

SECTION 201

CLEARING AND GRUBBING

201.01 DESCRIPTION

This work is the clearing, grubbing, removing, burning, burying, and disposing of vegetation and debris within the R/W limits and easement areas without damaging vegetation, adjacent property and other objects designated to remain in place.

Immediately stop work and notify the Project Manager if evidence of aboriginal activity or occupation is encountered.

201.01.1 Clearing

Clearing is felling trees, disposing of stumps, brush, windfalls, logs, limbs, sticks, piles of sawdust, rubbish, debris, vegetation, and other matter within the clearing limits or other areas that interfere with the excavation and embankment limits.

201.01.2 Grubbing

Grubbing is removing and disposing of roots, stumps, stubs, duff, matted roots, and debris from the grubbing limits.

201.01.3 Clearing and Grubbing

Perform clearing and grubbing in accordance with Subsections 201.01.1 and 201.01.2.

201.01.4 Disposal

Disposal is removing, burning, and burying material generated from clearing, grubbing, or clearing and grubbing operations meeting all local, state and federal laws and regulations.

201.02 RESERVED

201.03 CONSTRUCTION REQUIREMENTS

201.03.1 General

Limit dragging, piling, disposing of debris, and other work to areas to be excavated or covered by embankment. Do not damage or destroy vegetation not designated to be removed.

Do not injure or damage vegetation adjacent to streams, ponds, or lakes unless designated for removal in the contract. Replace damaged or destroyed vegetation not to be disturbed at Contractor expense.

Coat cut or scarred surfaces of trees or shrubs to be preserved with an asphaltum base paint formulated for tree surgery.

Locate pioneer roads or work trails a minimum 20 feet (6 m) inside of the clearing limits. Protect live root systems adjacent to, but outside of, the clearing limits.

Close-cut and remove potential hazards, such as leaning trees (alive or dead), and snags within the R/W as directed by the Project Manager.

Coordinate clearing, grubbing, or clearing and grubbing with the grading work to meet the approved erosion control plan in Subsection 208.03.2. Backfill or grade depressions caused by grubbing to drain. Construct temporary settling basins where scour may occur.

Stake construction limits for cuts, fills, channel changes, ditches, fence lines, utility relocation, roadside development areas, selective thinning for sight distance, grubbing, and similar areas to establish clearing and grubbing limits in accordance with 105.08.

201.03.2 Clearing

Clear only within the staked construction limits.

Cut off trees, stumps, brush, shrubs, and other vegetation to within 6 inches (150 mm) of the ground. Fell trees without endangering traffic and injuring trees or objects not designated for removal.

Remove dead vegetation, logs, stumps, limbs, sticks, sawdust piles, rubbish, debris, and other undesirable matter from areas where live shrubbery, brush, or trees are to remain in place.

Merchantable timber is the property of the Contractor.

201.03.3 Grubbing

Grub only within the staked construction limits.

Remove all stumps, roots, logs, timber exceeding 3 inches (75 mm) in diameter, and all brush, matted roots, and other debris within the grubbing limits to at least 12 inches (305 mm) below the original ground surface.

Grubbing items that do not extend more than 6 inches (150 mm) above the ground line that are to be covered with at least 4 feet (1.2 m) of subgrade or slope embankment may remain.

201.03.4 Clearing and Grubbing

Clear and grub in accordance with Subsections 201.03.2 and 201.03.3 requirements.

201.03.5 Disposal

Dispose of all brush, stumps, windfalls, slash, timber having no commercial value, and all other debris from clearing, grubbing, clearing and grubbing, or other operations to meet all local, state and federal requirements at Contractor expense.

Furnish the Project Manager a written statement detailing the disposal location of non-salvageable treated timber.

A. Burning. Burn materials meeting the State of Montana Open Burning Regulations administered by the Air Quality Bureau of the Montana Department of Health and Environmental Sciences, and all other applicable local, state and federal rules and regulations. The general requirements of the Montana Open Burning Regulations regarding burning season and permits are described below.

- 1. Permits.** Obtain an open burning permit from the Air Quality Bureau during the open burning season when burning more than 100 acres (40.5 ha) of forest residue per year.

When burning near public lands during the fire season (May 1st through September 30th, or as extended), obtain a burning permit from the local, state or federal fire protection agency having jurisdiction.

- 2. Open Burning Season.** The open burning season for forestry slash is from March 1st through November 30th. Open burning is not allowed during December, January, or February. Burning from September 1st through November 30th, on a day-to-day basis is subject to ventilation conditions available from the Air Quality Bureau, at 1-800-225-6779. Obtain the ventilation conditions daily before burning.
- 3. Burning Methods and Instructions.** Burning by the air curtain destructor or forced air methods are encouraged.

Obtain the Project Manager's approval for burning pits located within the R/W limits. Dispose of all pits, ashes, and debris meeting Subsection 201.03.5(B). Locate burning pits at least 100 feet (30.5 m) from free-flowing water or areas where ditches are to be constructed. Locate pits and incinerators to prevent fire damage or hazard to surrounding vegetation or structures. Contact local fire protection agencies before the start of any burning.

Provide 24 hour monitoring of all burning.

B. Disposal of Other Material. Obtain the Project Manager's approval to incorporate non-hazardous solid material into the work for constructive use.

Dispose of material not incorporated into the work at Contractor expense.

201.04 METHOD OF MEASUREMENT

Measurement for clearing, grubbing, or clearing and grubbing is by either of the following methods.

201.04.1 Lump Sum Basis

Clearing, grubbing, and clearing and grubbing are measured by the lump sum. Disposal of the material is not measured for payment.

201.04.2 Area Basis

Measurement is by the acre (ha) for the area actually cleared to the limits in the contract or as staked. Disposal is not measured for payment.

201.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Clearing	Lump Sum or Acre (ha)
Clearing and Grubbing	Lump Sum or Acre (ha)
Grubbing	Lump Sum or Acre (ha)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

201.05.1 Lump Sum Basis

Payments will be prorated for the percentage of completed work for each item listed as a lump sum item in the contract.

201.05.2 Area Basis

No payment is made or allowed for any areas not actually cleared (PTW, paved surfaces, etc.).

201.05.3 Reserved

201.05.4 Exclusion

When the contract does not contain a pay item for clearing, grubbing, or clearing and grubbing, the work is incidental to and included in payment for other items of work.

SECTION 202

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202.01 DESCRIPTION

Remove and dispose of all structures and obstructions not designated to remain or to be removed and disposed of under other items of the contract.

202.02 RESERVED

202.03 CONSTRUCTION REQUIREMENTS

- A. General.** Retain a Blasting Consultant as required in Subsection 204.03.1 when using explosives to remove structures or obstructions.

Raze, remove, and dispose of all buildings, foundations, structures, fences, debris, and other obstructions on the R/W, excluding utilities. Remove and transport specified salvage material designated to remain property of the Department, without damage, to the specified locations. Obtain the Project Manager's written permission to use any salvaged materials.

Dispose of unusable combustible material in accordance with Subsection 201.03.5(A). Dispose of unusable noncombustible material in accordance with Subsection 201.03.5(B). Backfill cavities caused by removing structures and obstructions level with the surrounding ground and compact the backfill in accordance with Subsection 203.03.3.

Install the necessary traffic control devices when removing and transporting structures to maintain traffic in the work area.

- B. Structure Removal.** Submit to the Project Manager, 5 copies of a written proposal that describes the proposed plan for removal and/or salvage of bridges. Do not begin removal or salvage operations prior to receiving approval. Include in the proposal a narrative of all operations, including all cutting and welding procedures, done in conjunction with the removal of the existing bridge. Include welder's certifications and descriptions of welding processes. Approval of the plan is contingent on the plan meeting the requirements of the contract and all permits.

202.03.1 Removal of Bridges and Major Drainage Structures

- A. Removal of Superstructures.** Repair or replace all damaged or destroyed members, pins, nuts, and plates from steel or timber structures designated to be salvaged at Contractor expense.

Match-mark all members to be salvaged with paint before dismantling. Similarly mark all pins, nuts, and plates to indicate their location in the structure. Paint all pins, pin holes, and machined surfaces with a zinc-rich paint, and wire all loose parts to adjacent members or pack in clearly marked boxes showing the contents and index-numbered for identification.

- B. Removal of Substructures.** Remove or cut off piles and substructures to 3 feet (915 mm) below the finished grade or existing ground surface elevation, whichever is lower. Shape and contour the removal areas to blend with the surrounding terrain.

Do not damage new work while removing existing structures.

- C. Disposal of Materials Removed.**

- 1. Structural Steel.** Store salvaged structure members and all steel beams above the ground on skids at the designated sites.
- 2. Concrete and Masonry.** Use concrete and masonry removed from old structures in backfills or approach embankments in accordance with Subsection 202.03.3. Dispose

of concrete or masonry not placed in backfills or embankments at Contractor expense. Remove all contract related concrete rubble from streams.

3. Timber and Other Materials. Store all salvageable timber or other salvaged materials above ground on skids at the designated sites.

D. Disposal of Temporary Structures. Remove and dispose of all temporary structures in accordance with Subsection 202.03.1(C).

E. Removal and Salvage of Structure. Do not weld or use a cutting torch on any portion of existing bridge without an approved welding or cutting plan. Follow the requirements of Section 624 and perform no welding without the presence of the CWI. Notify the Project Manager at least 5 working days prior to welding/cutting operations for scheduling of the CWI.

Assume all costs for repairs of contractor caused damage to the structure, including inspection and testing. Inspection/testing costs include salaries, travel expenses and fees for professional services by whomever the State assigns or hires to perform those services.

Notify each party (as listed in contract as owner) at least 30 days prior to the anticipated date of structure removal. Keep each party informed about any changes to the removal dates. If the new owners have a transport available on site at the time of removal, set the truss and floor materials on the transport provided by the new owners. If the new owners do not provide a transport at the time of removal, set the truss and floor materials aside on site at a location as directed. If the new owners have not transported the structure off the project within 60 calendar days of removal, dispose of it unless otherwise directed by the Project Manager.

Any loss or damage, suffered by the new owner of a removed bridge or by a firm or entity that is to remove the bridge on behalf of the new owner, caused by the contractor's failure to fully comply with the provisions of this contract, will be solely the responsibility of the contractor and will be paid by the contractor, or will subject the contractor to action under its bond or insurance policy, at no expense to the State.

Dispose of all non-salvageable materials in accordance with approved methods and applicable rules, laws and regulations for disposal of solid waste. At the conclusion of the project, clean up all affected areas to the satisfaction of the Project Manager.

202.03.2 Removal of Minor Drainage Structures

Remove minor drainage structures as specified in the contract. Replace lost or damaged salvaged material at Contractor expense.

202.03.3 Removal of Pavement, Concrete, and Masonry

Remove and dispose of all existing bituminous or concrete materials to be removed unless otherwise specified. If used for new roadway construction, process, handle and transport these materials for embankments; or crush, screen, mix and process for use as base, surfacing or traffic gravel as approved. Otherwise, dispose of them as solid waste in conformance with applicable laws, rules, regulations and the Montana Solid Waste Management Act.

Existing materials used for base gravel or surfacing must meet the specifications for the particular item. Process bituminous material to be used as embankment to a maximum 6-inch (150 mm) size in its largest dimension. Process concrete material, to be used in the embankment, to a maximum 12-inch (305 mm) size in its largest dimension. Do not place the removed bituminous or concrete material in ephemeral drainages or within 100 feet (30 m) of standing water and groundwater wells. Bituminous materials used for embankment of the new roadway must be covered with plant mix surfacing or 12 inches (305 mm) of soil capable of supporting plant growth.

Include all costs of this work in the unit price for the applicable contract item.

202.04 METHOD OF MEASUREMENT

202.04.1 Remove Structures and Obstructions

Remove structures and obstructions is measured by the lump sum and includes the removal and disposal of all structures and obstructions encountered within the right-of-way.

202.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Remove Structures and Obstructions	Lump Sum

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

When the contract does not contain estimated quantities or lump sum items for removal and disposal of structures and obstructions, the work is incidental to and included in payment for other items of work.

SECTION 203

EXCAVATION AND EMBANKMENT

203.01 DESCRIPTION

This work is the excavation, placing, compacting and disposal of material encountered within the construction limits necessary to construct the project. This is also referred to as grading.

