

INDIANA

DEPARTMENT OF NATURAL
RESOURCES



DIVISION OF RECLAMATION



ABANDONED MINE LANDS
PROGRAM

STANDARD SPECIFICATIONS

2022

TABLE OF CONTENTS

SECTION	TITLE	PAGE
DIVISION 01 – GENERAL PROVISIONS (SUPPLEMENTARY CONDITIONS).....		1
SECTION 101	– DEFINITIONS AND TERMS.....	1
SECTION 102	– BIDDING REQUIREMENTS AND CONDITIONS.....	8
SECTION 103	– AWARD AND EXECUTION OF CONTRACT	10
SECTION 104	– SCOPE OF WORK.....	12
SECTION 105	– CONTROL OF WORK	19
SECTION 106	– CONTROL OF MATERIAL	31
SECTION 107	– LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC	35
SECTION 108	– PROSECUTION AND PROGRESS	49
SECTION 109	– MEASUREMENT AND PAYMENT	54
SECTION 110	– MOBILIZATION AND DEMOBILIZATION	59
DIVISION 02 – EARTHWORK AND AREA OPERATION		61
SECTION 201	– CLEARING AND GRUBBING.....	61
SECTION 202	– REMOVAL OF STRUCTURES AND OBSTRUCTIONS	63
SECTION 203	– EARTHWORK.....	65
SECTION 204	– EXCAVATION AND EARTH FILL	67
SECTION 205	– STORMWATER MANAGEMENT.....	69
SECTION 206	– FLOWABLE BACKFILL	73
SECTION 207	– COAL REFUSE DEPOSIT TREATMENT	74
SECTION 208	– DEWATERING	75
DIVISION 03 – DRAINAGE CONTROL.....		79
SECTION 301	– DITCHES AND TERRACES.....	79
SECTION 302	– STOPLOG STRUCTURES	80
SECTION 303	– PIPES AND CULVERTS.....	81
SECTION 304	– RESERVED (CONCRETE BOX STRUCTURES).....	85
DIVISION 04 – REVEGETATION		86
SECTION 401	– SEEDING, MULCHING, AND FERTILIZER.....	86
SECTION 402	– TREE PLANTING.....	91
DIVISION 05 – MISCELLANEOUS CONSTRUCTION.....		94
SECTION 501	– PROJECT SIGNS	94
SECTION 502	– ACCESS ROUTES AND STAGING AREAS.....	94
SECTION 503	– RIPRAP.....	95
SECTION 504	– COARSE AGGREGATE	97
SECTION 505	– BENTONITE CLAY	99
SECTION 506	– FENCES AND ACCESS GATES	99
SECTION 507	– GUARDRAIL	103
SECTION 508	– ORGANIC SUBSTRATE	107
SECTION 509	– RESERVED (MINE SHAFT CAPS)	111
SECTION 510	– BAT GATES.....	111

TABLE OF CONTENTS

SECTION	TITLE	PAGE
DIVISION 06	– MATERIALS	113
SECTION 601	– AGGREGATES	113
SECTION 602	– CONCRETE, CLAY, AND PLASTIC DRAINAGE COMPONENTS	116
SECTION 603	– METAL PIPE	120
SECTION 604	– METAL MATERIALS	123
SECTION 605	– WOOD MATERIALS	128
SECTION 606	– CONCRETE MATERIALS	128
SECTION 607	– REVEGETATION MATERIALS	129
SECTION 608	– GEOSYNTHETIC AND EROSION CONTROL PRODUCTS	133
DIVISION 07	– STANDARD DRAWINGS	136

DIVISION 01 – GENERAL PROVISIONS (SUPPLEMENTARY CONDITIONS)

These AML Standard Specifications shall be incorporated into the Project Bid Package when referenced.

SECTION 101 – DEFINITIONS AND TERMS

Wherever in these specifications or in other contract documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows.

101.01 Abbreviations

Wherever the following abbreviations are used in specification or on the plans, they are to be construed the same as the respective expressions represented.

10	ACI	American Concrete Institute
	AML	Abandoned Mine Lands
	AASHTO	American Association of State Highway and Transportation Officials
	ANSI	American National Standards Institute
	ASTM	American Society for Testing and Materials
	AWS	American Welding Society
	BMP	Best Management Practice
	CFR	Code of Federal Regulations
	DAPW	Department of Administration, Public Works Division
	Division	IDNR's Division of Reclamation
20	ECB	Erosion Control Blanket
	EPA	Environmental Protection Agency
	HDPE	High Density Polyethylene
	IAC	Indiana Administrative Code
	IC	Indiana Code
	IDEM	Indiana Department of Environmental Management
	IDNR	Indiana Department of Natural Resources
	INDOT	Indiana Department of Transportation
	ISWQM	Indiana Storm Water Quality Manual
	MUTCD	Indiana Manual on Uniform Traffic Control Devices
30	NOI	Notice of Intent
	NTB	Notice to Bidders (DAPW 28)
	NPDES	National Pollutant Discharge Elimination System
	OFCCP	United States Department of Labor, Employment Standards Administration, Office of Federal Contract Compliance Program
	OSM	United States Department of the Interior, Office of Surface Mining
	PLS	Pure Live Seed
	PVC	Polyvinyl Chloride
40	QPL	Qualified Products List
	SWWF	Significant Water Withdrawal Facility
	TRM	Turf Reinforcement Mat
	TSS	Total Suspended Solids

101.02 Above Normal Inclement Weather Days

The specific yearly number of days over and above the normal inclement weather days shown below which work on the controlling operation is delayed by rain or other inclement weather. The above normal days include the days following a weather event on which the controlling operation is still delayed.

50

The following chart shows the estimated number of normal inclement weather days in each month, the Division considers when setting completion dates.

<u>Month</u>	<u>Estimated Number of Days</u>
April	18
May	8
June	5
July	5
August	4
September	5
October	6
November	12

101.03 Business Day

Monday through Friday, except for holidays in accordance with 101.23.

101.04 Calendar Day

Every day shown on the calendar. The term “day” as used in the contract documents shall mean calendar day unless otherwise specifically designated.

60

101.05 Change Order

A written order issued to the Contractor in accordance with DAPW 26, 12.1.2

101.06 Construction Limits (Project Limits)

The line shown on the plans beyond which no work is intended to be performed and that which no disturbance of existing terrain will be allowed unless otherwise authorized by the Engineer.

70

101.07 Contract

The contract documents form the contract for construction. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral.

101.08 Contract Documents

As defined in the Project Bid Package on DAPW 33 or DAPW 33A.

101.09 Contract Item (Pay Item)

A specifically described unit of work for which a price is provided in the contract.

80

101.10 Contract Sum

The total amount payable by the State for the performance of the work under the contract documents.

101.11 Contract Time

The number of work days or calendar days allowed for completion of the contract or phase of the contract, including authorized time extensions.

If a calendar date of contract completion or contract phase completion is shown in the
90 Project Bid Package in lieu of the number of work or calendar days, the contract shall be
completed by that date.

101.12 Contractor

The Contractor is the person or organization identified as such in the Agreement. The term Contractor means the Contractor or the Contractor's authorized representative.

101.13 Construction Limits (Project Limits)

The line shown on the plans beyond which no work is intended to be performed and that
which no disturbance of existing terrain will be permitted unless otherwise authorized by the
100 Engineer. The Contractor shall confine operations at the site in accordance with DAPW 4.13.

101.14 DAPW 26

DAPW form containing the general conditions for the contract. These standard specifications were developed to provide clarification of DAPW 26 pertaining to the administration of the contract during construction. During construction, AML projects will be administered by the Division and not by a designer or consultant unless otherwise specified. These specifications replace DAPW 26 articles, sections, and subsections unless they are referenced directly herein.

110 **101.15 DAPW 33**

DAPW form containing the standard contract language for contracts over the threshold amount.

101.16 DAPW 33A

DAPW form containing the standard contract language for contracts under the threshold amount.

101.17 Designer

The Designer is the person or organization identified as Designer of the project in the
120 Project Bid Package.

When the Division is identified as the Designer, Designer and Engineer mean one in the same.

101.18

When a consultant is identified as the Designer, the Designer is not the Engineer. In this case the Designer and Engineer will work together to address the needs of the project with all directions to the Contractor coming from the Engineer.

101.18 Division

130 The Indiana Department of Natural Resources, Division of Reclamation, as constituted under the laws of Indiana for the administration of AML Reclamation and Restoration and its duly authorized representatives.

101.19 Engineer

The engineering personnel of the Division, acting directly or through duly authorized representatives.

101.20 Equipment

140 All machinery and equipment together with the necessary supplies for upkeep and maintenance, and all tools and apparatus necessary for the proper construction and acceptable completion of the work.

101.21 Extra Work

An item of work not provided for in the contract as awarded but found essential to the satisfactory completion of the contract.

101.22 Field Orders

Written interpretations of the contract documents issued by the Engineer that do not cause a change in contract sum or contract time.

150

101.23 Holidays

Holidays are considered to be all Sundays and days determined by the Office of the Governor of the State Indiana.

101.24 Land-disturbing Activity

Any man-made action to the land surface that exposes the underlying soil including clearing, grading, excavation operations, cutting and filling, or the movement and stockpiling of topsoil.

160 **101.25 Major and Minor Contract Items**

All contract items having an original contract value in excess of 5% of the original contract amount shall be considered as major items. Minor contract items shall be all items shown in the Schedule of Pay Items which constitutes 5% or less of the original contract amount.

101.26 Materials

All substances specified for use in the construction of the project and its appurtenances.

101.27 Minor Changes in the Work

170 A change in the work not involving an increase in the contract sum or an extension of contract time and not inconsistent with the intent of the contract documents.

101.28 Notice to Proceed

Written notice to the Contractor to proceed with the contract work including, when applicable, the date of beginning of contract time. If there is no notice to proceed, it shall be the date of the Governor's signature on the Owner-Contractor Agreement or such other date as may be established therein.

101.29 Owner

180 The Owner is the State of Indiana, represented by the Commissioner; Department of Administration acting through the Director, Public Works Division, the Director's designated DAPW project manager, the IDNR Director of Engineering, the Division, the Project Manager, and the Engineer.

101.30 Plans (Drawings)

The approved plans, profiles, typical cross sections, standard drawings, working drawings, and supplemental drawings or exact reproductions thereof which show the location, character, dimensions, and details of the work to be done.

101.31 Professional Engineer

190 A person who is duly licensed by the Indiana Professional Licensing Agency to practice engineering in the State.

101.32 Professional Land Surveyor

A person who is duly licensed by the Indiana Professional Licensing Agency to practice land surveying in the State.

101.33 Project

200 The Project is the total construction designed by the Designer of which the work performed under the contract documents may be the whole or a part.

101.34 Project Bid Package

The portion of the contract documents containing the initial information for the bidding of the project.

101.35 Project Manager

The duly authorized representative of the Division for on-site administration of the construction of the project.

101.36 Qualified Products List

210 Lists of preapproved manufacturers, materials, products, sources, or suppliers maintained by INDOT.

101.37

101.37 Reasonably Close Conformance

Reasonably close conformance means conformance with reasonable and customary manufacturing and construction tolerances where working tolerances are not specified. Where working tolerances are specified, reasonably close conformance means conformance with such working tolerances. Without detracting from the complete and absolute discretion of the Engineer to insist on such tolerances as establishing reasonably close conformance, variations
220 beyond such tolerances may be accepted as reasonably close conformance where they will not materially affect the value or utility of the work and the interest of the State.

Reasonably close conformance also means, for materials manufactured according to the English system of measures, that the materials are about the same size as nearly equivalent metric-sized materials. For materials manufactured according to the metric system of measures, reasonably close conformance means the materials are about the same size as nearly equivalent English-sized materials. Nearly equivalent sized materials will be accepted unless the nearly equivalent material is outside specified working tolerances in the contract documents.

230 **101.38 Right-of-Entry**

Legal instrument obtained by the Division for the purpose of having permission to perform construction on property not owned by the Division.

101.39 Schedule of Supplemental Unit Price Items

A part of the contract documents which shows pay items, quantities, and pay units for the contract. The bidder shall complete the document by filling in the unit prices and the bid amounts.

101.40 Schedule of Values

240 Schedule aggregating the total contract sum, including quantities when required by the Engineer, and divided to facilitate payment.

101.41 Special Provisions

Additions or revisions to the Standard Specifications that describe conditions and requirements for special situations on a specific project.

101.42 Specifications

250 A general term applied to all directions, provisions, and requirements pertaining to performance of the work.

101.43 Specified Completion Date

The date on which the contract work is specified to be complete.

101.44 Standard Specifications

These Standard Specifications were developed to reduce project review time, provide consistency between projects, reduce errors, and provide clarification of DAPW 26. A particular standard specification shall apply when relevant to the work and circumstances of the project as shown on the plans, listed on the Schedule of Supplemental Unit Prices, shown on the Project Information page, referenced by another specification, or required by change order.

260

These specifications use the word “shall” to describe the Contractor’s responsibilities. The word “will” is used to describe the Division’s responsibilities. The words “shall” and “will” are not required to be followed by the words “by the Contractor” or “by the Division” to retain these meanings.

INDOT Standard Specifications are references herein and are denoted by INDOT followed by the section number.

As with all contract documents; prospective bidders shall read and be thoroughly familiar with the Standard Specifications.

101.45 State

The State of Indiana acting through its authorized representative.

101.46 Structures

Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, end walls, buildings, sewers, service pipes, underdrains, foundation drains, and other features which may be encountered in the work and not otherwise classified herein.

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101.47 Subcontractor

A subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the work at the site. The term includes a subcontractor’s authorized representative. Contractor tiers on a public works project are defined as follows:

290

1. Tier 1 contractor includes each person that has a contract with the public agency to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also know as a “prime contractor” or “general contractor”.
2. Tier 2 contractor includes each person that has a contract with a tier 1 contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person in this tier is also know as a “subcontractor”.
3. Tier 2 contractor includes each person that has a contract with a tier 2 contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also know as a “sub-subcontractor”.
4. Lower tier contractor includes each person that has a contract with a tier 3 contractor or lower tier contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also known as a “lower tier subcontractor”.

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101.48 Substantial Completion

The date, as determined by the DAPW Director, when the construction of a project is sufficiently completed in accordance with the plans and specifications, as modified by any approved change orders, so that it can be used for its intended purpose.

101.49

101.49 Superintendent

The authorized representative of the Contractor in responsible charge of the work.

310 **101.50 Technician or Inspector**

The authorized representative of the Engineer assigned to make detailed inspections of contract performances.

101.51 Titles (Headings)

The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

101.52 Township, Town, City

A subdivision of a county used to designate or identify the location of the proposed work.

320

101.53 Work

All labor, material, equipment, systems and services necessary to produce the result called for in the contract documents.

101.54 Work Days

A calendar day, exclusive of Saturdays and State recognized holidays, on which weather and other conditions not under the control of the Contractor will enable work on the controlling operations for at least 50% of the day with the normal working force. However, if weather is unsuitable for work on the controlling operation at the normal starting time, and remains

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unsuitable for 2 hours, the calendar day will not be considered a work day.

101.55 Working Drawings (Shop Drawings and Samples)

Shop drawings and samples shall be in accordance with DAPW 26, 4.12.

101.56 Written Notice

Written notice shall be in accordance with DAPW 26, 7.4.

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

102.01 Prequalification and Bidding

Certificate of Qualification for Contractors and Subcontractors performing work for the State of Indiana is obtained through DAPW. Bidding is a DAPW process the Division coordinates through IDNR's Division of Engineering.

Information on requirements, thresholds dollar amounts, and procedures for obtaining a Certificate of Qualification is available in the Project Bid Package, by contacting the Executive
10 Secretary of Certification Board of IDOA, and by visiting the DAPW website.

If apparent errors, discrepancies, or unclear statements are found in the contract documents prior to the contract award, the Division shall be contacted.

At least 15 percent of the total contract sum of the work shall be performed by the Contractor's own forces in accordance with DAPW 26, 7.10.2.

102.02 Base Bid

20 The base bid or contract sum shall include all the work shown on the plans, listed on the Schedule of Supplemental Unit Prices, and described in these specifications that is associated with the work shown on the plans and listed on the Schedule of Supplemental Unit Prices.

If work shown on the plans has a supplemental unit item in the specifications, but is not listed on the Schedule of Supplemental Unit Prices, the work shall be included in the base bid, and incorporated into the approved Schedule of Values. All such work will not be measured.

102.03 Supplemental Unit Prices

30 Unknown site conditions or design changes will have an impact on the amount of labor and materials required to complete the contract. The Contractor's base bid shall be prepared to include the items listed on the Schedule of Supplemental Unit Prices factored at their base bid quantities.

A completed Schedule of Supplemental Unit Prices shall be submitted with the Contractor's bid. The Engineer may authorize, in writing, an addition or deletion to any base bid quantity. If a base bid quantity increase or decrease is authorized by the Engineer, the contract sum shall and will be adjusted by change order, or by using the remediation allowance, at the unit price listed on the Schedule of Supplemental Unit Prices.

40 If a supplemental unit price is listed on the Schedule of Supplemental Unit Prices and the work is shown on the plans, the quantity of work shown on the plans will be included in the base bid quantity listed on the Schedule of Supplemental Unit Prices. If the base bid quantity listed on the Schedule of Supplemental Unit Prices is greater than the quantity of work shown on the plans, the difference shall be considered an undistributed quantity to be used at the discretion of the Engineer.

102.04 Remediation Allowance

The Contractor's base bid shall include an allowance in the amount stated on the Project Information page for Owner directed remediation of unforeseen constraints.

50 Such constraints include but are not limited to unforeseen subsurface conditions particular to this construction site; improperly recorded or unrecorded physical properties and conditions at the site; obstruction of or delays to reasonable work sequences by the Owner; uncommon adverse weather or site conditions; and conflict within or omissions from the contract documents.

All remediation work shall be proposed to and authorized by the Director of the Public Works Division prior to execution, jointly documented by the Contractor and Engineer, and recorded in the Contractor's as-built plans and the Engineer's project record documents.

60 Other cash allowances shall be in accordance with DAPW 26, 4.7.

102.05 OSM Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying

If OSM grant reimbursement funds are to be used for payment under a contract, these requirements shall apply. Information on the certifications will be included in the Project Bid Package.

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

103.01 Department of Administration, Public Works Division

Contracts will be awarded and executed by DAPW. DAPW will issue the purchase order and notice to proceed for the contract. The contract documents shall be signed by the State and the Contractor. The signature process may be done electronically at the discretion of the State.

