Somer's Beach State Park
Interim Improvements Project

FWP PROJECT # 7216803

SPECIFICATIONS

Montana Fish, Wildlife & Parks

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Somer's Beach State Park – Interim Improvements Project

March 2022, 60% Submittal

Index To Specifications

General Civil Specifications are taken from the Montana Public Works Standard Specifications (MPWSS) and are included, but not limited to, the following:

MPWSS - Division 1 – General Requirements

01500 Construction and Temporary Facilities
01570 Construction Traffic Control

MPWSS - Division 2 - Sitework

02110 Geotextiles
02112 Removals of Existing Pavement, Concrete Curb, Sidewalk, Driveway and/or Structures
02113 Adjusting Existing Manholes, Lampholes, Inlets, Water Valve Boxes, Water Services, and Fire Hydrants to Grade

02230 Street Excavation, Backfill and Compaction
02234 Sub Base Course
02235 Crushed Base Course

02510 Asphalt Concrete Pavement
02910 Seeding
02920 Hydraulic Seeding

Flathead County Approach Permit

SECTION 01500

CONSTRUCTION AND TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 CONSTRUCTION FACILITIES

A. Furnish temporary services and utilities, including use fees and operation costs for: potable and non-potable water; lighting and power; and, materials storage.

B. Furnish personnel support facilities including: sanitary facilities; drinking water; first aid supplies and facilities; and, trash removal.

C. Do not park vehicles or equipment or store materials on private property without written permission from the property owner under Section 01010.1.4.B.

1.2 SECURITY

A. Provide fencing, barricades, warning signs, and lights to secure all work areas, equipment, and materials.

1.3 DUST CONTROL

A. Be responsible for dust and vehicle off tracking control, providing all equipment and personnel for the work. Furnish Engineer name(s) and telephone number(s) of the person(s) responsible for dust control during evenings and weekends. If this person cannot be contacted, Owner may at Contractor expense, perform the work or contract the work out.

1.4 HAUL ROUTES

A. Obtain Owner approval of haul routes

1.5 IRRIGATION SYSTEMS

A. Contractor shall remove and reinstall; or modify irrigation systems as necessary to accommodate the construction work. Irrigation systems shall be operational within 5 calendar days after initial shutdown for construction between April 15th and October 15th. The Contractor shall coordinate construction activities with the appropriate property owner to assure proper shutdown, removal, relocation, and replacement of existing sprinkler or irrigation systems. It is recommended that the Contractor contact the property owners where sprinkler or irrigation systems are located to determine whether

the system is functioning properly prior to starting any work. Contractor shall take care to cut and remove the system with as little damage as possible. Replacement of damaged components will be with parts of equal or greater quality and preferably the same brand as the existing system. Although the Contractor will not be required to restore a non-functional system to be functional, it will be the Contractor's responsibility to restore any portion of the system that is damaged during construction. Contractor shall notify Engineer immediately of the locations of non-functioning sprinkler or irrigation systems

PART 2 - PRODUCTS — NOT USED

PART 3 - EXECUTION — NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. All items in Part 1 are incidental to the work and no separate payment is made for these items.

END OF SECTION

SECTION 01570

CONSTRUCTION TRAFFIC CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work is the furnishing of labor, materials and equipment for installing, maintaining and operating traffic control devices to ensure the safety of the general public and project personnel.

1.2 REQUIREMENTS

A. Perform work under this section meeting Manual of Uniform Traffic Control Services (MUTCD) and contract requirements.

1.3 NOTIFICATIONS

A. Coordinate all construction activities to reduce traffic conflicts at the work site, off-site events or other construction projects.

B. Furnish the Engineer, for Owner review, the construction traffic control plan at least one week before construction begins or before changes in segments or phases of the work on the project. The Owner will review and approve the Traffic Control Plan considering known off-site activities and may require modification to the plan or construction timing to coordinate events. Work shall not commence until said plan is approved.

C. For project sites involving a through street, provide the Engineer with a news release. Include in the news release, as a minimum, the work activity and duration. Once approved, furnish the news release to the local media at least three days before starting work. Notify all landowners or residents adjacent to the work of the type and duration of the construction.

PART 2 - PRODUCT

2.1 TRAFFIC CONTROL DEVICES

A. Assure all signs and barricades are reflectorized. Assure all night time traffic control devices meet MUTCD lighting requirements.

B. Use traffic control devices meeting the “Manual of Uniform Traffic Control Devices” and the “Traffic Control Devices Handbook” requirements, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20492.

C. Assure all traffic control devices are clean, legible, reflective for night-time use, and operable.

PART 3 - EXECUTION

3.1 WORK METHODS:

A. Place all traffic control devices as planned before permitting workers or equipment on the traveled way. Install signs, cones and barricades in that order.

B. Inspect the work area at least twice each day during construction and maintain records of traffic control devices used and their location.

C. Assure traffic control is appropriate to the work. Assure traffic control devices are appropriate and clean before suspending work for the day.

D. Remove traffic control devices in reverse order of installation at the end of each shift.

E. Remove and store all unnecessary traffic control devices away from traffic’s view.

3.2 NONCOMPLIANCE

A. Remove, repair or replace any traffic control device not providing its intended function.

B. Do not begin work until all required traffic control devices are placed.

C. The Engineer will periodically inspect the traffic control and inform the Contractor of any deficiencies.

D. Contractor failure to correct any deficiency in the traffic control within 4 hours of notification is cause to deduct monies from the contract payment on the next progress payment.

E. The Engineer may direct correcting traffic control deficiencies immediately. Failure to immediately correct the deficiency is cause for the Engineer to correct the deficiency at Contractor expense.

3.3 FLAGGING

A. Furnish competent and properly equipped flag persons as described in the booklet “Instructions for Flag persons” furnished by the Montana Department of Transportation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Measurement and payment for the Contractor's off- site traffic control plan and the designed on-site traffic control plan is on a lump sum basis. The lump sum payment is full reimbursement for all costs of furnishing, installing, maintaining, replacing and operating the construction traffic control systems throughout the work period. The construction traffic control system includes but is not limited to, signs, barricades, pavement markings, watering, flag persons and pilot cars.

B. Progress payments are in proportion to total construction completed.

END OF SECTION

SECTION 02110

GEOTEXTILES

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing, and placing a geotextile as a subsurface drainage fabric permeable separator between dissimilar materials (such as between subgrade and sub base/base), stabilization fabric, temporary and/or permanent erosion control measures or as waterproofing/stress releasing membrane within pavement structures.

1.2 REFERENCES

A. The current publications listed below form part of this specification.

B. ASTM Standards

D123	Standard Terminology Relating to Textiles
D276	Standard Test Methods for Identification of Fibers in Textiles
D4354	Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products for Testing
D4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles (Grab Method)
D4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
D3786	Standard Test Method for Bursting of Textile Fabrics - Diaphragm Bursting Strength Tester Method
D4833	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
D4491	Standard Test Method for Water Permeability of Geotextiles by Permeability
D4751	Standard Test Method for Determining the Number of Constrictions “m” of Non-Woven Geotextiles as a Complementary Filtration Property
D4354	Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products for Testing

D4759	Standard Practice for Determining the Specification Conformance of Geosynthetics
D276	Standard Test Methods for Identification of Fibers in Textiles
D4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light,-Moisture and Heat in a Xenon Arc-Type Apparatus
D4873	Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples
D5141	Standard Test Method for Determining Filtering Efficiency and Flow Rate of the Filtration for-Component of a Sediment Retention Device
D5261	Standard Test Method for Measuring Mass per Unit Area of Geotextiles
D1140	Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)

C. AASHTO Specifications – Standard Specifications for Transportation Materials and Methods of Sampling and Testing
   1. Augmenting and prevailing over this specification section.

PART 2 - PRODUCTS

2.1 PHYSICAL AND CHEMICAL REQUIREMENTS

A. Assure that fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, consist of long-chain synthetic polymers, composed of at least 95 percent by weight polyolefins or polyesters. They must be formed into a network so the filaments on yarns retain dimensional stability relative to each other, including selvedges. Furnish materials meeting the physical requirements listed in Section 2.4 or as shown on the plans.

B. Provide moderate or high survivability non-woven polypropylene fabric that is inert to commonly encountered chemicals and soils and that remains stable over a temperature range of -50 degrees Fahrenheit (-46° C) to 150 degrees Fahrenheit (66° C) and at a pH range of 2 to 13.

2.2 CERTIFICATION

A. Assure the manufacturer furnishes the purchaser a certificate stating: the name of the manufacturer, the chemical composition of the filaments or yarns, and other information fully describing the geotextile. The manufacturer must include in the certificate, a guarantee stating that the geotextile furnished meets specifications. The certificate must be attested to by a person having a legal authority to bind the company. Mismarking, or misrepresentation by the manufacturer is reason to reject the geotextile under these specifications. Notice sent to the manufacturer by the purchaser regarding rejection of, will be considered to be notice to all wholesalers, jobbers, distributors, agents and other intermediaries handling the manufacturer's product.

B. Label the fabric and its container with the manufacturer's name and fabric type or trade name, lot number and quantity.

2.3 SHIPMENT AND STORAGE

A. During shipment and storage, protect the fabric from direct sunlight, ultra-violet rays, temperatures exceeding 160 degrees Fahrenheit (71^{o}C), mud, dust and debris. Keep the fabrics in the manufacturer's wrapping until just before use. Include with each shipping, a document, a certification showing that the geotextile meets the manufacturer's certificate and a guarantee that has been previously filed with the purchaser.

B. At the time of installation, the fabric will be rejected if it has defects, seams or weakness, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation or storage.

2.4 MATERIALS

A. Stabilization Fabric

1. Furnish Class 1 fabric as specified in AASHTO M 288 – Geotextile Specifications for Highway Applications

PART 3 - EXECUTION

3.1 GENERAL

A. Where placing geotextiles on native ground, cut the trees and shrubs flush with the ground surface. Do not remove the topsoil and vegetation mat. Remove all sharp objects and large rocks. Fill depressions or holes with a suitable material to provide a firm foundation.

B. Replace or repair all geotextile that is torn, punctured, or muddy. Remove the damaged area and place a patch of the same type of geotextile overlapping 3 feet, in all directions, (0.9m) beyond the damaged area.

3.2 DRAINAGE, SEPARATION AND STABILIZATION APPLICATIONS

A. Shape the subgrade to a smooth surface and to the cross section required. Shape slopes to gradually transition into slope adjustments without noticeable breaks. At the ends of cuts, the intersection of cuts, and embankments, adjust slopes in the horizontal and vertical planes to blend into each other or into the natural ground.

B. Remove all material larger than 6 inches (15 cm) within the top 6 inches (15 cm) of the roadbed. Remove unsuitable material from the roadbed and replace with suitable material. Finish the roadbed and ditches to the required elevation and cross-section.

C. Place the geotextile smooth and free of tension, stress, or wrinkles. Fold and cut the geotextile to conform to curves. Overlap in the direction of construction. Overlap the geotextile a minimum of 2 feet (0.6m) at the ends and sides of adjoining sheets or sew the geotextile joints according to the manufacturer's recommendations. Do not place longitudinal overlaps below anticipated wheel loads. Hold the geotextile in place with pins, staples, or piles of covermaterial.

D. End dump the cover material onto the geotextile from the edge of the geotextileor from previously placed cover material. Do not operate equipment directly on the geotextile. Spread the end-dumped pile of cover material maintaining a minimum lift thickness of 10 inches (250mm). Compact the cover material with rubber-tired or nonvibratory smooth drum rollers. Avoid sudden stops, starts, or turns of the construction equipment. Fill all ruts from construction equipment with additional cover material. Do not regrade ruts with placement equipment.

E. Place subsequent lifts of cover material in the same manner as the initial lift. Vibratory compactors may be used for compacting subsequent lifts. If foundation failures occur, repair the damaged areas and revert to the use of nonvibratory compaction equipment.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. All geotextiles will be measured by the square yard on a plane parallel tothe ground surface, excluding overlaps. The accepted quantities, measured as providedabove, will be paid at the contract price per unit of measurement for the pay item that is shown in the bid schedule.

B. Payment indicated to include complete compensation for all labor, equipment, materialsand incidentals required for the completion of the work.

END OF SECTION

SECTION 02112

REMOVAL OF EXISTING PAVEMENT, CONCRETE CURB, SIDEWALK, DRIVEWAY AND/OR STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work consists of removing and disposing of existing pavement, concrete curb, combined curb and gutter, sidewalk, private driveways, and crosswalks, along with any structures designated for removal in the contract documents. Details of removals are specified in the contract documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Dispose of all existing pavement, concrete curb, crosswalk and/or combined curb and gutter specified for removal in the contract documents or directed by the Engineer. Exercise care in such removal to assure that remaining nearby facilities and/or structures are not disturbed. Restore to original condition any such existing facilities or structures damaged by construction activities.

B. Cut, remove and dispose of designated existing pavement to the lines indicated on the contract documents, or directed by the Engineer. Make straight and approximately vertical cuts of edges along which new pavement is to beplaced.

C. Remove and dispose of existing private concrete driveways and/or sidewalks which interfere with construction of street improvements or which do not match new grade as shown on the contract documents or as directed by the Engineer. Remove such driveways and/or sidewalks to distance of 8 inches (20 cm) behind curbs, or to greater distance if required to properly match the new curb and gutter grade. Remove along the neat line produced by a concrete saw cut. Make cuts to a depth of the thickness of the driveway and/or sidewalk or to a maximum depth of 6 inches (15 cm), whichever is lesser, and take care in removing the concrete assuring the slab breaks on the sawed neat line.

PART 4 - MEASUREMENT AND PAYMENT

4.1 ASPHALTIC CONCRETE PAVEMENT REMOVAL

A. Removal and disposal of asphalt concrete pavement is part of Section 2230, Street Excavation, Backfill and Compaction. No separate payment will be made for this item.

END OF SECTION

SECTION 02113

ADJUSTING EXISTING MANHOLES, LAMPHOLES, INLETS, WATER VALVE BOXES, WATER SERVICES, AND FIRE HYDRANTS TOGRADE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section consists of locating and adjusting to grade existing manholes, lampholes, inlets, water valve boxes or services, and fire hydrants as shown in the contract documents, staked in the field or as required in the Special Provisions.

1.2 STANDARD DRAWINGS

A. Standard drawings included in Appendix A of this specification book whichare applicable to this section are as follows:

Standard Drawing No. 02213-1	Manhole Adjustment Detail
Standard Drawing No. 02213-2	Water Valve Adjustment Detail

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide all materials including concrete, brick and mortar, complying with the specification section for the particular material involved, or if the material is not covered in these specifications, the material used for adjusting shall be equal, and comparable to that in the existing structure. If extensions for water valve boxes or services and fire hydrants are required beyond the length found to exist, provide items comparable to those in the existing structure.