203.01.1 Excavation

- A. Unclassified Excavation.** Unclassified excavation is excavating and disposing, when required, of material from the R/W or construction easement areas except borrow excavation and muck excavation.
- B. Borrow Excavation.** Borrow for embankment construction is Contractor furnished excavation from outside the R/W or construction easement areas.
- 1. Unclassified Borrow.** Use Department approved sources meeting current environmental and cultural resource preservation regulations. Material from a Department-optioned or Department-owned borrow source may be available at no cost. The applicable provisions of Subsections 102.06 and 106.02 apply to unclassified borrow.
 - 2. Special Borrow.** Special borrow-excavation and special borrow-neat line is the providing and placing of the specified quality of borrow material from designated sources or from other approved sources. The applicable provisions of Subsections 106.02 and 203.01.1(B)(1) apply to special borrow-excavation and special borrow-neat line.
- C. Unclassified Channel Excavation.** Unclassified channel excavation is excavating and disposing of all materials from new watercourses or channels and the widening, deepening, or relocation of existing channels.
- D. Street Excavation.** Street excavation is excavating and disposal of all material to the street template.
- E. Muck Excavation.** Muck excavation is removing and disposing of unsuitable material in cut sections or below the natural ground line in embankment sections. Material defined as muck must be deemed unsuitable and is unable to be excavated using the same equipment and methods as for unclassified excavation.
- Material is considered unsuitable if:
- 1.** It contains soil or organic matter unsuitable for foundation material, regardless of moisture content; or
 - 2.** It is too wet to be properly compacted and cannot be dried within a demonstrated reasonable timeframe prior to incorporating into work. Excessive moisture alone is not sufficient cause for determining unsuitable material.
- Topsoil removed below the natural ground line in embankment sections unsuitable material.
- Excavated unsuitable material areas will be measured before they are backfilled.
- Do not place fill over unsuitable or unstable foundation soils without the Project Manager's approval. Materials placed before approval may be ordered removed and replaced at Contractor expense.
- F. Sub-excavation.** Sub-excavation is removing unstable material from below the plan subgrade elevation as shown or directed.
- G. Digout Excavation.** Digout excavation is removing and replacing sections of material at neat lines as shown in the contract or directed by the Project Manager.

203.01.2 Embankment

Place and compact excavation in roadway embankments, dikes, areas where unsuitable material is removed, holes, pits, and other roadway depressions. Prepare embankment foundations prior to placing embankment material.

203.02 RESERVED**203.03 CONSTRUCTION REQUIREMENTS****203.03.1 Excavation**

- A. General.** Do not begin grading operations before the area is cleared of vegetation and obstructions in accordance with Sections 201 and 202. Ensure erosion controls are placed as specified in the contract.

Excavate without disturbing material and vegetation outside of the slope limits.

Use all suitable material removed from the excavation in embankments, subgrade, shoulders, top soiling, and other designated locations. Excavated material not used as specified or directed is not paid for.

Sequence excavation of backfill or road finishing material so it is placed into final position as soon as possible. Stockpile suitable material that is not immediately used.

Construct temporary fencing to restrict livestock and vehicular traffic from the work in accordance with Subsection 607.03.5.

Replace temporarily removed fence and repair damaged fence to a condition equal to the existing fence at Contractor expense. Confine livestock when fencing is disturbed.

If excavated material from the roadbed is used outside the embankments, furnish and place at Contractor expense, an equal quantity of borrow to replace the material.

Do not dispose of excess or unusable material within the right-of-way limits unless approved by the Project Manager.

Compact the top 8 inches (200 mm) of the subgrade in cut sections in accordance with Subsection 203.03.3.

- B. Rock Blasting.** Perform all blasting in accordance with Section 204.
- C. Rock Excavated Below Grade.** Excavate all un-yielding materials that require blasting or the use of rippers to at least 6 inches (150 mm) below subgrade within the roadbed limits. Backfill the excavation with specified or approved material. Remove or drain surface rock pockets that trap or pond water.

Rock, removed to a maximum depth of 6 inches (150 mm) below subgrade is measured and paid for as unclassified excavation. Rock removed or backfilling due to over excavating in excess of the 6 inches (150 mm) with approved backfill material is at Contractor expense.

- D. Removing Excess Moisture.** Rework materials from excavation or borrow areas exceeding 2% of optimum moisture to the specified optimum moisture before use in embankments or as backfill. Costs to remove excess moisture from the material are incidental to the embankment.

Remove excess moisture in the finished roadbed soil, introduced or caused by construction operations, for re-use in the work at Contractor expense. Excessively wet material, caused by the construction operations that cannot be properly compacted must be removed and replaced with suitable material at Contractor expense.

- E. Borrow Material.** Excluding special borrow, borrow material may be used only after the roadway excavation has been placed in the embankment. If excess borrow is placed creating a waste of excavation, the waste quantity will be deducted from the measured volume in the borrow area.

Notify the Project Manager 5 calendar days before excavating material from the borrow area so that the area may be surveyed. Do not excavate beyond the dimensions and elevations established for the borrow areas. Finish and shape all borrow areas to permit accurate measurements. Reclaim borrow areas meeting Subsection 106.02.5 requirements

F. Roughen Slopes. Roughen slopes as directed.

G. Digout. In areas of digout, excavate the full road width to a depth as shown in the contract or as directed by the Project Manager. Excavate parallel to the finish grade, daylighting to the left and right slopes. Slope the ends of the digout no steeper than 4H:1V. Dispose of the excavated material to the satisfaction of the Project Manager.

Provide special borrow for digout replacement material consisting of a well-graded sand and gravel, free of organic and other deleterious material, meeting the AASHTO M 145 requirements for A-1-a group classification, with 100% passing the 2-inch (50 mm) sieve and a maximum of 8% passing the No. 200 (0.075 mm) sieve. The material may consist of up to 50% millings, uniformly blended. Crusher fines and reject material may be used if the requirements in Table 701-22 are met.

Provide stabilization geotextile that meets the requirements of Subsection 716.03 for Stabilization geotextile.

Place stabilization geotextile over the bottom and sides of the excavated digout area in conformance with Subsection 622.03. Extend the geotextile up the side walls of the excavation for the full height of the exposed subgrade soils.

Place the initial lift of special borrow over the geotextile in accordance with Subsection 622.03.2.

Repair any geotextile damaged during construction in accordance with the Manufacturer's recommendations or as directed by the Project Manager at Contractor expense.

H. Sub Excavation. In areas of sub excavation, excavate the full road width to a depth as shown in the contract or as directed by the Project Manager. Excavate parallel to the finish grade, day lighting to the left and right slopes. Slope the ends of the excavation no steeper than a 10H:1V. Dispose of the excavated material to the satisfaction of the Project Manager.

Provide special borrow for sub-excavation replacement material consisting of a well-graded sand and gravel, free of organic and other deleterious material, meeting the AASHTO M 145 requirements for A-1-a group classification, with 100% passing the 6-inch (152 mm) sieve and a maximum of 8% passing the No. 200 (0.075 mm) sieve. The material may consist of up to 50% millings, uniformly blended. Crusher fines and crusher reject material may be used if the requirements in Table 701-22 are met.

Provide stabilization geotextile that meets the requirements of Subsection 716.03.

Place stabilization geotextile over the bottom and sides of the sub excavated area in conformance with Subsection 622.03. Extend the geotextile up the side walls of the excavation for the full height of the exposed subgrade soils.

Place the initial lift of special borrow over the geotextile in accordance with Subsection 622.03.2.

Repair any geotextile damaged during construction in accordance with Subsection 622.03.2.

203.03.2 Embankment

A. General. Do not place stumps, trees, logs, rubbish, vegetation, muck, frozen material, pockets of rock, volcanic ash or other deleterious materials in embankments.

Sod mixed with surface soil and soil containing excessive humus or other organic materials may be spread over the top of embankment slopes. Compact embankment, backfill, and embankment foundation areas in accordance with Subsection 203.03.3.

Leave the surface of completed embankments in a roughened condition.

Rework or remove and replace unstable or pumping material prior to placing additional lifts or materials. Reworking or replacing materials within constructed embankment is at Contractor expense.

B. Embankment at Structures. Do not place rocks, broken concrete, or other solid material in areas where piling is to be driven.

Do not place embankment against any backwall or abutment until the concrete has cured for 10 calendar days or has reached 70% of the required strength. Furnish a certified laboratory test report showing the field-cured cylinders meet the required strengths.

The Project Manager may approve early embankment work at backwalls or abutments with beams or girders in place, or that are cantilevered from a fixed footing or cap if the strength requirement is met.

Do not place embankment against un-supported backwalls or U-shaped abutments rigidly connected to the deck until the deck is placed and cured meeting the applicable requirements of Section 552.

The Contractor may submit a method of supporting the structure to permit early placement of embankment against the structure. If approved, all costs of the alternate method are at Contractor expense.

Place embankment in 8-inch (200 mm) maximum layers loose thickness and compact adjacent to structures, around columns and similar structural supports, and on both sides of concrete walls, box type structures, and similar structures. Extend embankment material placed above the excavation limits or ground line a minimum 10 feet (3 m) from the structure or structural support.

Restore, repair, or replace structures or structural members moved or distorted by placing and compacting embankment at Contractor expense.

Compact embankment inaccessible to rollers by mechanical tampers to the density specified in Subsection 203.03.3.

Before placing and compacting backfill, compact at least the top 8 inches (200 mm) of the existing ground in accordance with Subsection 203.03.3.

C. Preparation of Embankment Foundations. Bench all embankments placed and compacted on hillsides, against existing embankments, built one-half width at a time, or on slopes 6H:1V or steeper when measured at right angles to the roadway centerline. Construct benches in minimum 4-foot (1.2 m) widths. Maintain the horizontal inclination within 5% of horizontal. Backfill and compact each bench in maximum 8-inch (200 mm) layers.

Excavate each bench as close to each other as the slope permits. Use approved material excavated from benches in the embankment.

In excavation to embankment transitions where the natural ground slope exceeds 6H:1V, construct the excavated benches so the natural ground surface is a minimum 12 inches (305 mm) from the top of the subgrade.

Remove frozen earth, snow and ice from the cut or embankment surface and place it outside the slope stakes. Provide the replacement borrow material at no cost to the Department.

Clear the full width of the subgrade of sod and vegetative matter. Scarify the top 8 inches (200 mm) of the embankment foundation and compact in accordance with

Subsection 203.03.3 before constructing embankments 4 feet (1.2 m) high or less, or embankments placed on soils having less than 95% maximum density, determined by MT 210.

If original lightly compacted soils are encountered that exceed 8 inches (200 mm) in depth, remove it to the depth directed. Compact the upper 8 inches (200 mm) of the ground in accordance with Subsection 203.03.3. Place the removed material in the embankment or use it for topsoil as directed. Material useable as topsoil may be placed alongside the roadway after compaction is completed.

- D. Earth Embankment.** Place earth roadway embankment in uniform horizontal layers not exceeding 8 inches (200 mm) loose measurement and compact in accordance with Subsection 203.03.3. Continuously level, work, and maintain moisture to compact to the specified density. Uniformly work the entire surface of each layer.

Work each layer of earth embankment that is not rock, gravel or sand using a tandem type construction disk with a maximum disk spacing of 14 inches (355 mm) and a minimum worn disk diameter of 25 inches (635 mm). With the disk, work moisture into the soil, break clods of soil, disorient the soil particles, and penetrate the full depth of the layer being placed. Larger disks may be used if the ratio of disk spacing to disk size is comparable to the above dimensions. Leave the embankment slopes in a roughened condition.

- E. Rock Embankment.** When the excavated material contains more than 25% rock by volume, 6 inches (150 mm) or larger in its greatest dimension, place the embankment in layers 2 inches (50 mm) thicker than the maximum size rock in the material not to exceed 24 inches (610 mm) loose thickness.

Individual rocks and boulders larger than 24 inches (610 mm) in diameter may be placed in the embankment if the rocks do not exceed 48 inches (1.2 m) vertical height after placement, are evenly distributed, and are spaced to allow placing and compacting of the soil in between the rocks.

Place and compact the upper 2 feet (610 mm) of the embankment in maximum 8-inch (200 mm) layers loose thickness as specified in Subsection 203.03.2(D).

Dump and work rock from excavations to the stream face when the embankments are adjacent to streams or channels. Prevent the rock from entering the stream. This work is incidental to unclassified excavation.

- F. Embankment Over Swampy Areas.** On low, swampy ground incapable of supporting haul equipment, construct the lower part of the embankment by dumping successive loads of uniformly distributed material in layers thick enough to support the equipment. Place subsequent layers in accordance with Subsections 203.03.2(D) or (E) as directed.

- G. Disposal of Unsuitable or Excess Material.** If disposal of excess or unusable excavation within the R/W limits is approved by the Project Manager, slope and shape all disposal areas to blend into the surrounding terrain and meet the requirements of Subsections 106.02.5 and 107.11.

203.03.3 Moisture and Density Requirements

Compact each layer of material to the in-place density requirements of Table 203-1 for the method of moisture and density control used. The moisture and density control is the Proctor method or the Zero Air Voids method, determined by the Project Manager.

If proctors are used for density control, the Contractor may make a written request to the Project Manager to compact the soils at lower moisture content. Identify the soil class in the request. The Project Manager may approve the request provided a Department investigation

determines the lower moisture content is not detrimental to the soil for the given application. For A-1 material in embankments, MT 218 and MT 230 tests will be used.

Compact rock embankments that cannot be tested by Montana Test Methods MT 212 and MT 218 (Proctor Method) or MT 229 (Zero Air Voids Method) with compaction equipment and hauling and spreading equipment. Use grid rollers, pneumatic-tired rollers, vibrating rollers, vibrating compactors, or self-propelled tamping rollers. Do not use sheepsfoot rollers unless approved by the Project Manager. Use water as required.