The Contractor shall visit the site and correlated his observations with the requirements of the contract documents. Executing the contract shall represent that the Contractor affirms
10 visiting the site and having no major questions.

103.02 Disadvantaged Business Enterprise Participation

Information for these IDOA policies is contained in the Project Bid Package and on IDOA's Division of Supplier Diversity website.

103.03 Reserved

103.04 Insurance

Insurance requirements are included in the Project Bid Package. For projects over the
20 estimate threshold, the requirements are listed on forms DAPW 33 and DAPW 26. For projects under the estimate threshold, the requirements are listed on DAPW 33A.

If the project does not include a building structure on or in which work is to be performed, Builder's Risk insurance will not be required.

103.05 Performance Bond and Labor and Material Payment Bond

For projects advertised with an estimate above the threshold amount, the Contractor shall furnish and pay for bonds in accordance with DAPW 26, 7.6.

30 103.06 Wage and Labor Requirements

These requirements apply to all contracts let by the Division. These requirements will apply to all work performed by the Contractor with its own organization and with the assistance of workers under its immediate superintendence, and to all work performed by piecework, station work, subcontract, or lease.

(a) Non-discrimination of Employees

The Contractor and its subcontractors shall not discriminate against an employee or applicant for employment, to be employed in the performance of the contract work, with respect to hire, tenure, terms, conditions, or privileges of employment or matters directly or indirectly

40 related to employment, because of race, religion, color, sex, sexual orientation, sexual identity, disability, national origin, or ancestry in accordance with DAPW 33 and 33A. Breach of this covenant may be regarded as a material breach of the contract.

(b) Affidavits and Payrolls

All labor shall be paid weekly. The payroll and related records of the Contractor and all subcontractors shall be preserved for a period of three years after completion of the project work and shall be open to the inspection of the State.

50 The wages of labor shall be paid in legal tender of the United States. However, this condition will be considered satisfied if payment is made by means of a negotiable check, on a solvent bank, which may be cashed readily by the employees in the local community for the full amount, without discount or collection charges. If checks are used for payment, the Contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

No fee shall be asked or accepted by the Contractor or its agents from a person as a condition of the contract.

60 No laborers shall be charged for tools used in performing their respective duties except for reasonable avoidable loss or damage thereto.

Each employee on the work covered by the contract shall be allowed to lodge, board, or trade where or with whom he or she elects. Neither the Contractor nor its agents, nor its employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board, or trade at a particular place or with a particular person.

No charge shall be made for transportation furnished by the Contractor or its agents to a person employed on the work.

70 No individual shall be employed as a laborer on the contract except on a wage basis. This shall not be construed to prohibit the rental of trucks or other equipment from individuals. No such rental agreement, or charges for fuel, supplies, or repairs on account of such agreement shall cause deduction from the wages accruing to an employee except as authorized by the regulation cited herein.

(c) Wage Stipulations

If a General Decision is included in the Project Bid Package, the following requirements apply:

- 80
1. No person employed on the contract shall be paid less than required by the rate of wages set forth for labor classifications listed in the General Decision as required by the Davis Bacon Act and related Acts.
 2. The Contractor shall provide, and require each Subcontractor to provide, weekly payroll records listing employees engaged in work on the site for the

103.07

week and the hourly rates for base pay and benefits paid to each employee listed. The payroll record form shall include a statement by the Contractor/Subcontractor certifying the accuracy and completeness of the information provided. Payroll records shall be maintained by the Contractor during the course of the work until the end of any required warranty period.

90

- 3. The computations used in arriving at the contract unit prices shall be based on the hourly rates shown in the General Decision and as shown above. The wages herein stipulated shall become and be a part of the contract as provided by law.

No person employed on a state funded contract shall be paid at a rate of less than \$11.25 per hour, as required by IC 8-23-9-22.

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103.07 Accident Prevention and Safety (Protection of Persons and Property)

Safety precautions and programs shall be in accordance with DAPW 26, 10.1.

Safety of person and property shall be in accordance with DAPW 26, 10.2.

Emergencies shall be handled in accordance with DAPW 26, 10.3.

Protection of property against weather shall be in accordance with DAPW 26, 7.15.

110 Protection of persons and property against fire hazards shall be in accordance with DAPW 26, 7.16.

SECTION 104 – SCOPE OF WORK

104.01 Intent of Contract

The intent of the contract is to provide for the construction and completion in every detail of the work described.

The Contractor shall furnish all labor, materials, equipment, tools, safety equipment, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

10

It is understood by all concerned that the apparent silence of the specifications as to a detail or the apparent omission of a detailed description concerning a point shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the first quality is to be used. All interpretations of these specifications shall be made on this basis.

In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever any thing is, or is to be done, if, as, when, or where contemplated, required, determined, directed, specified, authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established,

approved, disapproved, acceptable, unacceptable, suitable, accepted, satisfactory, unsatisfactory, sufficient, rejected, or condemned, it shall be understood as if the expression were followed by the words “by the Engineer” or “to the Engineer”.

It is further provided that all work including the furnishing of materials, equipment, tools, labor, and incidentals required to carry out the terms of the contract shall be done by the Contractor, its employees, or subcontractors unless specifically set out otherwise in the Proposal book. The words “by the Contractor” will not necessarily be used to so indicate. All work shall be carried out in a thorough, careful, effective, and satisfactory manner without specifically using
30 these words to describe the action.

Reports and other documents that are determined to be pertinent and necessary to the effective monitoring of the contract shall be submitted by all applicable contractors and subcontractors in accordance with appropriately issued instructions.

If the project includes a building structure on or in which work is to be performed, the Contractor shall provide utilities in accordance with DAPW 26, 4.4.2.

If any item of work is the subject of a jurisdictional dispute as to the craft to be used for
40 said work, the requirements of DAPW 26, 4.4.3, shall apply.

104.02 Changed Conditions

A changed condition causes the work to substantially differ in kind or nature from the work as required in the original contract. The Division will adjust the contract for changed conditions as described herein. A contract adjustment may revise one or more of the following:

- (a) the work to be performed
- (b) the time required for the work
50
- (c) the amount of compensation due the Contractor.

Changed conditions that will be considered as reason for a contract adjustment are differing site conditions, suspensions of work ordered by the Engineer, and significant changes in the character of the work. A request by the Contractor for a contract adjustment shall be based on one or more of the changed conditions described herein.

(a) Differing Site Conditions

During the progress of the work, if subsurface or latent physical conditions are
60 encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.

104.02

Upon written notification, the Engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding anticipated profits, will be made and the contract modified in writing accordingly. The Engineer will notify the Contractor if an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided a written notice of a changed condition in accordance with 105.13.

No contract adjustment will be allowed under this clause for any effects caused on unchanged work.

(b) Suspensions of Work Ordered by the Engineer

If the performance of all or any portion of the work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation, and/or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Engineer in writing a request for adjustment within seven calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost and/or time required for the performance of the contract has increased because of suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The Contractor will be notified of the Engineer's determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed in accordance with 105.13.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of the contract.

(c) Significant Changes in the Character of Work

The Engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether such alterations or changes are in themselves significant changes to the character of the work or by affecting other work cause such other work to become significantly different in character, an adjustment, excluding anticipated profit, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the

work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the Contractor in such amount as the Engineer may determine to be fair and equitable.

If the alterations or changes in quantities do not significantly change the character of the work to be performed under the contract, the altered work will be paid for as provided elsewhere in the contract.

120 No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice of a changed condition in accordance with 105.13.

The term “significant change” shall be construed to apply only to the following circumstances:

1. When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction; or
- 130 2. When a major item of work, as defined elsewhere in the contract, is increased more than 125% or decreased below 75% of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125% of the original contract item quantity, or in case of a decrease below 75%, to the actual amount of work performed.

(d) Pre-established Remedies to Changed Conditions

The Contractor and the Division shall cooperatively work to resolve a request for a contract adjustment due to a changed condition by means of the pre-established remedies described herein.

140

After receipt of a notice of a changed condition in accordance with 105., the Engineer will determine if the Contractor’s request for a contract adjustment is justified. The Engineer will respond to the Contractor in writing within two business days of the receipt of notification, or other time as mutually agreed, as to whether the request is justified and as to how the changed condition will be remedied.

If the Engineer determines that a request for a contract adjustment in terms of contract sum is justified, the contract sum will be adjusted by change order based on one or more of the following pre-established remedies, in order of priority listed:

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1. Calculations and payment involving existing pay items in the contract in accordance with DAPW 26, 12.1.3(B),
2. DAPW 26, 12.1.3(A),
3. DAPW 26, 12.1.3(C),

104.02

If the Engineer determines that a request for a contract adjustment in terms of contract time is justified, the contract time will be adjusted by change order in accordance with DAPW 160 26, 8.3.

Payment for delay costs will be in accordance with DAPW 26, 8.3.

Payment for extra work shall be in accordance with 104.05

If the impact of a changed condition will not be known for some length of time, the following procedure shall be followed to expedite a contract adjustment until the impact of the change can be determined.

- 170
1. After submitting notification of the changed condition, the Contractor shall keep daily records, apart from other records, of all labor, material, and equipment costs incurred for the work affected. The daily records shall identify each operation affected and the location where work is affected.
 2. The Engineer will also maintain daily records of the work affected from the date of the notification.
 3. Beginning the week following notification of a changed condition, the Contractor shall meet weekly with the Engineer to exchange and discuss each party's daily records of the work affected during the preceding week.
 - 180 4. The Contractor shall notify the Engineer in writing within three work days of any disagreements with the Engineer's records and include the specific points of disagreement. These points will be addressed by the Engineer at the next weekly meeting.
 5. Refusal by the Contractor to attend any weekly meeting or to submit daily records at a weekly meeting will constitute a waiver to any objections to the accuracy of the Engineer's records and the Engineer's records will control for purposes of computing any contract adjustment for the changed condition.

190

If the Contractor accepts the Engineer's remedy for a changed condition, the contract adjustment will be considered full and complete compensation for the changed condition and no further contract adjustment will be made for the circumstances that gave rise to the Contractor's request.

If the Contractor disagrees with the Engineer's remedy for a changed condition, and decides to further pursue compensation, a written notification of claim must be submitted to the Engineer including the date of occurrence and location of each item along with supporting 200 documentation in accordance with 105.13. The claim must also contain a detailed statement of actions taken to mitigate the claim and specific provisions of the contract supporting the claim.

Pre-established remedies to a changed condition have the following conditions.

1. Acceleration

If the Division gives written direction for the Contractor to accelerate the work, a contract adjustment will be made specifying the work to be accelerated, the time to be saved by acceleration and the amount of compensation due the Contractor for the acceleration.

210 The Division assumes no liability for constructive acceleration unless the Contractor has provided written notice of the intent to accelerate the work, there is an excusable delay for which the Division has either improperly rejected the Contractor's request for an extension of contract time or failed to act on the request, and the Contractor has incurred additional costs for the acceleration.

2. Inefficiencies

If a claimed loss of productivity due to a changed condition cannot be isolated and remedied separately, the Division will consider payment for inefficiency costs using a method approved by the Engineer.

220 If the claimed inefficiency is that work was performed out of scheduled sequence due to the changed condition, the current accepted schedule will be analyzed to determine if the work was performed out of sequence.

3. Unrecoverable Costs

The Division will not make payment for any of the following:

- a. Loss of anticipated profits.
- 230 b. Consequential damages, including but not limited to loss of bonding capacity, loss of bidding opportunities and insolvency.
- c. Expense of claim preparation and submission, including but not limited to attorney's fees, consultant's fees and expenses and litigation expenses.
- d. Interest.
- e. Home office overhead in excess of that provided for in the contract.

4. Unacceptable Cost Calculation Methods

The Division will not make any payments for costs calculated using any of the following methods:

- 240 a. Total cost methods based on calculation of costs as the difference between the Contractor's bid for the work and the Contractor's calculation of the costs for the work.
- b. Calculation of home office overhead due to delay.

104.03 Minor Changes in the Work

The Engineer has authority to order minor changes in the work not involving an increase in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents. Such change may be affected by written field order. Such minor changes

104.04

250 need not be approved in writing; however, the Engineer may provide written approval of any substitution of significant materials or equipment.

If the Contractor claims that an issued order for a minor changes in work involves additional cost or time, the Contractor shall make such claim in accordance with 105.13.

104.04 Field Orders

Field Orders will be issued by the Engineer to interpret the contract documents without change in Contract Sum or Contract Time. The Contractor shall carry out such field orders promptly.

260

If the Contractor claims that an issued field order involves additional cost or time, the Contractor shall make such claim in accordance with 105.13.

104.05 Extra Work

Unforeseen work, for which there is no price included in the contract, shall be performed whenever it is deemed necessary to fully complete the contract within its intended scope, or it is in the best interest of the State to complete the unforeseen work under the contract. Such work shall be performed in accordance with the specifications and as directed, and will be paid for through remediation allowance or by a change order in accordance with 104.02(d).

270

104.06 Removal and Disposal of Structures and Obstructions

Unless otherwise provided, any existing structure or parts thereof, fence, building, or other encumbrance or obstruction upon or within the project limits which interferes in any way with construction shall be removed with no additional payment.

Materials belonging to abutting property owners shown to be retained for the property owner shall be stockpiled in an acceptable manner at a designated area off the project limits. Materials shown to be removed, shall become the property of the Contractor and shall be removed or disposed of according to the contract.

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Materials to be salvaged for Division use shall be removed without damage in sections that can be readily transported. These materials shall be stockpiled neatly at locations identified on the plans or identified by the Engineer.

104.07 Rights in and Use of Materials Found in the Project Site

Except for hazardous wastes, hazardous substances, hazardous materials, asbestos, trash, debris, timber, and coal, all materials designated to be removed from the project and not used in the work shall become the property of the Contractor, unless otherwise set out in the following or in other specifications. The value of these materials shall be taken into account when the bid is being prepared.

290

Construction materials such as gravel, stone, or sand found in the excavation shall not be used for purposes other than indicated on the plans without written approval.

On all contracts involving construction within the corporate limits of cities and towns or along public road right-of-way in which items such as drainage structures, castings, guardrail, or other items having a salvage value, are to be removed, the removed items shall remain the property of the governmental bodies involved unless a written waiver from the governmental body is provided. If the items are to be retained by the governmental body, the Contractor shall
 300 deliver the items to the nearest highway or maintenance garage of the particular governmental body.

If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al.) and State Law (IC 14-21-1) require that work must stop immediately and that the discovery must be reported to the Division of Historic Preservation and Archaeology in the Indiana Department of Natural Resources within 2 business days.

If archaeological artifacts are encountered during excavation operations, these operations
 310 shall be ceased in the immediate vicinity and the Engineer shall be notified. An archaeologist will be provided by the Division and a determination will be made as to the significance and the disposition of such findings. In no event shall an employee of the Contractor or the State of Indiana share in such ownership, or profit from salvaged archaeological findings.

104.08 Final Clean-Up

Before acceptance and final payment, within the project limits, borrow and disposal areas, and all ground occupied in connection with the work shall be cleaned of rubbish, excess materials, temporary buildings, structures, and equipment.

320 Waterways shall be left unobstructed.

All property which may have been damaged in the prosecution of the work shall be restored in an acceptable manner. All parts of the work shall be left in a neat and presentable condition. All equipment shall be removed from the project limits.

Unless otherwise provided, all falsework, piling, concrete or timber mudsills, or similar material placed during construction and not required in the completed work, shall be removed entirely or cut off at least 2 ft below the finished ground. Within a low water channel, they may be removed or cut off even with the stream bed.
 330

104.09 Warranty and Guarantee

A one-year warranty shall be included as part of the work in accordance with DAPW 26, 4.5 and 2.2.13.

SECTION 105 – CONTROL OF WORK

105.01 Authority of the Engineer

The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work; which may

105.02

arise as to the interpretation of the plans and specifications; and as to the acceptable fulfillment of the contract on the part of the Contractor.

10 All interpretations and decisions of the Engineer will be consistent with the intent of the contract documents and the Engineer will exercise good faith efforts to ensure faithful performance by the Contractor.

The Engineer will have the authority to suspend the work wholly or in part for failure to carry out provisions of the contract; for failure to carry out orders; for such periods as may be deemed necessary due to unsuitable weather; for conditions considered unsuitable for prosecution of the work; or for any other condition or reason deemed to be in the public interest. Any contract adjustments for suspension of work will be in accordance with 104.02(b). Work shall not be suspended without written authority from the Engineer.

20 **105.02 Conformance with Plans and Specifications**

The Contractor will be furnished a digital copy of the contract documents necessary for the execution of the work. One set of paper copies will be provided upon request by the Contractor. All drawings, specifications, and copies thereof furnished are the property of the Engineer. They shall not to be used for the construction of any other project.

30 All work performed, and all materials furnished shall be in reasonably close conformance with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans or indicated in the specifications. Any deviation from the plans or specifications that may be required by the exigencies of construction will be determined by the Engineer and authorized in writing.

40 Plan dimensions and contract specifications values are to be considered as the target value to be strived for and complied with as the design value from which any deviations are allowed. It is the intent of the specifications that the materials and workmanship shall be uniform in character and shall conform as nearly as realistically possible to the prescribed target value or to the middle portion of the tolerance range. The purpose of the tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons. When a maximum or minimum value is specified, the production and processing of the material and the performance of the work shall not be preponderantly of borderline quality or dimension.

When construction equipment, office equipment, production equipment, or testing equipment are specified in metric sizes, any such equipment that has been built to nearly equivalent English system dimensions will be accepted. When such equipment is specified in English system sizes, any such equipment that has been built to nearly equivalent metric sizes will be accepted.

50 If the Engineer finds the materials or the finished product in which the materials are used are not within reasonably close conformance with the plans and specifications, but that reasonably acceptable work has been produced, the Engineer will determine if the work will be accepted and remain in place. In this event, the basis of acceptance will be documented by

contract modification which will provide for an appropriate adjustment in the contract price for such work or materials as deemed necessary to conform to the determination based on engineering judgment.

If the Engineer finds the materials or the finished product in which the materials are used or the work performed are not in reasonably close conformance with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected with no additional payment.

60

The Contractor shall do all cutting, fitting, or patching of work that may be required to make its several parts come together properly and shall not endanger any work by cutting, excavating, or otherwise altering the work or any part of it. Defective or ill-timed work shall be corrected with no additional payment.