PART 3 - EXECUTION

3.1 GENERAL

A. Bring to required grade all existing manholes, inlets, lampholes and water valve boxes by either lowering or raising in accordance with the details shown in the contract documents. Do not lower manholes, lampholes or inlets by removal of portions of the cones or barrel sections. Accomplish downward adjustments by replacement of existing sections with shorter sections. Assure that all structures have a minimum of one 2-inch (5cm) concrete

adjusting ring and a maximumof 12 inches (30cm) of rings under the casting. Do not use brick and/or mortar for adjustment of castings.

B. On manholes requiring steps, assure that maximum spacing between steps is 16 inches (40cm) and that 10 inches (25cm) is themaximum distancefromthetopof the manhole cone section to the first step.

C. Excavate water valve boxes and services to readily determine whether height adjustment can be made without substituting a longer section. Adjust water valve boxes and services laterally so the valve stems can be operated by the extension. Adjust water services by raising or lowering the curb key stop and extension box.

D. Adjust manholes, lampholes and water valve boxes to final grade before placing the final pavement surface. If required, make preliminary adjustment to allow placement of base courses and paving adjacent to the manhole, lamphole orwater valve.

E. Provide backfill material conforming to the requirements of Section 02235, 1inch (25 cm) Minus Crushed Base Course, and compacted to at least 97% percent of the maximum dry density as determined by AASHTO T99 or ASTMD698.

F. If required, make minor adjustments 5 feet (1.5 meters) to 10 feet (3.0 meters) in the horizontal location of existing fire hydrants to ensure that they are the required minimum distance behind the back of curb. At the time of construction staking, any hydrants which require horizontal adjustment will be located by the Engineer and the adjusted location will be staked by the Engineer.

G. Make any minor adjustments required as dimensioned in the contract documents to the height of existing fire hydrants to ensure that they are at a reasonable height above the back of curb. At the time of construction staking, any hydrants which require vertical adjustment will be located by the Engineer and the adjusted height will be staked by the Engineer. Accomplish extension of fire hydrant height only by the use of standard extension spools provided by the hydrantmanufacturer.

H. Before final acceptance, clean all manholes, lampholes, inlets and water valve boxes/services. Assure that all water valve boxes, services and fire hydrants are operational.

I. All requirements of this section shall apply to new, as well as to existing, manholes, lampholes, valve boxes, water services and fire hydrants.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

No separate payment will be made for this item.

END OF SECTION

SECTION 02230

STREET EXCAVATION, BACKFILL AND COMPACTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work is the clearing and grubbing, excavation, filling or backfilling, and subgrade preparation to the specified lines, grades and cross sections as preparation for overlying base course or other courses as shown in the contract documents. Also included are the removal and disposal of debris and excess soil, the furnishing and placement of fill materials, and compaction.

1.2 REFERENCES

A. The current publications listed below are a part of this specification.

AASHTO T99	Moisture-Density Relations of Soils Using 5-lb (2.5kg) Rammer and 12-inch (305mm) Drop
ASTM D698	Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft-lbf/ft^3)(600 kN-m/m^3)
AASHTO T191 (ASTM D1556)	Density of Soil In-Place by the Sand-Cone Method
AASHTO T310	In-Place density and water content of the soil and soil aggregate
(ASTM D6938)	by Nuclear Method (Shallow Depth)
AASHTO T11 (ASTM C117)	Materials Finer Than No. 200 (0.075mm) Sieve in Mineral Aggregates by Washing
AASHTO T27 (ASTM C136)	Sieve Analysis of Fine and Coarse Aggregate
AASHTO T89	Determining the Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
ASTM D4318	Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils

1.3 DENSITY CONTROL TESTING

A. Field Density Testing
   1. Meet the quality control and quality assurance testing requirements in Section 01400, Contractor Quality Control and Owner Quality Assurance.
   2. In-place field density tests for quality assurance are at Owner expense meeting ASTM D1556A (ASHTO T191), Sand Cone Method; or ASTM D2922 and ASTM D3017 (AASHTO T238 and T239) Nuclear Densometer Methods. Qualityassurance field density testing frequency is at the discretion of the Engineer.
   3. Retesting of failing areas is at the expense of the Contractor.

B. Laboratory Maximum Density and Optimum Moisture
   1. Quality assurance tests will be made by the Engineer for each on-site natural soil or each source of off-site material, including borrow material, to determine the laboratory maximum density values and optimum compaction moisture content under AASHTO T99 or ASTM D698.

C. Material Submittals
   1. Submit to the Engineer results of gradation tests for Sub-excavation/Replacement Below Subgrade pitrun gravel/sand.
   2. Submit to the Engineer samples of soils and/or aggregates for laboratory moisture-density relationship testing by the Engineer.

PART 2 - PRODUCTS

2.1 ON-SITE EMBANKMENT

A. Fill and backfill materials are to consist of natural soils free from organic matter, frozen material, refuse, construction debris or other man-made items. Obtain approval of the Engineer for all fill before placing and use only the fill from designated borrow areas.

2.2 IMPORTED BORROW MATERIALS (FOR EMBANKMENTS IN-PLACE)

A. If required, obtain borrow soil for embankments from areas off the project site. Furnish imported borrow at Contractor expense. Obtain Engineer approval of borrow areas. Imported borrow is to meet the requirements of Section 2.1, On-Site Embankment.

2.3 SUBEXCAVATION/REPLACEMENT BELOW SUBGRADE

A. Sub-excavation consists of removing and disposing of unstable material from below planned subgrade elevation in cut sections or from below the natural ground line in embankment sections.

B. Replacement material for sub-excavations consists of either:

1. Suitable materials from within the project limits if suitable material is present within the project limits, or

2. Imported materials if suitable material is not present within the project limits. Where imported pitrun gravel is used, furnish replacementmaterial meeting the following gradation requirement:

Sieve Opening	% Passing
3 Inch	100
No. 4	25 - 60
No. 200	12 Max.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

A. Perform clearing and grubbing including the excavation, removal and disposal of roots, stumps, sod, or any organic material and buried debris from within construction limits. Construction limits are defined by all areas within the cut/fill limits and extending 1 foot (0.3 m) beyond the back of sidewalk and/or curb and gutter, or 2 feet (0.6 m) beyond the edge of pavement if no sidewalk or curb and gutter is present. Remove unsuitable material to at least 12 inches (30 cm) below subgrade elevation.

B. Stockpile for project use any topsoil removed by clearing andgrubbing.

C. Dispose of all clearing and grubbing material as specified.

3.2 EXCAVATION STABILITY AND SAFETY

A. Meet OSHA requirements for excavations and excavated material stockpiles. This may require design of temporary slopes and/or shoring by a licensed professional engineer.

3.3 PROTECTION OF PROPERTY

A. Take precautions to protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures, fences, and vegetation. Any disturbed or damaged facilities will be suitably restored or replaced consistent with condition(s) which existed prior to construction.

3.4 EXCAVATION

A. Excavate to the specified lines and grades or as directed by the Engineer. Excavate without causing rutting, pumping or other disturbance to underlying materials.

B. Excavation made outside the specified grade limits is not measured for paymentin the Excavation or Embankment In-Place quantities.

1. Restore sub-excavated areas as directed by the Engineer. Correct subgrade disturbance by removing the disturbed soil and replacing and compacting to reach at least 95 percent of the maximum laboratory dry density determined by AASHTO T99 or ASTM D698.

2. Correct subgrade disturbance before placing overlying fill, backfill, base course or other courses. Disturbed soils may be replaced with imported material approved by the Engineer and compacted to 95% of maximum laboratory dry density determined by AASHTO T99 or ASTM D698.

C. Maintain the subgrade to drain at all times. Construct side ditches or gutters from cuts to embankments to prevent erosion damage to embankments.

D. Construct and maintain temporary drainage where existing surface drainage, sewers, or under-drainage are disturbed during the work until permanent drainage facilities are completed. Protect and preserve all existing drains, sewers, sub-surface drains, conduits, gas lines, and other underground structures which may be affected by the work. Repair all damage to these facilities or structures resulting from the work, to the satisfaction of the Engineer.

E. Excavate to minimize foundation soil and/or subgrade soil exposure to erosion, drying or infiltrating moisture. Perform excavation to provide drainage away from foundation/subgrade soils and minimize the potential for surface runoff to enter the foundation/subgrade soils.

F. Grade all intersecting streets and approaches within the project limits asspecified or as directed using suitable materials on the surfaces to produce smooth riding and satisfactory approaches to the intersections.

3.5 DISPOSAL OF EXCAVATED MATERIAL

A. Dispose of debris and unused excavated materials off the project site in accordance with all applicable state and local regulations. Locate and provide suitable disposal areas.

3.6 DUST CONTROL

A. Furnish dust control meeting Section 01500, Construction and Temporary Facilities, requirements.

3.7 SUBGRADE PREPARATION AND COMPACTION

A. General

1. Assure the subgrade beneath pavements, curb, or sidewalks is natural soil free of topsoil, organic material or refuse. Place pavement components, curb and sidewalk over the prepared subgrade as soon as practical. Donot place pavement components on frozen subgrade. No separate payment is made for subgrade preparation since it is considered incidental to construction of overlying pavements/structures.

2. If the surface of a previous roadbed or pavement surface matches the surface of the finished subgrade scarify the top 6 inches (15cm) of the previous surface the full width of the subgrade to permit uniform reshaping and compaction.

B. Fine Grading

1. Assure the finished surface does not deviate not more than 0.1 foot (3cm) at any point from the staked elevation; and that the sum of the deviations from true grade of any two points less than 30 feet (9m) apart does not exceed 0.1 foot (3cm).

C. Compaction

1. Compact the upper 8 inches (20cm) of the subgrade to at least 95% of the laboratory maximum, determined by AASHTO T99 or ASTM D698. Proof roll the subgrade surface for observation by the Engineer. Compact all soft, yielding or otherwise unstable areas to provide adequate support of construction equipment as determined by the Engineer. Also compact the subgrade to meet the specified density requirements. Remove and replace any unstable or otherwise unsuitable subgrade as specified under Section 3.9, Sub-excavation/Replacement Below Subgrade.

3.8 EMBANKMENT PLACEMENT AND COMPACTION

A. General

1. Place fill materials (embankment) to the specified lines and grades. Place fill in uniform layers not exceeding 8 inches (20cm) in loose thickness. Once placed, moisten or aerate, mix, and compact each layer as specified. Work clay soils to maximum 2-inch (5cm) nominal size before compacting. Do not begin fill placement until the subgrade construction has been approved by the Engineer. Do not place fill on wet or frozen areas. Do not operate heavy equipment for spreading or compacting fill within 4 feet (1.2m) of structures.

2. If grading operations are suspended due to weather, blade the entire area until it is smooth, free of depressions and ruts, and crowned to drainwater.

B. Compaction

1. Control the fill moisture content to assist in obtaining the specified field density. Maintain the moisture content of fill soils within ± 3% of optimum moisture. Compact each fill layer and the top 8 inches (20cm) of subgrade soil to at least 95 percent of maximum laboratory density as determined by AASHTO T99 or ASTM D698. Compact areas within 4 feet (1.2m) of structures in maximum 8-inch (20cm) loose lifts using power-driven hand-held tampers.

2. Apply water, when required, at the locations and in the amounts required to compact the material to the specified requirements. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application. Apply water during the work to control dust and to maintain all embankment and base courses in a damp condition in accordance with Section 1500. Water required for compacting subgrade and/or embankments may be obtained from the municipal system if approved by the Owner, or from other sources.

3. Do not place fill or embankment when moisture content prevents effective compaction or causes rutting. Dry all embankments having excessive moisture by scarifying and blading the affected areas before compacting or placing succeeding layers.

3.9 SUBEXCAVATION/REPLACEMENT BELOW SUBGRADE

A. Sub-excavation consists of removing and disposing of unsuitable material from below planned subgrade elevation in cut sections or from below the natural groundline in embankment sections.

B. Soil is unsuitable if, in the opinion of the Engineer, it contains excessive organics, refuse, construction debris, or other objectionable material; or if it unstable, rutting or yielding; or if it contains excessive moisture. Generally, soils will be sub-excavated and replaced only if they are unable to adequately support equipment typically used for excavation and soil transport.

C. Assure the Engineer has measured the area where unstable materials have been removed before backfilling. Do not backfill any area where unstable foundation soils have been excavated until authorized by the Engineer. Backfill placed without approval may be ordered removed and replaced at Contractor expense.

D. Backfill with either suitable soils from within the project limits or imported pit run gravel complying with the requirements of Section 2.3, Sub-excavation/Replacement Below Subgrade. Different measurement and payment items are used for the on-site soil and pit run gravel replacements.

E. Compact the replacement material to 95% of the maximum laboratory density as determined by AASHTO T99 or ASTM D698.

3.10 PROTECTION OF THE WORK

A. Repair damaged embankments to the specified elevations and grades. Maintain ditches and drains along the subgrade to drain the subgrade. Assure the finished grade does not deviate more than 0.1 (3cm) foot at any point from the staked elevation and the sum of the deviations from true grade of any two points not more than 30 feet (9m) apart does not exceed 0.1 foot (3cm). Do not place any surface course or pavement until the subgrade has been checked and approvedby the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Excavation Above Subgrade

1. The volume, based upon the plan quantity as specified above, is paid for at the contract unit price bid for Excavation Above Subgrade, and is full compensation for all labor, equipment, tools and incidentals necessary to accomplish all clearing, grubbing, old pavement removals, hauling, disposal, and excavating to prepare the subgrade shown in thecontract.

B. Sub-excavation/Replacement Below Subgrade.

1. This item is field measured using the average end area method and paid for by the cubic yard in-place of material removed, measured in its original position, at the contract unit price bid for Sub-excavation/Replacement Below Subgrade, which price and payment constitutes full compensation for all labor, equipment, tools, and incidentals to complete the excavation and disposal of unsuitable material in the embankment foundation or in the subgrade. The cost of backfilling and compacting holes created by the removal of unsuitable materialwith the specified replacement material is also included in Sub- excavation/Replacement Below Subgrade Item.

2. Payment is made under:

a. Sub-excavation/Replacement Below Subgrade (Replacement with Imported Materials) - Per Cubic Yard.

C. Embankment In Place.

1. When specified in the contract as a bid item, Embankment In Place is paid for at the contract unit price per square yard for the actual field measuredvolume of embankment constructed and accepted in place to the specified lines and grades. Price and payment are full compensation for all labor, tools, equipment, and other incidentals necessary to secure borrow material, haul, place, level, manipulate, compact the embankment material, and perform other work for embankment construction.

2. When Embankment In Place is not specified in the contract, the cost of constructing embankments is incidental to and included in the unit prices bid for the associated bid items for the work.

3. Payment is made under: Embankment In Place - Per Square Yard.

END OF SECTION

SECTION 02234

SUB-BASE COURSE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work is constructing a sub-base course of either crushed or uncrushed materials meeting the specified gradations and other quality criteria specified herein.