**TABLE 203-1
COMPACTION REQUIREMENTS**

Compaction Control Method		
Material Compacted	Proctor	Zero Air Voids
	Test Methods: MT 210, MT 230, MT 212, MT 218	Test Method: MT 229
Earth embankment including all backfills	Minimum 95% of maximum density at optimum moisture \pm 2%	Less than 10% air-filled voids
Top 8 inches (200 mm) of subgrade in cut sections		
Culvert foundations		
Top 8 inches (200 mm) of embankment foundations		
Backfill foundations		

203.03.4 Sloping and Finishing

A. Sloping. Finish and shape all cut slopes, ditches, embankments, and structure berms to a uniform, rough textured surface. Scarify smooth slopes.

Conduct slope roughening in accordance with the contract and Detailed Drawings. Slope roughening is a part of slope construction and is not measured for payment.

Where roadway slopes are not completed to the planned or directed lines and the material from the backslope erodes, sloughs, or slides due to incomplete erosion control measures or the Contractor's operations, the removal of the material and restoration of the slope is at Contractor expense.

Where roadway slopes are completed to the plan or directed lines, all required erosion control devices are in place as specified, and the material from the completed slopes erode, slough, or slide onto the roadbed before acceptance of the work, through no fault of the Contractor, the removing of the slide material, potential slide material, and the drainage excavation is paid for in accordance with Subsection 109.04.

When directed, widen cuts and flatten slopes to obtain additional excavation for embankments or to increase slope stability. The Project Manager may steepen stable rock slopes. This work is measured and paid for under the grading item unless it requires non-contract construction methods increasing costs that are considered extra work in accordance with Subsection 104.03.

B. Finishing. Finish the entire roadbed to the final elevations specified.

203.03.5 Maintenance of Constructed Roadway

Maintain the roadway during construction so it is continuously well drained.

Keep all drainage ditches and structures open and free from debris until the final inspection is approved.

If grading work is suspended, blade smooth and grade the entire roadway area to prevent water from collecting or ponding on the roadway. Maintain the roadway during suspension periods to the specified grade and cross section at Contractor expense.

Maintain erosion and siltation control devices meeting the contract requirements.

203.03.6 Topsoil - Salvaging and Placing

Remove sufficient amounts of topsoil from the excavation and embankment foundations to ensure replacement quantities are available to cover all disturbed areas with 4 inches (100 mm) of topsoil.

Place topsoil on the completed graded roadway to the lines, grades, and elevations specified.

Unless directed by the Project Manager, place topsoil on all slopes, excluding slopes 2H:1V or steeper. Place topsoil to an average 4-inch (100 mm) loose depth on the base course surfacing inslope. Uniformly spread the remaining topsoil over the rest of the disturbed areas. Finish the disturbed areas in accordance with Subsection 610.03.2.

Stockpile topsoil at acceptable selected locations within the R/W. When construction operations do not permit stockpiling within the R/W, make arrangements for stockpile sites outside the R/W at no additional cost to the Department.

Construct stockpiles so drainage is maintained and topsoil is easily reclaimed. Provide erosion controls following best management practice.

In the event that construction sequencing prevents replacement of topsoil over all disturbed areas prior to final paving, reserve adequate quantities to cover the exposed base course surfacing inslope as shown in the Detailed Drawings.

203.03.7 Limitation on Grading Operations

The maximum length allowed to be disturbed at one time within the project limits is 2.0 miles (3,200 m) of clearing and grubbing and 2.0 miles (3,200 m) of borrow, excavation and embankment.

The Project Manager may modify the restriction when soil characteristics, Contractor operations or both, indicate that a smaller or larger area is acceptable. For long or complex projects, the Contractor may have several separate grading operations working, where the Project Manager may apply the limit to each individual operation, provided finishing, mulching, and seeding closely follow the rough grading operations at each location. Use the specified pollution controls at each individual location.

203.04 METHOD OF MEASUREMENT

203.04.1 Excavation

The quantities of unclassified excavation, unclassified borrow excavation, special borrow-excavation, unclassified channel excavation, street excavation, sub-excavation, digout excavation, and muck excavation are measured for payment in cubic yards (m³) as surveyed or calculated in accordance with Subsection 109.01.

The Department will provide the initial measurement at no charge for the following specific work areas:

1. In slide areas determined by the Department not to be the fault of the Contractor;
2. In excavated areas authorized by the Project Manager, outside the staked lines and grades; and
3. In un-staked areas such as borrow areas, muck excavations, sub-excavations, and un-staked excavations authorized by the Project Manager.

These areas of excavation and borrow are measured in their original position in accordance with Subsection 109.01. Disposal of excess or unusable excavation is not measured for payment.

The quantities of special borrow-neat line for payment are calculated in its final position in accordance with Subsection 109.01 with no allowance for shrink or swell.

Either the Department or the Contractor may request re-measurement of specific work areas, or the entire project, if there is disagreement over the accuracy of quantities computed from the staked lines and grades. The party requesting the re-measurement is responsible for all costs associated with the re-measurement. Department staff may perform the re-measurement, in which case, the cost for the Department's re-measurement is the Contractor's responsibility. An independent third party acceptable to the DCE, and under the direction of a professional land surveyor registered in Montana, may also be used to perform the re-measurement, at Contractor expense.

Excavation is eligible for a second payment under the following conditions:

1. A second handling is required;
2. The excavated material meets all the contract requirements for the second usage;
3. The second payment item quantity is calculated in-place in its final disposition, or computed from plan dimensions. Items that require a second field measurement, such as special borrow-excavation, are not eligible for a second payment;
4. The contractor makes up any shortfall in excavation, at no cost to the Department, caused by the second use. The material making up the shortfall is subject to approval by the Project Manager; and
5. The contractor is responsible for the haul, balance lengths, balance points or other foreseen or unforeseen project constraints. No payment will be made for any additional costs.

Authorized excavation of rock, shale, muck, or unstable material below grade necessary to provide the designed thickness of backfill is measured for payment. If the designated bottom plane of the excavation falls within a layer of rock, the below-grade excavation to the bottom of the layer, not exceeding 6 inches (150 mm) below grade, is considered authorized and is measured for payment.

Rock excavation exceeding 6 inches (150 mm) below grade is not measured for payment. If the nature of the material, the thickness of the layers or strata, and method of operations make it practical to excavate only to the plan depth, any material removed below plan depth is not measured.

Measurements are made for unusable materials excavated and removed.

Useable material temporarily removed and replaced for Contractor convenience is not measured for payment.

Removal and disposal of unusable materials from borrow areas is not measured for payment. Special borrow removed from areas before surveying is not measured for payment.

The actual quantities of plan and approved sub-excavation are measured and added to the quantities of unclassified excavation for payment.

Unstable material reworked in accordance with Subsection 203.03.1(D) is measured and paid for as unclassified excavation for the second handling.

When the contract does not contain a bid item for muck excavation and an area is determined to be muck in accordance with Subsection 203.01.1(E), the muck excavation quantity is measured and paid for in accordance with Subsection 109.04. Measurement and payment for muck excavation at the agreed price includes all excavating and hauling, disposing of all stumps, logs, and other debris encountered in the excavation, all pumping and de-watering required, and finishing of the planned disposal areas.

Unclassified excavation allowed for pre-split drill equipment clearance is calculated from the area bounded by the plan slope and lines parallel to plan slope, offset 2 feet (610 mm) for each 50-foot (15.2 m) increment in vertical cut height. The quantity for drill equipment clearance where the cut slope height is less than 50 feet (15.2 m) is not measured for payment.

Excavation used as select or stockpiled select material is measured by the cubic yard (m³) in its original position.

Removed and placed stockpile material is measured using the volume in its original excavated position.

Channel excavation is measured and paid for as unclassified channel excavation.

Street excavation is measured and paid for as unclassified excavation unless the contract has street excavation as a bid item. Disposal of material or other items within the limits of the street excavation are not measured for payment.

Geotextile is measured in accordance with Subsection 622.04. Accepted quantities of geotextile are paid for in accordance with Subsection 622.05.

203.04.2 Reserved

203.04.3 Embankment in Place

The embankment quantities measured in cubic yards (m³) for payment as Embankment In Place include the following:

1. The actual quantities of roadway embankment measured, above the original ground line in accordance with Subsection 109.01, with no volume adjustments made for shrinkage, compaction, or subsidence.
2. The topsoil replacement quantity, measured in the topsoil stockpiles.
3. Excavation of unusable material and sub-excavation in the contract or directed by the Project Manager in its original position.

203.04.4 Compaction

Work and materials to compact embankment material and backfill to the specified density is not measured for payment.

203.04.5 Topsoil

Excavation of topsoil material from its original position, loading, hauling, stockpiling, and removal from the stockpile and spreading on the designated areas is measured for payment by the cubic yard (m³) in the stockpile before final placement.

Before measurement, shape and smooth each stockpile into the smallest practical area. Haul is not measured for payment.

Topsoil removed from cut areas is not deducted from the grading quantities.

Measurement is made as if the topsoil had not been removed.

Topsoil removed from embankment areas and from borrow areas, excluding Contractor-optional in accordance with Section 106, is measured under the bid item Topsoil - Salvaging and Placing.

203.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Digout Excavation	Cubic Yard (m ³)
Embankment in Place	Cubic Yard (m ³)
Muck Excavation	Cubic Yard (m ³)
Special Borrow	Cubic Yard (m ³)
Street Excavation	Cubic Yard (m ³)
Topsoil - Salvaging and Placement	Cubic Yard (m ³)
Unclassified Borrow Excavation	Cubic Yard (m ³)
Unclassified Channel Excavation	Cubic Yard (m ³)
Unclassified Excavation	Cubic Yard (m ³)

Payment at the contract unit prices is full compensation for all resources necessary to complete these items of work in accordance with the contract.

SECTION 204

BLASTING

204.01 DESCRIPTION

This work is using blasting techniques to form cut slopes, remove rock obstructions and other objects to construct highway roads, bridges and facilities.

204.02 MATERIAL

Furnish non-plastic crushed granular material for stemming, meeting the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
5/8" (16 mm)	100
No. 4 (4.75 mm)	0 – 10

Provide a minimum of 35% of the material retained on the No. 4 (4.75 mm) sieve with at least one mechanically fractured face.

204.03 PRODUCTION BLASTING

Production blasting refers to the main fragmentation blasting resulting from more widely spaced production holes drilled throughout the main excavation area adjacent to the controlled blast line.

204.03.1 Blasting Professional

- A. Blasting Consultant.** Retain a recognized Blasting Consultant to assist in the blast design. Ensure the Blasting Consultant is an expert in the field of drilling and blasting and is not an employee of the Contractor, an explosives manufacturer, or explosives distributor. Review the Blasting Consultant's resume to ensure adequate experience in drilling and blasting. Submit a copy of the resume to the Project Manager at the Pre Construction Conference. The Blasting Consultant is professionally responsible when advising the Contractor on issues relating to blast safety, blast design, and public safety and convenience. The Contractor is responsible for all damage.

The Blasting Consultant is in responsible charge of the blast monitoring, pre-blast and post-blast surveys, ground vibration monitoring, and air overpressure monitoring. Have the Blasting Consultant review all blasting plans and submit comments regarding the adequacy of the blast plans to ensure conformance to these specifications and all other applicable Federal, State, and local regulations. The Blasting Consultant and the Blaster-in-Charge must coordinate their efforts to ensure these requirements are met. Forward the Blasting Consultant's comments, Master Blasting Plan, and all other ancillary plans required by the contract, to the Project Manager for review.

The Blasting Consultant has the authority to require modification of any of the proposed blasting plans to meet project requirements, environmental requirements, or satisfy safety concerns. Submit these modifications to the Project Manager for review as required.

The Blasting Consultant must attend all blasting related meetings including the preconstruction meeting.

- B. Prequalified Blasting Contractors.** Use prequalified blasting contractors to complete the work required in the contract. A list of prequalified contractors is located at the following website: <http://www.mdt.mt.gov/business/contracting/prequalified.shtml>.

Contractors not currently prequalified by the Department to perform blasting work can obtain pre-qualification information from the CES Bureau, 2701 Prospect Ave., Helena,

Montana. A complete Statement of Qualifications (SOQ) must be received a minimum of 14 calendar days prior to the bid opening as specified in the Invitation for Bids.

204.03.2 Use of Explosives

Explosives refer to any commercial explosive products, materials, blasting agents, primers, delays, initiators, etc., used in blasting operations.

Transport, store, handle, and load explosives and blasting agents following all laws and ordinances as well as the applicable requirements of Title 29, Title 30, and Title 49 of the Code of Federal Regulations and specifically the current Office of Surface Mining Reclamation and Enforcement (OSMRE) Blasting Guidance Manual when using, handling, loading, transporting, and storing explosives and blasting agents.

Use only explosives permitted by the State, local laws and ordinances, and all respective agencies having jurisdiction over them.

Use explosives without endangering life or property and be responsible for all resulting property damages, injury, or death.

Only use persons experienced in the handling of explosives and do not fire explosives until sounding a warning and removing all persons from the radius of danger.

Notify each property owner, Railway Company, and public utility Company having facilities near the blasting area of the intent to use explosives to enable them to take precautions to protect their property from injury. Be responsible for damages to property or injury to persons attributable to the use of explosives.