105.03 Coordination of Plans, Standard Specifications, Special Provisions, and Supplementary Documents

These specifications, the plans, special provisions, and all supplementary documents are essential parts of the contract. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; and the following list shows the relationship which documents hold over others. 1 holds over all and 6 holds over none:

70

1. Written Instructions, Clarifications, and Addenda to Bidders
2. Schedule of Supplemental Unit Items
3. Special Provisions
4. Plans
5. Standard Specifications
6. *State of Indiana - General Conditions (DAPW 26)*

80

Notes on the plans which are not also included in either the special provisions or among the general notes portion of the plans, and refer to payment, non-payment, or cost to be included in that of the base bid or Supplemental Unit Items, will not govern over specifications.

Written interpretations necessary for the proper execution of the work, in the form of drawings or otherwise will be issued with reasonable promptness by the Designer. Such interpretations shall be consistent with and reasonably inferable from the contract documents, and may be issued by field order.

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Advantage shall not be taken of any apparent error or omission in the plans or specifications. In the event such an error or omission is discovered, the Engineer shall be notified immediately. Such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications will then be made.

105.04

105.04 Cooperation by Contractor

The Division will furnish the Contractor all contract documents in electronic format without charge. The Contractor shall be responsible for supplying all necessary information for use by contractor and subcontractor personnel.

100

The work shall be given the constant attention necessary to facilitate the progress thereof. The Contractor shall cooperate with the Engineer, technicians, inspectors, and other contractors in every way possible.

The Contractor shall always have available, and on the work site when work is in progress, as its agent, a competent superintendent capable of reading and understanding the plans and specifications and experienced in the type of work being performed. The superintendent shall receive instructions from the Engineer or its authorized representatives and shall have full authority to execute orders or directions without delay. They shall promptly supply such materials, equipment, tools, labor, and incidentals as may be required. Such superintendence shall be furnished irrespective of the amount of work sublet.

110

105.05 Cooperation with Utilities

The Contractor shall not disturb any water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, or any other utility appurtenances within the working area. The Contractor shall be responsible for contacting, coordinating, and cooperating with all utility companies involved. All damage to these utilities caused by the Contractor's operations or equipment shall be repaired or replaced by the Contractor at no cost to the State.

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105.06 Cooperation Between Contractors (Separate Contracts)

If separate contracts are let in connection with other portions of the project, the requirements shall be in accordance with DAPW 26, 6.

105.07 Construction Stakes, Lines, and Grades

When specified on the Project Information page, construction engineering shall be performed by the Contractor in accordance with this section.

(a) Description

The work shall consist of performing all surveys, measurements, and computations required for construction.

130

(b) Equipment and Material

Equipment for construction engineering shall be of a quality and condition to provide the required accuracy. The equipment shall be maintained in good working order and in proper adjustment at all times. Records of repairs, calibration tests, accuracy checks, and adjustments shall be maintained and be available for inspection by the Engineer. Equipment shall be checked, tested, and adjusted as necessary in conformance with manufacturer's recommendations.

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Material is field notebooks, stakes, templates, platforms, equipment, spikes, steel pins, tools, and all other items necessary to perform the work specified.

(c) Quality of Work

All work shall follow recognized professional practice and the standards of the industry. The work shall be performed to the accuracy and detail appropriate for the type of job. Notes, sketches, and other data shall be complete, recorded neatly, legible, reproducible and organized to facilitate ease in review and allow reproduction of copies for job documentation. Survey equipment that requires little or no manual recording of field data shall have survey information documented.

150

All computations shall be mathematically correct and shall include information to identify the bid item, date, and who performed, checked, and approved the computations. Computations shall be legible, complete, and clearly document the source of all information used including assumptions and measurements collected.

If a computer program is used to perform the computations, the Contractor shall provide the Engineer with the software identification, vendor's name, version number, and other pertinent data before beginning survey activities. Computer generated computations shall show all input data including values assigned and assumptions made.

160

The elevations of permanent and temporary benchmarks shall be determined and recorded to the nearest 0.01 foot. Differential leveling and transit traverses shall be of such precision that the error of vertical closure in feet shall not exceed plus or minus 0.1 times the square root of the traverse distance in miles. Linear measurements shall be accurate to within 1 foot in 5,000 feet. The angular error of closure for transit traverses shall not exceed 1-minute times the square root of the number of angles turned.

The minimum requirements for placing slope stakes shall be at 100-foot stations for tangents, as little as 25 feet for sharp curves, breaks in the original ground surface and at any other intermediate stations necessary to ensure accurate location for construction layout and measurement. Slope stakes and cross sections shall be perpendicular to the centerline. Significant breaks in grade shall be determined for cross sections. Distances shall be measured horizontally and recorded to the nearest 0.1 foot. Side shots for interim construction stakes may be taken with a hand level.

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Measurements for stationing and establishing the location of structures shall be made to the nearest 0.1 foot.

Elevations for concrete work, pipes, and mechanical equipment shall be determined and recorded to the nearest 0.01 foot. Elevations for earth work shall be determined and recorded to the nearest 0.1 foot.

180

(d) Primary Control

The Division will provide the Contractor with two northing and easting coordinates and one elevation. These benchmarks shall be used as the origin of all surveys, layouts, and measurements to establish construction lines and grades. The Contractor shall take all necessary precautions to prevent the loss or damage of primary control points. Any stakes or control points

105.07

lost or damaged by construction activity will be reestablished by the Contractor or at the Contractor's expense.

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The Contractor shall verify the benchmarks before significant construction starts and submit to the Engineer a statement of verification. The statement of verification shall clearly indicate the Contractor agrees that the project can be completed as designed from these benchmarks.

The Contractor shall not make claims for discrepancies or adjustments for additional payment due to benchmark errors. If discrepancies are found, they shall be reported to the Engineer immediately. The Contractor and the Engineer shall and will work to resolve the discrepancies in a timely manner.

200

(e) Construction Layout

Prior to the start of work that requires Contractor performed layout, the Contractor shall submit in writing for the Engineer's review: the name, qualifications, and experience of the individuals to be assigned to the layout and survey tasks.

The Contractor shall perform all the work necessary to establish lines and grades; set slope stakes; check staking; perform supplemental or interim staking; establish final grade stakes; provide grade sheets; and perform quantity surveys, measurements, and computations for progress payment.

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(f) Staking

The construction staking required for an item of work shall be completed before work on that item begins. Construction staking shall be completed as follows:

1. The boundary of the areas to be cleared and grubbed shall be staked or flagged at a maximum interval of 200 feet, closer if needed, to clearly mark the limits of work. All boundary stakes will be reviewed by the Engineer before start of this work item.
2. Slope stakes shall be placed at the intersection of the specified slopes and ground line. Slope stakes and the reference stakes for slopes shall be marked with the stationing, required cut or fill, slope ratio, and horizontal distance from the centerline or other control line.
3. Centerline and offset reference line stakes for location, alignment, and elevation shall be placed for all structures.

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The Contractor may use computer-controlled GPS equipment in lieu of staking for earthwork when approved by the Engineer.

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If the Engineer approves the use of computer-controlled GPS equipment for earthwork, the Engineer will provide the breaklines, centerlines, and profiles used to create the contours shown on the plans in digital format. The Contractor shall have a surface model prepared by a

professional land surveyor or professional engineer and surface model preparer shall approve that the surface model's accuracy allows for proper completion of the earthwork contours as shown on the plans and used in the computer-controlled GPS equipment. Any contours provided shall not be used in the creation of the surface model.

240 Any surface model created for use on the project shall be provided to the Engineer for record purposes before use by the computer-controlled GPS equipment. The Engineer shall never be considered as approving surface models provided by the Contractor. No payment will be made for issues caused by the Contractor's use of provided breaklines, centerlines, or profiles.

(g) Construction Engineering for Earthwork

250 Submitting a bid for the project shall represent that the Contractor affirms to examining the existing and proposed contours, making the necessary calculations for the quantity of earthwork taking into account estimated shrink and swell factors, that such calculation shows a reasonably close balance of the earthwork in terms of cut to fill, and that the project can be completed as designed. If errors or discrepancies are found during the examination of the existing and proposed contours or in the calculation for the quantity of earthwork, the Contractor shall report them immediately to the Engineer.

The shrink and swell factors used in the design are general estimates and cannot take into account the variety of materials found on an AML project site. With this understanding, all efforts shall be made by the Contractor to limit the movement of material to below estimated volumes. The Contractor shall make all necessary plans to utilize the cut/fill adjustment areas provided on the plans to limit the movement of material to below estimated volumes.

260 If cut/fill adjustment areas are not provided on the plans, the Contractor and Engineer will work together to limit the movement of material to below estimated volumes. The Engineer will identify areas for adjustments where the planned grade is less critical.

A working drawing of the Contractor's earthwork plan shall be submitted at the first progress meeting and at least two weeks prior to the start of earthwork operations unless otherwise approved by the Engineer. The purpose of the working drawing is to ensure the movement of material is limited to below estimated volumes by identifying potential shortages or excesses of material as early as possible. The working drawing shall at minimum contain and meet the following requirements:

- 270
1. The drawing shall be neat and legible and on 11 in. x17 in. or 24 in. x 36 in. sheet of paper.
 2. The drawing shall be at a standard engineering scale, show a bar scale, and a north arrow.
 3. The drawing shall show the grading limits of the earthwork.

105.07

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4. The drawing shall identify the areas of the planned earthwork. The areas shall be divided to monitor the monthly progress of the cut and fill in coordination with the progress schedule.
5. The drawing shall indicate original grades and existing grades for each area.
6. The drawing shall show the total estimated volume of material to be moved for each area.

290

The working drawing and earthwork plan shall be updated and submitted to the Engineer at each monthly progress meeting. The Engineer will adjust the monthly submission deadline based on weather and holidays that may affect the schedule.

The Contractor shall survey completed areas, even if finish grading has not been performed, and update the working drawing to show the amount of material moved in the completed areas.

Volumes will always be considered in bank cubic yards.

(h) Records

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All layout and survey data shall be recorded in fully identified standard hard-bound engineering survey field notebooks with consecutively numbered pages. All field notes and printed data shall include the purpose or description of the work, the date the work was performed, weather data, sketches, and the personnel who performed and checked the work. Electronically generated survey data and computations shall be bound, page numbered, and cross referenced in a bound field notebook containing the index for all survey activities. All work shall follow recognized professional practice.

310

The construction survey records shall be available at all times during the progress of the work for examination and use by the Engineer and when requested, copies shall be made available. The original field notebooks and other records shall be provided to and become the property of the owner before final payment and acceptance of all work.

Complete documentation of computations and supporting data for progress payments shall be submitted to the Engineer with each invoice for payment.

(i) Basis of Payment

When specified on the Project Information page, construction engineering will be paid for in accordance with the approved Schedule of Values.

320

The cost of all materials, equipment, tools, labor, transportation, operations, and incidentals shall be included in the cost of construction engineering.

No payment will be made for issues caused by the Contractor's use of provided breaklines, centerlines, or profiles.

105.08 Duties of Project Manager, Technician, and Inspector

The project managers, technicians, and inspectors employed by the Division are stationed on the work to:

- 330
1. keep the Engineer informed as to the progress of the work and the manner in which it is being done;
 2. report whenever it appears that the materials furnished and the work performed fail to fulfill the requirements of the specifications and contract; and
 3. call to the attention of the Contractor, as the work progresses, all known deviations from, or infringement upon, the plans and specifications with respect to materials and workmanship.

340 The Project Manager shall have the authority to issue field orders and approve or direct minor changes in the work.

Project Managers, technicians, and inspectors will be authorized to inspect all work done and materials furnished and to exercise such additional authority as may be delegated to them. They shall have authority to reject defective materials and to suspend any work that is being improperly done, subject to the final decision of the Engineer.

Such inspection will not relieve the Contractor from any obligation to furnish acceptable materials or to perform all work strictly in accordance with the requirements of the plans and specifications.

350

Verbal agreements, understandings or conversations with any agent or employee of the Division, either before or after the execution of this contract, shall not affect or modify any of the terms or obligations of the contract.

Project Managers, technicians, and inspectors will, in no case, act as foremen or perform other duties for the Contractor, nor interfere with the management of the work.

105.09 Inspection of Work

360 All materials and each part or detail of the work will be subject to inspection. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance as is required to make a complete and detailed inspection. Such inspection may include preparation and manufacture of the materials at the plant.

At any time before acceptance of the work, such portions of the finished work shall be removed or uncovered as may be directed. After examination, said portions of the work shall be restored to the standard required by the specifications. If the work thus exposed or examined proves to be acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for by the Division with a change order. If the work so exposed or examined proves to be unacceptable, the uncovering, or removing, and the

105.10

370 replacing of the covering or making good of the parts removed will be with no additional payment.

The Engineer or Project Manager will identify critical work where Division personnel's supervision will be required. All critical work performed or critical materials used without supervision or inspection by an authorized Division representative may be ordered removed and replaced with no additional payment unless the Division representative failed to inspect after having been given reasonable notice that the critical work was to be performed.

380 When work covered by the contract is being done under a permit, such as a building permit, or agreement with a unit of government or political subdivision, or a railroad corporation, its respective representatives shall have the right to inspect the work. Such inspection shall in no sense make such unit of government or political subdivision or such railroad corporation a party to the contract and shall in no way interfere with the rights of either party hereunder. The Engineer shall be given timely notice of its readiness and of the date fixed for such inspection, testing, or approval so the Engineer may observe the same. The Contractor shall bear all cost of such inspections, tests, and approvals unless otherwise provided. Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered to the Engineer.

390 **105.10 Correction and Removal of Unacceptable or Unauthorized Work**

All work which is not in accordance with the contract will be considered as unacceptable work, subject to conditions set out in 105.02.

(a) Correction of Work before Substantial Completion

Correction of work prior to substantial completion shall be in accordance with DAPW 26, 13.2.

(b) Correction of Work after Substantial Completion

400 13.3. Correction of work after substantial completion shall be in accordance with DAPW 26,

If the Contractor fails to correct defective work as required by DAPW 26, 13, or persistently fails to carry out the work in accordance with the contract documents, then DAPW 26, 3.2.4, shall apply.

105.11 Load Restrictions

Legal load restrictions shall be complied with on public roads beyond the limits of the project. A special permit will not relieve the Contractor of liability for damage which may result from the moving of equipment.

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The operation of equipment of such weight or so loaded as to cause damage to structures or the roadway or to any other type of construction will not be allowed. No loads will be allowed on concrete pavement, concrete bases, or structures before the expiration of the curing period. The Contractor shall be responsible for all damage done by the Contractor, its employees, agents, or subcontractors.

This requirement will serve as written notice that hauling or handling of materials on completed or partially completed structures, pavement structures, or paved shoulders in excess of legal weight limits will not be allowed unless approved in advance of the operation. Approval shall be obtained from the authority having jurisdiction over the structures, pavement structures, or paved shoulders.

105.12 Acceptance and Final Inspection

When notified by the Contractor that the work or a designated portion thereof is substantially complete, the Engineer and the Contractor shall determine jointly by inspection that the work is substantially complete. If the work is determined to be substantially complete, the Contractor shall then prepare a Certificate of Substantial Completion with an accompanying list of incomplete items of work (punch list) and submit it to the Engineer for his signature and subsequent forwarding for approval by the Director, Public Works Division. The Certificate shall fix the date of Substantial Completion and shall state the responsibilities of the Division and the Contractor for maintenance.

Upon approval of substantial completion, and notice from the Contractor that the work is ready for final acceptance, the Engineer and the Contractor will promptly make final review, and when they find the work acceptable under the contract and the contract fully performed, the contractor shall promptly submit the final certificate for payment with all other required documents, showing that the work has been completed in accordance with the terms and conditions of the contract, and that the entire balance in said final certificate, is due and payable.

Neither the final payment nor any part of the retained percentage shall become until the Contractor submits to the Division releases or waivers of all liens arising out of the Contract; an affidavit that the releases and waivers include all the labor, materials, and equipment for which a lien could be filed and that all payrolls, material bills, and other indebtedness connected with the work for which the State or its property, or the property where construction occurred, might in any way be responsible have been paid or otherwise satisfied; and such other data establishing payment or satisfaction of all such obligations as the State may require. If any such lien or claim remains unpaid, the Contractor shall refund to the State all monies that the latter may be compelled to pay in discharging such lien or claim, including all costs.

If, after substantial completion, final completion thereof is materially delayed through no fault of the Contractor, and the Engineer so confirms, the State will, upon certification by the Engineer, and without terminating the Contract, make payment of the balance due for that portion of the work fully completed and accepted, or such portion as may be available from funds not already released to an escrow agent pursuant to IC 4-13.6-7. Such payment will be made under the terms and conditions governing final payment, except that it will not constitute a waiver of claims.

The making of final payment will constitute a waiver of all claims by the State except those arising from:

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105.13

- (a) unsettled liens,
- (b) faulty work appearing after substantial completion,
- (c) failure of the work to comply with the requirements of the contract documents,
- (d) terms of any special guarantees required by the contract documents.

If upon substantial completion of the work there are any remaining uncompleted minor items, the State shall withhold, until those items are completed, an amount equal to two hundred percent (200%) of the value of each item as determined by the Engineer.

470 The acceptance of final payment shall constitute a waiver of all claims by the Contractor, except those previously made in writing and still unsettled and covered by other agreed arrangements.

105.13 Notice of Changed Conditions and Claims

Nothing in this subsection shall be construed as establishing a claim contrary to terms as set out in 104.02.

(a) Contractual Notice of a Changed Condition

480 If the Contractor requests a contract adjustment for a changed condition, notification to the Engineer in accordance with DAPW 26, 12.2 shall be made in writing before the work is begun or expenses relating to the request are incurred, except in an emergency that endangers life or property.

The written notification of a changed condition shall be submitted to the Engineer and shall include the following minimum information.

1. A statement that the submittal is notification of a changed condition.
- 490 2. The date the circumstances believed to have caused the changed condition were discovered and an explanation of how and by who the changed condition was discovered.
3. A detailed and specific statement describing the nature and circumstances of the changed condition.
4. A statement of the estimated effect of the changed condition on the controlling operation and the cost and contract time of the project.

500 If written notification of a changed condition is not given and the Engineer is not afforded the opportunity to remedy the changed condition, then no request for a contract adjustment will be considered. Notification of a changed condition and the estimate of the cost of the change shall not be construed as validation of a changed condition. If the Engineer determines that a contract adjustment is due, payment will be made as provided for herein.