1.2 REFERENCES

AASHTO T11	Amount of Material Finer Than No. 200 (0.075 mm) Sieve in Aggregate
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T89	Determining Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T176	Plastic Fines in Graded Aggregates and Soils by the Use of the Sand Equivalent Test
AASHTO T96	Resistance to Degradation of Small-Size Course Aggregate By Abrasion and Impact in the Los Angeles Machine
AASHTO T99 (ASTM D698)	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5kg) Rammer and 12-Inch (305mm) Drop
ASTM D5821	Determining the percentage of Fractured Particles in Coarse Aggregate
AASHTO T191 (ASTM D1556)	Density of Soil in-Place By Sand Cone Method
AASHTO T310 (ASTM D6938)	In-Place density and water content of the soil and soil aggregate by Nuclear Method (Shallow Depth)

1.3 DENSITY CONTROL TESTING

A. Field Density Testing

1. Meet the quality control and quality assurance testing requirements in section 01400, Contractor Quality Control and Owner Quality Assurance.
2. In-place field density tests for quality assurance are at Owner expense meeting AASHTO T191 (ASTM D1556) Sand Cone method or AASHTO T310 (ASTM D 6938), Nuclear Densometer method. Quality assurance field density testing frequency is at the discretion of the Engineer.

3. Retesting of failing areas is at the expense of the Contractor.

B. Laboratory Maximum Density and Optimum Moisture
   1. Moisture density curves will be provided by the Contractor for each base material supplied. These will be provided at the expense of the Contractor.

C. Materials Submittals
   1. Submit to the Engineer gradations, moisture density curves and other preliminary test results for sources to be used for base materials prior to delivery to the site for approval by the Engineer. If recycled materials are proposed, CBR test data must be submitted to the Engineer to assure consistency with design requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish select sub-base material meeting the applicable aggregate quality.

2.2 CRUSHED SUBBASE

A. Furnish material having both fine and coarse crushed stone or crushed gravel, and/or natural gravel, and when approved, blended with soil, sand, screenings, recycled concrete and/or asphalt or other materials.

B. Furnish crushed gravel or stone consisting of hard, durable particles, not containing excessive flat, elongated, soft or disintegrated rock, dirt, or other deleterious matter, and having a wear not exceeding 50% at 500 revolutions as determined by AASHTO T96.

C. Use production methods that produce a percent of fractured rock in the finished product that is constant and uniform. Crush aggregate so that at least 25% of the material is retained on the No.4 sieve and has one or more mechanically fractured faces.

2.3 GRADATION

A. Produce material, including any added binder or filler, meeting the following Table of Gradations as determined by AASHTO Methods T11 and T27:

TABLE OF GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVES

Passing	4" Minus	3" Minus	2" Minus	1-1/2" Minus	1" Minus
1-1/2 Inch	---	---	---	100	
1 Inch	---	---	---	---	100
No.4	25-60	25-60	25-60	25-60	25-70
No.40	10-30	10-30	10-30	10-30	10-30
No.200	2-10	2-10	2-10	2-10	2-10

B. Up to 5% "oversized" material is permitted provided that the "oversized" material passes the screen size immediately larger than the top size specified. The material between the maximum screen opening and the No.4 sieve shall be reasonably well graded.

C. Suitability of the aggregate is determined by the gradation testing of material placed in the project as required in the Contract documents, within the allowable limits described by the Table of Gradations for the particular grading specified.

D. Assure the liquid limit for the aggregate fraction passing a No.40 sieve does not exceed 25, nor the plasticity index exceed 6, as determined by AASHTO T89 and T90.

2.4 WATERING:

A. Use water from an approved source.

PART 3 - EXECUTION

3.1 PREPARATION

A. Immediately before placing the base course, blade smooth and shape the underlying subgrade, subbase or base course to the plan cross-section before the base course is placed on the street. Do not place sub-base course on wet or muddy subgrade or subbase course. Maintain at least 1 completed area of finished and accepted subgrade or sub-base course in advance of placing base course.

3.2 PLACEMENT AND SPREADING

A. Mix and place the material in maximum 6-inch (15 cm) horizontal layers loose thickness. Deposit and spread each load of material on the prepared subgrade, or on a completed sub-base course layer continuously without breaks. Assure hauling over the subgrade or over any completed subbase course does not damage the subgrade, sub-base or base course.

B. Spread using dump boards, spreader boxes, or moving vehicles equipped to distribute the material in a uniform layer or a windrow. Place and spread the material in a uniform layer to the specified depth without causing segregation. Once the base course is spread, blade-mix it the full depth by alternately blading the entire layer to the centerline and back to the roadway edge.

C. For multiple layers, mix each layer as specified above. Blade smooth and compact each layer before placing the succeeding layer.

D. Uniformly add water, when required, on site and place in amounts required to compact the material as necessary to aid in densification and to limit segregation. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application.

E. Apply water during the work to control dust and to maintain the base course in a damp condition.

F. Where crushed sub-base is specified, produce a product with at least 25% of the material retained on the No.4 sieve having one or more fractured faces.

G. Water required for compacting base gravel may be obtained from the municipal system if approved by the Owner, or from other sources.

H. Compact the material using appropriate tamping equipment or power rollers. Correct all irregularities or depressions that develop under rolling by scarifying the material and adding or removing material, as required, until the surface meets specifications.

I. Blade and compact alternately, as required to produce the specified surface until final inspection. Tamp the material along curbs, headers, manholes, and similar structures and all places inaccessible to rollers using approved mechanical tampers or hand tampers meet field density requirements.

3.3 FIELD DENSITY REQUIREMENTS

A. Furnish watering and rolling to obtain a minimum field density of 95% of the maximum dry density determined by AASHTO T99. No separate compensation is allowed for rolling and watering the sub-base course other than the sub-base course bid item or items listed on the Contract documents.

3.4 SURFACE TOLERANCES

A. Finish the sub-base course so that when tested using a 10-foot (3m) straight edge placed on the surface with its center line parallel to the street center, the maximum surface deviation from the straight edge does not exceed ½ inch (12.7mm). Additionally, the finished grade cannot deviate more than 0.1 foot (30mm) at any point from the staked elevation and the sum of the deviations from two points not more than 30 feet (9.14m) apart cannot exceed 0.1 feet (30mm).

B. Perform all sub-base course corrections to meet the above tolerances using approved methods and materials. Payment for patching aggregate is at the unit price bid for the sub-base course material.

PART 4 - MEASUREMENT AND PAYMENT

4.1 CUBIC YARD BASIS: SUB-BASECOURSE

A. This item is measured and paid for by the cubic yards of crushed, sub-base course of the specified gradations, complete in place, at the contract unit price bid for 1.5" Minus Crushed Sub-Base Course", whichconstitutes full compensation for furnishing, loading, hauling, spreading, blending, shaping, watering, and compacting the sub-base course material, and for all tools, labor and incidentals necessary to complete this item.

END OF SECTION

SECTION 02235

CRUSHED BASE COURSE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work is the placing of one or more base courses composed of crushed gravel, stone or other similar materials meeting the gradation and other quality criteria specified herein.

1.2 REFERENCES

AASHTO T11	Materials Finer than No. 200 (0.075 mm) Sieve in Aggregate
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T89	Determining Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T176	Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
AASHTO T96	Resistance to Degradation of Small-Size Coarse Aggregate By Abrasion and Impact in the Los Angeles Machine
AASHTO T99 (ASTM D698)	Moisture-density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5 kg) Rammer and 12-Inch (305 mm) Drop
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
AASHTO T191 (ASTM D1556)	Density of Soil In-Place By Sand Cone Method
AASHTO T310 (ASTM D6938)	In-Place density and water content of the soil and soil aggregate by Nuclear Method (Shallow Depth)

1.3 DENSITY CONTROL TESTING

A. Field Density Testing

1. Meet the quality control and quality assurance testing requirements in section 01400, Contractor Quality Control and Owner QualityAssurance.
2. In-place field density tests for quality assurance are at Owner expense meeting AASHTO T191 (ASTM D1556) Sand Cone method or AASHTO T310 (ASTM D6938) Nuclear Densometer method. Quality assurance field density testing frequency is at the discretion of the Engineer.

3. Retesting of failing areas is at the expense of the Contractor.

B. Laboratory Maximum Density and Optimum Moisture

1. Moisture density curves will be provided by the Contractor for each base material provided. These will be provided at the expense of the Contractor.

1.4 MATERIALS SUBMITTALS

A. Submit to the Engineer gradations, moisture density curves and other test results for sources to be used for base materials prior to delivery to the site for approval by the Engineer. If recycled materials are proposed, CBR test data must be submitted to the Engineer to assure consistency with design requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish aggregate base material meeting the applicable aggregate quality requirements.

2.2 CRUSHED BASE MATERIAL

A. Consists of both fine and coarse fragments of crushed stone or crushed gravel, and/or natural gravel, and when approved, blended with sand, finely crushed stone, crusher screenings, recycled concrete and/or asphalt or other similar materials. Where recycled materials are permitted, project specifications shall state the minimum required CBR value (design minimum) of the Crushed Base Course.

B. Use crushed stone or gravel consisting of hard, durable particles of fragments of stone, free of excess of flat, elongated, soft or disintegrated pieces, dirt, or other deleterious matter, and having a percent of wear of not exceeding 50 at 500 revolutions when tested under AASHTO T96.

C. Crush material so that the percentage of fractured particles in the finished product is as constant and uniform as practical. Crush to produce material where at least 50% of the material retained on the No. 4 sieve has at least one fractured face.

D. Incorporate all material produced in the crushing operation and passing the No. 4 mesh sieve into the base material necessary to meet the gradation requirements.

2.3 GRADATION

A. As determined by AASHTO Methods T11 and T27, furnish material for the grading specified in the contract documents including binder or filler, which may have been added at the plant or at the site, meeting the requirements of that grading in the Table of Gradations below:

TABLE OF GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVE

Passing	1½" Minus	1" Minus	¾" Minus
1½ Inch	100		
1 Inch	—	100	
¾ Inch	—	—	100
½ Inch	—	—	—
No. 4 Sieve	25 - 60	40 - 70	40 - 70
No. 10 Sieve	—	25 - 55	25 - 55
No. 200 Sieve	0 - 8	2 - 10	2 - 10

B. Up to 5% "oversized" material is permitted provided that the "oversized" material passes the screen size immediately larger than the top size specified. The produced material between the maximum screen opening and the No.4 sieve shall be reasonably well graded.

C. Suitability of the aggregate is based on samples obtained during placement in the project within limits allowed in the table for the particular grading specified.

D. That portion of the fine aggregate passing the No. 200 sieve must be less than 60% of that portion passing the No. 40 sieve.

E. The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed 25, nor the plasticity index exceed 6, as determined by AASHTO T89 and T90.

2.4 WATERING:

A. Use water from an approved source.

PART 3 - EXECUTION

3.1 GENERAL

A. Before placing the base course, smooth and shape the surface of the underlying subgrade, sub-base or base course to the cross section shown on the plans before placing the base course.

B. Do not place base course on a wet or muddy subgrade or sub-basecourse. Complete at least one area of finished and accepted subgrade, sub-base or underlying base before the placing of any base course.

3.2 PLACEMENT AND SPREADING

A. Mix and place the material in maximum 8 inches compacted layers unless otherwise approved. Deposit and spread each load of material on the prepared subgrade, or on a completed sub-base or base course layer continuously without interruption. Discontinue operating haul units over subgrade, or over any sub-base or base course completed if the haul units damage the subgrade, sub-base or base course.

B. Deposit and spread the material in a uniform layer, without segregation, to a loose depth so that when compacted, and making allowance for any filler to be blended on the road, the layer has the specified thickness.

C. Spread material using dump boards, spreader boxes, or vehicles equipped to distribute the material in a uniform layer. The material may be deposited in windrows mixed and spread as described below.

D. Construct each layer meeting these requirements. Blade smooth and thoroughly compact each layer as specified before placing the succeeding layer.

E. If segregation or moisture problems exist, or if the material was placed on the road in windrows, thoroughly blade-mix the material of the affected layer by alternately blading to the center and back to the edges of the street.

F. Uniformly add water, when required, on site and place in amounts required to compact the material as necessary to aid in densification and to limit segregation. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application.

G. Apply water during the work to control dust and to maintain the base course in a damp condition in accordance with Section 01500 under Dust Control.

H. Uncontaminated water required for compacting base gravel may be obtained from the municipal system if approved by the owner, or from other sources.

3.3 FIELD DENSITY REQUIREMENTS

A. Compact placed material the full width by rolling with suitable tamping equipment or power rollers. Correct all irregularities or depressions that develop during rolling by loosening the material in these places and adding or removing material, as required.

B. Perform blading and compacting alternately as required or directed, to maintain a smooth, even, uniformly compacted surface until the final inspection. Along curbs, headers, manholes, and similar structures, and at all places not accessible to the roller, compact the base course material with suitable mechanical tampers or hand tampers to reach the compaction requirements.

C. Provide the watering and rolling required to obtain a minimum field density of 95% of maximum dry density as determined by AASHTO T99. No separate compensation is made

for rolling and watering the base course other than the base course bid item or items listed on the contract documents.

3.4 SURFACE TOLERANCES

D. The base course surface when finished and tested with a 10-foot (3.0 meter) straight edge placed on the surface with its center line parallel to the center line of the street, will not have a surface deviation from the straight edge exceeding 3/8- inch (1.0 centimeter). Additionally, the finished grade cannot deviate more than 0.05 feet (1.5 centimeters) at any point from the staked elevation, and further, the sum of the deviations from two points not more than 30 feet (9.0 meters) apart cannot exceed 0.05 feet (1.5 centimeters).

E. For base course receiving asphalt concrete surfacing, the finished grade cannot deviate more than 0.02 feet (0.6 centimeters) at any point from the staked elevations, and the sum of the deviations from two points not more than 30 feet (9.0 meters) apart cannot exceed 0.02 feet (0.6 centimeters).

F. If patching of the base course is necessary to meet the tolerances, perform patching using methods and aggregates approved by the Engineer. Payment for patching aggregate is at the unit price bid for the base course material.

PART 4 - MEASUREMENT AND PAYMENT

4.1 CUBIC YARD BASIS: CRUSHED BASE COURSE.

A. This item is measured and paid for by the cubic yards of crushed base course of the gradations specified in the Contract documents, complete in place, at the contract unit price bid for 0.75" or 1.5" Minus Crushed Base Course". Price and payment is full compensation for furnishing, crushing, loading, hauling, spreading, shaping, watering and compacting the base course material, and for all tools, labor and incidentals necessary to complete this item.

END OF SECTION

SECTION 02510

ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Work is the production and placement of plant mix asphalt concrete pavement.

B. Hot plant mix asphalt concrete is a mineral aggregate and asphalt material mixed at a hot plant meeting these specifications and placed in one or more courses on a newly prepared or existing street roadway in accordance with the contract documents.