Do not use explosives and explosive products containing the chemical compound perchlorate (ClO_4).

204.03.3 Master Blasting and Safety Plan

Submit a Master Blasting Plan, along with any comments from the Blasting Consultant, to the Project Manager for review at least 10 business days before the start of test or production drilling operations or at any time the drilling and blasting methods, or explosive type or product are changed. Include full details of the drilling and blasting patterns and controls to be used for production blasting in the blasting plan.

A. Blasting Plan. Include the following information, at a minimum, in all blast plans:

1. Shot Number.
2. Date and proposed time of shot.
3. Top and bottom elevations of the blast.
4. Seismograph locations, elevations, and distances between the blast and vibration monitoring points.
5. The station limits of the proposed blast(s) and the number of holes to be drilled and shot per blast.
6. The hole diameter, hole depths, and explosive load for each hole (number of cartridges of each type, stemming depth, decks, and primers, etc.).
7. Explosive type; diameter; length; weight; and brand name.
8. Proposed quantities of production and presplit/cushion blasting for each blast and the entire project.
9. Appropriately scaled plan diagram(s) showing: blast hole locations, blast hole diameter, blast hole pattern, blast hole angle(s), free face, burden, spacing, lift height, sub drill depth(s), delay periods, delay pattern, and relative location of nearby structures and appurtenances. Base all plan diagrams on the project plan sheets, including topography.

10. Appropriately scaled cross section diagram(s) showing: blast hole depths, blast hole angle(s), loading, stemming, sub drill (as applicable), etc. Base all cross section views on the project plan sheets, including topography.
11. Total pounds of explosives and number of cartridges to be used.
12. Total volume of blasted material.
13. Powder Factor and maximum pounds of explosives per delay.
14. Detailed calculations for predicted peak particle velocities, and predicted vibration frequencies for ground and pertinent adjacent structures to ensure compliance with required peak particle velocity and vibration limits.
15. The signatures of the Blaster-in-Charge and the Blasting Consultant.
16. A storage plan for explosives, including the type of magazine or explosive facility, (if applicable) or a declaration indicating the use of daily explosive deliveries for the duration of the project. Provide a copy of the notification letter sent to the Federal Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), signed by the magazine owner, if daily delivery will not be utilized at any time during the contract.
17. A detailed plan with the methods describing fly rock or blast debris prevention.
18. Manufacturer's product data sheets or technical bulletins and MSDS information for all explosives to be employed.
19. Copies of the Blaster-in-Charge's current State of Montana Blasters License. The State of Montana requires blasters to have a current Montana Blasters License.

The Master Blasting Plan and required submittals will be reviewed and revised based on the results of the test blasts. After satisfactorily completing the test blast section(s), and incorporating all test blast results and Blasting Consultant's comments, submit the reviewed and revised blasting plan as the Master Blasting Plan.

Submit an individual production blast plan for all subsequent blasts at least 4 business days prior to the planned blast day. Include the items discussed above, in Subsection 204.03.3(A), items (1) through (15), in each blast plan. Submit the production blasting plans on form CSN-55.

Do not begin full scale production blasting until the master blast plan has been submitted and reviewed for conformance to the Contract. Review of the blast plan(s) does not relieve the Contractor of responsibility for the accuracy, adequacy, and safety of the plan when implemented in the field.

B. Safety Plan. Submit a Safety Plan, in addition to the Master Blasting Plan and including any comments from the Blasting Consultant, to the Project Manager for review at least 10 business days before the start of test or production drilling operations. Include the following information, in the Safety Plan:

1. The name and telephone number of the Blaster-in-Charge. The Blaster-in-Charge is responsible for directing the day to day drilling and blasting operations, for clearing the blast site before excavation of the blasted material may proceed, for clearing local traffic through the blast zone, and for all required report preparation including daily blast logs, daily explosives consumption reports, and loss reports. Submit sample copies of daily blast logs, daily explosives consumption reports, and loss reports.
2. A detailed access control plan with the methods proposed to clear the blast area and to control access to the blast site and other closure locations required by the contract by unauthorized personnel during drilling, loading, blasting, and scaling operations. This plan will be followed exclusively by all parties concerned.
3. A detailed plan with the methods proposed to notify local residences, and all project personnel involved with field operations within the blast area, of an impending blast. Include the method(s) of notification and the proposed timeline(s) in the plan.

4. A detailed plan with methods to document, assess, and control ground vibration and air overpressure as well as calculated scale distances to each structure or appurtenance within a minimum of 1,320 feet (400 m) from the blast. Structures and appurtenances include, but are not limited to: culverts, bridges, other drainage facilities, wells, gabion walls, bin walls, other retaining structures, utilities, buildings, residences, railroads, etc.
5. A detailed vibration and blast monitoring plan, including a current calibration certification of any seismographs to be used.
6. A detailed fire prevention and protection plan.
7. A detailed plan to identify all potential blast site electrical hazards including, but not limited to, a lightning detection and protection plan.
8. A detailed emergency plan outlining the procedures to be followed in the event of an injury, accident, or unanticipated road closure in excess of one hour. Details of this plan must contain provisions for emergency vehicle traffic and personnel including potential detour routes, length of emergency detour, and estimated time to traverse the emergency detour.
9. A detailed blasting day protocol to be followed by all parties concerned. Information in the blasting day protocol must include, but is not limited to:
 - (a) Notifications made to impacted local residents, all project personnel, local emergency response organizations, utilities, or other entities that may be impacted by the blast.
 - (b) A contact list and appropriate phone numbers of all parties impacted by or involved in the blasting. Post copies of the contact list in the field office and submit a copy of the contact list to the Project Manager.
10. A copy of a sign-up sheet for documenting attendance of mandatory safety meetings by all project personnel involved with field operations within the blasting area.
11. A detailed scaling plan including the methods proposed and the entity responsible for conducting scaling operations on the project.
12. The signature of the Blaster-in-Charge and the Blasting Consultant.

Blasting and Safety Plan submittals must be complete. They may be submitted as 2 separate submittals, but each plan must be a complete document. The review time does not start until the complete package is received. Electronic documents (.pdf) are encouraged, but may also be in the form of portable storage devices.

204.03.4 Blasting Test Section(s)

Prior to conducting full-scale blasting operations, demonstrate the adequacy of the proposed Master Blasting Plan by drilling, blasting, and excavating test sections 100 feet (30 m) in length. Use the test sections to demonstrate which combination of methods, burden, spacing, other blast design parameters, and charge perform the best based on in-situ field conditions. When warranted by field conditions, test sections shorter than 100 feet (30 m) may be required, as determined by the Project Manager.

Requirements for production blasting operations covered elsewhere in this specification also apply to the blasting operations carried out in conjunction with the test blasts.

Do not drill ahead of the test blast area until the test section has been excavated and the results are evaluated by the Project Manager. If the results of the test blast(s) are unsatisfactory, adopt revised methods as necessary to achieve the required results at no additional cost to the Department.

If methods of drilling and blasting do not produce a uniform slope and shear face or adequate fragmentation within the tolerances specified in the contract, drill, blast, and excavate in short

sections, not exceeding 100 feet (30 m) in length, until a technique is arrived at producing the desired results, with no additional cost to the Department.

Unsatisfactory blast results include, but are not limited to: fragmentation beyond the indicated lines and grade (over break), excessive oversize material, poor fragmentation, fly rock, excessive ground vibration, excessive air overpressure, or violation of other requirements within these specifications. All costs incurred in adopting revised blasting methods necessary to produce an acceptable test blast are the sole responsibility of the Contractor.

204.03.5 Safety

Comply with all State and Federal requirements for blasting safety, including the OSMRE *Blasting Guidance Manual*, which provides guidance on the use of explosives and certification of blasters.

- A. General.** Prior to the each blast, conduct a safety meeting to discuss the safety requirements for blasting operations and the blast day protocol. Attendance for this meeting is mandatory for all project personnel that may be involved in field operations within the blasting and closure areas. Document attendance with a sign-up sheet and provide a copy of this sheet to the Project Manager. If there any changes to the safety requirements or blast day protocol, conduct another mandatory meeting and document attendance as required above.
1. Post required blasting signage prior to the start of the shift on the day of the blast. Signage must meet requirements of Section 618 and the traffic control plan.
 2. Do not blast during hours of darkness (one-half hour before sunset to one-half hour after the following sunrise).
 3. Do not load holes during hours of darkness (as defined above).
 4. Do not load explosives prior to Department review of applicable blast plans.
 5. Keep all personnel and equipment not involved in loading or blasting operations a minimum of 100 feet (30 m) from the blast site during loading operations.
 6. Keep all equipment and personnel a minimum of 1,000 feet (305 m) from the blast site during blasting operations.
 7. Remove and properly dispose of all explosives packaging material prior to each blast.
- B. General.** The blasting day protocol is to be followed exclusively by all parties concerned. Information in the blasting day protocol includes, but is not limited to, the information listed in Subsection 204.03.3(B)(9).
1. Convene the following personnel one hour prior to blasting to coordinate traffic control, required closures, and blast procedures: Blasting Consultant, Blaster-in-Charge, Traffic Control Contractor, Project Manager (or Representative), Contractors or Subcontractors Foreman, and other pertinent personnel.
 2. Road closures due to blasting operations and clean-up may not exceed the requirements of the contract. Clean-up activities include, but are not limited to, scaling or clean-up of loose rock or blasting related debris for safety purposes.
 3. If road closures due to blasting operations exceed the required time limit, the Project Manager will suspend all work not directly related to blasting activities in accordance with the following:
 - (a) Closures up to 15 minutes beyond the allowed closure will result in a 2-day suspension of all work as defined above and time charged to the contract.
 - (b) Closures of 15 to 30 minutes beyond the allowed closure will result in a 3-day suspension of all work as defined above and time charged to the contract.
 - (c) Closures of greater than 30 minutes beyond the allowed closure will result in a 4-day suspension of all work as defined above and time charged to the contract.

(d) The Project Manager will rescind the suspension of work after receipt of a written plan from the Contractor detailing the measures to be taken ensuring compliance with the required road closure times. No adjustment to contract time will be made for work suspensions resulting in excessive road closures.

C. Warnings and Signals. Provide a detailed explanation and description for the signals that will be used. The warning signals must be clearly audible for ½-mile (800 m) from the blast site. The Blaster-in-Charge must demonstrate to the Project Manager that the method of warning meets this requirement.

1. Sound an initial warning signal 5 minutes prior to blast initiation to notify all in the area of the start of blasting within a 5 minute period. Sound a second warning signal one minute prior to blast initiation.
2. After the blast is over, the Blaster-in-Charge and the Blasting Consultant are required to observe the entire blast area for a minimum of 5 minutes to determine if all explosives have detonated and to guard against rock fall before commencing cleanup work and excavation.
3. The Blaster-in-Charge is responsible for clearing the site. If any holes have not detonated, the Blaster-in-Charge, with the assistance and advice of the Blasting Consultant, is required to address the misfire(s) and eliminate the hazard before other personnel enter the worksite. The blast site is off limits to unauthorized personnel during this time. The Contractor is responsible for all costs resulting from misfires. If a misfire occurs on a blast, notify the Project Manager. Submit a written report of existing conditions and remedial action taken to the Project Manager within 24 hours.
4. Once the Blaster-in-Charge and the Blasting Consultant indicate the area is free from misfires, blast damage, overhangs, or other hazards, sound an all clear signal to indicate to all personnel in the area that blasting operations are finished. Do not allow traffic to proceed until the all clear signal is given.

204.03.6 Pre-Splitting Rock Slopes

A. General. Pre-split rock cuts to a smooth plane using loaded, timed, and spaced drill holes.

Produce a continuous or semi-continuous fracture between drill holes and a stable rock cut by eliminating over break in the back slope during primary blasting.

B. Drilling. Use drills equipped with mechanical devices that accurately determine the angle the drill steel enters the rock. Do not drill if the devices are missing or inoperative.

Perform grading, as necessary, to remove overburden soil and loose or decomposed rock along the top of the excavation to establish a uniform and stable platform for drilling activities.

Use pre-split hole diameters that are between 2½ and 3 inches (65 to 75 mm). Drill pre-split holes within 3 inches (75 mm) of the staked collar location. Holes drilled outside the 3-inch (75 mm) tolerance will be rejected and not measured for payment. Drill hole intervals may vary between 24 and 36 inches (610 to 915 mm). A 30-inch (765 mm) interval is used to estimate the quantity of pre-split drilling in the contract.

When the cut height exceeds 30 feet (10 m), and after completion of the top excavation lift, an offset from the staked slope line, not to exceed 2 feet (610 mm) is allowed at the top of each lift after the top lift. The actual slope cannot deviate from the plan slope by more than 1-foot (305 mm).

Control the drilling operations to ensure that no hole deviates from the slope plane by more than 9 inches (230 mm). This tolerance applies to deviations left or right of an apparent vertical projection of the hole when viewed from a right angle to the slope face or deviations into or out of

the planned slope plane when viewed parallel to the slope face. Pre-split holes exceeding these limits will not be paid for.

Drilling 2 feet (610 mm) below ditch bottom to aid in removing the toe berm is permitted.