Any approved change in the contract sum or contract time resulting from such claim will be incorporated in a change order, initiated by the Engineer, and executed by the State. If the

Engineer does not initiate or the State execute a change order within a reasonable time in response to the request, such lack of action shall be construed as prima facie evidence of rejection of the request. For the purpose of this section “reasonable time” is expected not to exceed 30 days after receipt by the State.

No contract adjustment will be made for work performed or for expenses incurred prior to the date of notification of a changed condition. The Contractor shall diligently prosecute the work unaffected by the changed condition to the maximum extent possible.

(b) Claims

Claims for damages shall be in accordance with DAPW 26, 7.5. The acceptance of final payment shall constitute a waiver of all claims by the Contractor, except those previously made in writing and still unsettled and covered by other agreed arrangements in accordance with DAPW 26, 9.7.7.

SECTION 106 – CONTROL OF MATERIAL

106.01 Source Supply and Quality Requirements

The Contractor shall furnish the Engineer a complete statement of the origin, composition, and manufacture of any or all materials to be used in the construction of the work upon request. If, during the course of the contract, changes or additions to the statement are required, the Contractor shall provide the information five calendar days prior to the source supplying materials to the project.

10 Reasons for change of materials include:

- a. Original material no longer manufactured
- b. Delivery not possible within time specified for the project
- c. Unavailability due to causes beyond the control of the Contractor

If the Engineer agrees the change is necessary, the Contractor shall present a request for substitution and show the merit of the proposed substitution. The decision of the Engineer regarding the substitution shall be final.

20 Where in these specifications, one or more certain materials, trade names, or articles of certain manufacture are mentioned, it is done for the express purpose of establishing a basis of durability and efficiency and not for the purpose of limiting competition. Approval of other acceptable products for those specified may be obtained by requesting to the Engineer no later than 14 days in advance of bid date with all documentation required for the Engineer to evaluate any approval. If approval is granted, the subject product will be added by addendum.

(a) Approved or Prequalified Materials

Pre-approved and prequalified materials are listed within these specifications. Materials on INDOT’s QPL meeting specifications contained herein will also be considered pre-approved or prequalified materials.

106.02

The materials used shall be those prescribed for the items which constitute the finished work and shall comply with all the requirements for such materials in accordance with this specification and . In any combination of materials, even though the individual components meet the specifications, such combination shall also meet the specifications and produce the required results. Failure to do so will be cause for rejection.

40 Approval of a material at its source will not necessarily constitute acceptance of materials from that source. All materials tested at the source may be subjected to further testing from production to after incorporation into the work. Approval will be based on the results of tests made nearest to incorporation into the work. Material tested prior to incorporation into the work and found not to be in accordance with the requirements will be rejected. Material tested after incorporation into the work and found not to be in accordance with the requirements will be governed by 105.02.

All packaged materials shall be marked plainly showing the amount and nature of contents and shall be delivered intact.

(b) Material Records

50 The Contractor shall provide the following material records to the Engineer upon request.

1. Documentation of Material Delivery

The Contractor shall provide a copy of each delivery ticket and certifications, if required, to the Engineer not later than the next business day. If providing this information on the next business day is not possible, the Contractor and the Engineer will agree upon other arrangements for the receipt of the necessary documentation prior to the event.

2. Delivery Ticket Information

60 The material delivery ticket shall include an itemized quantity of all materials delivered, the date of delivery, and the contract number. The material delivery ticket shall document the source of supply and source code, if known, and shall contain information necessary to obtain a basis for use as required by Division specifications.

3. Payment Procedures

If the Contractor does not provide the necessary documentation for the materials, such materials will not be paid for. The Engineer will notify the Contractor of those materials held from the estimate with the justification for withholding payment. If corrective action has not been taken within six weeks of the materials delivery to the project site, the entire estimate payment may be withheld.

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106.02 Samples, Tests, Cited Specifications

Such facilities as may be required for collecting and forwarding samples shall be provided and the materials represented by the samples shall be held until tests have been made and such materials found to have the qualities required in the specifications. All samples required and additional material required to replace samples shall be furnished without charge.

To facilitate the sampling and testing of materials, the Engineer shall promptly be advised when orders for materials are placed and when such materials are received. The quantity, source of supply, and the locations where the materials have been stored shall be included in the notice.

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All tests of materials will be made in accordance with the methods described or designated in these specifications. When tests are made at places other than the laboratory, every needed facility shall be furnished for the verification of all scales, measures, and other devices which are used.

If the Contractor elects to supply materials which require on-site sampling or testing as they are manufactured in out-of-state manufacturing plants located more than 60 mi outside the State line, the Contractor shall provide the sampling or testing services required. No additional payment will be made for such services. Such services shall be conducted by a Division-

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approved testing laboratory.

The standards for materials and methods of tests of AASHTO and ASTM or other specification referred to herein or elsewhere shall be the standard, interim, or tentative specifications included in the latest published edition which is on file on January 1, unless otherwise specified. In case of discrepancy, the following list shows the relationship which documents hold over others. 1 holds over all and 4 holds over none:

1. Special Provisions
2. AASHTO
3. ASTM

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Tests will be made by and at the expense of the Division unless otherwise specified. Samples will be taken by or under the supervision of a representative of the Division. All materials being used are subject to inspection, test, or rejection at any time.

106.03 Plan Inspection

The Engineer may undertake the inspection of materials at the source.

If plant inspection is undertaken, the following conditions shall be met:

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- (a) The Engineer shall have the cooperation and assistance of the Contractor and the material supplier. All reasonable facilities to assist in determining whether the materials meet the requirements of the specifications shall be furnished without additional payment.
- (b) The Engineer shall have entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.
- (c) Adequate safety measures shall be provided and maintained.

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106.04 Material Delivery

Material delivery shall be in accordance with DAPW 26, 7.14.

106.05

106.05 Storage of Materials

Storage of materials shall be such that will assure the preservation of their quality and fitness for the work. When considered necessary, materials shall be placed on raised, clean platforms, constructed of wood or other hard surfaced material, and under cover. Stored materials shall be located to facilitate proper inspection. Materials to be used for all contracts shall be stored separately and intact and, after being tested for such work, shall not be used for
130 other purposes except unless otherwise approved.

The portion of the project labeled as staging area shall be used for storage purposes and for placing the Contractor's plant and equipment. Any other area will require a written request. Approval will be based on but not limited to NEPA requirements, nearby property use, and the Contractor's proposed procedure for re-establishing vegetation in the affected area to its original condition or better. Private property shall not be used for storage purposes without written permission of the owner or lessee. If requested, copies of such written permission shall be furnished. All storage sites shall be restored to their original or designed condition with no additional payment. This shall not apply to the stripping and storing of topsoil, or to other
140 materials salvaged from the work.

106.06 Handling of Materials

All materials shall be handled in such manner as to preserve their quality and fitness for the work.

106.07 Unacceptable Materials

All materials not in accordance with the specifications shall be considered as unacceptable work, all such materials will be rejected, and shall be removed immediately from the site of the work unless otherwise instructed in accordance with 105.10. No rejected material,
150 the defects of which have been corrected, shall be used until approval has been given.

If rejected materials are not removed within the time specified, the Division may the material removed at the expense of the Contractor

106.08 Hazard Communication Program

The Contractor and all subcontractors will be required to furnish the Engineer with Safety Data Sheets for each hazardous material which each firm uses or stores on the project site. Such sheets shall be generated by each hazardous material manufacturer and shall be in accordance with Indiana OSHA requirements.
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106.09 Division Furnished Materials

The Contractor shall furnish all materials required to complete the work except those specified to be furnished by the Division. Materials furnished by the Division will be delivered or made available at the locations specified. The cost of handling and placing materials after they are delivered to the locations specified shall be included in the contract price for the item in connection with which they are used. The Contractor will be held responsible for all materials delivered. Deductions will be made from any monies due to the Contractor to make good all

shortages or deficiencies and for all damage which might occur after delivery or for demurrage charges.

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106.10 Proportioning Materials

All materials used shall be proportioned as specified for each type of work, kind of unit, or item of work required by the contract. No change in the source, or kind of materials, will be allowed during construction without written consent. Application for such consent shall be in writing. Material which is not in accordance with the quality requirements set out in these specifications shall not be blended with a better quality material to upgrade the end product.

Where not explicitly set out, the size and amount of aggregate material to be used shall be as ordered.

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SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107.01 Laws to be Observed

The Contractor shall keep fully informed of Federal and State laws; local laws; ordinances; and rules, regulations, orders, and decrees of bodies or tribunals having any jurisdiction or authority which, in any manner, affect those engaged or employed on the work or which, in any way, affect the conduct of the work. The Contractor shall observe and comply with all such laws, ordinances, rules, regulations, orders, and decrees.

10 Certain counties in the State are considered by the United States Department of Agriculture to be generally infested with various harmful pests such as, but not limited to, various types of beetles. To prevent these pests from being spread by shipments of infested materials, quarantines have been imposed. Under the regulations, materials and equipment that may be infested must be treated before they are moved from an infested area. Such items as hay, straw, fodder, small grains, corn, sod, earth moving equipment, and other articles that might be infested are subject to these regulations. All State, Federal, and local regulations and quarantines pertaining thereto shall be observed. No additional allowance or compensation will be made for any delay or inconvenience incurred conforming to such requirements, but the cost thereof shall be included in the lump sum of the contract.

20

Water wells or test wells to be drilled shall be in strict accordance with the Indiana Code.

Any building construction work, alterations, repairs, plumbing, mechanical, and electrical installations and appliances connected therewith, shall comply with the rules and regulations of the Department of Homeland Security, Fire and Building Safety Division, State Board of Health, local ordinances, Rules for Licensure of Building Trades, and other statutory provisions pertaining to this class of work; such rules and regulations and local ordinances to be considered as a part of these specifications.

30 107.02 Permits, Licenses, and Taxes

All permits and licenses which may be required due to construction methods such as, but not limited to, borrow or disposal pits, stream crossings, causeways, work bridges, cofferdams, etc., but which are not part of the contract documents shall be procured by the Contractor prior to

beginning the work which requires the permit. All charges, fees, and taxes shall be paid. All notices necessary and incidental to the due and lawful prosecution of the work shall be given.

The Division is exempt from State, Federal, and local taxes and will not be responsible for any taxes levied on the Contractor as a result of the contract. The Contractor and all subcontractors shall submit an Exemption Certificate for Construction Contractors (Form ST-40 105) to each supplier in order to obtain exemption from Indiana Gross Tax (sales and use).

The Division may have acquired environmental permits, including, but not limited to, U.S. Army Corps of Engineers Permit, IDNR Certificate of Approval of Construction in a Floodway, or IDEM Section 401 Water Quality Certification. If the Division has acquired one or more of such permits, the restrictions or conditions which were issued with such permits will be made available to bidders prior to letting. The Contractor shall prosecute the work in accordance with all such restrictions or conditions.

107.03 Patented Devices, Materials, and Processes

50 If a design, device, material, or process covered by letters of patent or copyright is employed by the Contractor, such use by suitable legal agreement with the patentee or owner shall be provided. The Contractor and the surety shall indemnify and save harmless the State, affected third party, or political subdivision from all claims for infringement by reason of the use of such patented design, device, material, process, trademark, or copyright. The State shall be indemnified for costs, expenses, and damages which it may be obliged to pay by reason of infringement during the prosecution or after the completion of the work.

107.04 Restoration of Surfaces Opened by Permit

60 The right to construct or reconstruct utility service in the highway or street or to grant permits for same is hereby expressly reserved by INDOT for the proper authorities of the municipality in which the work is done.

An individual, firm, or corporation wishing to make an opening in the highway shall obtain a permit from INDOT. Parties bearing such permits, and only those parties, will be allowed to perform work on the right-of-way. Contractors and subcontractors shall sign and execute INDOT's Additional Disclosure form if required.

107.05 Federal Aid Provisions

70 When the United States Government pays or reimburses all or a portion of the cost of a project, the Federal laws and the rules and regulations made pursuant to such laws shall be observed. The work shall be subject to inspection by the appropriate Federal agency. Such inspection will in no sense make the Federal Government a party to the contract and will in no way interfere with the rights of any party.

107.06 Federal Contract Provisions

If OSM reimbursement grant funds are used for the project, the following contract provisions apply as set out in the OSM's *Federal Assistance Manual*. Additional information is available in OFCCP's *Construction Technical Assistance Guide* located at <https://www.dol.gov/agencies/ofccp/compliance-assistance>.

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(a) General

These contract provisions shall apply to all work performed on the contract by the Contractor's own organization and with the assistance of workers under the Contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

90 Except as otherwise provided for in each section, the Contractor shall insert in each subcontract the stipulations contained in this section, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. These contract provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these contract provisions.

A breach of any of the stipulations contained in the contract provisions of this section shall be sufficient grounds for termination of the contract and such termination shall be carried out in accordance with DAPW 26.

100 For contracts more than \$10,000, the Division shall have the right to terminate the contract for cause and for convenience. The Division may, by written order, terminate the contract or a portion thereof only after a meeting with the Contractor and after determining that termination would be in the public interest. Reasons for termination will include, but will not be limited to, the following:

1. executive orders of the President relating to prosecution of war or national defense; or
2. national emergency which creates a serious shortage of materials; or
3. budgetary concerns of the Division; or
- 110 4. errors in the plans, specifications, or other contract documents which make the project unbuildable; or
5. orders from duly constituted authorities relating to energy conservation; or
6. restraining orders or injunctions obtained by third-party citizen action resulting from national or local environmental protection laws, or where the issuance of such order or injunction is primarily caused by acts or omissions of persons or agencies other than the Contractor; or
- 120 7. when it is the finding of the Division that the Contractor is unable to complete the contract and the construction covered thereby within a reasonable length of time on account of inability to obtain materials or satisfactory substitutes therefore which do not change the general type of construction or labor.

107.06

In such cases, work performed, including partially completed items, will be paid for in full at the contract unit prices for the actual quantities of work done, which prices will not be subject to change if the quantity for a supplemental unit item or items is increased or decreased more than 20%. Should such relief from performance of a portion of the contract or such elimination of a portion of the contract directly cause the loss of work or material already
130 furnished under the terms of the contract, the actual cost of such work or of salvaging such material will be reimbursed. All such material may, at the option of the Division, be purchased at its actual cost. Anticipated profit on work not performed will not be permitted. Final settlement will depend upon the merits of the individual case. All actual damages will be paid following a meeting with the Contractor to determine if payment of actual damages is appropriate and in accordance with applicable laws.

(b) Equal Employment Opportunity

For construction contracts in excess of \$10,000, the Contractor shall comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive
140 Order 375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

(c) Copeland "Anti-Kickback" Act

The Contractor shall comply with the Copeland "Anti-Kickback" Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR Part 3). This Act provides that the Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is entitled. The recipient must report all suspected or reported violations to OSM.

(d) Reporting

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1. Notification of Award of Contracts

Contractors and subcontractors shall notify the regional OFCCP office within 10 days of award of any federally funded construction over \$10,000 via email to OFCCP-MW-ConstructionAward@dol.gov

2. EEO-1 Report

Contractors and subcontractors with 50 or more employees and with a covered contract or subcontract of \$50,000 or more must submit an annual EEO-1 Report (41 CFR 60-1.7a).

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(e) Access to Records

The Contractor shall provide for access by the Division, the Department of the Interior, the Comptroller General of the United States, or any of their authorized representatives, to any books, documents, papers and records of the contractor which are directly pertinent to that specific contract, for the purpose of making audit, examination, excerpts, and transcription. The Contractor shall maintain all pertinent records for three years after the Division makes final payments and all other pending matters are closed.

(f) Clean Air and Water Acts

For contracts in excess of \$100,000, the Contractor shall comply with all applicable
170 standards, order, or requirements issued under section 306 of the Clean Air Act (42 USC

1857(h)), section 508 of the Clean Water Act (33 USC 1368), Executive Order 11738, and Environmental Protection Agency (EPA) regulations (40 CFR Part 15).

(g) Energy Policy and Conservation Act

Contractors and subcontractors shall recognize mandatory standards and policies relating to energy efficiency which are contained in the Indiana State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163, 89 Stat.871).

(h) Contractor Employee Whistleblower Rights

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1. This contract and employees working on this contract will be subject to the whistleblower rights and remedies in the pilot program on Contractor employee whistleblower protections established at 41 U.S.C. 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239) and FAR 3.908.
2. The Contractor shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C. 4712, as described in section 3.908 of the Federal Acquisition Regulation.

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(i) Buy America Requirement

All contracts shall be supplied with steel and iron products that are made in the United States and shall comply with IC 5-16-8 and the 23 CFR 635.410.

200 All steel or iron products incorporated permanently into a contract shall be made of steel or iron produced in the United States and all subsequent manufacturing shall be performed in the United States except for pig iron and processed, pelletized, and reduced iron ore. Manufacturing is any process that modifies the chemical content; physical shape or size; or final finish of a product. Manufacturing begins with the initial melting and mixing and continues through the bending and coating stages. If a domestic product is taken out of the United States for any process, it becomes a foreign source material.

Manufactured products that are partially or predominantly steel, shall be entirely produced with domestic steel. If a product has miscellaneous foreign steel incorporated, such as fasteners or brackets, then those miscellaneous pieces shall be replaced or substituted.

1. Exceptions

210 The Engineer may grant specific written permission to use foreign steel or iron products when both of the following conditions apply:

- a. The total cost of all foreign products to be used does not exceed 0.1 percent of the total Contract cost, or \$2,500, whichever is greater. The cost is the value of the product as delivered to the project.

107.07

- 220 b. The specified products are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet the requirements of the Contract Documents. The Engineer may require the Contractor to obtain letters from three different suppliers documenting the unavailability of a product from a domestic source if the shortage is not previously established by the State. A Buy America Certification shall be submitted and received for each product or source of material prior to being incorporated into the contract

107.07 Sanitary Conditions Requirements

Accommodations for the use of the Contractor's and Division's employees shall be provided and maintained in a neat sanitary condition as may be necessary to comply with the requirements of the Federal, State, and local Boards of Health, or of other bodies or tribunals having jurisdiction.

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The Contractor shall at all times keep the premises cleaned up in accordance with DAPW 26, 4.15.

107.08 Public Convenience and Safety

All safeguards, safety devices, and protective equipment shall be provided. Responsibility reasonably necessary to protect the lives of employees on the job, the safety of the public, and property in connection with the performance of the work, shall be taken.

(a) Worker Safety

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All workers working near public roads who are exposed either to traffic or construction equipment within the work area shall wear high visibility safety apparel in accordance with 23 CFR 634.