1.2 REFERENCES

AASHTO T11 (ASTM D1140)	Amount of Material Finer than No. 200 (0.075 mm) Sieve in Aggregate
ASTM D5361	Standard Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing
AASHTO T27 (ASTM C136)	Sieve Analysis of Fine and Coarse Aggregate
AASHTO T89 (ASTM D4318)	Determining Liquid Limit of Soils
AASHTO T90 (ASTM D4318)	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T283 (ASTM D4867)	Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
AASHTO T176 (ASTM D2419)	Plastic Fines in Graded Aggregates and Soils by Use of The Sand Equivalent Test
AASHTO T96 (ASTM C131)	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T312 (ASTM D6925)	Standard Test Method for Preparation and Determination of the Relative Density of Asphalt Mix Specimens by Means of the Superpave Gyratory Compactor
ASTM D2041	Theoretical Maximum Specific Gravity and Density of Bituminous Mixtures
ASTM C1097	Hydrated Lime for Use in Asphalt Cement or Bituminous Paving Mixtures
ASTM D3666	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

ASTM D5821	Percentage of Fractured Particles in Coarse Aggregate
ASTM C123	Lightweight Particles in Aggregate
ASTM D6307	Asphalt Content of Asphalt Mixture by Ignition Method
ASTM C142	Clay Lumps and Friable Particles in Aggregates
MS-2	Asphalt Institute – Mix Design Methods

PART 2 - PRODUCTS

2.1 GENERAL:

A. The Asphalt Concrete Surface Course must have at least a 3-bin separation, when continuous flow mixing types of plants are used. When a drum dryer is used with a weight batching system from dry bins, separate and stockpile the crushed aggregate into two sizes.

B. Unless otherwise specified, furnish Type B or B-Modified aggregate meeting the requirements of Table 1 in this section for all asphalt pavement applications.

C. Unless otherwise specified, furnish (PGAB) PG58-28 Asphalt Binder Material meeting the requirements of Table 2 in this section for all asphalt pavement application.

D. Prepare pavement course to conform to the lines, grades, thickness and typical cross sections shown in project documents and plans, and shall be rolled, finished, and approved by the Engineer before the placement of the next course.

2.2 PLANT MIX AGGREGATES

A. Furnish aggregates from acceptable sources approved by the Engineer.

B. Furnish test data as outlined in this section on each source to be used for acceptance by the Engineer.

C. Designation of the source of supply and the acceptability of the material there from, does not extend to the grading of the material as it may naturally come from the pit or crusher. Adjust the crusher and screens to remove certain portions of the material as may be necessary to furnish gravel that will comply with the specifications in the contract. No additional compensation will be allowed for such adjustment of the equipment or the rejection of waste. It is understood that the Engineer may order procurement of material from any portion of any area designated as a pit site and may reject portions of the deposit as unacceptable.

D. Aggregate materials shall not contain more than 1.5% by weight of clay lumps, shale, or coal, nor shall light weight particles exceed 3.5% by weight. No combination of clay, shale, coal, or lightweight particles shall exceed 3.5% by weight. Do not use Scoria (fired clay). Aggregate materials shall conform to the grading stipulated in the contract documents. Use reasonable care in the selection of material in a pit so that uniform product will be produced at all times. No compensation will be allowed for such stripping of the pit as may be required in order that satisfactory material may be secured.

E. Aggregate used shall consist of gravel, crushed to the specified size, crushed stone, composed of hard durable pebbles or stone fragments, reclaimed asphalt pavement, and finely crushed stone filler, sand or natural clean material, or other fine mineral material. The portion of the material retained on the No. 4 sieve (4.74 mm) will be called coarse aggregate and that passing the No. 4 sieve (4.74 mm) and retained on the #200 sieve (0.075 mm) will be call fine aggregate. The material Passing the #200 (0.075 mm) will be called mineral filler. The reclaimed asphalt pavement shall be removed from its original location and reduced by suitable means to such particle size as may be required for use in hot plant mix asphalt concrete.

F. For all gradings of fine aggregate, including any blended fine aggregate and mineral filler, passing a No 40 sieve (0.425 mm), shall have a liquid limit not exceeding 25 and a plasticity index of not more than 6.

G. Produce coarse aggregate retained on the No. 4 sieve (4.75 mm) having a minimum of 75% by weight of particles with at least two mechanically fractured faces. When fractures are contiguous, assure the angle between the fracture planes is at least 30 degrees to count as two fractured faces.

H. Preliminary acceptance of aggregates proposed for use may be made at the point of production. Final acceptance will be made only after tests of the aggregates are complete and in place.

I. Surface Course Asphalt Plant Mix Aggregate:

TABLE 1

REQUIREMENTS FOR GRADING OF SURFACE COURSE AGGREGATE

Percentage by Weight Passing Job Mix Target Bands						
Sieve Size	A 1”	B ¾”	C ½”	D 3/8”	E #4	Job Mix Tolerances
1” (25.0 mm)	90 - 100	100				---
¾” (19.0 mm)	90 Max	90 - 100	100			+/- 5
½” (12.5 mm)		90 Max	90 - 100	100	100	+/- 5
3/8” (9.5 mm)			90 Max	90 - 100	95 - 100	+/- 5
No 4 (4.75 mm)				90 Max	90 - 100	+/- 5
No 8 (2.36 mm)	19 - 45	23 - 49	28 - 58	32 - 67		+/- 4
No 30 (0.600 mm)						+/- 3
No 200 (0.075 mm)	1 - 7	2 - 8	2 - 10	2 - 10	6 - 13	+/- 2

1. The above gradation bands represent the job mix target limits, which determine the suitability of aggregate for use. The final job mix target gradation must be within the specified bands and uniformly graded from coarse to fine and not vary from the low limits on one screen to the high limits on the adjacent screen, or vice versa. The final job mix gradation limits are established by applying the job mix tolerances to the job mix targets.
2. The job mix formula establishes target values. During production of the mix, the gradations shall lie within the job mix gradation limits specified in Table 1. For example, "Type A, No. 200" band is "1-7". QA job mix target of 5 has been selected for the final mix. The job mix gradation limits is 5, plus and minus 2. Therefore, the job mix gradation limits for production is 3-7.

2.3 ASPHALT BINDER MATERIAL

A. Furnish asphalt binder material to be used as specified in the contract documents that meet the type and grade specified requirements in this section in Table 2.
   1. Grades:
      a. (PGAB) PG 58-28
      b. (PGAB) PG 64-22
      c. (PGAB) PG 64-28 (Polymer Modified)
      d. (PGAB) PG 70-28 (Polymer Modified)

B. The percentage of asphalt by weight, to be added to the aggregate will be, generally, between 4 and 8% of the weight of the total mix. A minimum effective asphalt binder content of 4.5% is required for ¾" for Type B and ½" mixes, 5.0% for ½" for Type C mixes. The mix design will establish the exact percentage of asphalt in the mix, based upon preliminary laboratory tests, sieve analysis and grading and character of the aggregate furnished within the specification limits. No claim is allowed for the payment for rejecting any batch or load of mixture containing an excess or deficient amount of asphalt binder varying more than 0.4 of a percent from the fixed mix design percentage.

C. Obtain Engineer approval of the asphalt material source before shipments are made to any project. The source of supply cannot change after work is started unless approved in writing by the Engineer. The Engineer is not liable for the quantity shipped.

D. Samples of asphalt binder material may be taken, as directed by the Engineer, and placed in uncontaminated one-quart containers. When sampled, these shall be taken from the tanker car or truck at the point of delivery on the project and submitted to the Engineer.

E. All transport vehicles must be equipped with a spigot or gate valve installed in either: (1) the unloading line, (2) in the tanker at the centerline on the tank, (3) in the pressure line from the unloading pump, or other locations approved by the Engineer. Assure the spigot or gate valve has a diameter of between 3/8 inch (1 cm) and 3/4 inch (2.5 cm). The spigot valve must be located to prevent contamination from plant dust or other contaminants.

F. The supplier furnishing the asphalt binder material shall inspect each tanker car or truck before it is loaded and ship only in clean, uncontaminated, fully insulated cars or trucks, sealed after loading by the supplier.

G. The material supplier shall issue, in duplicate, a certificate showing full compliance with the specifications for the designated grade of material, together with the following information. Project number, date of shipment, source of the material, car or truck initial and number, destination, gross quantity loaded, loading temperature, and net quantity in gallons at 60° F (15.5° C) or tons, whichever unit of measurement is stipulated. Assure the certificate of compliance accompanies the shipment and is furnished to the Engineer. The certificate, signed by the supplier representative, must also certify that the conveyance vessel was inspected and found to be free of contaminating material.

H. The certificate of compliance is the basis for tentative acceptance and use of the material. Samples taken according to applicable sampling methods and retained by the Engineer may be tested at the Engineer's discretion. Failure of the asphalt material to meet these specifications may result in rejection of the entire, associated work. If rejected, removed and replace rejected work.

I. Apply asphalt material at temperatures that assure uniform mixing or spreading. Application temperature ranges for each grade of material should be accompanied with the mix design. Application temperature for mixing applications will be in accordance with the mix design.

J. Upon request by the Engineer, furnish the Engineer and/or laboratory (responsible for completing the mix design) with data or a report showing the temperature-viscosity relationship of each asphalt binder used on the project. Assure this data covers the range of temperatures used for mixing and compaction. In addition, the Engineer may request a complete set of test results from Table 2 for each grade used on the project.

TABLE 2
PERFORMANCE GRADED ASPHALT BINDER (PGAB)

Performance Grade	PG 58	PG 64		PG 70	Test Methods
	-28	-22	-28	-28	
Average 7-day Maximum Pavement Design Temperature, °C	<58	<64		<70	
Minimum Pavement Design Temperature, °C	>-28	>-22	>-28	>-28	
Original Binder					
Flash Point Temp.: Minimum °C	230				AASHTO T48
Viscosity: Maximum, 3 Pa ·s (3000 CP), Test Temp, °C	135				ASTM D4402
Dynamic Shear: G* / sin delta, Minimum, 1.00 kPa Test Temp @ 10 rad / s, °C	58	64		70	AASHTO T315
Rolling Thin Film Oven (AASHTO T240) or Thin Film Oven (T179) Residue					
Mass Loss, Maximum, %	1.0				AASHTO T240
Dynamic Shear: G* / sin delta, Minimum, 2.20 kPa Test Temp @ 10 rad / s, °C	58	64		70	AASHTO T315
Pressure Aging Vessel Residue (AASHTO PP1)					
PAV Aging Temp, °C	100	100		100	AASHTO R28
Dynamic Shear: G* / sin delta, Maximum, 5000 kPa Test Temp @ 10 rad / s, °C	19	25	22	25	AASHTO T315
Creep Stiffness [a]: S, Minimum, 300 MPa m-value, Minimum, 0.300 Test Temp, @ 60 sec, °C	-18	-12	-18	-18	AASHTO T313
Direct Tension [a]: Failure Strain, Minimum, 1.0%, Test Temp @ 1.0 mm/min. °C	-18	-12	-18	-18	AASHTO T314

1. If creep stiffness is below 300 MPa, the direct tension test is not required. If the creep stiffness is between 300 and 600 MPa the direct tension failure strain requirement can be used in lieu of the creep stiffness requirement. The m-value requirement must be satisfied in both cases.

2.4 HYDRATED LIME FOR ASPHALT CONCRETE.

A. Mineral filler may be incorporated in the asphalt concrete mixture. Furnish hydrated lime as filler when specified. Assure it is free of lumps and extraneous material and meets the following gradation requirements as per ASTM D242:

Sieve	Percent Passing
No. 30 (0.60 mm) Sieve	100
No. 80 (0.180 mm) Sieve	95-100
No. 200 (0.075 mm) Sieve	70-100

B. Assure the hydrated lime meets paragraph 2 (chemical composition) and paragraph 7 (a) requirements (chemical analysis) of ASTM C1097.

C. Where required, the mineral filler will be effectively mixed with the hot plant mix asphaltic concrete.

2.5 COMPOSITION OF MIXES:

A. General

1. Submit to the Engineer for approval a mix design for each mix required on the project. Assure the job-mix formula is within the gradation limits in Part 2 Products in this section.
2. Have the job-mix formula prepared by an independent testing laboratory approved by the Engineer and performed under the supervision of a Professional Engineer. The requirements of ASTM D-3666 are the guidelines for testing laboratory approval. The cost of the job-mix formula(s) is at Contractor expense.
3. Keep the job mix formula current and contain the following minimum information:
    a. Gradation of all constituent aggregates.
    b. Specific gravity of constituent aggregates and asphalt cement.
    c. Source of supply of all materials and grade of asphalt cement.
    d. Marshall design curves for stability, unit weight, flow and volumetric requirements (VMA and total voids) at asphalt contents below and above optimum (four points minimum).
    e. Measured void less (Rice's) specific gravity used in voids computations.
    f. Composite aggregate grading.
    g. Recommended asphalt cement content.
    h. Marshall or gyratory compactive effort.
    i. Date of mix design (job mix formula).
    j. Index of retained strength.
4. In addition to the job mix formula, all asphalt concrete surfacing mix submittals will have laboratory tests indicating that the Tensile Strength Ratio (TSR) as determined by AASHTO T-283 is at least 70%. Test shall be performed at 7.0 +/- 0.5% air voids and shall include the freeze cycle. Mixtures that fail to meet this minimum criteria may be resubmitted with and approved anti-strip agent meeting the same 70% criteria.

B. Asphalt Concrete Surface Course

1. The maximum permissible variation from the job-mix formula within the specification limits is as follows:
    a. Aggregate gradation within job mix tolerances
    b. Asphalt ± 0.4%*

c. Temperature of mix ± 20°F.

* This tolerance will be permitted only if the job mix parameter curves indicate that the corresponding design limits are not exceeded.

2. Produce Hot Plant Mix Asphalt Concrete Surface courses having the following characteristics as measured by AASHTO T245, ASTM D6726 & D6927 "Resistance to Plastic Flow of Bituminous Mixtures by Means of the Marshall Apparatus":

a. Number of compaction blows, each end of specimen 50.
b. Stability, minimum 1500.
c. Flow 8 – 18.
d. Air voids, percent 3-5.
e. Percent voids in mineral aggregate (minimum)

All type B-modified asphaltic concrete surfacing shall meet the following Marshall Design criteria as determined by ASTM D1559.

a. Number of Compaction Blows, Each End of Specimen 75
b. Stability, Minimum 1500 lbs.
c. Flow 8 – 16
d. Air Voids, Percent 3 - 5
e. Percent Air Voids Filled with Bitumen 65-75

3. As an alternative to Marshall mix production, SuperPave Hot Plant Mix Asphalt Concrete Surface courses can be produced having the following characteristics as measured by AASHTO R 35 and M 323.