Extend pre-split holes a minimum of 30 feet (9.1 m) beyond the limits of the production holes or to the end of the cut.

Maintain the length of pre-split holes for any individual lift at no more than 30 feet (9.1 m).

The Project Manager may approve a written request to increase the hole length to a maximum of 60 feet (18.2 m) if it is demonstrated that the above pre-split hole tolerances and a uniform slope can be maintained. If over 5% of the pre-split holes are misaligned in any one lift, reduce the lift heights until the 9-inch (230 mm) tolerance is met.

204.03.7 Blasting Operations

A. General. All blasting operations, including the transport, storage, handling, and loading of explosives, are the direct responsibility of the Blaster-in-Charge. Conduct all blasting operations in accordance with the contract and all applicable Federal, State, and local regulations.

Store all explosives in accordance with the submitted storage plan and all applicable Federal, State, and local regulations.

Provide each cap period from one lot number. Mixing of lot numbers for any one cap period is prohibited. Any blasting materials in excess of one year of age are prohibited.

If any explosives are determined to be of either excessive age or in a deteriorated condition, cease all blasting work until the explosives age or quality can be verified. Do not use explosives that do not meet the manufacturer's specifications. Remove and properly dispose of explosives, not meeting the manufacturer's specifications, at no cost to the Department.

Explosives missing date codes are prohibited and cannot be brought to the site. The Blasting Consultant is responsible for verifying that the above requirements are met.

The Project Manager has the authority to:

- Require the explosives to be tested by an independent organization to determine its performance compared to the manufacturer's product data sheet.
- Approve the independent testing organization prior to performing the tests.
- Reject any lot number if the explosives performance and/or composition deviates more than 10% in any manner from the manufacturer's product data sheet.

All costs for testing and replacement of the explosives are the Contractor's responsibility if the explosives performance or composition deviates by more than 10%. The Department will pay the testing costs if the explosives meet the manufacturer's product data sheet.

B. Procedure. Drill production blast holes in accordance with the patterns shown on the submitted blasting plan(s). Drill the production blast holes within two blast-hole diameters of the staked collar location. Do not drill the production hole bottoms lower than the presplit hole bottoms. The maximum allowable diameter for production holes is 6 inches (150 mm).

Locate and stake the blast holes. If more than 5% of the holes are drilled outside of this tolerance, fill the holes with crushed stone or approved material and re-drill the blast holes at the proper location.

Detonate production holes on a delay sequence toward a free face. Stem production holes a minimum of 3 feet (915 mm) or 0.7 times the burden distance, whichever is greater, with stemming meeting the requirements of this specification. Take all precautions necessary in the blasting operations to prevent blast damage to the final rock

slope. Production blasting is incidental to and included in the measurement and payment for unclassified excavation.

Do not use bulk ammonium nitrate and fuel oil in the pre-split holes. Use only standard explosives manufactured specifically for pre-splitting.

Fit blast holes with a temporary plug to prevent overburden, drill cuttings, or other foreign material from falling into the hole after drilling. Verify that the drill holes are free of obstructions for their entire depth before placing charges. Take precautions to prevent material from entering the drill holes during loading operations.

Stem all presplit holes a minimum of 3 feet (915 mm) with stemming meeting the requirements of this specification. The Contractor may pre-split the slope face before production drilling or pre-split the slope face and production blast at the same time, if the pre-split drill holes are fired simultaneously at least 100 milliseconds before the production blast. Do not delay pre-split holes more than 25 milliseconds, hole to hole, to reduce noise and ground vibration.

Prior to loading any blast holes, check and measure holes for conformance to the submitted blast plan. The Blasting Consultant is responsible for verifying the location and depth of these holes. If the blast holes are not drilled to the correct depth, are plugged, or are unable to be fully loaded, clean out or re-drill those holes not meeting the contract requirements or the submitted blast plan. The Blasting Consultant is responsible for verifying that all explosives and stemming are installed in accordance with the submitted blast plan. Notify the Project Manager of any variations or deviations from the submitted blast plan. Submit a detailed written report on the discrepancies observed and recommended remedial action to the Project Manager as soon as possible.

204.03.8 Scaling

Scale slopes throughout the duration of the contract, and at such frequency as required, removing all loose rocks, overhangs, or other hazards. Scale during or upon completion of excavation in each lift. Do not allow drilling of the next lift until this work has been completed. Scaling must be performed to industry standards and contract requirements.

Perform additional stabilization or scaling, required as a result of the blasting, at no additional cost to the Department.

The Project Manager has the authority to prohibit or halt blasting operations if:

- The required slopes are not being obtained in a stable condition;
- The safety and convenience of the traveling public is being jeopardized; or
- Unsatisfactory blast results are being obtained as defined in Subsection 204.03.4.

All costs incurred in adopting revised blasting methods necessary to produce acceptable blasting results are the sole responsibility of the Contractor.

204.03.9 Records

A. Drilling Logs. On a daily basis, and prior to loading any explosives, provide copies of the daily drilling logs to the Blasting Consultant, the Blaster-in-Charge, and the Project Manager. Include all of the following information, at a minimum, for each hole drilled:

1. Drill hole location within the blast pattern (i.e. row number and hole number).
2. Drill hole diameter.
3. Total depth of drill hole.
4. Drill hole angle.
5. Depth of overburden.
6. Depth to any changes in material hardness (e.g. clay seams, sand seams, soft rock, coal seams, etc.).
7. Depth and length of any voids encountered.

8. Depth to water if encountered.
 9. Date drilled.
 10. Driller's name.
- B. Blasting Logs.** On a weekly basis, provide copies of the daily logs of blasting operations to the Project Manager. Include the numbers, times, dates, blasting locations, and patterns of all blasts in the logs for that week. Additionally, include all of the following information:
1. Any variations from the reviewed blasting plan.
 2. Trade names and sizes of all explosives.
 3. Explosives consumption and loss reports.
 4. All ground vibration and air overpressure records.
 5. Signature of Blaster-in-Charge.

204.03.10 Survey

- A. Pre-Blast Condition Survey.** Have the blast consultant arrange for a pre-blast survey of any nearby buildings, structures, utilities, or other appurtenances that may potentially be at risk from blasting damage. Use a survey method acceptable to the Contractor's insurance company. Submit copies of all pre-blast survey records to the Project Manager for review before blasting operations begin. Notify occupants/owners of local buildings, structures, utilities, or other appurtenances a minimum of 48 hours prior to the start of blasting operations.
- B. Post-Blast Condition Survey.** If complaints of damage or annoyance are made, have the blast consultant arrange for a post-blast survey of any nearby buildings, structures, utilities, or other appurtenances affected by blasting. Use a survey method acceptable to the Contractor's insurance company. Be responsible for any damage as described in Subsections 107.15 and 204.03.2. Submit copies of all post-blast survey records to the Project Manager for review within 48 hours of completing the survey. Notify the Project Manager of any damage or annoyance claims from occupants/owners of local buildings, structures, utilities, or other appurtenances a within 24 hours of the complaint.
- C. Vibration Control and Monitoring.** Have the blast consultant establish a vibration control and monitoring program. Submit the vibration control and monitoring program to the Project Manager for review at least 10 business days before the start of test or production drilling operations or at any time the drilling and blasting methods are changed.

When blasting near buildings, structures, or utilities, or other appurtenances that may be subject to damage from blast induced ground vibrations; control the ground vibrations by using properly designed delay sequences and allowable charge weights per delay. Establish allowable charge weights per delay by carrying out test blasts and measuring vibration levels. Confirm that the test blasts, in accordance with Subsection 204.03.4 and modified as required, limit ground vibrations to below damage thresholds.

Monitor each blast using an approved seismograph(s) located, in accordance with the submitted Master Blasting Plan, between the blast area and the closest structure(s) subject to blast damage whenever vibration damage to adjacent structures is possible. Use a seismograph(s) capable of recording peak particle velocity for three mutually perpendicular components of vibration in the ranges typical for blasting operations. All seismographs employed for monitoring are required to be calibrated within the preceding 12 months. Furnish current calibration certifications to the Project Manager.

Do not allow peak particle velocity or frequency of each component to exceed the safe limits of the nearest structure subject to vibration damage. Have the Blasting Consultant

interpret the seismograph records to ensure that the seismograph data is effectively utilized in the control of the blasting operations with respect to the existing structures.

Provide the data recorded for each blast to the Project Manager prior to the next blast and include the following:

1. Identification of instrument used.
2. Name of qualified observer and interpreter.
3. Distance and direction of recording station from blast area.
4. Type of ground at recording station and material on which the instrument is sitting/placed.
5. Maximum peak particle velocity and frequency in each component.
6. A dated and signed copy of photographic records of seismograph readings.

Table 204-1 lists suggested conservative limits for maximum peak particle velocity and minimum frequency.

**TABLE 204-1
SEISMOGRAPH TOLERANCES**

Structure Type	Maximum Peak Particle Velocity, inches per second	Minimum Vibration Frequency, Hertz
Green concrete (less than 7 days)	1.00	18
All other structures; utilities; wells; springs; and aquifers	2.00	30

The Blasting Consultant has the authority to modify the above parameters to safely meet contract and environmental requirements.

Older deteriorated structures, utilities, or structures housing computers or other sensitive equipment, may require lower peak particle velocity and different frequency limits than given in Table 204-1. Additionally, buried pipelines, fiber optic cables, or other appurtenances owned by private utility companies or structures owned by other entities may be subject to lower limiting values imposed by the owner. On critical projects where vibration and frequency control is important, have an experienced vibration specialist establish safe vibration limits.

In special cases, the Blasting Consultant may use the Blasting Level Chart, (Figure 1, page 24, OSMRE Guidelines) to determine maximum allowable ground vibration. This figure provides alternative blasting level criteria based on blast vibration frequency and maximum allowable peak particle velocity.

The Blasting Consultant is responsible for; all necessary materials and equipment utilized in the performance of this work, for providing a high-speed film or video record of each blast, to be available to perform evaluation, monitoring, and record keeping as described above and as directed by the Project Manager.

204.03.11 Noise and Debris Control

- A. Air Overpressure and Noise Control.** Have the Blasting Consultant install an air overpressure monitoring system, if appropriate, between the main blasting area and the nearest structure subject to blast damage or other detrimental effects. Ensure the equipment used to make the air overpressure measurements is the type specifically manufactured for that purpose. Hold peak overpressure below 0.05 psi (0.34 kPa) at the nearest structure or other designated location. Use appropriate blast hole patterns, stemming, and detonation systems to prevent venting of blasts and to minimize air overpressure and noise levels produced by the blasting operations. Lower the overpressure limit if it proves too high based on damage or complaints. Immediately after

each blast, furnish a permanent signed and dated record of the peak overpressure measurements to the Project Manager.

- B. Fly Rock Control.** Where necessary, use approved blasting mats, soil, or other equally serviceable materials or containment methods to prevent fly rock and/or debris.

Permit violations, resulting from blasting operations, are the sole responsibility of the Contractor.

204.03.12 Controlled Blasting

Controlled blasting refers to the controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes to produce a free surface or shear plane in the rock along the specified excavation back slope.

Controlled blasting techniques include presplitting and cushion (trim) blasting. All final slopes identified in the contract as pre-split slopes must be excavated with controlled blasting methods. Ripping is not allowed within 10 feet (3 m) of the final slope face.

- A. General.** Meet all requirements of Subsection 204.03, as well as the following:

1. When presplitting, detonate the presplit line before detonating any production holes.
2. Cushion blasting is similar to presplitting, except detonation along the cut face is after the detonation of the production holes.
3. Unless otherwise approved by the Project Manager, begin tests using controlled blast holes spaced 2½ feet (760 mm), adjusting if necessary, to a maximum spacing of 3.0 feet (915 mm), until the Project Manager approves the spacing to be used for a full-scale controlled blasting operations.

- B. Controlled Blasting Methods**

1. **Presplitting.** Perform all presplitting, including the blasting test sections, in accordance with Subsection 204.03.4.
2. **Cushion (Trim) Blasting.** Cushion blast, in lieu of presplitting, where the horizontal distance from the cut face to the existing rock face is less than 15 feet (5 m). The difference in delay time between the trim line and the nearest production row cannot be more than 75 milliseconds or less than 25 milliseconds.

204.04 METHOD OF MEASUREMENT

204.04.1 Drill Pre-Splitting Holes

- A. Production Blasting.** Production blasting is incidental to and included in the measurement for Unclassified Excavation in accordance with Section 203.
- B. Controlled Blasting.** Drill pre-splitting holes are measured by the linear foot (m) of controlled blast hole. The measurement is made from hole collar to a depth of 2 feet (610 mm) below finished ditch grade. Holes with alignments not meeting the requirements of Subsection 204.03.3 are not measured for payment. Quantities shown in the contract are based on 2½-foot (760 mm) hole spacing. Actual quantities will depend on field conditions and results from test sections. The quantity of drill pre-splitting holes shown in the contract is not guaranteed, and the Department reserves the right to increase or decrease this item with no adjustment in the contract unit price.

204.04.2 Blasting Consultant

Blasting Consultant is measured by the lump sum.