If a trench, 5 ft or more in depth, is constructed on a project, the requirements for trench safety systems as specified in OSHA regulations 29 CFR 1926, Subpart P, shall be performed. Unless otherwise specified, trench safety systems work will not be paid for separately, but the cost thereof shall be incidental to the contract.

(b) Dust and Air Pollution

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Provision shall be made for prompt removal from traveled roadways of all dirt and other materials that have been deposited thereon by operations concerned with the project whenever the accumulation is sufficient to cause the formation of dust or mud, interfere with drainage, damage pavements, or create a traffic hazard. Construction methods and means shall be employed to keep flying dust and air pollution to a minimum. Provision shall be made for the control of dust on the project and on roads, streets, and other areas affected by the project wherever traffic or buildings, or construction materials are affected by such dust. The materials and methods used for dust control shall be subject to approval. The cost of controlling dust and air pollution shall be incidental to the contract and no additional payment will be made.

260 **(c) Protection to Traffic**

The work shall be conducted in a manner that will ensure the least obstruction to public road traffic. Non-operating construction equipment, worker's vehicles, materials, field offices, field laboratories, and temporary offices may be stored on the project limits no less than 30 ft from the edge of public roads except, storage may be permitted closer to such roads if traffic is protected by guardrail in good condition or other suitable barrier. However, if the area has a posted speed limit of 40 mph or less prior to the start of construction, this distance may be reduced to 10 ft, if approved.

270 **(d) Notice to Local Public Officials**

On construction work, the chief administrative officer of the local governmental unit shall be given 24 hour notice, in writing, before it becomes necessary to blockade across a street or road.

If it is desired to use water from public hydrants, application shall be made to the proper authorities and in accordance with the city ordinances, rules, and regulations concerning their use. Fire hydrants shall be accessible at all times to the fire department. No material or other obstruction shall be placed closer to a fire hydrant than permitted by ordinances, rules, or regulations, or within 5 ft of a fire hydrant in the absence of such ordinances, rules, or regulations.

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(e) Site Access

The local governmental agencies for each jurisdiction in the State have the legal authority to establish load limits on their roads. Prior to submitting a bid, each bidder shall contact the local governmental agency in which the use of roads is contemplated and confirm allowable routing of bidder's equipment.

290 The Contractor shall coordinate with and meet the requirements of the Indiana Department of Transportation, cities, towns, and counties, whichever is applicable, for public road access to the site. The Contractor shall provide a copy of the written agreement with the county to the Engineer. The Contractor shall be responsible for bonding or any other county requirements for road damage. Road damage shall be repaired or replaced by the Contractor at no additional cost to the State.

107.09 Railroad Requirements

300 Whenever it is necessary or required for personnel or construction equipment to be on operating railroad right-of-way, all necessary arrangements shall be made with the railroad company regarding a temporary or existing railroad grade crossing for this purpose. Such railroad grade crossing shall be in accordance with these specifications and shall meet all requirements of the railroad company. All cost involved in establishing the crossing shall be included in the contract price for various pay items and will not be paid for directly.

All work on the railroad right-of-way shall be performed at such times and so as not to interfere unnecessarily with the movement of trains or traffic upon the tracks of the railroad company. All care and precautions shall be used in order to avoid accidents, damage, or unnecessary delay or interference with the trains or other property of the railroad company.

When necessary, adjacent structures, embankments, and tracks of the railroad company shall be protected and shored adequately. The Contractor shall assume all risks and liability for damage done to such property as a result of its operations or negligence. No method of work
310 which affects the tracks, movement of trains, or other operations of the railroad shall be used without the approval of the railroad company.

(a) Protection of Track Ballast

Operations shall be conducted both on and off railroad right-of-way so that earth, mud, silt, or other foreign matter shall not be allowed to foul railroad track ballast. Temporary earth dikes, sheeting, tie cribbing, silt fences, or other precautions to prevent the fouling of railroad track ballast shall be installed as directed.

Where demolition work, concreting, or hauling along or across tracks, in the opinion of
320 the railroad company, will result in ballast becoming fouled, preventive measures shall be taken to protect the entire ballast section. This may be accomplished by nailing canvas, plywood, or similar material to the ties in the entire area likely to be affected. This protective material shall remain in place until there is no further possibility of fouling the ballast. At that time, it shall be removed.

These protective measures shall be performed with no additional payment under the supervision and to the satisfaction of the chief engineer of the railroad company or its authorized representative. The railroad company will assume no responsibility for the adequacy of the protective measures. However, in addition to the aforementioned protective measures, if the
330 railroad track ballast does become fouled, the railroad company, with its own forces, will remove the fouled ballast and replace it with clean ballast. The charges for this work will be billed by the railroad company against the Contractor.

(b) Hold Harmless Clause

The Contractor shall indemnify and save harmless the Railroad Company and the State from all suits, actions, or claims of any character brought for or on account of any injuries or damages received or sustained by any person, persons or property from the acts of the Contractor or its forces, or in consequence of any neglect in safeguarding the work, or on account of any claims or amounts recovered for any material furnished or labor performed, or for any
340 infringement of patent, trademark or copyright, or any claims arising or amount recovered under the Worker's Compensation Laws, Federal Employer's Liability Act, or under any other laws, by-laws, ordinances, orders or decrees.

107.10 Archaeological Artifacts

If archaeological artifacts, including cultural features or skeletal remains are discovered, all work within a minimum 100 ft radius of the discovery shall cease immediately, the area shall not be further disturbed, and the Contractor shall notify the Engineer immediately.

In accordance with IC 14-21-1-27, if skeletal remains are encountered, the Contractor
350 shall notify the local law enforcement agency immediately and the Engineer immediately

thereafter. The Department will notify IDNR within two days. Work within the area of the discovery shall not resume without written authorization.

For discoveries other than skeletal remains, the Department will coordinate with IDNR to mitigate impacts to the discovery. Work within the area of the discovery shall not resume without written authorization.

In no event shall an employee of the Contractor or the State of Indiana share in ownership or profit from salvaged archaeological findings.

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107.11 Traffic Control Devices

All necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices shall be provided, erected, and maintained. All necessary precautions shall be taken for the protection of the work and safety of the public. Public roads closed to traffic shall be protected by effective barricades. Obstructions shall be illuminated during hours of darkness. Suitable warning signs shall be provided to control and direct traffic

Warning signs shall be erected in advance of any location on the project where operations may interfere with the use of public roads by traffic. Such warning signs shall be constructed and
370 erected in accordance with the plans.

Barricades, warning signs, lights, signals, markings, and other protective devices shall be in accordance with the plans and the MUTCD current on the date of advertisement for bids.

All signs, barricades, and other protective devices shall be maintained in good condition. Barricades and the backgrounds and messages of all signs shall be kept clean and bright. They shall be renewed or replaced as often as necessary to keep them effective.

Pavements and shoulders having an edge drop of more than 3 in. shall be delineated with
380 drums. The use of cones will be permitted during daylight hours in lieu of drums.

At least seven days before a road is to be closed to traffic, notification shall be given of such intention to the Division.

Sufficient barricades, supplemented by watchers or flaggers when necessary, shall be provided continuously to protect any and all parts of the work and to promote safe and orderly movement of traffic. When a road is closed but is still usable by local traffic, barricades and road closure sign assemblies, in addition to the closure barricades, required at the beginning and end of the portion of such road, shall be erected at all high hazard locations. Such barricades shall be
390 located within 150 ft of high hazard location. These barricades shall be of the type shown on the plans. Such barricades shall extend from shoulder to shoulder, or to the limit of area that is readily traversable by a motor vehicle, as directed. During non-working hours, no opening shall exist in the barricades. The road closure sign assembly shall be placed at or near the center of the roadway.

107.12

The use of hand signaling flags will not be permitted except for emergency situations. The “Stop”/“Slow” paddle shall be required as a primary hand signaling device to control traffic through work areas. The “Stop”/“Slow” paddle shall be in accordance with section 6E.03 of the MUTCD, except it shall be at least 24 in. wide.

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If any of these requirements are violated, operations shall be suspended until adequate measures are taken for full compliance.

107.12 Use of Explosives

Blasting or the use of explosives will not be permitted without written authorization from the Engineer.

When the use of explosives is authorized, the utmost care shall be exercised not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.

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All explosives shall be stored in a secure manner in accordance with all laws and ordinances. All such storage places shall be clearly marked in large black letters on a red background “Dangerous Explosives”. Where no local laws or ordinances apply, satisfactory storage shall be provided no closer than 1,000 ft from public roads or from a building or camping area or place of human occupancy. Detonators shall not be stored with explosives.

Each public utility company having structures in proximity to the site of the work shall be notified of intentions to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps necessary to protect their property from injury. The notification shall in no way relieve responsibility for damage to the structures.

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107.13 Protection and Restoration of Property and Landscape

The Contractor shall be responsible for the preservation of all public and private property. All land monuments and property marks shall carefully be protected from disturbance or damage until the Engineer has witnessed or otherwise referenced their location and approved their removal. All areas within the project limits that are used for storage of any kind shall be restored to their original condition when no longer required for that purpose.

The Contractor shall be responsible for damage or injury to property resulting from defective work or materials and from any act, omission, or misconduct in its manner or method of executing the work. When direct or indirect damage or injury is done, such property shall be restored with no additional payment to a condition similar or equal to that existing before such damage or injury, or such damage or injury shall be made good in an acceptable manner.

430

Construction equipment shall not be stored in wetland replacement sites shown on the plans. Such sites shall not be used for purposes other than for the creation of wetlands.

107.14 NPDES and Notice of Intent

440 Erosion and sediment control for storm water run-off associated with reclamation activities is required and all water discharged off-site must be authorized under Rule 7 of the NPDES General Permit Rule Program, 327 IAC 15-7.

If treating and discharging water off-site is not anticipated, a General NPDES Permit will be required. BMPs for erosion and sediment control for the storm water run-off associated with reclamation activities shall be in accordance with .

450 If treating and discharging water off-site is anticipated, a General NPDES Permit will be required that includes all outfalls and appropriate discharge parameters. Treatment and discharging of water shall be in accordance with and BMPs for erosion and sediment control for the storm water run-off associated with reclamation activities shall be in accordance with .

If treating and discharging water off-site is not anticipated, but becomes necessary, all work associated with the treating and discharging of water off-site shall stop. The Contractor shall be responsible for modifying the existing General NPDES Permit to include all outfalls and appropriate discharge parameters. No water shall be discharged until the modification has been approved by IDEM and copies of all modification documents have been provided to the Engineer.

460 The Division will prepare the NOI for the anticipated situation. The Contractor shall sign and deliver the NOI letter and all fees to IDEM. By signing the NOI, the Contractor shall assume full responsibility for the proper treatment and discharge of water as specified in the NPDES permit.

No construction activity or discharge of water shall begin until 15 days after a complete NOI is filed by the Contractor. No construction activity shall begin until the Contractor has provided the Engineer with a signed copy of the NOI and proof of payment of fees to IDEM.

107.15 Forest Protection

470 In carrying out work within or adjacent to State or National Forests and other wooded areas, the Contractor shall comply with all regulations of the State Fire Marshal, Natural Resources Commission, Forestry Department, or other authority having jurisdiction, governing the protection of forests and the carrying out of work within forests. The Contractor shall observe all sanitary laws and regulations with respect to the performance of work in forest areas. The Contractor shall keep the areas in an orderly condition, dispose of all refuse, and obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks, and other structures in accordance with the requirements of the forest supervisor.

480 Reasonable precautions shall be taken to prevent and suppress forest fires. The Contractor's employees and subcontractors shall be required, both independently and at the request of forest officials, to do all reasonably within their power to prevent and suppress and to assist in preventing and suppressing forest fires and to make every possible effort to notify a forest official at the earliest possible moment of the location and extent of all fires seen by them.

107.16

107.16 Responsibility for Damage Claims

The Contractor shall indemnify, defend, exculpate, and hold harmless the State of Indiana, its officials and employees from all liability due to loss, damage, injuries, or other casualties of whatsoever kind, or by whomsoever caused, to the person or property of anyone on or off the project arising out of or resulting from the performance of the contract or from the
490 installation, existence, use, maintenance, condition, repairs, alteration, or removal of any equipment or material, whether due in whole or in part to the negligent acts or omissions:

- (a) of the State, its officials, agents, or employees;
- (b) of the Contractor, its agents or employees, or other persons engaged in the performance of the contract;
- (c) the joint negligence of any of them, including any claim arising out of the Worker's Compensation law or any other law, ordinance, order, or decree.

500

The Contractor also agrees to pay all reasonable expenses and attorney's fees incurred by or imposed on the State in connection herewith in the event that the Contractor shall default under the provisions of this section. As much of the money due the Contractor under and by virtue of its contract as the Division may consider necessary for such purpose may be retained for the use of the State. If no money is due, the Contractor's surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Division. Money due will not be withheld when the Contractor produces satisfactory evidence that it is protected adequately by public liability and property damage insurance. The obligation of the Contractor under this
510 section and 107.01 shall not extend to the indemnification or exculpation against claims arising out of the preparation or approval of plans, specifications, or special provisions unless furnished by the Contractor.

It is specifically agreed between the parties executing the contract that it is not intended by the provisions of any part of the contract to create the public or any member thereof a third party beneficiary hereunder, or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

107.17 Contractor's Responsibility for Work

520 Until the date the Contractor is relieved of further maintenance as stated in the final written acceptance of the project, the Contractor shall have the charge and care thereof. The Contractor shall be responsible for injury or damage to any part thereof, by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. All portions of the work occasioned by the above causes shall be rebuilt, repaired, and restored. All injuries or damages shall be made good before final acceptance. The Contractor shall bear the expense thereof except as otherwise provided in these specifications or otherwise determined.

In case of suspension of work, the Contractor shall be responsible for the contract work
530 and shall take such precautions as may be necessary to prevent damage to the contract work.

Normal drainage shall be provided, and all necessary temporary structures, signs, or other facilities shall be erected with no additional payment. During such period of suspension of work, newly established plantings, seedlings, and sodding furnished under the contract shall be properly and continuously maintained in an acceptable growing condition.

107.18 Contractor's Responsibility for Utility Property and Services

At points where the Contractor's operations are adjacent to properties of railroad, telegraph, telephone, and power companies or are adjacent to other property, damage to which might result in considerable expenses, loss, or inconvenience, work shall not be commenced until
540 all arrangements necessary for the protection thereof have been made.

The Contractor shall coordinate and cooperate with the owners of all underground or overhead utility lines in their removal and relocation operations in order that this work may progress in a reasonable manner, that duplication of relocation work may be reduced to a minimum, and that services rendered by those parties are not unnecessarily interrupted.

If there is an interruption to water or utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority, and shall cooperate with the said authority in the restoration of service. If water service
550 is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

The Contractor shall establish and maintain open communication with each utility affected by the construction and document and report all communication to the Engineer. The Contractor shall prepare its construction schedule to accommodate all the utility work plans included in the contract documents including some allowance for unexpected minor variation in the anticipated utility work plan and schedule.

560 Regardless of any previous notification by the Division, the Contractor shall give notice to the owners of each utility located within the contract limits, or which might be affected by the work, in sufficient time before beginning work for the owners to relocate or protect their property. No work shall be done which injures or damages such property until satisfactory arrangements have been completed with the owner for its protection, relocation, or reconstruction.

Prior to any work which penetrates any existing soil, the Contractor shall notify the Indiana Underground Plant Protection Service, IUPPS (Indiana 811), in accordance with the requirements of IC 8-1-26.

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107.19 Furnishing Right-of-Entry

The Division will be responsible for securing necessary right-of-entry in advance of construction. Exceptions will be indicated at the pre-bid meeting.

107.20

107.20 Personal Liability of Public Officials

In carrying out any of the provisions of these specifications, or in exercising any power or authority granted to them by or within the scope of the contract, there shall be no liability upon the IDNR, the DAPW, their Directors, the Division, the Engineer, or their authorized representatives, either personally or as officials of the State, it being understood that in all such matters they act solely as agents and representatives of the State.

107.21 Waiver of Legal Rights

Upon completion of the work, the Division will expeditiously make final inspection and notification of acceptance. Such final acceptance, however, shall not preclude or estop the Division from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Division be precluded or estopped from recovering from the Contractor or its surety, or both, such overpayment as it may sustain by failure on the part of the Contractor to fulfill its obligations under the contract. A waiver on the part of the Division of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Division for latent defects, fraud, or such gross mistakes as may amount to fraud, or with regard to the rights of the Division under any warranty or guaranty.

107.22 Assignment

Assignment shall be in accordance with DAPW 33 or DAPW 33A.

107.23 Governing Law

Governing laws shall be in accordance with DAPW 33 or 33A.

107.24 Severability

Severability shall be in accordance with DAPW 33 or 33A.

107.25 Delinquent State Taxes

The Contractor certifies by entering into this Contract that neither it nor its principal(s) is presently in arrears in payment of taxes in accordance with DAPW 33 or 33A. DAPW 26, 7.1, and IC 4-13-2-14.5 contain requirements concerning delinquent State taxes.

107.26 Out-of-State Contractors

Out-of-state Contractors shall provide proof of payment of Indiana Gross Income Tax in accordance with DAPW 26, 7.13.1.

Out-of-state corporations shall be authorized to do business in the State prior to submitting bids in accordance with DAPW 26, 7.13.2.

SECTION 108 – PROSECUTION AND PROGRESS

108.01 Subletting of Contract

The subletting of contracts shall be in accordance with DAPW 26, 5.2. All references to the Designer in that section shall be replaced with Engineer.

108.02 Subcontractual Relations

Subcontractual relations shall be in accordance with DAPW 26, 5.3.

10 **108.03 Notice to Proceed**

The date of commencement of the work shall be the date established in a notice to proceed. DAPW will issue a notice to proceed and a purchase order. Regardless of the time on the notice to proceed to start active work on the contract, no work shall begin before a pre-construction meeting is scheduled and held with the Division.

If the contract is canceled after an award has been made but prior to the issuing of the notice to proceed, no reimbursement will be made for any expenses accrued relative to this contract during that period.

20 For contracts where sites are unknown prior to the bid award, work orders will be issued as the need for work becomes apparent. The contract time shall start as shown on the notice to proceed without a pre-construction meeting.

108.04 Review of Contract Documents and Record Documents at the Site

The Contractor shall carefully study and compare the contract documents and shall at once report to the Engineer any error, inconsistency or omission he may discover. The Contractor shall perform no portion of the work at any time without contract documents or, where required, approved shop drawings, product data or samples for such portion of the work.