TABLE 3
SUPERPAVE GYRATORY COMPACTION EFFORT

20-Year Design ESALs" (in millions)	Compaction Parameters			Typical Roadway Applications
	$N_{initial}$	N_{design}	$N_{maximum}$	
< 0 .3	6	50	75	Applications include roadways with very light traffic volumes, such as local roads, county roads and city streets where truck traffic is prohibited or at a very minimal level. Traffic on these roadways would be considered local in nature, not regional, intrastate or interstate. Special-purpose road ways serving recreational sites or areas may also be applicable to this level.
0.3 to< 3	7	75	115	Applications include collector roads or access streets. Medium- trafficked city streets and the majority of county roadways may be applicable to this level.

a. Air voids, percent.....3-5.
b. Voids Filled with Asphalt..... 65-80
c. Dust to Effective Binder ratio 0.6-1.4

d. N_{Max} 98
e. N_{Min} 91.5
f. N_{Design} 95-97
g. Percent Voids in Mineral Aggregate ..... See Table 4.

TABLE 4 REQUIRED VOIDS IN MINERAL AGGREGATE (VMA)	
Nominal particle size (table 2)	Voids in Mineral Aggregate, Min.
No 4 (4.75 mm) 3/8 – inch (9.5 mm) ½ - inch (12.5 mm) ¾ - inch (19.0 mm) 1 – inch (25.0 mm)	16 15 14 13 12
Nominal maximum particle size is one size larger than the first sieve to retain more than 10 percent.	

PART 3 - EXECUTION

3.1 CRUSHING:

A. Crushing Equipment
1. Fit crushing plant-screening equipment, when required, with blowers or other devices capable of removing excess and undesirable fines.

B. Screening Plants
1. Screening plants consist of a revolving trommel screen, shaker screen, vibrating screen, or other devices capable of removing oversize material, excess and undesirable fines.

C. Scales
1. Furnish scales, when required, satisfactory to the Engineer. Test and certify scales prior to their use on the project and as often thereafter as the Engineer may consider necessary to ensure their accuracy. Have on hand not less than ten, 50-pound weights for testing scales.
2. House the recording devices of the scales in a suitable manner. Place the scales in a location suitable to facilitate accurate weighing of loads. The scales shall be accurate to one-half of one percent at any weight. Alternate methods or devices for weighing may be acceptable, provided that these methods or devices produce the same degree of accuracy as required of platform scales.

3.2 MATERIAL HANDLING:

A. All work involved in clearing and stripping pits and quarries, including handling unsuitable material encountered, are performed with no additional compensation being allowed for this work. The pits as utilized shall immediately be opened so as to expose the vertical faces of the various strata of acceptable material and, unless otherwise directed, the material shall be secured in successive vertical cuts extending through all the exposed strata.

B. Provide, unless otherwise specified, material containing as large a proportion as possible of crushed aggregate. Combine the crushed material with the screened material to obtain a uniform product.

C. No material will be accepted which is loaded into hauling units in a segregated condition or which does not meet the required grading. In case the material deposit contains sand or other material in excess of the specification gradation requirements, or of an unacceptable quality, such excess or undesirable material shall be removed and disposed of prior to crushing, or during screening operations, if crushing is not required.

D. Provide a storage bin of ample capacity to ensure uniform quality and delivery of material. Loading of trucks directly from the conveyor belt, from the crusher or screening plant will not be permitted.

3.3 STOCKPILES:

A. Grub and clean sites for aggregate stockpiles prior to storing aggregates. Assure the site is firm, smooth and well drained. Maintain a bed of aggregate suitable to avoid the inclusion of soil or foreign material.

B. Build up coarse aggregate stockpiles in tiers of not more than 4 feet (1.2 m) in thickness. Assure each tier is completely in place before the next tier is placed. Do not allow material to “cone” down over the next lower tier.

C. Dumping, casting or pushing over the sides of stockpiles will be prohibited, except in the case of fine aggregate stockpiles.

D. Space stockpiles of different gradations of aggregate far enough apart, or separated by suitable walls or partitions, to prevent the mixing of theaggregates.

E. Any method of stockpiling aggregate, which allows the stockpile to become contaminated with foreign matter or causes excessive degradation of the aggregate, will not be permitted. Excessive degradation will be determined by sieve tests of samples taken from any portion of the stockpile over which equipment has operated and failure of such samples to meet all grading requirements for the aggregate discontinuance of such stockpiling procedures.

F. Transfer the aggregate from the stockpiles in such a manner that uniform grading of the material is preserved.

3.4 CONVEYOR STOCKPILING:

A. Materials stockpiled by conveyors shall be deposited in a succession of merging-cone piles. Do not drop material over 12 feet (3.66 m) nor allow cones to exceed 12 feet (3.66 m) in height. Cones should be leveled to a thickness of approximately 4 feet (1.2 m) prior to starting another tier.

3.5 TRUCK STOCKPILING:

A. Materials stockpiled by trucks shall construct the stockpile in tiers approximately 4 feet (1.2 m) in thickness. Complete each tier before the next tier is started.

3.6 ASPHALT MIXING PLANTS:

A. Use mixing plants of either the weight batching type, the continuous flow mixing type, or drum dryer type. Use drum dryer mixers specifically designed and constructed for producing hot mix.

B. Equip all plants with approved conveyors, power units, aggregate handling equipment, aggregate screens and bins that are coordinated and operated to produce a uniform mixture within the specified job mix tolerances.

C. Use batch-type plants having a minimum batch production capacity of 2,000 pounds (900 kg). Use continuous flow or drum dryer plants having a minimum production capacity of 60 tons per hour (27 kg per hour). These capacity requirements may be modified if specified in the Contract Documents.

D. Stop production and remove from the project mixing plants that fail to continuously produce a mixture meeting requirements as specified.

3.7 INSPECTION AND CONTROL OF ASPHALT MIXING PLANT:

A. For verification of weights and measures, character of materials and determination of temperatures used in the preparation of the paving mixes, the Engineer or Engineer's authorized representative will, at all times, have access to all portions of the mixing plant, aggregate plant, storage yards and other facilities for producing and processing the materials for the work. All sampling and testing of processed and unprocessed material is performed in accordance with the provisions of the Contract Documents.

3.8 MIX DESIGN:

A. The Owner's acceptance testing agency may make gradation analyses of the completed mix to assure that the materials being produced and used are within the tolerances of the mix design and the specifications of the mix being used.

3.9 SAMPLING AND TESTING FOR ACCEPTANCE:

A. Sampling and testing of aggregates or other constituent materials may be performed by the Owner's testing agency at a frequency determined by the Owner or the Owner's representative. Field control is performed under AASHTO T245, ASTM D6926 & D6927, and ASTM D6925. Field density testing is by core testing for acceptance purposes. Densities to conform to Section 2510,3.28. Gradations to be within the job mix gradation limits. Oil content to be within 0.4% of the Mix Design.

B. Samples will be used to verify compliance with the requirements set forth in this Section. If there is a dispute, a third party testing firm may be retained by the contractor for additional retesting.

3.10 WEATHER LIMITATIONS:

A. When the moisture in the stockpiled aggregate or the dryer adversely effects the quality of mix production, normal plant operations, or when pools of water are observed on the base, mixing and placing of hot-mix asphalt is prohibited.

B. Do not place asphalt hot-mix surface course mixture when the air temperature is less than 40° F (4° C) and rising. Do not place asphalt hot-mix base course mixtures of compacted lifts 4 inches (10 cm) or more when the air temperature is less than 30° F (-1° C) and rising. Do not place asphalt upon a surface which is frozen or that has a temperature of less than 32° F (0 ° C). Do not place paving during rainfall or in standing water.

3.11 SURFACE PREPARATION:

A. Assure the area to be paved is true to line and grade and has a dry and properly prepared surface before starting paving operations. Assure the surface is free from all loose screenings and other loose or foreign material.

3.12 NEW WORK:

A. For new work, meet the surface preparation requirements in Sections 02230, 02234 or 02235 of these specifications. Prime prepared soil or aggregate bases if indicated as a bid item in the Contract Documents.

B. Before paving, proof-roll the base with equipment having at least one 18 kip single axle load or equivalent. Excavate and replace areas that yield or crack under these wheel loads as directed. This does not replace or relax the base or subgrade compaction requirements.

C. Paint the surfaces of curbs and gutters, vertical faces of existing pavements and all structures in contact with asphalt mixes with a thin coating of asphaltic material to provide a water-tight joint.

3.13 TRANSPORTATION OF MIX:

A. Transport the mix in vehicles cleaned of all foreign material which may affect the mix. The truck beds must be painted, or sprayed with a lime-water, soap or detergent solution at least once a day or as often as required. After this operation elevate the truck bed and thoroughly drain it, with no excess solution being permitted. Dispatch the vehicles so that all material delivered is placed in daylight, unless the Engineer approves artificial light. Deliver material to the paver at a uniform rate and in an amount well within the capacity of the paving and compacting equipment.

3.14 SPREADING AND FINISHING:

A. Spread and finish meeting the following requirements
   1. The minimum lift thickness shall be no less than three times the Nominal Maximum Aggregate Size for gradations above the Maximum Density Line, and no less than four times the Nominal Maximum Aggregate Size for gradations below the Maximum Density Line.
   2. The maximum lift thickness is 3 inches (6.5 cm) for surface courses and 6 inches (13 cm) for base courses.

3.15 MECHANICAL PAVERS:

A. Spread and strike off the base and surface courses with a mechanical paving machine. Operate the paving machine so that material does not accumulate and remain along the sides of the receiving hopper.

B. Do not use equipment which leaves tracks or indented areas, which cannot be corrected in normal operation, produces flushing or other permanent blemishes, or fails to produce a satisfactory surface.

C. Construct longitudinal joints and edges to true line markings. Establish lines for the paver to follow in placing individual lanes parallel to the centerline of the proposed roadway. Position and operate the paver to follow closely the established lines.

D. When using pavers in echelon, assure the first paver follows the marks or lines with the second paver following the edge of the material placed by the first paver. To assure a hot joint and obtain proper compaction, assure the pavers work as close together as possible not exceeding 100 feet (30 m) apart. In backing trucks against the paver, take care not to jar the paver out of its proper alignment.

E. As soon as the first load of material has been spread, check the texture of the unrolled surface to determine its uniformity. Segregation of materials is not permitted. If

segregation occurs, suspend spreading operation until the cause is determined and corrected.

F. Offset transverse joints in succeeding courses at least 2 feet (0.6 m). Offset longitudinal joints at least 6 inches (15 cm).

G. Correct all irregularities in alignment left by the paver by trimming directly behind the machine. Immediately after trimming, thoroughly compact the edges of the course by tamping. Avoid distorting the pavement during thisoperation.

H. Assure edges against which additional pavement is to be placed is straight and approximately vertical. Use a lute or covered rake immediately behind the paver, when required, to obtain a true line and vertical edge. Correct all irregularities in the surface of the pavement course directly behind the paver. Remove excess material forming high spots by a shovel or lute. Fill low areas with hot mix and smooth it with the back of a shovel being pulled over the surface. Fanning of material over such areas is not permitted.

3.16 MOTOR GRADER:

A. When motor graders are used for the spreading of leveling courses, place the material on the roadbed so that the proper amount of material is available. Spread the mix to the required thickness, line and grade, with a uniform surface texture, while at a workable temperature.

3.17 HAND SPREADING:

A. In small areas where the use of mechanical finishing equipment is not practical, the mix may be spread and finished by hand, if so directed by the Engineer. Wood or steel forms, approved by the Engineer, rigidly supported to assure correct grade and cross section, may be used. In such instances, measuring blocks and intermediate strips must be used to obtain the required cross-section. Perform hand placing carefully. Uniformly distribute the material to avoid segregation of the coarse and fine aggregate. Broadcasting of material is not permitted. During the spreading operation, loosen and uniformly distribute all material using lutes or covered rakes. Reject material that has formed into lumps and does not break down readily. Following placing and before rolling, check the surface with templates and straightedges and correct all irregularities.

B. Maintain on the project heating equipment for keeping hand tools free from asphalt. Exercise caution to prevent heating that may burn the material. Assure the temperature of the tools when used is not greater than the temperature of the mix being placed. Use heat only to clean hand tools; petroleum oils or solvents are not permitted.

3.18 COMPACTION:

A. Furnish the number of rollers necessary to provide the specified pavement density. During rolling, keep the roller wheels moist to avoid picking up the material.

B. After the longitudinal joints and edges have been compacted, start rolling longitudinally at the sides and progress toward the center of the pavement. For transverse graded streets, begin rolling on the low side and progress to the high side, overlapping passes by at least one-half the width of rollers and uniformly lapping each preceding pass. Operate the rollers at a slow, uniform speed with the drive roll or wheel nearest the paver. Do not exceed 3 miles per hours (4.8 km per hour).

C. Do not quickly change the line of rolling reversing direction suddenly. If rolling displaces the material, re-work the area using lutes or shovels and restore to the original grade of the loose material before re-rolling. Do not permit heavy equipment or rollers to stand on the finished surface before it has been compacted and has thoroughly cooled.

D. When paving in single width, roll the first lane placed as follows:
   1. Transverse joints
   2. Outside edge
   3. Initial or breakdown rolling, beginning on the low side and progressing toward the high side
   4. Second rolling, same procedure as 3
   5. Finish rolling

E. When paving in echelon, or abutting a previously placed lane, perform the longitudinal joint rolling the same as transverse joint rolling.

F. When paving in echelon, leave 2 or 3 inches (5 to 7.5 cm) of the edge unrolled, which the second paver can match unrolled. Then the joint between the lanes can be rolledtogether. Do not leave edges exposed more than 15 minutes without being rolled.

G. In laying a surface mix adjacent to any finished area, place it high enough so that, when compacted, the finished surface is true and uniform.

H. On slight grades, check gutters with a straightedge and test with running water to assure drainage to the planned outlet.

I. The average density shall be equal to or greater than 93% of the maximum density as determined by ASTM D2041 and no individual sample shall be less than 92% of maximum density.

3.19 TRANSVERSE JOINTS:

A. Construct and compact transverse joints to provide a smooth riding surface. Joints will be straight edged and string lined to assure smoothness and true alignment.

B. Joint formed with bulkheads to provide a straight line and vertical face will be checked with a straightedge before fresh material is placed against it to complete the joint. If bulkheads are not used to form the joint and the roller is permitted to roll over the edge of the new material, locate the joint line in back of the rounded edge the distance required to provide a true surface and cross-section. If a joint has been distorted by traffic

or by other causes, trim it to line. Paint the joint face with a thin coating of asphalt before the fresh material is placed against it.

C. Place the material against the joints vertical face with the paving machine positioned so that the material overlaps the edge of the joint 1 to 2 inches (2.5 to 5 cm). Maintain a uniform depth of the overlapped material. Remove and dispose of the coarse aggregate in the overlapped material that dislodged during raking.