204.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Blasting Consultant	Lump Sum
Drill Pre-Splitting Holes	Linear Foot (m)

Equipment to perform vibration and air overpressure monitoring, pre-blast and post-blast surveying, film, videotape, and other expendable materials are incidental to Blasting Consultant work and are not paid separately. Payment for all costs associated with Blasting Consultant work is included in the lump sum bid price for Blasting Consultant.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

204.05.1 Production Blasting

Payment for all costs associated with production blasting including materials, explosives, labor, tools, and equipment is included in the contract unit price per cubic yard (m³) of Unclassified Excavation.

204.05.2 Controlled Blasting

Payment for all costs associated with controlled blasting including materials, explosives, labor, tools, and equipment is included in the contract unit price per linear foot (m) of drill pre-splitting holes.

SECTION 206

DETOURS

206.01 DESCRIPTION

This work consists of constructing, maintaining and removing a detour within the prescribed corridor and as specified in the contract.

206.02 RESERVED

206.03 CONSTRUCTION

206.03.1 General

Construct the detour to the lines and grades shown in the contract and cross sections. Provide surfacing materials and thicknesses as specified in the contract.

Remove and stockpile topsoil within areas of the detour that require excavation prior to detour grading operations. Complete detour grading operations in accordance with Section 203.

In wetland or riparian areas as shown in the contract, cut shrubs impacted by temporary detour construction flush with the ground, do not grub. Use geotextile, or other approved separation, between the natural ground and temporary detour fill to provide minimal disturbance to the existing ground.

206.03.2 Design

Construct the temporary detour within the R/W or permit area and to the lines and grades shown in the contract and cross sections or as approved by the Project Manager. Surface the detour as indicated in the contract.

The method required for conveyance of a waterway is not included in the Preconstruction authorizations and permits issued by resource and regulatory agencies. Prior to commencing any work on the detour, determine a preferred method of conveyance and submit this with the Contractor's temporary facilities joint application to the Project Manager. The submittal will be forwarded to the appropriate resource and regulatory agencies for review and approval.

- A. Culverts.** If used, furnish culverts of the size and length shown in the contract. Provide adequate bulkheads at the approach fills to prevent fill materials from entering the waterway. Place culverts in accordance with Section 603.
- B. Structures.** If a bridge is chosen as means for conveyance of the waterway, provide a waterway opening of sufficient size to accommodate the 2-year flood event, spanning the active channels with 1-foot (305 mm) minimum freeboard. Construct all temporary bents in a manner that the current remains un-deflected. Provide adequate bulkheads at the approach fills to prevent fill materials from entering the waterway.

Provide the detour bridge with a width greater than or equal to that of the existing bridge, with a design load capacity of AASHTO HS-20 (MS-18). Provide a rail system with blunt end protection at all bridge ends. Ensure the rail system either meets NCHRP 350 TL-1 or MASH crash test requirements or can resist raiing design forces as specified in AASHTO LRFD TL-1 (Table A13.2-1).

206.03.3 Submittals

- A. Bridge.** Submit a copy of the design and calculations plus 5 copies of the working drawings for the proposed detour bridge stamped and signed by a professional engineer licensed to practice in the State of Montana. Show the following in the drawings:
 - 1. Bridge length and width.
 - 2. Location of all bents.
 - 3. Clear water opening.
 - 4. Bulkheads and method of construction.

5. Details of the bridge rail.

B. Culverts. When culverts are not shown in the contract, submit a copy of the design for the proposed pipe which must show the following:

1. Pipe size and length.
2. Location.
3. Minimum fill cover.

The Department has 20 business days to review the submittals. Approval of the detour is contingent upon meeting the requirements of this provision and those of the resource and regulatory agencies with jurisdictional authority.

206.03.4 Maintenance

Maintain the detour in accordance with Subsection 104.05 to provide the traveling public with a safe and smooth riding surface. Provide a satisfactory surface similar or better to that which existed on the PTW prior to beginning construction. Repair all damage to the detour and the PTW connections immediately and at no additional cost to the Department. This includes, but is not limited to, damage from washouts, chuckholes, soft spots, guardrail damage, or debris on the roadway. Failure to maintain the detour in a manner that provides the traveling public with a safe and smooth riding surface is cause for the Project Manager to stop work until corrective actions take place. All costs associated with the delay are the Contractor's responsibility.

206.03.5 Removal

Remove the detour only after the mainline work has been completed and approved by the Project Manager. Fill areas excavated for detour construction and incorporate the material removed from the detour into the mainline embankment. Grade the location impacted by the detour to approximately match its original contours. Place salvaged topsoil over the disturbed area and seed as specified in the contract.

206.04 METHOD OF MEASUREMENT

Detour - Construct, Maintain, and Remove will be measured as a lump sum quantity in accordance with Section 109. Materials, labor, and equipment needed to construct, maintain, and remove the detour are considered incidental to this item of work and will not be measured for payment. No additional measurements will be made for finish grade control or traffic control devices associated with detour construction. Traffic control devices used to maintain traffic after detour construction is complete will be measured under the traffic control bid item specified in the contract.

206.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Detour - Construct, Maintain, and Remove	Lump Sum

Include all materials, labor, and equipment needed to construct, maintain, and remove the detour in the lump sum bid for Detour - Construct, Maintain, and Remove. Traffic control devices required to construct the detour are considered incidental and will not be paid separately. Traffic control devices required for operation of the detour will be paid under the traffic control item specified in the contract.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

SECTION 207

CULVERT EXCAVATION AND TRENCH EXCAVATION

207.01 DESCRIPTION

This work is the excavation for placing or removing drainage and other appurtenant structures. It includes foundation preparation, backfilling, disposal of excavation material, bailing, drainage, sheeting, shoring, cribbing and installation of safety measures needed to satisfy the requirements of Subsection 107.17. Excavation classes are described below.

207.01.1. Culvert Excavation

Culvert excavation is all work under Subsection 207.01, where vertical walls are not required and the excavation width is not specified.

207.01.2. Trench Excavation

Trench excavation is the excavation for placing or removing storm drains, sanitary sewers, water lines, and other installations in the contract. Vertical trench walls, when required, must be shored or supported to meet the U.S. Department of Labor, OSHA, Safety and Health Regulations for Construction. Trench widths are specified in Subsection 207.03.3.

207.02 RESERVED

207.03 CONSTRUCTION REQUIREMENTS

207.03.1 General

Excavate to permit removal, jointing, and backfilling of pipe.

Construct and maintain the excavations to prevent personal injuries, damage to foundations, structures, pole lines, or other facilities.

Pile and maintain all excavated material to meet OSHA requirements and with a minimum of inconvenience to the public. Do not obstruct fire hydrants, water valves, meters, and the free flow of storm water in gutters, other conduits, and natural water courses.

Do not excavate below the specified depth, except as permitted in Subsection 207.03.6.

Remove all obstructions in the excavation at Contractor expense.

Backfill excavated areas in accordance with Subsection 603.03.4. Do not place backfill against newly constructed masonry or concrete structures for at least 14 calendar days. Remove all sheeting and bracing before backfilling.

207.03.2 Culvert Excavation

When special foundation stabilization is specified, excavate the bedding trench walls vertically and excavate the trench width to provide room for the bedding material.

207.03.3 Trench Excavation

Keep trench lengths to a minimum in paved roadways, sidewalks, or other improved areas, in advance of the pipe laying and not to exceed 200 feet (61 m). Keep trench backfilling and compaction to within 300 feet (91.5 m) of the installed pipe.

Cut the pavement full depth vertically along regular neat lines in paved roadways that require patching. Excavate the minimum trench width possible.

When vertical trench walls are specified, the maximum trench width is the external width of the pipe barrel plus 3 feet (915 mm). When a special foundation is specified, excavate the bedding trench walls vertically and the trench width as specified.

Do not exceed the specified trench width without the Project Manager's approval when vertical trench walls are specified.

Furnish any additional select backfill material and additional surface and subsurface improvements if the maximum trench width is exceeded at Contractor expense.

207.03.4 Excavation for Appurtenant Structures

Excavate for riprap, rubble masonry, retaining walls, cutoff walls, headwalls, manholes, drop inlets, catch basins, headgates, division boxes, and other structures appurtenant to culverts, sewers, drains, pipes, or tubing to meet the applicable requirements of Subsection 207.03.1.

207.03.5 Shoring

Provide and remove shoring or supports for excavation walls that protect the work, existing property, utilities, pavement, and other existing facilities. Provide safe working conditions meeting OSHA, local and state safety codes.

Repair damage caused from excavation support failure or from failure to provide support at Contractor expense.

207.03.6 Foundation Preparation

Compact foundations for culverts, sewers, drains, pipes, tubing, and appurtenant structures to the moisture and density requirements of Subsection 203.03.3.

Remove unstable or unsuitable material encountered below the excavation floor elevation and replace with material meeting Subsection 701.04.2. Cover with bedding material meeting Subsection 701.04.1 as directed. If approved by the Project Manager excavatable CLSM may be substituted as bedding material for concrete and steel pipes. A request to use excavatable CLSM for any other pipes or application must be submitted at least 5 business days prior to use. The Project Manager will investigate unstable pipe installations requiring 4 feet (1.2 m) or more of foundation material.

Remove unyielding material below the staked elevation to at least 12 inches (305 mm) and replace with bedding material meeting Subsection 701.04.

Bed culverts larger than 12 inches (305 mm) as shown in the Detailed Drawings. Place bedding for 12-inch (305 mm) diameter and smaller culverts to uniformly support the culvert throughout its length. The bedding does not need to conform to the outside of the culvert.

Do not lay pipe until the foundations are approved by the Project Manager. Remove and relay pipe laid on unapproved foundations at Contractor expense.

207.04 METHOD OF MEASUREMENT

Culvert excavation, trench excavation and excavation for bedding and foundation material are not measured for payment.

207.05 BASIS OF PAYMENT

Payment for all costs associated with culvert and trench excavation, furnishing and installing culverts is included in the contract unit price per foot (m) of pipe (type and size).

When bedding or foundation material is specified in the contract, payment for all costs associated with excavation required to place bedding and foundation material is included in the contract unit price per cubic yard (m³) of bedding or foundation material.

Payment for safety measures required to protect open trenches is included in the contract unit price per foot (m) of pipe (type and size).

SECTION 208

WATER POLLUTION CONTROL AND AQUATIC RESOURCE PRESERVATION

208.01 DESCRIPTION

Water pollution control is the planning, scheduling, installing, maintaining, and removing of measures and devices to prevent or minimize pollution and control sediment transport and soil erosion. Aquatic resource preservation is the avoidance and minimization of impacts to aquatic resources.

208.02 MATERIALS

Use materials meeting contract requirements or approved by the Project Manager if permanent and temporary materials are not specified.

208.03 CONSTRUCTION REQUIREMENTS

208.03.1 General

Comply with all local, state, tribal, and federal laws and regulations as well as applicable permits, authorizations, and notifications for prevention or abatement of erosion, water pollution, and siltation. Obtain and submit copies of any required permits, authorizations, and notifications to the Project Manager before beginning construction activities covered under the applicable permit. The Department is not responsible for delays caused by incomplete or inaccurate submittals by the Contractor. Defend, indemnify, and hold harmless the Department from legal actions or fines resulting from violations of the rules, regulations, permits, authorizations, and notifications due to any act, omission, neglect, or Contractor misconduct.

Plan, install, inspect, and maintain temporary and permanent water pollution controls (i.e. BMPs) to provide economical, effective, continuous erosion and sediment control, prevent pollution during and after completion of construction activities, and preserve existing aquatic resources. Erosion and sediment control is required on all projects as necessary to minimize damage to the highway and adjacent properties and abate pollution of surface and ground water resources.

208.03.2 Water Pollution Control

Contractor failure to provide erosion, sediment, and water pollution controls may cause the Department to provide the work and deduct those costs from monies due or to become due the Contractor, or otherwise billed to the Contractor. The Department may also stop the work or withhold any payments due until acceptable corrective action is taken.

- A. Spill Prevention and Waste Disposal.** Prevent chemicals, fuels, lubricants, bitumen, raw sewage, and other wastes from entering regulated aquatic resources. Dispose of all wastes, refuse, and discarded materials in accordance with Subsection 107.11.
- B. Erosion and Sediment Control Measures.** Control erosion, sediment, and water pollution during all work and work suspensions. Design, install, and maintain erosion and sediment controls to control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.
 - 1. Temporary Control Measures.** Install BMPs prior to, or concurrently with, soil disturbance activities. When BMP installation is concurrent with the soil disturbance activity, limit the work to an area that can be protected by BMPs no later than the same day the work is performed. Failure to install BMPs within the same day will result in suspension of all work relating to those BMPs.

Maintain all temporary erosion control, sediment control, and other pollution control measures until it is no longer needed or conflicts with the work. If devices that

conflict with the work are removed, replace these devices no later than the end of each shift.

Re-grade work sites to match the surrounding terrain after the devices are removed.

Repair or replace damaged, inadequate, non-functioning, or non-conforming devices. Initiate work to fix the problem immediately after discovering the problem. Unless specified differently in permits or authorizations, complete this work as soon as practicable, but no later than 7 calendar days after discovering any deficiencies.