30 The Contractor shall maintain for the Engineer as part of the contract one record copy of all drawings, specifications, addenda, shop drawings, change orders and other modifications at the site in good order, and marked to record all changes made during construction. These shall be available to the Engineer at all times while work is in progress. All changes made during construction shall be recorded monthly and reviewed by the Engineer before approval of each partial progress payment. The record documents shall be submitted to the Engineer prior to the Contractor's final payment.

108.05 Prosecution of the Work

40 A pre-construction meeting will be held at the earliest possible date, at which time it will be determined at what point the Contractor's operations will start.

For contracts where sites are unknown prior to the bid award, individual pre-construction meetings shall be held at each site to review the work order with the Engineer prior to the start of work at each site.

108.06

50 The Contractor shall furnish the Engineer with a bar graph type schedule which shows the estimated times required to prosecute the major or critical items of work for acceptance unless work orders will be used, the contract has less than 60 calendar days completion time, less than 35 work days, or less than 60 days between the date of the notice to proceed and the calendar completion date. This schedule shall incorporate all contract requirements regarding the order of performance of work and each activity. The schedule shall graphically show the calendar time for which each activity is scheduled for work. The schedule may be used as the basis for establishing major construction operations and as a check on the progress of the work. Sufficient materials, equipment, and labor shall be provided to guarantee the completion of the project in accordance with the plans and specifications within the specified completion time. The Engineer shall be notified at least three days in advance of the date on which the work is expected to begin. The schedule shall be submitted at the pre-construction meeting.

60 The Division and the Contractor shall meet at least once each month to review actual and proposed schedules. The Contractor shall submit the correspondence to the Engineer after each monthly meeting addressing each item of work that is behind schedule and as to what action will be taken to get the work back on schedule.

70 If, in the opinion of the Engineer, construction progress has been or will be materially affected by changes in the plans or in the quantities of work, or if performance has failed to conform to the accepted schedule, a revised schedule shall be submitted when requested. Acceptance of the schedules will in no way justify them, but will simply indicate concurrence in their reasonableness and feasibility on the assumption that every effort shall be made to meet them. Existence of a current and accepted schedule will be a condition precedent to the processing and payment of a partial pay estimate.

If the prosecution of the work is discontinued, the Engineer shall be notified at least 24 h in advance of resuming operations.

When temporary construction materials are no longer required such materials shall be removed and disposed.

108.06 Superintendent

80 The Contractor shall keep on the project, during the entire contract time, a competent superintendent and necessary assistants, all satisfactory to the Engineer. The superintendent shall not be changed, except with the consent of the Engineer, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor and shall have full authority to act on the Contractor's behalf. All communications given the superintendent shall be as binding as if given by the Contractor. Important communications shall be confirmed in writing.

Supervision of the work shall be in accordance with DAPW 26, 4.3.

108.07 Limitations of Operations

90 Except as hereinafter specified, no load of material for any construction shall be dispatched so late in the day that it cannot be placed, finished, and protected within the

specification's limits and provisions during daylight of that same day. Daylight will be defined as the period between sunrise and sunset as established by the National Weather Service. When it is important that construction shall be completed at an early date, work may be allowed at times other than daylight hours provided sufficient illumination is available and that work performed under these conditions complies in every respect with the terms and conditions of the contract.

108.08 Character of Workers, Methods, and Equipment

100 Sufficient labor and equipment for prosecuting the several classes of work shall be employed at all times to full completion in the manner and time required by these specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform all work properly and satisfactorily.

110 Each person employed by the Contractor or by each subcontractor who does not perform in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the employer of such person. The person shall not be employed again in any portion of the work without approval. If the person is not removed as required herein, or if suitable and sufficient personnel for proper prosecution of the work are not furnished, all estimates may be withheld or the work suspended by written notice until these requirements have been met.

120 All equipment which is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment which was originally developed to be used in performing work in International System measurements may be used in performing work in English System measurements. Where possible, such equipment shall be adjusted to the English System measurements. Where equipment cannot be adjusted, it shall then be made compatible, as required, to satisfactorily be used for performing work in English System measurements. Equipment used on the project shall be such that no injury to roadways or adjacent property will result from its use.

130 Construction equipment, which is used in recreational areas, shall not be left parked in existing parking areas or on existing park road pavements except as may be necessary during the time construction work is in progress. All damage to such roadways or parking lot pavements caused by equipment, such as gouge marks or petroleum leakage, shall be repaired with no additional payment.

When the methods and equipment to be used in accomplishing the construction are not prescribed in the contract, any methods or equipment that will accomplish the work in accordance with the contract may be used.

When the contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized. If the use of a method or type of equipment other than those specified in the contract is desired,

140 authority to do so may be requested. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in accordance with contract requirements. If, after trial use of the substituted methods or equipment, it is determined that the work produced does not meet contract requirements, the use of the substitute methods or equipment shall be discontinued, and the remaining construction shall be completed with the specified methods and equipment. The deficient work shall be removed and replaced with work of specified quality or other corrective action shall be taken as directed. No change will be made in basis of payment for the construction items involved or in contract time as a result of authorizing a change in methods or equipment under these provisions.

150 **108.09 Determination and Extension of Contract Time**

All time limits stated in the contract documents are of the essence of the contract. Progress and completion shall be in accordance with DAPW 26, 8.2.

Delays and Extensions of contract time shall be in accordance with DAPW 26, 8.3. All references to the Designer in that section shall be replaced with Engineer.

160 In addition to DAPW 26, 8.3, Contractors shall not work during the following holiday periods unless prior written approval is received from the Engineer. All deliveries and traffic coming from suppliers shall cease during the Division-ordered suspensions of work listed below. No time extensions to closure periods, intermediate completion dates, or contract completion dates will be granted for suspending work during these holiday periods.

(a) New Year's Day. If New Year's Day falls on a Sunday, work shall be suspended from noon December 31 until sunrise January 3. If New Year's Day falls on a Monday through Saturday, work shall be suspended from noon December 31 until sunrise January 2.

(b) Good Friday. Work shall be suspended from noon on Good Friday until sunrise Monday.

170 (c) Memorial Day. Work shall be suspended from noon the Friday before Memorial Day until sunrise Tuesday, the day after Memorial Day.

(d) Independence Day. If Independence Day falls on a:

Sunday - Work shall be suspended from noon Friday, July 2, until sunrise Tuesday, July 6.

180 Monday - Work shall be suspended from noon Friday, July 1, until sunrise Tuesday, July 5.

Tuesday - Work shall be suspended from noon Friday, June 30, until sunrise Wednesday, July 5.

Wednesday - Work shall be suspended from sunset on Tuesday, July 3, until sunrise Thursday, July 5.

Thursday - Work shall be suspended from noon Wednesday, July 3, until sunrise Monday, July 8.

Friday - Work shall be suspended from noon Thursday, July 3, until sunrise Monday, July 7.

Saturday - Work shall be suspended from noon Thursday, July 2, until sunrise Monday, July 6.

(e) Labor Day. Work shall be suspended from noon the Friday before Labor Day until sunrise Tuesday, the day after Labor Day.

(f) Thanksgiving Day. Work shall be suspended from noon the Wednesday before Thanksgiving Day until sunrise the Monday after Thanksgiving Day.

(g) Christmas Day. Work shall be suspended from noon December 24 until sunrise December 27.

108.10 Failure to Complete on Time

For each calendar day that work remains incomplete after the contract time for the completion of the work as specified on the Project Information page, the liquidated damages specified on the Project Information page will be deducted from any money due the Contractor. Calendar days will not be charged while waiting for final inspection provided all contract work has been satisfactorily completed.

108.11 Default and Termination of the Contract

Termination of the Contract shall be in accordance with DAPW 33, 33A, and 26, 14.

108.12 Right to Carry Out the Work

The State has the right to carry out the work in accordance with DAPW 26, 7.7.

108.13 Termination of Contractor's Responsibility

The contract shall be considered as completed after all work provided for therein has been accepted. The Contractor shall then be released from all further obligations except as provided in 107.21 and 105.12.

The Division may, by written order, terminate the contract or a portion thereof only after a meeting with the Contractor, and after determining that termination would be in the public interest. Reasons for termination will include, but will not be limited to, the following:

(a) executive orders of the President relating to prosecution of war or national defense;

108.14

- 230 (b) national emergency which creates a serious shortage of materials;
(c) budgetary concerns of the Division;
(d) errors in the plans or Proposal Bid Package which make the project unbuildable;
(e) orders from duly constituted authorities relating to energy conservation;
(f) restraining orders or injunctions obtained by third-party citizen action resulting from national or local environmental protection laws, or where the issuance of such order or injunction is primarily caused by acts or omissions of persons or agencies other than the Contractor;
240 (g) when it is the finding of the Division that the Contractor is unable to complete the contract and the construction covered thereby within a reasonable length of time on account of inability to obtain materials or satisfactory substitutes therefore which do not change the general type of construction or labor.

250 In such cases, work performed, including partially completed items, will be paid for in full at the contract unit prices for the actual quantities of work done, which prices will not be subject to change if the quantity for a pay item or items is increased or decreased more than 20%. Should such relief from performance of a portion of the contract or such elimination of a portion of the contract directly cause the loss of work or material already furnished under the terms of the contract, the actual cost of such work or of salvaging such material will be reimbursed. All such material may, at the option of the Division, be purchased at its actual cost. Anticipated profit on work not performed will not be allowed. Final settlement will depend upon the merits of the individual case. All actual damages will be paid following a meeting with the Contractor to determine if payment of actual damages is appropriate and in accordance with applicable laws.

108.14 Contract Documentation

The Contractor shall furnish upon request, all documentation relating to its performing as a Contractor or subcontractor on a contract. The requested information may be, but is not limited to, the following: payroll records, material invoices, subcontract agreements with pertinent attachments, lease agreements, and Equal Employment Opportunity documentation.

SECTION 109 – MEASUREMENT AND PAYMENT

109.01 Measurement of Quantities

(a) General Requirements

All measurements of work completed under the contract will be according to the English System unless otherwise specified.

10 The standard measures shown in this publication are primarily in the English System of Units such as feet and inches, pounds, gallons, and acres. Any metric equivalents, shown in parentheses, are intended only for those contracts in which they are specified, or to maintain consistency with industry standards. No guarantee is provided, explicit or implicit, that the units are accurate conversions.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally

recognized as conforming to good engineering practice. When a figure is to be rounded to fewer digits than the total number available, the results are to be determined using the following “5” up procedures:

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- (a) When the first digit discarded is less than 5, the last digit retained shall not be changed. For example, 3.46325, if rounded to three digits, would be 3.463; if rounded to two digits, would be 3.46.
- (b) When the first digit discarded is 5 or greater, the last digit retained shall be increased by one unit. For example, 8.37652, if rounded to three digits, would be 8.377; if rounded to two digits would be 8.38.

30

When the quantities to be measured are shown in English System units, and the Contractor uses equipment or materials that were originally developed to be used in performing work in the International System measure, there will be no allowance if the International System dimensions exceed the English System measurements. When the quantities to be measured are shown in International System measure, and the Contractor uses equipment or materials that were originally developed to be used in performing work in the English System units, there will be no allowance if the International System dimensions exceed the English System measurements.

40

Unless otherwise specified, longitudinal measurements will be made along the centerline of the feature to be measured. No deduction will be made for individual features having an area of 10 sq ft or less. Unless otherwise specified, transverse measurements for area computations will be the neat line dimensions shown on the plans or ordered in writing.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

When a complete structure or structural unit, in effect lump sum work, is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

50

All work which is measured by the linear foot will be measured parallel to the base or foundation upon which such work is placed, unless otherwise specified.

A station when used as a definition or term of measurement in the English System will be 100 linear feet. A station when used as a definition or term of measurement in the International System will be 1 km.

When metric dimensioned materials are specified, the Contractor shall convert to metric all weigh tickets, delivery receipts, or other material documentation before submitting the documentation.

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The term gauge, when used in connection with the measurement of metal plates or sheets, will mean the U.S. Standard Gauge except when the referenced AASHTO, ASTM, or other specification for a material specifies that it be ordered and measured in terms of thickness.

When the term gauge refers to the measurement of wire, it will mean the U.S. Steel Wire Gauge except when the reference AASHTO, ASTM, or other specification for the wire specifies that it be ordered and measured in terms of wire size number or diameter.

70 The term ton will mean the short ton consisting of 2,000 pounds avoirdupois. The term megagram will mean 1,000,000 g or 1,000 kg. All materials which are measured or proportioned by weight (mass) shall be weighed on accurate approved scales which are in accordance with all requirements and specifications adopted by the Indiana State Board of Health, Division of Weights and Measures. The weighing shall be accomplished by competent qualified personnel at designated locations. Materials specified according to metric unit weights may be weighed on a scale that uses English system units and then converted to the metric equivalent using standard conversion factors.

(b) Scales and Measurement by Weight (Mass)

80 All materials for which measurements are obtained by weight (mass) shall be weighed on approved scales which, except as hereinafter provided for out-of-state scales, shall be tested and sealed by the Indiana State Board of Health, Division of Weight and Measures. This inspection shall have been made within a period of not more than one year prior to the date of use for weighing material. A scale which has been tested and approved within this one-year period and which has been repaired or dismantled or moved to another location, shall again be tested and approved before it is eligible for weighing. All interested parties, such as the Division, the Contractor, or the owner of the scales, may request an inspection of the scales in question. The latest inspection shall take precedence over all previous inspections.

90 A motor-truck scale shall have a suitable undercarriage of such construction that shall safely carry and weigh an amount equal to 80% of the rated capacity of the scale on either end of the scale platform. When so loaded, the stresses in the lever system shall not exceed the stresses allowable under American Railway Engineering Association specifications. The load carried per 1 in. of knife-edged bearing shall not exceed 5,000 lb.

The scale platform shall be of such length and width as to conveniently accommodate all trucks containing materials which need to be weighed. The entire truck load shall rest on the scale platform and shall be weighed as one draft.

100 If material is weighed on truck scales, weigh tickets showing the net weight of each load of material delivered shall be supplied to the Engineer for use in computing quantities. The tickets shall be prepared and verified at the weighing site under the supervision of a competent weighman, and shall contain the ticket serial number, date, contract number, source of supply, material designation such as size or type, truck number, time weighed, gross weight direct reading if scale is of the direct reading type, tare, net weight, and moisture content if applicable. A space shall be provided on each ticket for signature by the Contractor when the material arrives at the site.

A duplicate ticket may be furnished by the Contractor for its records. The original, and duplicate if furnished, tickets shall be signed at the point of incorporation into the work. No additional payment will be made for furnishing, maintaining, and operating scales.

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The weight of materials weighed outside the State and intended for use on the contract may be determined on scales tested and approved by the proper governmental unit having authority where the scales are located. In such case, the Division shall be furnished with a certified copy of such inspection and approval which, to be acceptable, shall have been made within one year to the time of such weighing. Out-of-state truck scales used shall be in accordance with all pertinent provisions as they apply to truck scales accepted within the State of Indiana. They shall be subject to approval and inspection by the Division and to the requirements applicable to such scales located within the State.

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If materials are shipped by rail, the car weight may be accepted provided payment is made for only the actual weight of the materials. Car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as directed. Each truck shall bear a plainly legible identification mark.

(c) Measurement by Volume

130

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of the size or acceptable type provided the body is of such shape that the actual contents may be determined readily and accurately. All vehicles shall be loaded to at least their water level capacity. All loads shall be leveled when directed, after the vehicles arrive at the point of delivery.

When requested and approved in writing, material specified to be measured by the cubic yard may be weighed. Such weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

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In computing volumes of excavation items shown on the schedule of supplemental unit prices, the average end area method or other acceptable methods will be used.

If excavation items shown on the schedule of supplemental unit prices are to be measured by cross sections, the following will apply:

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1. Unless otherwise provided, where sodded areas are involved, the cross sections will be considered as located at the surface of the sod.
2. If the cost of excavation is specifically included in the payment for a pay item of work, the final sections will be taken at the finished surface of the work.
3. If the cost of excavation is not specifically included in the payment for a pay item of work, the final sections will be taken at the limits of the authorized excavation.

Unauthorized wastage of material will be deducted. Only such quantities as are actually incorporated into the completed work will be included in the final estimate.

(d) Measurement of Aggregates

160 Unless otherwise provided, all aggregates for which measurements are obtained by the cubic yard will be measured at the truck loading point in truck beds that have been measured, stenciled, and approved. They may be weighed and converted to cubic yards by a conversion factor computed at sufficient intervals to ensure correct measurement.

Free water in all aggregates for which payment is made on a weight basis shall be drained prior to weighing. The percent of moisture shall be less than 6% for borrow; 9% of optimum moisture content, as determined in accordance with AASHTO T 99, whichever is greater, for size No. 53 or No. 73 aggregates or modifications thereof when specified; or 4% for aggregates of all other specified sizes including sand.

170 Percent of Moisture (M) will be equal to the wet weight minus the dry weight, then divided by the dry weight and multiplied by 100.

If the Engineer determines the percent of moisture exceeds the limitations set out above, the weight to be paid for will be the gross weight of aggregate minus the weight of excess moisture.

(e) Rental of Equipment

Rental of equipment will be measured in hours of actual working time and necessary traveling time of the equipment within the project limits.

180 **(f) Manufactured Materials**

If standard manufactured materials are specified such as fence, wire, plates, rolled shapes, pipe, or conduit, and such materials are identified by gauge, unit weight, or section dimensions, such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted. Nearly equivalent metric dimensioned manufactured items will be accepted in lieu of English dimensioned items, provided they are within the specified tolerances, when English sizes are specified. Nearly equivalent English dimensioned manufactured items will be accepted in lieu of metric dimensioned items, provided they are within the specified tolerances, when metric sizes are specified.

190

109.02 Scope of Payment

Payments will be processed through the Division in coordination with, the IDNR Division of Engineering, and DAPW.

(a) Schedule of Values

The schedule of values shall and will be created in accordance with DAPW 26, 9.2. All references to the Designer in that section shall be replaced with Engineer.

(b) Progress Payments

200 Progress payments shall a will be in accordance with DAPW 26, 9.3. All references to the Designer in that section shall be replaced with Engineer.

(c) Certificates for Payment

Certificates of payment will be in accordance with DAPW 26, 9.4. All references to the Designer in that section shall be replaced with Engineer.

(d) Payments Withheld

210 Payments will be withheld in accordance with DAPW 26, 9.5. All references to the Designer in that section shall be replaced with Engineer.