D. Position rollers on the previously compacted material transversely so that no more than 6 inches (15 cm) of the rolling wheel rides on the edge of the joint. Operate the roller to pinch and press the mix into place at the transverse joint. Continue rolling along this line, shifting position gradually across the joint, in 6-to 8-inch (15 to 20 cm) increments, until the joint has been rolled by entire width of the roller wheel.

E. Keep the number of transverse joints to a minimum. When paving single width and maintaining traffic, pave one lane no farther than one block. Complete all lanes to the same station at the end of each paving day. When paving in echelon, bring the lanes up even as is practical.

3.20 LONGITUDINAL JOINTS:

A. Roll longitudinal joints directly behind the paving operation. Assure the first lane placed is true to line and grade and has a vertical face. Place the material in the lane being paved up firmly against the face of the previously placed lane. Position the paver during spreading to assure the material overlaps the edge of the lane previously placed by 1 inch to 2 inches (25 to 50 mm). Uniformly maintain the width and depth of the overlapped material at all times. Keep the paver aligned with the line or markings placed along the joint for alignment purposes. Before rolling, remove and dispose of the coarse aggregate in the material overlapping the joint.

B. Shift rollers onto the previously placed lane so that not more than 6 inches (15 cm) of the roller wheel rides on the edge of the fine material left by brooming. Operate the rollers to compact the fines gradually across the joint. Continue rolling until a compacted, neat joint is obtained. When the abutting lane is not placed in the same day, paint the joint with a very thin coating of asphalt before placing the abutting lane. If the joint is distorted during the day's work bytraffic or by other causes, carefully trim the edge of the lane to a neat line.

3.21 EDGES:

A. Roll the pavement edges concurrently with or immediately after rolling the longitudinal joint.

B. Exercise care in consolidating the course along the entire length of the edges. In rolling pavement edges, extend the roller wheels 2 to 4 inches (5 to 10 cm) beyond the pavement edge.

3.22 BREAKDOWN ROLLING:

A. Immediately begin breakdown rolling following the rolling of the longitudinal joint and edges. Operate rollers as close to the paver as required to obtain density without causing undue displacement. Operate the breakdown roller with the drive roll or wheel nearest the finishing machine. The Engineer may make exceptions when working on steep slopes or super-elevated curves.

3.23 SECOND ROLLING:

A. Assure the second rolling follows the breakdown rolling as close as possible while the paving mix is still at a temperature that will provide the specified density.

3.24 FINISH ROLLING:

A. Perform the finish rolling while the material is still warm enough to remove roller marks. If necessary, the Engineer may require using pneumatic-tired rollers. Complete finish rolling the same day the mixture is placed.

B. In places inaccessible to standard rollers, perform compaction using trench rollers or others to meet the specified compaction requirements. Operate the trench roller as directed until the course is compacted. Hand, manual or mechanical tamping, may be used in such areas if it is proved to the Engineer that the operation will provide the specified density.

3.25 SHOULDERS:

A. Where paved shoulders or curbs are not specified, do not place the shoulder material against the pavement edges until the surface course rolling is completed. Take care to prevent distortion of the pavement edge from specified line and grade. When shoulders are paved (except in conjunction with the traveled way paving), cold joint construction procedure is required to assure a tight bond at the joint.

B. When the rolling of the surface course has been completed and the edges have been thoroughly compacted, immediately place shoulder material against the edges and roll it.

3.26 DENSITY AND SURFACE REQUIREMENTS:

A. The average mat density shall be equal to or greater than 93% of the maximum density as determined by ASTM D2041 for single lift applications. For two lift applications, the first lift on base course shall be a minimum of 92% of the maximum density and the second lift shall be a minimum of 93% of the maximum density. In both cases individual sample shall be no less than 92% of maximum (Rice's) density, prepared as specified in

Part 2-Products in this section and made from plant mix meeting the job-mix formula. Verification of maximum density as determined by ASTM D2041 from plant produced material during production is recommended.

B. The longitudinal joints shall be compacted to a target density of 91 percent of the theoretical maximum specific gravity as determined by ASTM D2041 and no individual sample shall be less than 89 percent of maximum (Rice's) density. The theoretical maximum specific gravity used to determine the joint density will be the average of the daily theoretical maximum specific gravities for the material that was placed on either side of the joint.

C. Produce a final surface that is uniform in texture and meets the line and grade specified. Before final acceptance of the project or during the progress of the work, the Engineer will determine the thickness of all courses. Repair or replace all unsatisfactory work.

D. Assure density and thickness meets the plans and specifications. During compaction, preliminary tests to aid in controlling the thickness, may be performed by inserting a flat blade, correctly graduated, through the materialto the top of the previously placed base, or by other approved methods.

E. In checking compacted depth, the cutting of the test holes, refilling with acceptable materials and proper compaction may be performed by the Owner's testing agency.

F. For testing the surface on all courses, a 10-foot (3 m) straightedge will be used with the centerline of the straightedge placed parallel to the roadway centerline.

G. Any variations that exceed 5/16-inch (0.8 cm) in 10 feet (3 m) for base course and 1/4-inch (0.64 cm) in 10 feet (3 m) for surface course must be corrected. Correct irregularities that may develop before the completion of rolling by loosening the surface mix and removing or adding materials as is required. If any irregularities or defects remain after the final compaction, remove the surface course and place and compact new material to a true and even surface. All minor surface projections, joints and minor honeycombed surfaces must be rolled smooth to grade, as directed

H. Remove and replace areas of new pavement requiring patching as directed. Patching material will be tested for meeting specifications. The cost of testing is at Contractor expense.

3.27 PAVEMENT AND MATERIAL TESTING REQUIREMENTS:

A. Contractor will produce their own core samples of the asphalt surface courses under the supervision of the Owner's testing agent and give completed cores to the Owner's testing agency to check in place density and compacted depth. The cores are 4-inch (10 cm) diameter. Materials and acceptance tests will be made by the Owner's testing agency to determine the Contractor's compliance with the specifications.

B. Materials failing to meet the tests specified may be retested if approved and as directed by the Engineer. The Contractor shall pay the costs of any required re- testing for

acceptance purposes. Re-testing will be performed by the Owner's testing agency unless otherwise approved by the owner. If there is a dispute, a third party testing firm may be retained by the contractor for additional retesting for the Engineer's review and consideration.

C. The costs of the following tests are at Contractor expense:
   1. Initial aggregate quality tests
   2. Job-mix formula
   3. Any tests the Contractor requires to control his crushing, screening or other construction operations
   4. Retesting of failing tests as provided above

D. Correct all pavement composition, field density, or thickness, deficiencies at Contractor expense.

E. The field density and thickness of the pavement is determined by measuring the cores tested. The actual thickness must be no less than 1/4-inch (6.5 mm) from the specified thickness.

F. When the measurement of any core is less than the plan thickness by more than the allowable deviation, the actual thickness of the pavement in this area may be determined by taking additional cores at intervals parallel to the centerline ineach direction from the affected location. Continue in each direction until a core is found which is not deficient by more than the allowable deviation. The Engineer will evaluate areas found deficient in thickness and determine which areas warrant removal. Remove and replace the areas with asphaltic concrete of the thickness shown on the plans. Additional coring is considered as re-testing of failing areas.

PART 4 - MEASUREMENT AND PAYMENT

4.1 TONNAGE BASIS:

A. Asphalt Concrete Pavement
   1. These items are measured by the ton of 2,000 pounds (900 kg) of asphalt paving mixture, including the weight of the asphalt. The quantities measured for payment are the amount of asphalt paving materials actually used in the completed and accepted work in accordance with the plans and specifications.
   2. "Asphalt Concrete Pavement" is paid for at the unit price bid per ton of 2,000 pounds (900 kg).
   3. Price and payment is full compensation for cleaning base or underlying course; for producing, furnishing, transporting, stockpiling, heating, drying and screening of aggregate materials; for furnishing, handling, measuring, mixing, manipulating and placing of materials; for hauling, placing, shaping, compacting and finishing of the paving mix; for improving unsatisfactory areas; for furnishing samples; for furnishing, testing and certifying of scales; for furnishing the weigh house; for all materials (exclusive of asphalt), manipulation, labor, tools, equipment and

incidentals necessary to complete the work in full compliance with the plans and specifications.

4. Payment is made under:
   a. Asphalt Concrete Pavement Base Course - per ton
   b. Asphalt Concrete Pavement Surface Course Grade - per ton.

END OF SECTION

SECTION 02910

SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes ground surface preparation; furnishing and applying fertilizer; and furnishing and planting seed in areas described in thecontract documents or directed by the Engineer.

B. Hydraulic seeding is not included in this section. Hydraulic seeding is covered in Section 02920, Hydraulic Seeding.

1.2 SUBMITTALS

A. Submit to the Engineer applicable seed mixture certifications, fertilizer descriptions and mulch certifications. Furnish duplicate signed copies of the vendors statement certifying that each seed lot has been tested by a recognized seed testing laboratory within 6 months of date of delivery. Assure the statement includes: Name and address of laboratory, date of test, lot number for each seed species and the test results including name, percentages of purity and of germination, percentage of weed content for each kind of seed furnished and, for seed mixes, the proportions of each kind of seed.

PART 2 - PRODUCTS

2.1 SEED

A. Furnish seed and seed mixture, free of all prohibited noxious weed seed orany other weed seed prohibited by state or local ordinance.

B. Seal and label all seed containers to comply with Montana Seed Law and Regulations or meeting U.S. Department of Agriculture and Regulations under the Federal Seed Act, if shipped in interstate commerce.

C. Do not use wet, moldy, or otherwise damaged seed in the work.

D. Furnish seed mixture of the species per the approval of the FWP staff.. Furnish seed in standard containers labeled with the seed name, lot number, net weight, percentages of purity, germination, hard seed, and percentage of maximum weed seed content for each seed species.

2.2 TOPSOIL

A. Use topsoil that is loose, friable, loamy soil, free of excess acid and alkali. Assure topsoil does not contain objectionable amounts of sod, hard lumps, gravel, sub-soil or other undesirable material that would form a poor seedbed. Before striping topsoil, assure it has supported the growth of healthy crops, grass or other vegetable growth.

2.3 LIME

A. Furnish ground limestone or other material deemed suitable by the Engineer containing a minimum 85% of total carbonate equivalent ground so that 90% will pass through a No. 100 mesh sieve. Coarser material may be acceptable, if the application rates are increased to provide at least the minimum quantities and depth specified using an approved Dolomitic lime or a high magnesium lime containing at least 10% magnesium oxide.

2.4 FERTILIZER

A. Furnish standard commercial fertilizers supplied separately or in mixtures containing the specified percentages of total nitrogen, available phosphoric acid, and water soluble potash. Apply fertilizer at the specified rate and depth meeting the applicable State and Federal laws. Furnish fertilizer in standard containers clearly labeled with name, weight, and guaranteed analysis of contents. No cyanamide compounds of hydrated lime are permitted in mixed fertilizers.

B. Fertilizers may be supplied in one of the following forms:
   1. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
   2. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
   3. A granular or pellet form suitable for application by blowerequipment.

2.5 SOILS FOR REPAIRS

A. Use soil for filling and topsoiling repair areas of equal quality to the existing topsoil being repaired. Assure the soil is free of large stones, roots, stumps, or other materials that interfere with sowing, compacting, and establishing turf. Obtain approval from the Engineer before placing topsoil.

PART 3 - EXECUTION

3.1 TOPSOIL

A. Place at least 6 inches (15 cm) of topsoil in all areas to be seeded. Import topsoil if sufficient topsoil is not available from excavated areas of the project.

B. ALLOWABLE SEEDING MONTHS

1. Perform seeding when the temperature and moisture are favorable to germination and plant growth. Seed preferably before June 1st and after October 1st of each year. Seeding dates must be approved by the Engineer.

3.2 SEEDBED PREPARATION AND SOWING

A. Clear the areas to be seeded of all debris, vegetation, and other material determined by the Engineer to be detrimental to the preparation of a seedbed. Once the area is cleared, disc, harrow, rake, or work the area by other suitable methods, into a smooth, even seedbed. Assure the prepared seedbed surface is firm enough to prevent seed loss from high winds or normal rainfall. If rolling is required, perform rolling before seeding using a suitable roller, of a weight appropriate to the soil conditions.

B. Sow seed in the areas described in the contract documents at thespecified application rates.

C. Sow seed using a force feed drill having a grass seed attachment, except of slopes steeper than three to one or on areas too small to be seeded with a force feeddrill. In these areas, seed may be sown by power sprayers, blowers or other effective methods. Use equipment in good working order.

D. Seed Kentucky Bluegrass at a depth of one-quarter inch or less and cultipack the seed.

E. Do not sow seed in winds that prevent proper imbedment into the surface.

3.3 FERTILIZER

A. Spread and work fertilizer into the soil during the final seedbed preparation. Apply fertilizer at the rate described in the contract documents.

3.4 CARE OF SEEDED AREAS

A. Keep the seeded area moist until it has germinated and its continued growthis assured. Prevent erosion during watering. Water is incidental to the item “Seeding”.

B. Protect all seeded areas from traffic or pedestrian use with warning barricades or other Engineer approved methods.

C. Maintain the seeded area, performing any required watering and mowing until the seed is firmly established. Prevent weeds and other undesirable vegetation from establishing in the seeded area. Mow weeds and rake and remove the clippings from the areas.

D. Replace any seeded areas failing to germinate which have died or been damaged by construction activities. Replace such areas to meet the contract requirements. The contract warranty period applies to this item.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Seeding is measured by the LUMP SUM. Payment indicated to include complete compensation for all labor,equipment, materials and incidentals required for the completion of the work.

END OF SECTION

SECTION 02920

HYDRAULIC SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes the hydraulic seeding of the areas shown on the contract documents or as directed by the Engineer. Hydraulic seeding is typically employed for slopes steeper than 3:1 (horizontal to vertical) or when theseedbed surface is impractical to drill seed.

PART 2 - PRODUCTS

2.1 Products are as described in Section 02910, Seeding, Part 2, Products.

PART 3 - EXECUTION

3.1 TOPSOIL

A. Place at least 6 inches (15 cm) of topsoil in all areas to be seeded. Import topsoil if sufficient topsoil is not available from excavated areas.

3.2 APPLICATION RATES

A. Apply seed mixture to the areas described in the contract documents atthe specified application rates.

3.3 MAINTENANCE RESPONSIBILITIES

A. Maintain and protect newly seeded areas until the grass is established and accepted by the Engineer. During this period, repair damaged areas and reseed areas where complete establishment has not occurred.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Hydraulic seeding is measured and paid for by LUMP SUM: Payment indicated to include complete compensation for all labor,equipment, materialsand incidentals required for the completion of the work.

END OF SECTION

FLATHEAD COUNTY APPROACH PERMIT

AE - 3449
Permit No.