Temporary pollution control measures required due to the Contractor's negligence, carelessness, failure to maintain, or failure to install designed permanent controls in place of temporary controls are at Contractor expense.

2. Permanent Control Measures. Install permanent pollution controls concurrently or immediately following work that disturbs natural ground.

C. Inspections. Conduct inspections as specified in the permit. When no permit is required, conduct inspections to evaluate performance and maintenance needs of water pollution controls in accordance with the following schedule unless specified differently in permits or authorizations:

- At least once per month; and
- Within 24 hours of a storm event of 0.25 inches (6.5 mm) or greater.

Use the Department's most current SWPPP Inspection Report, when no permit is required. Use the Department's form or another form that conforms to permit requirements when a permit is required. Provide one copy of the signed inspection report to the Project Manager.

Failure to conduct inspections and submit inspection reports renders the BMPs unacceptable.

Immediately report potential noncompliance in accordance with applicable regulations, guidance, and permit conditions. The Contractor is wholly responsible for all violations including but not limited to those that result during the times when the required monitoring is not conducted, inspection report forms are not submitted, BMPs are ineffective, required maintenance or monitoring of BMPs is not performed.

BMPs will be inspected as part of the final inspection to ensure they are adequate, maintained, and functioning properly.

D. Erosion Control Plan. MPDES permits are issued by the DEQ for discharges within the state of Montana not including Indian Countries. NPDES permits are issued by the EPA for discharges inside the boundaries of Indian Countries. Some Tribal governments also have NPDES review authority and/or separate permitting authority. For projects requiring MPDES and/or NPDES General Storm Water Permit coverage, submit one NOI package and the associated fees for ground disturbance areas within the project limits to the appropriate permitting agency. Use Department furnished blank erosion control plans to complete the SWPPP as required by the General Permit. Provide a copy of the NOI package submitted and confirmation for receipt of a complete NOI package from the permitting agency to the Project Manager and Environmental Services Bureau prior to conducting any ground disturbance activities.

Be responsible for erosion, sediment, and water pollution control for Contractor furnished material sources, staging areas, plant sites, or any other Contractor caused ground disturbance outside the project limits. Submit a separate NOI package and the associated fees to the permitting agency for ground disturbance areas outside the project limits. Contractor furnished material sources, staging areas, plant sites, or any other Contractor caused ground disturbance outside the project limits, are the Contractor's responsibility and must be submitted under a

separate NOI package from the ground disturbance within the project limits. Although these areas are permitted separately, the areas of disturbance are considered cumulative with the project disturbance area when determining the requirement for permit coverage.

Comply with the conditions of the permit. Revise and/or update the SWPPP to reflect current conditions, pollution prevention measures, and installed BMPs in accordance with permit requirements. Submit all changes to the Project Manager.

Do not transfer or terminate the General Storm Water Permit coverage until the BMPs are inspected and approved and all records required under the permit, including inspection and monitoring reports, are furnished to the Project Manager. The Department may require that certain BMPs be replaced by another type of BMP as a condition of permit transfer.

When submitting the General Storm Water Permit transfer package/application to the Department, include a check for the permit transfer fee. Make the check for the amount of the fee payable to the DEQ.

208.03.3 Aquatic Resource Protection

A. General. Unless authorized with approved permits and authorizations, meet the following general provisions:

1. Do not operate mechanized equipment in any regulated aquatic resource, unless authorized in accordance with Subsection 208.03.4(B).
2. Isolate work zones from flowing and standing waters during construction, unless authorized in accordance with Subsection 208.03.4(B).
3. Do not spill or dump material from equipment into regulated aquatic resources.
4. Do not discharge wastewater from washout of concrete related equipment, concrete finishing, saw cutting, wet concrete, hydraulic demolition, etc. into any regulated aquatic resource.
5. Do not place fill or other materials in any regulated aquatic resource unless included in the contract. or authorized in accordance with Subsection 208.03.4(B).
6. Locate staging or storage areas at least 50 feet (15.2 m) horizontally from any aquatic resource, top of stream bank, or the highest anticipated water level during the construction period, whichever is furthest from the resource.
7. Store and handle petroleum products, chemicals, cement and other deleterious materials to prevent their entering regulated aquatic resources.
8. Provide sediment and erosion controls for topsoil stockpiles, staging areas, access roads, channel changes, and instream excavations.
9. Shape and contour streambeds and stream banks to their pre-disturbed condition to match adjacent undisturbed ground, unless included in the contract.
10. Clean, maintain, and operate equipment so that petroleum-based products do not leak or spill into any regulated aquatic resource.

B. Temporary Facilities and Construction Activities. Obtain required permits and authorizations for the installation, maintenance, operation, and removal of temporary facilities such as work bridges, work pads, cofferdams, temporary detours, diversions, etc. Department obtained permits and authorizations do not typically include removal and disposal of existing structures, access to and from authorized locations, sequencing and construction methodology to construct authorized features, impacts to areas outside of the planned construction footprint, and other items potentially affecting an aquatic resource.

Plan temporary construction facilities to:

1. Minimize disturbance to regulated aquatic resources;
2. Not restrict or impede fish passage in streams;

3. Not restrict water flow anticipated during use; and
4. Remove temporary facilities as soon as practicable once they are no longer needed.
Complete application forms in accordance with the permitting agency requirements. Plans included as part of the application forms must at a minimum contain the following information:

1. Details depicting regulated aquatic resource features before installation of temporary construction facilities and after removal;
2. Location of facilities relative to permanent work and regulated aquatic resources;
3. Plan and elevation views of facilities showing regulated aquatic resources;
4. Anticipated high water elevation during use of the facilities;
5. Waterway openings and clearances;
6. Type of bridge bent, pier, and superstructure construction (wood, steel, concrete, etc.);
7. Quantity and type of material proposed for use;
8. Written description for installing, operating, maintaining, and removing facilities including proposed construction techniques, containment plans, equipment, stockpile and storage areas, temporary erosion and sediment control measures, site re-vegetation/restoration and weed control plans;
9. Estimated time the temporary facilities are to be in place; and
10. A plan for and written description of existing structure removal, if applicable, as described in Subsection 208.03.4(C).

Shape and contour areas disturbed by the installation or removal of temporary construction facilities to match adjacent undisturbed ground upon removal of the facilities.

Submit copies of the plans and application packages, their modifications, or their revisions to the Project Manager. The Department will review the plans and application packages, their modifications, or their revisions, and either request revisions or submit to applicable resource and regulatory agencies within 21 calendar days. Resource and regulatory agency review time does not begin until the Department submits the application to the applicable agencies. Do not begin work on temporary construction facilities or modifications to approved plans until receiving written approval from the regulatory and resource agencies.

- C. Existing Bridge and Structure Removal.** Furnish the Project Manager a plan and written description detailing how the existing bridge(s) and/or structure(s) are to be removed. Include in the description what methods and equipment are to be used to remove the bridge deck, superstructure, piers, footings, and end bents, and, if applicable, containment plan. Conduct work in accordance with Section 202.

Provide the anticipated start date of removal work and estimated time to complete the work.

Include details of erosion, sediment, and pollution control, and containment measures used during removal.

Remove contract-related debris from the regulated aquatic resources within 48 hours of placement.

Maintain constant progress on all in-stream work until completed.

208.03.4 Seeding

- A. Temporary Seeding.** Temporarily seed or implement other soil stabilization measures approved by the Project Manager on all disturbed soil areas as required by permits/authorizations. When no permit is required, temporarily seed or implement other soil stabilization measures approved by the Project Manager on all disturbed soil areas

when grading activities will not resume for a period of 14 calendar days or more by the 14th day after the last disturbance. Permanently seed areas not requiring further disturbance, if they fall within the seeding dates.

- B. Erosion Seeding.** Conduct erosion seeding on freshly exposed slopes steeper than 3H:1V that will not be top soiled or re-disturbed, unless implementing other soil stabilization measures in accordance with permits or as approved by the Project Manager. Manually broadcast seed the disturbed areas at the completion of each day, regardless of season. Excessively rocky slopes that cannot be excavated by ripping are exempt from erosion seeding. Broadcast seed with the following mixture and rates:

<u>Species</u>	<u>lbs PLS per acre</u>
Cereal barley	10.0
“Pryor” slender wheatgrass	5.0
“MT origin” Canada wildrye	10.0

Erosion seeding does not replace or substitute for final seeding activities specified in the contract.

208.04 METHOD OF MEASUREMENT

Temporary erosion and sediment control devices for use within the project limits are measured as lump sum and will not be measured separately. Only erosion and sediment controls within the project right-of-way and installed in accordance with manufacturer specifications or the Detailed Drawings will be paid for. BMPs and associated permit costs for Contractor furnished material sources, staging areas, plant sites, or any other site not within project limits are not measured for payment.

Permit fees and monitoring costs associated with obtaining and maintaining permit coverage for ground disturbance areas both within and outside the project limits are considered incidental to the project and are not measured separately for payment.

Normal maintenance of BMPs, in accordance with permit requirements and the contract, are considered incidental to the work and no additional measurements will be made. Maintenance includes:

- Removal of BMPs no longer required;
- Removal of sediment and debris in front of and around BMPs;
- Repair and replacement of incorrectly installed devices;
- Mobilization and travel for inspections and maintenance; and
- Maintenance until the permit is terminated or transferred.

Replacement of satisfactory BMPs requested by the Department at the final inspection will be measured in accordance with the Erosion Control Rate Schedule.

208.04.1 Temporary Erosion and Sediment Controls - Units

Temporary Erosion and Sediment Control (TESC) devices are measured by the unit of control devices used and accepted. A unit is the base value for establishing the relative value of each type of TESC device. The relative value of each TESC device in units is shown in the Erosion Control Rate Schedule.

Temporary and erosion seeding are measured parallel to the ground line and include seedbed preparation, fertilizing and seeding.

These will not be used to correct deficiencies of lump sum items.

208.05 BASIS OF PAYMENT

No additional payment will be made for the fees or monitoring costs associated with the General Permit for storm water discharges associated with construction activity. Include these

costs in the temporary erosion control bid item. Include fees associated with transferring the permit in the Lump Sum Temporary Erosion Control bid item.

Failure to implement BMPs identified in the SWPPP, update the SWPPP as required by the Construction General Permit, or conduct BMP inspections and submit inspection reports renders the BMPs unacceptable. No payment will be made for BMPs installed and the total paid to date on progress estimates for BMPs will be deducted on the next monthly progress estimate until SWPPP deficiencies are remedied and the inspection reports are completed and copies received by the Project Manager.

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Erosion Control	Unit
Temporary Erosion Control - LS	Lump Sum

Payment at the contract unit price is full compensation for all resources necessary to complete the work in accordance with the contract.

208.05.1 Temporary Erosion and Sediment Control - Lump Sum

Partial payment for Temporary Erosion Control will be monthly based on the lump sum contract price as follows:

**TABLE 208-1
TEMPORARY EROSION CONTROL
LUMP SUM PROGRESS PAYMENTS**

% Of Contract Amount Paid	% Of Erosion Control Bid Amount
First estimate after start of erosion control work	60
25	70
50	80
75	90
substantial work complete date	100

Include the cost of temporary erosion control in the cost of the lump sum item. Anticipate probable adverse weather and stream flow conditions.

A request may be submitted for compensation resulting from the addition of BMPs due to acts of God described in Subsection 107.17 or extra work added by change order. Include documentation in the request that demonstrates such an event has occurred. Payment for quantities required by an event or extra work, and approved by the Project Manager, will be by a change order and in accordance with the Erosion Control Rate Schedule contained in the contract at a unit price of \$1.00 per unit.

The installation of additional BMPs requested by the Department at the final inspection will be added by change order and paid for in accordance with the Erosion Control Rate Schedule.

208.05.2 Temporary Erosion and Sediment Control - Units

Temporary erosion and sediment controls are paid for at the contract unit price per temporary erosion control. The units of each type of temporary erosion control paid for will be calculated by multiplying the measured quantity of each device by the assigned value per units shown in the Erosion Control Rate Schedule included in the contract.

Payment for completed and accepted temporary erosion/sediment control devices will be made in accordance with one of the following categories:

- 1. Category No. 1 - New Installation.** When a device is new and used for the first time it will be paid at 100% of the rate schedule.

2. Category No. 2 - Reuse. When a previously used BMP material that meets contract specifications is placed in a new location, it will be paid at 75% of the rate schedule.

Maintenance of BMPs, in accordance with the MPDES/NPDES permit(s) and the contract, is not paid for separately. Include this work in the unit price bid for temporary erosion control devices.

No additional compensation is made for the removal of BMPs that are no longer required.

SECTION 209

STRUCTURE EXCAVATION

209.01 DESCRIPTION

Structure excavation is excavating bridge foundations and all other structure foundations. The item includes disposing of excess or unsuitable material from the excavations, backfilling to the original ground level, bailing, pumping, draining, sheeting, shoring and cribs.

209.01.1 Structure Excavation Type I

Structure excavation Type I is excavating, de-watering, shoring and cribbing, backfill and compaction for the excavation.