(e) Failure of Payment

If there is a failure to issue any certificate for payment, DAPW 26, 9.6, will apply. All references to the Designer in that section shall be replaced with Engineer.

SECTION 110 – MOBILIZATION AND DEMOBILIZATION**110.01 Description**

This work shall consist of all work necessary for the movement of personnel and equipment to and from the project site necessary to the performance of the work.

110.02 Limitations

10 Mobilization and demobilization will be limited to 8% of the original total contract price. The mobilization portion shall not exceed 65% of the amount shown on the approved Schedule of Values for mobilization and demobilization. The remaining portion, demobilization, shall be contained in the final pay request when work has been accepted and all equipment has been removed from the site.

110.03 Special Conditions

When mobilization demobilization is shown on the project information page as unit price and is included in the schedule of supplementary unit prices, the following applies.

(a) Method of Measurement

20 Mobilization and Demobilization will be measured on a unit price basis per piece of major equipment with operator per site. Major equipment includes but is not limited to backhoes, excavators, or dozers. Equipment mobilization must be authorized by the Engineer prior to mobilization

(b) Project Initiation and Completion

Work orders will be issued for each site. The work order will include the scope of work, completion date and mobilization authorization. A sample work order form is provided in the plans.

30 The Contractor shall begin work within 10 calendar days after notification. Failure to mobilize within the specified time frame will result in assessment of liquidated damages for late

110.04

completion as specified on the project information page and may result in cancellation of the contract.

The work shall be completed within the number of work days specified by the work order. Failure to complete the work within the specified time frame will result in assessment of liquidated damages for late completion as specified on the project information page, may result in cancellation of the work order, and may result in cancellation of the contract.

40 The contract shall end by the date shown on the project information page unless the contract time is extended by change order.

110.04 Basis of Payment

Mobilization and demobilization will be paid for in accordance with the approved Schedule of Values unless included in the schedule of supplemental unit prices.

50 When specified as base bid on the project information page, mobilization and demobilization the Contractor shall be included it in the base bid. The cost of all materials, equipment, tools, labor, transportation, operations, and incidentals shall be included in the cost of mobilization and demobilization.

If not specified on the Project Information page, the cost of the mobilization and demobilization shall be incidental to the contract.

110.05 Unit Priced Mobilization Demobilization

When included in the List of Supplemental unit prices, the following applies.

Supplemental Unit Items **Unit Symbol**

60 Mobilization and DemobilizationEACH

Implements or equipment needed for the work such as farm tractors, seeders, hand tools, and tillers shall be incidental to the contract unless mobilized to a site where major equipment was not mobilized. In a case where major equipment was not mobilized to a site all other implements and equipment needed for the work will be paid for as one mobilization and demobilization

70 The Contractor shall not remove equipment from the site prior to the completion of the work without approval from the Engineer. If removal of equipment prior to completion of work is approved, no additional mobilizations or demobilizations will be paid for bringing equipment back to the site to complete the work.

DIVISION 02 – EARTHWORK AND AREA OPERATION

SECTION 201 – CLEARING AND GRUBBING

201.01 Description

This work shall consist of clearing, grubbing, removing, and disposing of all vegetation, trash, and debris, except such objects as are designated to remain or are to be removed in accordance with other sections of these specifications, within the project limits as shown on the plans. This work shall include the preservation from injury or defacement of all vegetation and objects designated to remain.

10 **201.02 General**

Trees, shrubs, plants, seeded or sodded areas, slopes or other things to remain will be designated. All such designated items and vegetation shall be preserved. All areas outside the project limits shall remain in their original condition. All damage to natural terrain, vegetation, objects designated to remain, or areas outside the construction limits which have subsequently eroded or been damaged, shall be repaired or replaced at no additional cost. Tree wound dressing in accordance with 607.07(c) is required for cut or scarred surfaces of trees or shrubs designated to remain.

20 **201.03 Indiana Bat**

All felling of trees equal to or greater than 4 in. in diameter at breast height shall be performed between October 1 and the following March 31, inclusive, unless otherwise approved by the Engineer, to minimize project-related impacts on the Indiana bat, *Myotis Sodalis*.

30 **201.04 Clearing and Grubbing**

Surface objects, trees, stumps, roots, and other protruding obstructions not designated to remain shall be cleared and grubbed, including mowing as required. Undisturbed sound stumps, roots, and non-perishable solid objects, which are a minimum of 3 ft below the final grade or slope of embankments, may be left, provided they are as nearly flush as possible. However, they shall not extend more than 4 in. above the ground line of existing grade or low water level. Sound stumps may be cut off at ground level outside the grading limits of cut and embankment areas if approved.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable material and compacted.

When performing clearing and grubbing operations in State or National Forests that conduct timber sales, all merchantable timber identified by the State Forester, the forest supervisor, a forest property manager, or the Engineer shall be neatly set aside in a pile as directed by the Engineer.

40 Perishable materials and debris shall be disposed of in one of the following methods. Burning of perishable material is not permitted. The method for a particular area will be shown on the plans.

201.05

(a) Brush Piles

Perishable material shall be disposed of on site in brush piles at locations determined by the Engineer during construction.

(b) Chip

50 Perishable material shall be chipped and disposed of at a location shown on the plans or determined at the pre-bid meeting. The location may be off site and may require hauling of chipped material to other AML sites. Chips shall be produced using a disc chipper or a drum grinder equipped with a chipping drum. Chip size shall be between 1 and 3 inches. Samples are available at the Division's Jasonville field office.

201.05 Scalping

60 Areas where excavations are to be made, or embankments are to be placed, shall be scalped to a maximum of 4 in. Scalping shall include the removal of material such as brush, roots, sod, grass, residue of agricultural crops, sawdust, and decayed vegetable matter from the surface of the ground.

201.06 Hedge Removal

Hedges and shrubs shall be pulled or grubbed in such a manner as to ensure complete and permanent removal.

201.07 Tree Removal on an Individual Basis

70 Tress shall be removed and, when specified, stumps shall be ground to at least 4 in. below the existing ground surface. Tree removal on an individual basis shall only apply when specific individual trees are shown to be removed on the plans or when there is an item to remove specific individual trees in the Schedule of Supplemental Unit Prices. Tree removal on an individual basis does not apply for areas inside or along grading limits shown on the plans.

201.08 Method of Measurement

When specified for grading areas on the plans or shown on the Schedule of Supplemental Unit Prices, measurement of this work will be made by one or more of the following methods.

(a) Area Basis

80 When specified on the Schedule of Supplemental Unit Prices in acres, the clearing and grubbing or scalping areas will be measured by rounding to the nearest 1/4 acre. All clearing and grubbing or scalping greater than 0 and less than 1/4 acre will be considered 1/4 acre.

(b) Lump Sum Basis

If clearing and grubbing or scalping is specified for grading areas on the plans, no measurement of area will be made.

(c) Individual Unit Basis

1. The diameter of trees will be measured at a height of 24 in. above the ground. Trees of less than 4 in. in diameter will be classified as brush.

90

2. If the Schedule of Supplemental Unit Prices shows measurement to be on an individual unit basis, the units will be designated and measured in accordance with the schedule of sizes as follows:

	Measured Diameter at Breast Height	Pay Diameter
	0 to 4 in.	2 in.
	Over 4 to 8 in.	6 in.
100	Over 8 to 12 in.	10 in.
	Over 12 to 24 in.	18 in.
	Over 24 to 36 in.	30 in.
	Over 36 to 60 in.	48 in.
	Over 60 in.	60 in.

201.09 Basis of Payment

Clearing and grubbing and scalping will be paid for in accordance with the approved Schedule of Values unless provided for in the schedule of supplemental unit prices.

- 110 Tree removal and tree and stump removal will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

Clearing and Grubbing.....	ACRE
Scalping.....	ACRE
Tree, <u> (size) </u> , Remove.....	EACH
Tree, <u> (size) </u> , and Stump, Remove.....	EACH

- 120 The cost of all labor, materials, equipment, and tools necessary to clear and grub or scalp the areas designated on the plans shall be included in the base bid unless provided for in the schedule of supplemental unit prices.

The cost of all labor, materials, equipment, and tools necessary to remove trees and tree stumps on an individual basis shall be included in tree removal and tree and stump removal.

The cost of repair or replacement of terrain, vegetation, objects designated to remain, or areas outside the construction limits which have been damaged by the Contractor or have subsequently eroded, shall be incidental to the contract.

130 **SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

202.01 Description

This work shall consist of the removal, wholly or in part, and satisfactory disposal of all obstructions which are not designated or permitted to remain, except for the obstructions to be

202.02

removed and disposed of under other items in the contract. It shall include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits.

202.02 General

10 All obstructions within the project limits designated to be removed shall be razed, removed, and disposed of except those features for which other provisions have been made for removal. Designated salvageable material shall be removed without unnecessary damage in sections or pieces which may be transported readily and shall be stored at locations within the project limits or as otherwise designated.

202.03 Removal of Trash and Debris

Trash and debris shall be removed and disposed of in accordance with applicable federal, state, and local laws in approved landfills or disposal sites.

20 **202.04 Removal of Culverts, and Other Drainage Structures**

Culverts and other drainage structures in use by traffic shall not be removed in whole or in part until satisfactory arrangements have been made to accommodate traffic. Any excavation adjacent to the structure or to its approaches shall be shored adequately to avoid damage to them or to traffic.

202.05 Removal of Pipe and Tile Drains

Pipes to be re-laid shall be removed and stored so that there is no loss or damage to the pipe. Replacement will be required of sections lost from storage or from damage through negligence or from improper methods in handling.

30

202.06 Reserved (Removal of Houses and Buildings)

202.07 Reserved (Removal of Asbestos)

202.08 Method of Measurement

The length of pipe removed will be measured by the linear foot, computed by multiplying the number of commercial lengths removed by the nominal laying length, or by measuring in place prior to removal, if practicable.

40 Pavement and concrete slab removal will be measured by the square yard of the area removed.

All other specific work designated for removal will be measured per unit, by the linear foot, by the square yard, or by the ton.

202.09 Basis of Payment

Trash and debris removal will be paid for in accordance with the approved Schedule of Values

50 All other specific work removal will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Item	Unit Symbol
<u> </u> (specific work) , Remove.....	EACH
	LFT
	SYS
	TON

60 The cost of all labor; equipment; materials; and documentation required for complying with the applicable laws, regulations and procedures, including but not limited to, licenses, permits, other legal fees, or disposal charges shall be included in the cost of the base bid or supplemental unit items. No payment will be made for work which is not performed in accordance with the specifications or that which is not required by the contract.

 The cost of removal of specific work shall include the removal and disposal of such obstructions, all necessary excavation, salvage of materials removed, their custody, preservation, storage, and disposal. All damage to existing facilities caused by the Contractor’s operations or equipment shall be satisfactorily replaced or repaired with no additional payment.

70

SECTION 203 – EARTHWORK

203.01 Description

This work shall consist of all earthwork, borrow excavation, hauling of borrow, spreading of borrow, grading, compaction, and density testing required to achieve the lines and grades within the grading limits as shown on the plans.

203.02 Grading

10 The Contractor shall achieve those grades shown on the plans using materials approved by the Engineer prior to their use.

Slopes shall not be steeper than 4:1 unless otherwise indicated on the plans. Grading shall be such that all areas blend smoothly into surrounding topography. Grade stakes or use of computer-controlled GPS equipment shall be in accordance with 105.07. All exposed stones and rubble larger than 6 in. in diameter within disturbed areas shall not be left on the graded surface.

20 Positive drainage shall be maintained on all areas unless indicated otherwise on the plans. The Contractor shall protect all newly graded areas from the elements as much as possible before seeding. All settlement or erosion that occurs prior to the acceptance of the work shall be repaired and re-graded at the Contractor’s expense.

203.03 Compaction

Unless otherwise specified, all earthwork shall be compacted to at least 95% of the maximum dry density. Earthwork shall be placed in lifts. The loose depth of each lift shall be such that the required compaction can be obtained, but in no case shall it exceed 8 in. The first two layers shall be compacted with 3 passes using a vibratory roller or until no appreciable

203.04

movement is detected. The top 6 in. of soil shall be fine graded and prepared in accordance with 401.05.

30 **203.04 Density Testing**

The percent of compaction shall be based on maximum dry densities unless otherwise specified or directed. The Contractor shall provide for in-situ density tests in the quantity listed on the Schedule of Supplemental Unit Prices. The in-situ density tests shall be in accordance with ASTM D 1556, D 2167, D 2922, or D 2937, and shall be performed where directed by the Engineer for the purpose of insuring uniform compaction of at least 95%.

203.05 Borrow

40 Borrow shall consist of approved material required for the construction of embankments or for other portions of the work. Unless otherwise specified. Borrow shall be obtained from the on-site locations and sources shown on the plans. Borrow material shall be free of substances that will form deleterious deposits, or produce toxic concentrations or combinations that may be harmful to human, animal, plant or aquatic life, or otherwise impair the designated uses of the stream or area.

The excavation of borrow material shall be planned to minimize finish grading. Borrow areas shall be cut to provide the borrow necessary to achieve the final grades shown on the Plans. The exact amount of borrow material required will be dependent upon borrow needs and borrow quality. When primary and secondary borrow areas are shown on the plans, the secondary borrow areas shall not be used until the primary is exhausted.

50 For cut/fill adjustment areas that are shown on the plans or for borrow areas not shown on the plans, the Contractor shall leave a transition slope no steeper than 4:1 from the bottom of the excavation to the surrounding areas not to be disturbed by the contract. The slopes within the bottom or top of these areas shall be between 2% and 20%. The Contractor shall finish grade these areas to a smooth contour approved by the Engineer. Lime, fertilizer, seed, and mulch shall then be applied in accordance with 401.

203.06 Method of Measurement

60 All density and moisture tests performed in the field or in a laboratory to determine the percent compaction at one specific location will be measured as 1 density test.

Earthwork will not be measured directly. The management of the volumes of earthwork shall be in accordance with 105.07(g).

203.07 Basis of Payment

70 Earthwork and construction engineering to achieve the grades inside the grading limits shown on the plans will be paid for in accordance with the approved Schedule of Values. No additional payment for earthwork will be made if the Contractor fails to submit working drawings for the earthwork plan in accordance with 105.07(g).

Density tests will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Item	Unit Symbol
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Density Test	EACH
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80 The cost of all earthwork including but not limited to borrow excavation, grading, finish grading, hauling, and compacting to achieve the grades inside the grading limits shown on the plans shall be included in the base bid.

The cost of all labor, materials, equipment, tools, and incidentals necessary to complete the required density tests shall be included in the cost of the density test. No payment will be made for tests that fail to meet the compaction requirements.

SECTION 204 – EXCAVATION AND EARTH FILL

204.01 Description

This work shall consist of light grading, unclassified excavation, excavation of vertical openings, hauling excavated material, placing earth fill, and compacting earth fill as shown on the plans or as directed by the Engineer.

204.02 Light Grading

10 Light grading work shall consist of grading existing soils in order to smooth rills, gullies or other washouts. Light grading shall be grading of depths up to 12 in utilizing a bull dozer of sufficient size as determined by the Engineer.

204.03 Unclassified Excavation

Unclassified excavation shall consist of the excavation and disposal of all materials of whatever character encountered in the work. The placement area shall be within 200 ft of excavation.

204.04 Excavation of Vertical Openings

20 This work shall consist of excavating and filling mine related openings as follows:

The Contractor shall excavate the openings to a stable base as determined by the Engineer. A Type A backfill will be used only where water must continue to drain into the works. Flowable fill for a Type B backfill shall be by directly dumping from the delivery truck.

(a) Shallow

Shallow excavation shall be excavation of depths greater than 1 ft to 17 ft utilizing an excavator of sufficient size as determined by the Engineer.

(b) Medium

30 Medium excavation shall be excavation of depths greater than 17 ft utilizing a tracked excavator of sufficient size as determined by the Engineer.

204.05

The Contractor shall excavate the openings to a stable base as determined by the Engineer. Fill shall be as shown on the plans or as directed by the Engineer.

204.05 Commercial Borrow

Commercial borrow shall consist of non-plastic granular soil material, free of trash and debris of any kind, organic or biodegradable matter, vegetation or any unsuitable objectionable objects. Commercial borrow shall be provided by the Contractor from an approved, licensed off-site source and shall be free of contamination. Loads of commercial borrow determined by the Engineer to have excessive moisture will be rejected.

Commercial borrow shall be spread and placed in loose lifts not to exceed 8 in. and compacted until no appreciable movement is detected.

204.06 Topsoil

Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, stones, or other foreign materials. The topsoil shall consist of sandy loam, with soil particles within the following percentages: clay; 0-25; silt; 25-50; sand; 50-70; decomposed organic matter; 5-10. The clay content is optional. The soil shall have a soil acidity range between a pH 5.0 to pH 7.0. The soil salinity shall not exceed 3 millimhos per centimeter at 25oC (as described by USDA Circular No. 982). The Contractor shall notify the Engineer of the source of topsoil not less than 10 days prior to excavation

Placing and spreading of topsoil shall not be done when the ground is frozen, excessively wet or otherwise in a condition detrimental to the work. Surfaces designated to be covered shall be lightly scarified just prior to the spreading operation. Compaction of topsoil will not be required. After placement is completed the surface of the topsoil shall be finished to a reasonably smooth surface.

204.07 Haul and Place Material

The Contractor shall haul and place or spread materials as directed by the Engineer. These materials shall consist of, but may not be limited to, on-site borrow material, materials delivered to the site by another contractor, coal combustion by-products, synthetic soil amendment, organic substrate, highway ditch cleanings, and agricultural lime substitutes.

(a) Equipment

Material shall be hauled and placed on site utilizing a slow moving, low capacity, piece of equipment such as a front-end loader, skid steer, or excavator. Distance is limited to 1,500 ft, one way.

(b) Truck

Material shall be hauled and placed on site utilizing a fast moving, high capacity, machine such as a dump truck. Distance is limited to 6,000 ft, one way.

204.08 Method of Measurement

Light grading will be measured by the acre.

80 Unclassified excavation and excavation of vertical openings will be measured by the bank cubic yard.

Commercial borrow and topsoil will be measured by the ton. Weight receipts for commercial borrow and topsoil shall be retained by the Contractor and presented to the Engineer upon request.

Haul and place materials will be measured by the cubic yard.

204.09 Basis of Payment

90 The accepted quantities of light grading will be paid for at the contract unit price per acre graded.

The accepted quantities of unclassified excavation and excavation of vertical openings will be paid for at the contract unit price per bank cubic yard removed.