1. Applicant Information: Montana Fish Wildlife & Parks
(Name)
PO Box 200701
(Mailing Address)
Helena, MT 59620-0701
(City, State & Zip)
406.841.4019 (Phone No.) randi.rognlie@mt.gov (Email Address)

2. Property Address of Approach: 558 Somers Road
(Obtained from the GIS Department)

3. Type of Approach:

		Agricultural	$100.00
	X	Single Driveway	$100.00
		Shared Driveway (2 lot approach only)	$150.00
____ # of Lots		Minor Subdivision (5 or fewer lots)	$300.00/approach + $30.00/lot
____ # of Lots		Major Subdivision (6 or more lots)	$650.00/approach + $30.00/lot

4. If Subdivision: Name N/A Somers Beach State Park
Does the access comply with Subdivision Regulations for Approaches: Yes N/A No _____
Is Area Zoned: Yes _____ No V. Zoning Classification: Not zoned
Planning & Zoning Representative Sign and Date: Erin Appelt 3/17/22

5. Location must be flagged with address posted for pre-construction inspection. Date 3-15-2022 when location will be flagged. Road Department will provide lathe or applicant will have equivalent of lathe with bright orange flagging attached or painted a bright orange.
Give description at or near which installations or structures will be installed (ie; 300 feet North of intersection of Roads A & B, fence line, etc.) Across the road from 563 Somers Rd
a. Provide area map with directions to location.
b. LEGAL: Section: 24 Township: 27 Range: 21

6. Completion date of preliminary approach before paving will be within 90 days from approval of this permit. Approaches that are required to be paved and were approved between October 1st and May 1st, will be granted an additional 30 days after June 1st, to complete the paving portion of the requirements, due to availability of asphalt material.

INSTRUCTIONS CONCERNING USE OF THIS FORM

Applicant will complete this form and submit it to the Flathead County Road Department. This application is for all approaches on County right-of-way. When applicant has signed both sides of application and application is approved or denied, a copy will be made available to applicant. See reverse side for additional rules and regulations.

THE TERMS OF THIS PERMIT APPLICATION ARE ACCEPTED AND AGREED BY:

Randi Rognlie, Project Manager 2-16-2022
Signature of Applicant(s) Date

REVIEW OF APPLICATION FOR APPROACH PERMIT

- To be filled in by Flathead County Road Dept Representative -

PRELIMINARY INSPECTION OF APPLICATION RECOMMENDED FOR:

APPROVAL _____ CONDITIONAL APPROVAL X DISAPPROVAL _____

Don Robinson 3.23.22
Flathead County Road Dept Representative Date

Conditions of approval attached to permit. Circled items are requirements for this approach only.

The Road Department is to be notified upon completion of work for scheduling of inspection.

OFFICE USE ONLY

Completed Application	V Yes	No
Plans/Maps/Specifications	V Yes	No
Subdivision/Zoning Info	V Yes	No
Fees Paid	V Yes	No

$100 Amount
233820 Check Number
660260 Receipt Number

CONDITIONS OF PERMIT

Subject to the following terms and conditions, the permit applied for upon the reverse side, hereof, is hereby granted:

1. TERM: This permit shall be in full force and in effect from the date hereof until revoked as herein provided.
2. REVOCATION: This permit may be revoked by the County upon giving 10 days notice to Permittee by ordinary mail, directed to the address shown in the application hereto attached, but the County reserves the right to revoke this permit without giving said notice in the event Permittee breaks any of the conditions or terms set forth herein.
3. COMMENCEMENT OF WORK: No work shall be commenced until Permittee notifies the County authorized representatives, as listed on the front of this application, as to the proposed commencement of work.
4. CHANGES IN HIGHWAY: If the County changes highway, necessitating changes in structure or installations under this permit, Permittee shall make necessary changes without expense to County.
5. TRENCHING OR PAVEMENT ALTERATIONS: Removal of pavement must be preceded by sawing the existing pavement around the area(s) to be removed. Replacement base and subbase materials must be compacted to a minimum of 95% relative density. Replacement of pavement must be accomplished within 48 hours of pavement removal.
6. COUNTY SAVED HARMLESS FROM CLAIMS: In accepting this permit, the Permittee, its/his successors or assigns, agree to protect the County and save it harmless from all claims, actions, or damage of any kind and description which may accrue to, or be suffered by, any person, or persons, corporations, or property by reason of the performance of any such work, character of materials used, or manner of installations, maintenance and operation, or by the improper occupancy of said highway right-of-way, and in case of any suit or action brought against the County and arising out of, or by reason of, any of the above causes, the Permittee, its/his successors or assigns, will, upon notice to it /him of the commencement of such action, defend the same at its/his sole cost and expense and satisfy any Judgment which may be rendered against the County in any suit or action.
7. PROTECTION OF TRAFFIC: Insofar as the interests of the County and the traveling public are concerned, all work performed under this permit shall be done under the supervision of the County Road Department and its authorized representatives, and he/they shall indicate the traffic control devices, the lighting thereof at night, placing of flagmen and watchmen, the acceptable manner in which traffic is to be handled, and shall specify to Permittee how road surface is to be replaced if it is disturbed during operations, but said supervision shall in no way operate to relieve or discharge Permittee from any of the obligations assumed by acceptance of this permit and especially those set forth under Section 6 hereof.
8. HIGHWAY DRAINAGE: If the work done under this permit interferes in any way with the drainage of the County highway affected, Permittee shall, at its/his own expense, make such provisions as the County may direct to take care of said drainage.
9. RUBBISH AND DEBRIS: Upon completion of work contemplated under this permit, all rubbish and debris shall be immediately removed and roadway and roadside left in a neat and presentable condition satisfactory to the County.
10. WORK TO BE SUPERVISED BY COUNTY: All work contemplated under this permit shall be done under the supervision of and to the satisfaction of the authorized representative of the County, and the County hereby reserves the right to order the change of location or removal of any structure of installation authorized by this permit at any time, said changes or removal to be made at the sole expense of the Permittee.
11. COUNTY'S RIGHT NOT TO BE INTERFERED WITH: All such changes, reconstructing, and relocation shall be done by Permittee in such a manner as will cause the least interference with any of the County's work, and the County shall in no way be liable for any damage to the Permittee by reason of any such work by the County, its agents, contractors, or representatives, or by the exercise of any rights by the County upon the highways by the installation or structures placed under this permit.
12. REMOVAL OF INSTALLATIONS OR STRUCTURES: Unless waived by the County, upon termination of this permit, the Permittee shall remove the installation or structures contemplated by this permit and restore the premises to the condition existing at the time of entering upon the same under this permit, reasonable and ordinary wear and tear and damage by the elements, or by circumstances over which the Permittee has no control, excepted.
13. MAINTENANCE AT EXPENSE OF PERMITTEE: Permittee shall maintain, at its/his sole expense the installations and structures for which this permit is granted, in a condition satisfactory to the County.
14. COUNTY NOT LIABLE FOR DAMAGE TO INSTALLATIONS: In accepting this permit the Permittee agrees that any damage or injury done to said installations or structures by a contractor working the County or by any County employee engaged in construction, alteration, repair, maintenance, or improvement of the County right-of-way shall be at the sole expense of the Permittee.
15. COUNTY TO BE REIMBURSED FOR REPAIRING ROADWAY: Upon being billed therefore, Permittee agrees to promptly reimburse the County for any expense incurred in repairing surface of roadway due to settlement at installation, or for any other damage to roadway as a result of the work performed under this permit, including any incurred legal fees.

Dated this 16th day of February 2022.

The undersigned, the "PERMITTEE" mentioned in the foregoing instrument, hereby accepts this permit, together with all of the terms and conditions set forth therein.

Randi Rognlie
(PERMITTEE)

(PERMITTEE)

Randi Rognlie
Project Manager
Montana Fish, Wildlife & Parks

558 Somers Road

APPROACH PERMIT REQUIREMENTS

THE ATTACHED PERMIT IS GRANTED IF THE FOLLOWING CONDITIONS ARE MET:
(Circled items pertain to this permit only)

1. **All brush, trees, fences, etc are to be removed from the county road right-of-way** on each side of the approach for a distance of at least the entire length of the property and a setback to the outside edge of the right-of-way. This will facilitate improved roadway maintenance, safety and sight distance.

2. A corrugated **metal** culvert having a minimum diameter of (12, 15, 18) inches be installed beneath the approach such that the culvert bottom (invert) be even with and at the same grade as the ditch bottom. The culvert must meet the 6:1 slope either by cutting the culvert at an angle or attaching flared ends. (The culvert will provide adequate drainage should water accumulate in the ditch.) See the attached diagrams on pages 5 and 6.

3. The approach must have a **20-foot long landing graded 3 percent away** from the county road. (See the attached sheet for details.) (This will reduce the amount of gravel loss and the possibility of drainage from the approach on to the county road.) See the attached diagram on page 7.

4. All approaches onto a county road shall meet the road at a **90-degree angle**.

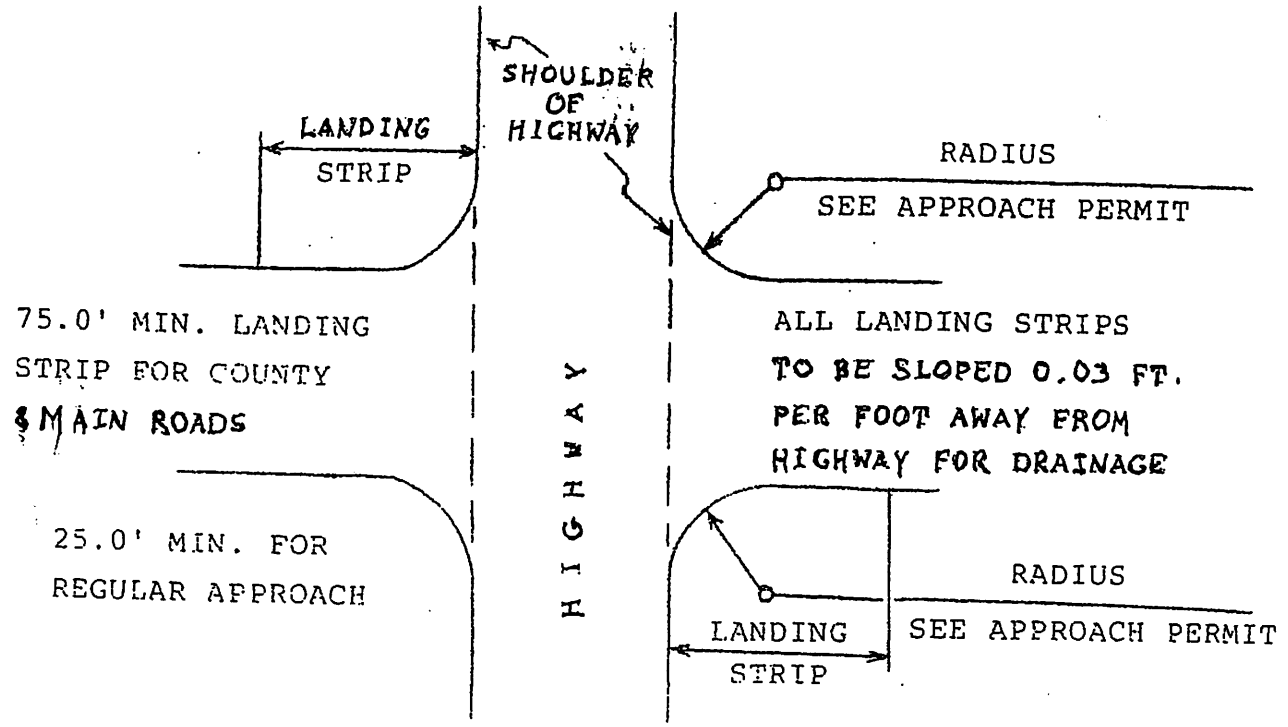
5. All approaches will be **24 feet wide** to the outside edge of the right-of-way. This will help Emergency vehicles to access your property easier.

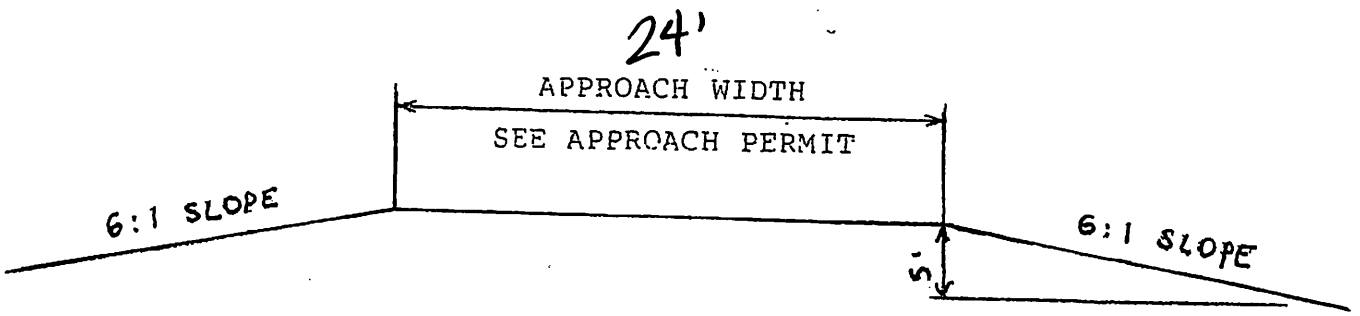
6. All approaches onto a paved road shall be paved a minimum of **3 inches compacted by 24 feet wide** and from the paved road to the outside edge of the right-of-way. See the attached diagram on page 3.

7. All areas within the county right-of-way disturbed during construction must be reseeded. Contact the Flathead County Weed Department for seeding requirements. (Reseeding will reduce the potential for growth of noxious weeds adjacent to the county road as well as the adjacent property.) See reseeding specs on page 4.

8. **Contact the Road Department to schedule a post construction inspection**.