209.01.2 Structure Excavation Type II

Structure excavation Type II is excavating, de-watering, backfill, and compaction for the excavation, excluding shoring and cribbing.

209.01.3 Shoring and Cribs

This is constructing and removing all shoring and cribs, cofferdams or caissons, and for all material, labor, equipment, tools, and incidentals to complete the work.

209.02 RESERVED

209.03 CONSTRUCTION REQUIREMENTS

209.03.1 General

The plan excavation lines in the contract are estimated. Excavate all foundations to the plan elevations and dimensions.

Removing boulders, logs, and other obstructions found in the excavation is incidental to this work.

Remove timber, sheeting, and other material used in the excavation before backfilling.

Remove and stockpile all excavated material that is suitable for backfill.

209.03.2 Treatment of Foundation Materials

When the excavation reaches the designated depth, de-water, clean, and maintain the excavation until the foundation bed is inspected.

Clean and fill rock seams and crevices with concrete mortar.

Obtain the Project Manager's approval of the foundation before placing concrete on the foundation.

Place concrete without disturbing the bottom of the excavation.

Minimize disturbance of the natural ground outside the excavation pay limits except as required for constructing cofferdams.

209.03.3 Cofferdams

Submit drawings and calculations prepared by a professional engineer showing the proposed method of cofferdam construction and de-watering procedures before starting the work. The cofferdam must meet OSHA requirements.

Ensure cofferdams or cribs for foundation construction are watertight to permit de-watering.

Provide clearance within the cofferdam for constructing forms, inspection of the form exteriors, and for pumping.

Re-align or enlarge the cofferdams or cribs that are tilted or moved laterally during the work to provide work clearance at Contractor expense.

Timber bracing may be left in cofferdams or cribs extending into the substructure masonry with the Project Manager's written approval.

When weighted cribs are used to resist the hydrostatic pressure acting against the bottom of the foundation seal, use an anchorage to transfer the entire weight of the crib to the foundation seal.

When the foundation seal is placed, vent or port the cofferdam at the cofferdam design low-water level.

The foundation seal depths in the contract are based on the estimated, normal water-surface elevations or are consistent with those satisfactorily used on past projects.

The specified seal thickness is a minimum. The Contractor may request an increased seal depth. Submit the request in writing to the Project Manager for approval. Any approved increase in seal depth and associated costs are at Contractor expense.

Repair or replace failed cofferdams, foundation seals or both at Contractor expense.

Pump out the cofferdam and place the remaining masonry or concrete in the dry after meeting the time limit in Subsection 209.03.4.

Remove all cofferdam or crib material after the substructure is complete without disturbing or marring the finished work.

209.03.4 Pumping Water from Cofferdams

Pump interior foundation enclosures without disturbing the in-place concrete. Do not pump for at least 24 hours after placing concrete unless pumping from a sump separated from the concrete work by a watertight wall.

209.03.5 Inspection

Place the footings as soon as practical after the excavation depth and the foundation material are approved.

Drill holes or drive rods in the excavation bottom to determine the materials quality when requested by the Project Manager.

Excavate the spread footings and take rod soundings at each individual substructure unit and submit rod soundings simultaneously for the footing elevation approval.

209.03.6 Backfilling

Once approved, backfill and compact all excavated areas without damaging adjacent structures, to match the existing ground line.

Place backfill to be covered by roadway embankment in maximum 8-inch (200 mm) loose thickness, continuous horizontal layers.

Compact each layer in accordance with Subsection 203.03.3.

Remove and dispose of backfill containing large or frozen lumps, wood, or other deleterious materials. Do not jet or pond the backfill.

Serrate or step the slope bounding the excavation for abutments and wingwalls.

Place coarse gravel or broken stone around drain holes in wingwalls or abutments as shown in the contract.

Backfill around piers and in front of abutments and wingwalls with material large enough to resist erosion. If acceptable material is not available, the Project Manager may order stone or lean concrete backfill, paid for as extra work.

Place backfill against masonry abutments, and wingwalls in accordance with Subsection 203.03.2(B). Allow culvert related concrete work to cure 14 calendar days before backfilling.

Dispose of excess material at Contractor expense, in accordance with all applicable laws, rules and regulations.

209.04 METHOD OF MEASUREMENT

209.04.1 Structure Excavation Type I and Type II

Measurement in cubic yards (m^3) is based on the volume bounded on the sides by vertical planes 18 inches (455 mm) outside of the footing neat lines; on the top by the original undisturbed ground surface at the time excavation begins or by the lines in the contract; and on the bottom to the specified footing elevation or the elevation directed by the Project Manager.

Calculations for tie beams, overhangs, or similar volumes extending beyond the footing lines are computed from lines 18 inches (455 mm) outside of and below neat lines. The computed structure excavation includes only those portions not contained in the volume of footing excavation.

209.04.2 Shoring and Cribs

Shoring and cribs used with structure excavation Type I are not measured for payment.

Shoring and cribs used with structure excavation Type II are measured by the lump sum.

209.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Shoring and Cribs	Lump Sum
Structure Excavation Type I	Cubic Yard (m^3)
Structure Excavation Type II	Cubic Yard (m^3)

Additional approved material for backfill provided from other sources is paid for as extra work. Payment includes the costs of obtaining the material, processing, handling, and transporting to the project. The cost of placing and compacting the additional material and disposing of unsuitable material is included in the contract unit price for structure excavation.

No payment is made for additional material placed outside structure excavation pay limits and slope lines to comply with safety regulations.

No payment is made for additional material to replace material removed from the excavation, rendered unsuitable by improper excavation, handling, or stockpiling methods.

Partial payments for structure excavation Type I or II will be made based on the total quantity as follows:

1. 85% when removed to plan elevation.
2. 95% when backfilled and compacted.
3. 100% when the area is cleaned up to the Project Manager's satisfaction.

Partial payments for shoring and cribs will be made based on the lump sum contract unit price as follows:

1. 65% when shoring and crib is in position.
2. 90% when driven to final elevation.
3. 100% when shoring and crib is removed and the area is cleaned up to the Project Manager's satisfaction.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

SECTION 210 EQUIPMENT USE

210.01 DESCRIPTION

This describes the equipment to be used for the contract work.

210.02 RESERVED

210.03 CONSTRUCTION REQUIREMENTS

210.03.1 General Requirements

Provide equipment in good mechanical condition having sufficient power to perform the work. Repair or replace equipment not meeting these requirements.

210.03.2 Motor Graders

Use self-propelled motor graders either tandem or all-wheel drive equipped with pneumatic tires.

Equip the graders with a moldboard at least 12 feet (3.6 m) long with a cutting edge, a scarifier with nine or more teeth having minimum dimensions of 3 x 1 x 16-inch (75 x 25 x 405 mm), and power-operated controls.

The motor grader manufacturers power rating must be at least 100 horsepower (75 kW).

210.03.3 Dozers

Use dozers of any standard type attached to a crawler tractor of at least 75 horsepower (56 kW) having power-operated controls.

Furnish dozers a minimum 90 inches (2.3 m) wide. The dozer and tractor is considered a single unit.

210.03.4 Rollers

A. General. Provide rollers and compaction equipment of standard manufacture bearing the manufacturer's identification label. Roller weight is the manufacturers rating.

Use self-propelled rollers capable of reversing direction without backlash.

Keep rollers in good mechanical condition with positive, accurate steering control.

Use adequately powered trucks or tractors for pull-type rollers.

Other than traction units, operate rollers separate and distinct from other equipment.

Equip all rollers with self-cleaning devices that prevent material from adhering to the wheels or tamping surfaces.

B. Smooth-wheeled Rollers. Use smooth-wheeled, self-propelled rollers meeting one of the following:

1. Tandem-type weighing up to 10 tons (9 MT); or
2. Three-wheeled type weighing a minimum 10 tons (9 MT); or
3. Towed steel-drum rollers weighing a minimum 4 tons (3.6 MT).

C. Tamping Rollers. Use tamping rollers with grids, drums, or shells surrounded by metal studs, pads, or similar elements that compress small areas of material.

D. Pneumatic-tired Rollers. Use pneumatic-tired rollers meeting the following:

1. Two-axle type, straight or oscillating;
2. Rigid framed providing a platform or body for ballast loading;
3. Effective rolling width of at least 4 feet (1.2 m);
4. Minimum working weight capacity of 250 pounds (113.5 kg) per inch width of tire tread;
5. Smooth tires (no tread) equal in size and diameter;
6. Rear axle tires spaced to overlap the tread gap of the preceding two tires;

7. Uniform tire pressure not varying from each other by more than 5 psi (34.5 kPa); and
8. Self-propelled or tractor or truck drawn (tractive power).

Operate the rollers, while turning, to prevent tearing or loosening of the material being rolled or the adjacent material.

Do not use wobble-wheeled pneumatic-tired rollers for bituminous surfacing work.

E. Vibratory Rollers. Use vibratory rollers capable of obtaining the required compaction.

210.03.5 Watering Equipment

Furnish and operate pneumatic-tired water equipment having spray bars capable of uniformly distributing water over the surface area. The control valves must be positive closing to prevent leakage.

210.03.6 Test Trailer, Transport, and Setup

Transport State-owned test trailers from a designated location to the project site and return it to a designated location as directed. Contact the Project Manager for details concerning the transport of the trailer at least 30 calendar days prior to plant mix operations. The Contractor is responsible for all required permits.

Purchase minimum \$85,000 insurance for the trailer and its contents. Provide written proof of the insurance to the Project Manager prior to moving. Verify that the Department has prepared the trailer and contents for transport.

Repair or replace all contents and trailer damage occurring in transport at Contractor expense. Do not move the trailer without the Project Manager's permission.

Provide a level parking area, the required blocking, and electrical power service for the test trailer. Locate and construct the parking area a minimum 200 feet (61 m) from the plant mix dryer drum, mixing plant, and storage silo unless otherwise directed, to accommodate the 12-foot x 32-foot (3.6 m x 9.8 m) trailer. Transport, set up, and make the trailer fully operational at least 2 days before starting plant mix paving. Park, block, level, re-block, re-level and unblock the trailer as directed. Supply electrical power 24 hours a day, 7 days a week. Suspend paving work during power interruptions or periods of insufficient power to the trailer.

Furnish and install a continuous 200-ampere, 220 to 230 volt, single phase, 60 hertz power supply to the trailer. The power must be independent from the hot plant operation. Have the source connected by a Montana licensed electrician using a four wire connection.

210.04 METHOD OF MEASUREMENT

210.04.1 Equipment Use

Equipment use, when specified as a bid item, is measured by the hour for the hours performing the work and includes furnishing the equipment, including operator, servicing, repairs. Time in moving equipment from point to point on the project and for repair and servicing is not measured.

Equipment used in the work but not specified as a bid item is incidental to the work.

210.04.2 Test Trailer, Transport, and Setup

Test trailer, transport, and setup is measured by the mile (km) for the actual miles (km) moved. It includes insurance, transporting, blocking, unblocking, leveling, furnishing and installing electrical power and associated wiring, removing power and wiring, and all other necessary resources to complete the item of work. Maintenance re-blocking and re-leveling is incidental to the work and is not paid separately. The mileage shown in the contract is an estimate only and may be adjusted by the Project Manager.

210.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Dozer	Hour
Motor Grader	Hour
Test Trailer Transport/Setup	Mile (km)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

SECTION 212
OBLITERATE ROADWAY

212.01 DESCRIPTION

Obliterate roadway includes removal of the existing roadway and related items, rehabilitating the abandoned roadway area by scarifying and shaping, and seeding.

212.02 RESERVED

212.03 CONSTRUCTION REQUIREMENTS

Grade and contour abandoned roadways to blend with the new roadway or existing terrain.

If not specified in the contract, dispose of the existing bituminous materials in conformance with applicable laws, rules, regulations and the Montana Solid Waste Management Act.

After the old roadway surfacing is removed, salvage the topsoil from areas to be graded and perform the rough grading. Grade and contour the obliterated roadway to blend with the new roadway and adjacent terrain. Spread the salvaged topsoil and seed the obliterated roadway area.

Work construction scars, sharp breaks, and steep slopes or cuts to blend with the terrain. Existing aggregate surfacing material may be used to construct fills when covered with 12 inches (305 mm) of soil capable of supporting plant growth. Existing bituminous materials used for embankment of the new roadway must conform to the requirements of Subsection 202.03.3.

Remove and dispose of bituminous materials, old structures, guardrail, and other non-salvageable items not included in other contract items for removal at Contractor expense. Remove and neatly store all material designated as salvageable to prevent damage.

The species of seed, seed bed preparation, fertilizing, mulching, and application rate is specified in the contract.

212.04 METHOD OF MEASUREMENT

Obliterate roadway is measured in stations to the nearest whole station along the centerline of the roadway obliterated.

Topsoil is measured in accordance with Subsection 203.04.

Seeding is measured in accordance with Subsection 208.04.

212.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Obliterate Roadway	Station
Seeding	Acre (ha)
Topsoil	Cubic Yard (m ³)

Material obtained from the obliterated roadway and used in the construction of the new roadway is measured and paid for as unclassified excavation in accordance with Section 203.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work in accordance with the contract.

