/or Environmental Specialist and Resident Engineer, the Contractor shall remove the cofferdams in such a way as to slowly wet the stream to minimize the initial sediment pulse. Every attempt shall be made to minimize the downstream movement of sediment.

The final streambed/bank shall maintain the general configuration of the existing streambed bedform and there shall be minimal subsurface flow upon final inspection by the Resident Engineer and Geomorphologist and/or Environmental Specialist. The project must be passable by fish, other aquatic organisms, and wildlife following construction.

The streambed/bank restoration to be measured for payment will be the complete and accepted work for restoration of the streambed/bank within the limits shown on the Plans as approved by the Resident Engineer and Geomorphologist and/or Environmental Specialist.

BASIS OF PAYMENT

Once accepted, the streambed/bank restoration will be paid for on a lump sum basis. Payment will be full compensation for excavating, stockpiling, furnishing, transporting, importing any additional material, and placing the material specified and for furnishing all labor, tools, equipment, testing, and incidentals necessary to complete the work.

The Geomorphologist and/or Environmental Specialist will be provided by MassDOT at no cost to the Contractor.

FIGURES

[Insert site photos showing sediment in restoration area as well as reference sites from upstream or downstream.]

Figure A: View of stream channel …. facing upstream. (source, date)

Figure B: View of stream channel …. facing downstream. (source, date)

Figure C: View of upstream reference stream channel …. facing upstream. (source, date)

Figure D: View of downstream reference stream channel …. facing upstream. (source, date)