APPROACH PERMIT ATTACHMENT





TYPICAL SECTION

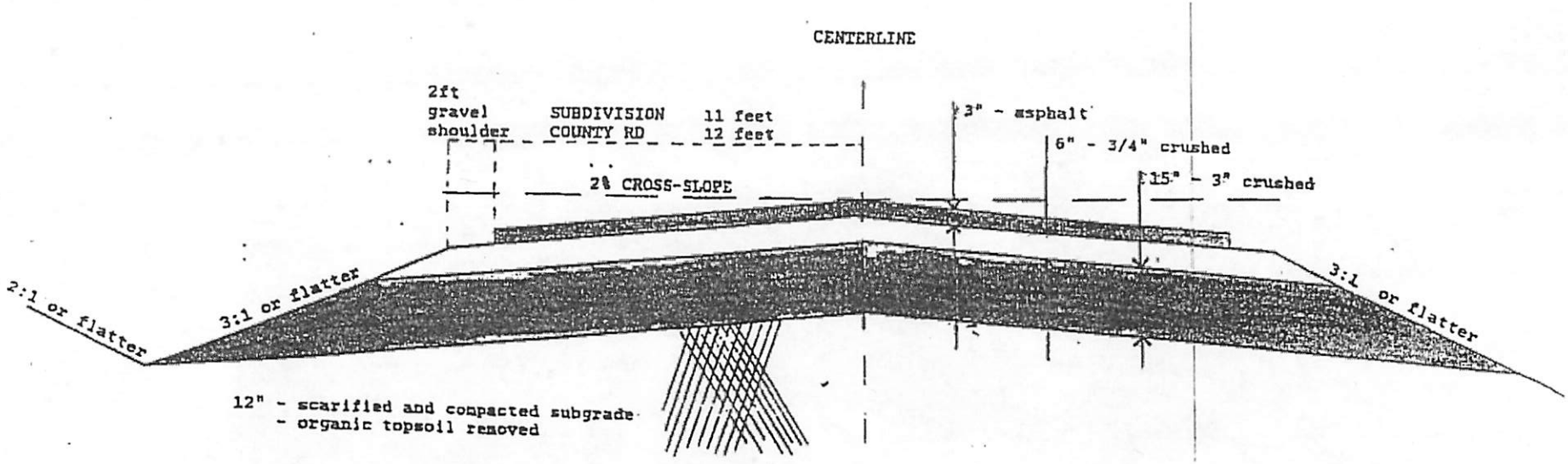
USED 6:1 SLOPE FOR FILLS OF 5 FEET OR LESS

FOR DRAINAGE

USE PIPE AS SPECIFIED IN APPROACH PERMIT

NOTE: GRADE OF APPROACH NOT TO EXCEED 10% UNLESS TRAFFIC VOLUME AND COST INDICATE SUCH TO BE JUSTIFIABLE.

APPROACHES TO BE CONSTRUCTED TO FIT LOCAL CONDITIONS, BUT IN SUCH A MANNER AS TO MINIMIZE TRAFFIC HAZARD AND AFFORD SAFE AND COMMODIOUS ENTRY AND EXIT OF TRAFFIC TO AND FROM HIGHWAY.



FLATHEAD COUNTY ROAD SPECIFICATIONS

1. Roads to have 60' of cleared Right-of-Way.
2. Roads to have no more than MAXIMUM of 6% grades.
3. Road CURVES to have 600 feet line of sight.
4. Roads to use cuts and fills to eliminate vertical curves wherever practical.
5. Road to have culverts where needed (minimum size of culvert – 12" I.D.)
6. Culverts to consist of only two (2) types:
   (A). Corrugated metal pipe (C. X. P.)
   (B). Concrete
7. All roads to be compacted to 90 % minimum (including sub-grade).
8. Construction fabric to be placed under road base in all wet areas.
9. Road to be built with the following minimum:
   (A). 15 inches minimum 3 inch crushed aggregate
   (B). 6 inches of ¾" crushed aggregate
   (C). If paved, road surface to consist of 3" compacted asphalt minimum; 4" compacted asphalt if used as an arterial road.
10. All roads to be engineered prior to construction. Plans must bear an engineer's stamp and then be approved by Flathead County Road Dept.

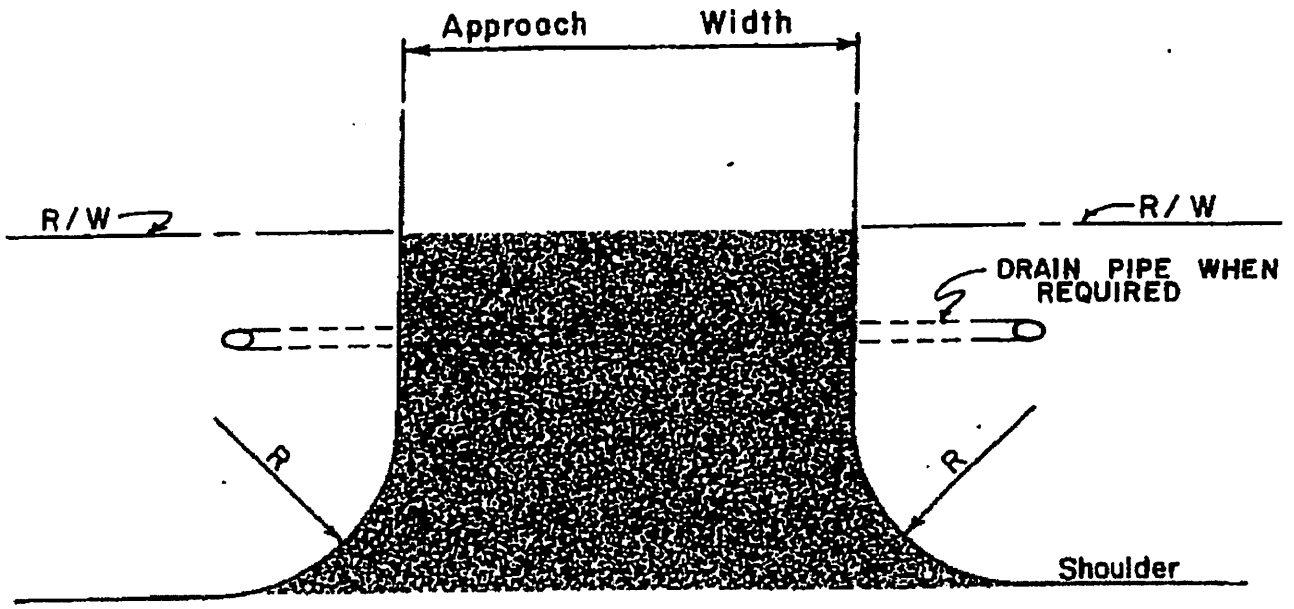
SEEDING MIX FOR FLATHEAD COUNTY

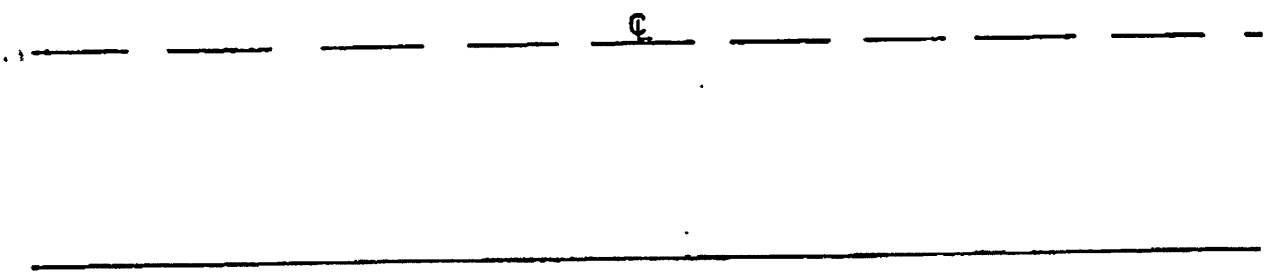
Seeding will be drilled following the slope contours immediately after final grading using the below mix. The seeding mix and rates to used are as follows:

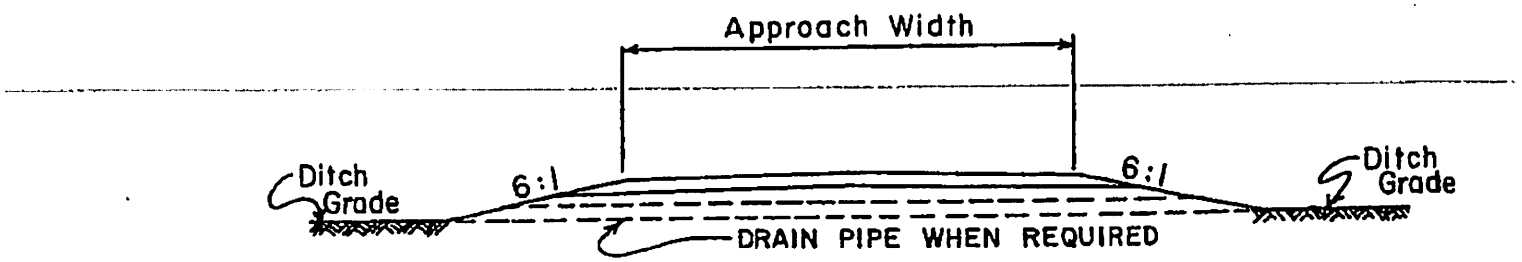
SPECIES	#'s PLS/ACRE
Regar Brome	3.5
Hard Fescue	3.0
Intermediate Wheatgrass	2.5
Alsike Clover	2.5
Annual Ryegrass	2.5
Kentucky Bluegrass	2.0
Ladak Alfalfa	2.0
Timothy	1.5
Napier Orchard Grass	1.0
Total Pounds Per Acre	20.5

The #'s PLS/ACRE means pounds per acre of pure, live seed that is certified to be weed free. The rates shown should be doubled if seeds are broadcast, and scarifying is required after seeding to cover seeds with topsoil to prevent loss by wind, water and wildlife.

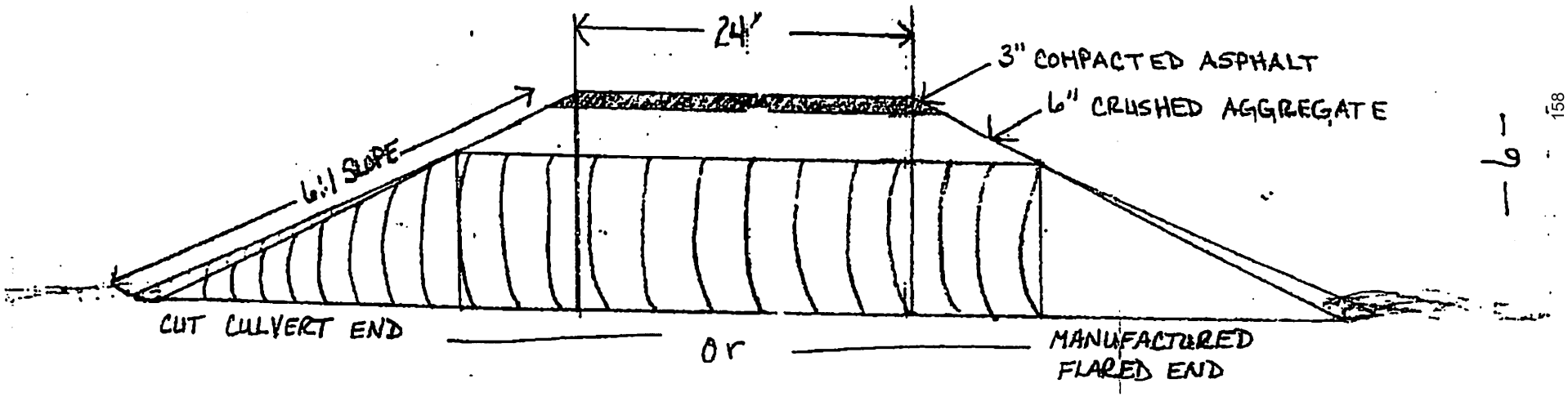
TYPICAL APPROACH SECTION AT RIGHT OF WAY LINE







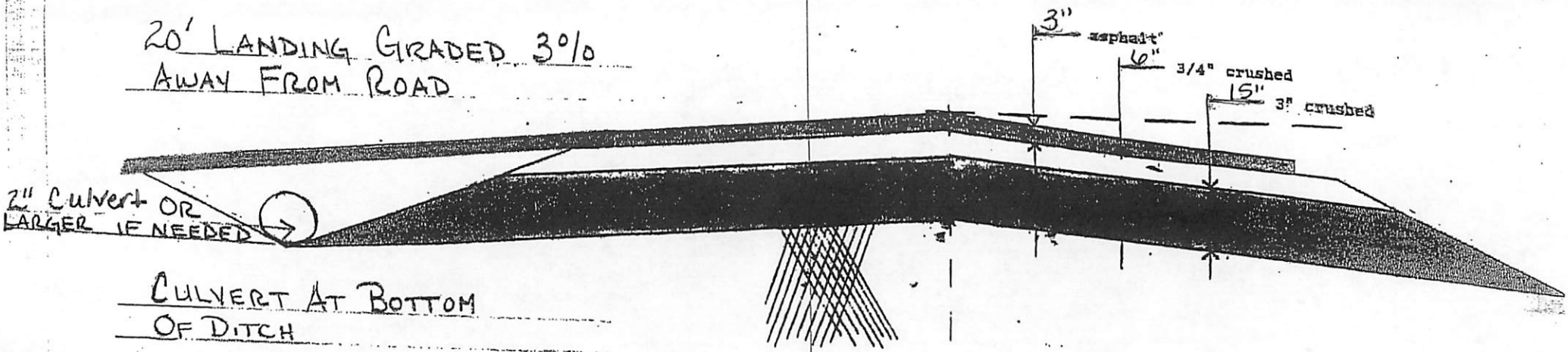
Typical Cross Section Of Approach With Culvert



Not to Scale

Correct - Approach Onto County Road

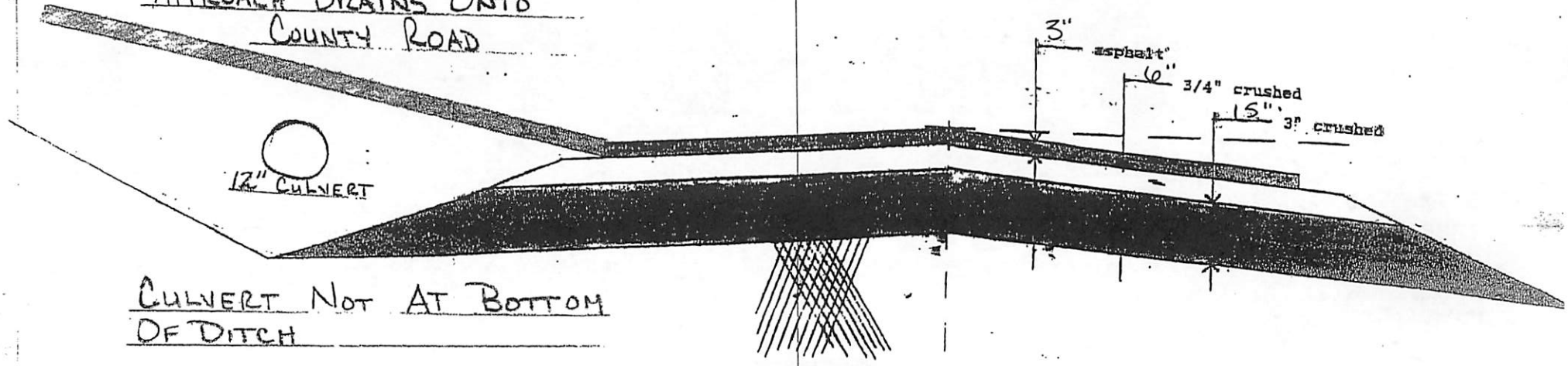
20' Landing Graded 3% Away From Road



Culvert At Bottom Of Ditch

Wrong - Approach Onto County Road

Approach Drains Onto County Road



Culvert Not At Bottom Of Ditch

Not to Scale