The accepted quantities of commercial borrow and topsoil will be paid for at the contract unit price per ton.

The accepted quantities of haul and place materials will be paid for at the contract unit price per cubic yard hauled and placed.

Supplemental Unit Items	Unit Symbol
Commercial Borrow.....	TON
Topsoil	TON
Excavation of Vertical Openings, <u> (type) </u>	CYS
Haul and Place Material, <u> (type) </u>	CYS
Light Grading.....	ACRE
Unclassified Excavation.....	CYS

110 The cost of all tools, equipment, materials, and labor shall be included in the respective item.

Hauling and placing of materials brought to the site by the Contractor and paid for under a separate item shall be incidental to the respective item.

SECTION 205 – STORMWATER MANAGEMENT

205.01 Description

This work shall consist of employing BMPs for construction operations and BMPs for the furnishing, installing, maintaining, and removing of temporary erosion and sediment control measures.

205.02 Materials

Materials shall be in accordance with the following.

205.03

10

Coarse Aggregate, Class F or Higher601
 Geotextile.....
 Revetment Riprap601
 Stakes607.07(b)

Straw bales shall not weigh less than 35 lb. Bales shall be bound with wire or nylon twine.

205.03 NPDES

20

Compliance with Rule 7 of the NPDES General Permit Rule Program, 327 IAC 15-7, requires the use of the best management practices outlined in this section to protect public health, existing water uses, and aquatic biota.

30

The Contractor shall submit a monthly report for NPDES discharge to IDEM as a condition of the NPDES permit. The first report shall be submitted by the 28th day of the month following the month in which the permit becomes effective and monthly reporting shall continue for the life of the project. If no water is treated and/or discharged, the monthly report shall reflect a “NO DISCHARGE” condition. The Contractor shall provide the Engineer with a copy of the monthly report of NPDES discharge no later than the 28th day of the month following each monitoring period.

The Contractor shall comply with NOI and other requirements in accordance with 107.14.

205.04 Control Measures

40

The installation of temporary erosion and sediment control measures shall include those necessary or required by permits at project locations where erosion or sediment control becomes an issue during the contract. The Contractor’s shall designate an individual that shall be responsible for the installation, inspection, and maintenance of these measures.

Adjustments of the erosion and sediment control measures shall be made where appropriate to meet field conditions. These measures shall be constructed as soon as practical and shall be maintained in accordance with these specifications.

The Contractor shall control the sediment leaving the site by employing the BMPs outlined in 205.04(a through 205.04(h) .

50

The Contractor shall schedule and conduct his operations to minimize erosion of soils and the movement of sediment into creeks, streams, rivers, lakes, reservoirs, impoundments, water pits, sewer systems, and drain systems. All contract work designed to control erosion and sedimentation shall be carried out before earth disturbing work begins for a particular area. The Contractor shall minimize the amount of exposed soil open at any one time.

(a) Silt Fence

The manufacturer's recommendations shall be followed regarding shipping, handling, storage, and protection from direct sunlight. The geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, storage, or installation. Each roll shall be labeled or tagged to provide product identification.

60 Silt fence shall be constructed as shown on the plans. The spacing of the posts shall be adjusted such that the posts are located at the low points along the fence line. Joints in fabric shall be avoided at low points along the fence line. At joints, the overlap shall be nailed or similarly fastened to the nearest post with a lath.

The original copies of all current manufacturers' manuals shall be provided prior to installation.

(b) Check Dams

70 Check dams shall be constructed with revetment riprap or straw bales as shown on the plans or in accordance with Chapter 7 of the ISWQM if not shown on the plans.

1. Revetment Riprap

Revetment riprap shall be in accordance with 503 unless otherwise specified.

2. Straw Bales

80 Straw bales shall be embedded and staked as shown on the plans or in accordance with Chapter 7 of the ISWQM if not shown on the plans. Adjacent bales shall be chinked to eliminate gaps between the bales. Bales shall be placed such that the bindings are parallel to and not in contact with the ground.

(c) Temporary Mulching

All disturbed areas not under active construction for a period of 14 days shall be mulched in accordance with 401.09 unless otherwise directed by the Engineer.

(d) Temporary Seeding

All disturbed areas not under active construction for a period of 14 days shall be seeded as follows unless otherwise directed by the Engineer:

	<u>Season</u>	<u>Seed</u>	<u>lbs/ac</u>
90	Early Spring to	Perennial Ryegrass	10
	Mid Spring	Annual Ryegrass	5
	(2/15 - 6/15)	Weeping Lovegrass	2
	Mid Spring to	Sudangrass	10
	Mid Summer	Weeping Lovegrass	2
	(6/15 - 8/15)	Pearl Millet	6
		Foxtail Millet	8
		Red Clover	4

205.05

100	Mid Summer to Early Fall (8/15 - 11/15)	Rye Winter Wheat Annual Ryegrass Perennial Ryegrass Crimson Clover	45 45 4 5 10
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Temporary Seeding shall be in accordance with 401.07.

(e) Topsoil Salvage & Utilization

110 When directed by the Engineer, the Contractor shall salvage, store, and utilize topsoil in accordance with Chapter 7 of the ISWQM.

(f) Vegetative Filter Strip

When directed by the Engineer or shown on the plans, the Contractor shall maintain existing vegetation to create vegetative filter strips in accordance with Chapter 7 of the ISWQM.

(g) Earthwork Shaping

Prior to suspension of construction operations for an appreciable amount of time, the Contractor shall shape all exposed earthwork in a manner that will minimize erosion and sedimentation in accordance with Chapter 7 of the ISWQM and as directed by the Engineer.

120

(h) Surface Roughening

When directed by the Engineer, the Contractor shall roughen bare surfaces with tracked machinery to reduce storm water runoff velocity in accordance with Chapter 7 of the ISWQM.

205.05 Maintenance and Removal

130 Temporary erosion and sediment control measures shall be inspected by the Contractor once every seven days and after rain activities. Inspections shall be documented and records shall be maintained by the Contractor, to be made available for review upon request. Records shall include, at a minimum, the date, the inspector's name, the maintenance and corrections needed based on this inspection, and the status of previously identified deficiencies. The temporary protection measures shall be returned to good working conditions within 48 hours after inspection or as directed.

Temporary erosion and sediment control measures shall remain in place until directed to be removed. The Contractor shall remove and dispose of all excess silt accumulations, dress the area, and vegetate all bare areas. Use or disposal of riprap and straw bales shall be as directed.

205.06 Method of Measurement

140 Silt fence will be measured by the linear foot. Straw bale check dams will be measured per each bale installed. Revetment riprap check dams will be measured by the ton.

Weight receipts for supplemental unit items measured by the ton shall be retained by the Contractor and presented to the Engineer upon request.

205.07 Basis of Payment

Topsoil salvage & utilization, vegetative filter strips, earthwork shaping, surface roughening, temporary mulching, and temporary seeding shall be incidental to the contract.

150 Silt fence and check dams will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items**Unit Symbol**

Temporary Check Dam, No. 8 Stone.....	TON
Temporary Check Dam, Revetment Riprap.....	TON
Temporary Silt Fence.....	LFT
Temporary Check Dam, Straw Bales.....	EACH
Geotextile.....	SYS

160 The cost of geotextile fabric, trenching, backfilling, posts, fencing, and all necessary incidentals shall be included in the cost of silt fence.

The cost for stakes, trenching, backfilling, posts, and all necessary incidentals shall be included in the cost of temporary check dams, straw bales.

The cost of maintenance and removal of temporary erosion and sediment control items shall be included in the base bid.

SECTION 206 – FLOWABLE BACKFILL**206.01 Description**

This work shall consist of placing flowable backfill as shown on the plans or as directed by the Engineer.

206.02 Materials

Materials shall be in accordance with the following:

10	Fine Aggregate.....	601.04
	Water.....	606.03

Portland Cement shall conform to the requirements of AASHTO M 85

Fly ash shall be in accordance with AASHTO M 295.

206.03

206.03 Flowable Backfill Mix

The flowable backfill mix shall be as follows:

20	<u>Material</u>	<u>lbs/yd³</u>
	Portland Cement	250
	Fine Aggregate	2400
	Fly Ash	550
	Water	250 (approx. 30 gal)

When placed in a 3 in. tube 6 in. long the spread shall be 8 in. Flow consistency will be measured in accordance with ASTM D6103. The diameter of the spread shall be at least 8 in.

206.04 Placement

30 Flowable backfill shall be placed as shown on the plans or as directed by the Engineer. Flowable backfill shall not be placed on frozen ground. Flowable backfill shall be protected from freezing for 72 hr. Flowable backfill shall not be placed into or through standing water unless approved by the Engineer in writing.

Flowable backfill shall be brought up uniformly to the fill line as shown on the plans or as directed.

206.05 Method of Measurement

40 Flowable backfill will be measured by the cubic yard. Receipts for flowable backfill shall be retained by the Contractor and presented to the Engineer upon request. The quantity of flowable backfill ordered shall be as directed by the Engineer.

206.06 Basis of Payment

The accepted quantities of flowable backfill will be paid for at the contract unit price per cubic yard, furnished and placed.

Supplemental Unit Items

Unit Symbol

Flowable Backfill.....CYS

50 The cost of all labor, materials, equipment, and tools shall be included in the cost of flowable backfill.

SECTION 207 – COAL REFUSE DEPOSIT TREATMENT

207.01 Description

This work shall consist of treating, removing, or burying coal refuse deposits.

207.02 Materials

Materials shall be in accordance with the following.

Agricultural Lime..... 607.03

10

207.03 General

Coal refuse deposits shall be treated by one or a combination of following methods as shown on the plans.

(a) Agricultural Lime

The coal refuse shall be covered with 100 tons agricultural lime per acre of, unless otherwise directed, incorporated to a minimum of 6 in. and compacted with 3 passes using a vibratory roller or until no appreciable movement is detected.

20

(b) Removal

The objectionable material shall be removed and hauled to a location as shown on the plans.

(c) Burial

The objectionable material shall be buried in earthwork as shown on the plans.

207.04 Method of Measurement

Agricultural lime will be measured by the ton. Weight receipts for agricultural lime shall be retained by the Contractor and presented to the Engineer upon request.

30

207.05 Basis of Payment

Coal refuse deposit treatment, with the exception of agricultural lime, will be paid for in accordance with the approved Schedule of Values.

Agricultural lime will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

40

Agricultural Lime..... TON

The cost of all materials, labor, equipment, and tools necessary for placing, incorporating, and compacting agricultural lime shall be included in agricultural lime.

The cost of all materials, labor, equipment, and tools necessary to treat coal refuse deposits, with the exception of agricultural lime, shall be included in the cost of the base bid.

SECTION 208 – DEWATERING

208.01 Description

This work shall consist of the removal of water as necessary to perform the construction required by the contract in accordance with the specifications. It shall include:

1. constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions;

208.02

- 10
2. furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment;
 3. testing and treating water when required by NPDES permit, and
 4. removing all such temporary works and equipment after their intended function is no longer required.

20 When shown on the plans, all dewatering work shall be included in the base bid. All labor, materials, and equipment for water treatment shall be included in the cost of the sodium hydroxide item shown in the Schedule of Supplemental Unit Prices.

208.02 Materials

Sodium Hydroxide (NaOH) Solution 208.05

208.03 NPDES

30 The Contractor shall submit a monthly report for NPDES discharge containing test results of water samples collected during the previous month. to IDEM as a condition of the NPDES permit The first report shall be submitted by the 28th day of the month following the month in which the permit becomes effective and monthly reporting shall continue for the life of the project, or until directed otherwise by the Engineer. During months in which no water is discharged, the monthly report shall reflect a “NO DISCHARGE” condition. The Contractor shall provide a copy of the monthly report of NPDES discharge to the Engineer no later than the 28th day of the month following each monitoring period.

The Contractor shall comply with NOI and other requirements in accordance with 107.14.

208.04 Application

40 An in-line aeration system, as referred to in the U.S. Bureau of Mines *Report of Investigations 8868* and *Information Circular 9027* shall be utilized in the treatment of water. A venturi type jet pump shall be utilized for mixing acidic water, Sodium Hydroxide (NaOH), and air. The mixture shall then pass thru a static mixer.

50 The Contractor shall submit a written request and detailed information regarding the use of an alternative treatment process to the Engineer. The submittal shall include the proposed treatment method, treatment sequence, and equipment to be used. An alternative treatment process must have the prior approval of the Engineer before any construction activities are initiated. The Contractor shall take full responsibility for the water treatment operation to produce the desired water quality stipulated.

208.05 Sodium Hydroxide (NaOH) Solution

The Contractor shall use the sodium hydroxide solution listed on the Schedule of Supplemental Unit Prices to treat acidic water as well as any additional acidic water accumulated

in sediment or water treatment basins used during construction. A 50% sodium hydroxide solution freezes at approximately 56°F. The Contractor shall use 20% sodium hydroxide solution at temperatures below 56°F.

208.06 Testing

60 The Contractor shall be responsible for testing and monitoring all effluent discharges from areas being dewatered and any sediment/water treatment basins. Once the pH has been adjusted to a level greater than 6.0 but less than 9.0, and water has a minimum retention time of 24 hours, it may be discharged into the receiving stream if, through proper testing, it has proven to meet the following criteria:

	Daily <u>Average</u>	Daily <u>Maximum</u>
Flow	Report	Report
Total Iron	3.0 mg/l	6.0 mg/l
70 Total Manganese	2.0 mg/l	4.0 mg/l
TSS	35 mg/l	70 mg/l

Effluent shall be visually clear.

If the water in the impoundment does not meet the criteria, the treatment process shall be repeated until these quality standards are met.

80 When water is being treated or discharged the Contractor shall continually monitor the operation in order that an "Upset Condition", as referred to in the NPDES permit, can immediately be detected. If an upset condition is detected, all discharging shall cease until such time as the situation is remedied.

The Contractor shall sample water in the affected areas and effluent prior to and at the start of discharging to verify that all testing criteria have been met. Sampling shall be done a minimum of every four hours thereafter. This sampling shall utilize a field test kit from the HACH Company or an equivalent approved by the Engineer.

90 Another sample shall be taken at the start of discharging each day and split with the Division. The Contractor shall send their sample to a laboratory approved by the Engineer for testing and the results shall be recorded in the monthly report for NPDES discharges.

On-site refrigeration for all Contractor and Division samples shall be provided by the Contractor and approved by the Engineer.

Should water quality exceed the acceptable standards, the Contractor shall stop all pumping until acceptable water quality levels are achieved.

The Contractor shall maintain a log of water treatments and discharging activities including but not limited to:

100

208.07

1. Application rate of treatment
2. Discharge rates, dates, and times
3. Water quality test results, sample dates and times for:

110

Flow
 TSS
 pH
 Total Iron
 Total Manganese
 Total Aluminum
 Total Copper
 Total Nickel
 Total Zinc

This log is to be available to the Engineer upon request and shall become property of the Division at the completion of the project.

120

208.07 SWWF Registration

In accordance with IC 14-25-7-15, if the Contractor has the capability of withdrawing, in the aggregate from all sources and by all methods, more than 100,000 gallons of ground water, surface water, or ground and surface water combined in one day, the Contractor shall submit a temporary construction dewatering report to the Engineer prior to submitting a final pay request. Information on registering is available through the INDNR Division of Water’s website at [DNR: Water: Significant Water Withdrawal Facility Registration \(in.gov\)](http://DNR:Water:SignificantWaterWithdrawalFacilityRegistration(in.gov)).

208.08 Method of Measurement

Sodium hydroxide solutions will be measured by the gallon.

130

208.09 Basis of Payment

Dewatering will be paid for in accordance with the approved Schedule of Values.

Sodium hydroxide solutions will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Item

Unit Symbol

Sodium Hydroxide Solution, (percent) GAL

140

The cost of all labor, materials, equipment, pumps, tools, temporary earthwork, and incidentals, except sodium hydroxide solution for water treatment, necessary for dewatering shall be included in the base bid.

The cost of all labor, materials, equipment, tools, and incidentals required for water treatment shall be included in the cost of sodium hydroxide solution.

DIVISION 03 – DRAINAGE CONTROL

SECTION 301 – DITCHES AND TERRACES

301.01 Description

This work shall consist of the construction and cleaning of ditches and terraces in accordance with the plans.

301.02 Materials

Materials shall be in accordance with the following.

10	Coarse Aggregate, Class F or Higher	601
	Erosion Control Blanket	608.
	Geotextile.....	608
	Riprap.....	601
	Turf Reinforcement Mat	608.

301.03 General

All ditches and terraces shall be constructed to the elevations, dimensions, and locations shown on the plans. Staking of centerline elevations shall be in accordance with 105.07. Details for ditch and terrace types will be shown on the plans.

20

During excavation approved boulders shall be segregated and used as drop structures in ditch and pool areas.

Ditch cleaning shall consist of restoring flowline to an existing ditch by removing debris such as wood, vegetation, and sediment. Excavation shall not exceed 12 feet from water's edge and approximately 3.5 feet from water surface at the time of cleaning. Excavated debris shall be placed on the opposite side of the excavator from the ditch such that access is maintained adjacent to the ditch unless directed otherwise by the Engineer. Area of excavation and deposit shall not exceed reach of the excavator.

30

301.04 Preparation of Ground Before Applying Erosion Control Blanket

Prior to placing the blankets, the area to be covered shall be relatively free of all rocks or clods over 1 1/2 in. in diameter, and all sticks or other foreign material, which prevent the close contact of the blanket with the seed bed.

If as a result of a rain, prepared seed bed becomes crusted or eroded, or if eroded places, ruts, or depressions exist, the soil shall be reworked until it is smooth. Such areas which are reworked shall be re-seeded.

40

301.05 Turf Reinforcement Mat Installation

The TRM shall be installed in accordance with the manufacturers recommended procedures and as shown on the Plans using U-shaped staples of recommended wire gauges with legs at least 6 in. in length. Staples shall be placed using the white DOT staple pattern and along all breaks.

301.06

Prior to the installation of the TRM the areas shall be prepared, limed, fertilized, and seeded in accordance with 401 and approved by the Engineer.

301.06 Method of Measurement

50 Ditches and terraces will be measured by the linear foot along the centerline.

Coarse aggregate and riprap will be measured by the ton.

Geotextile, erosion control blanket, and turf reinforcement mat will be measured by the square yard.

Weight receipts for supplemental unit items measured by the ton shall be retained by the Contractor and presented to the Engineer upon request.

60 **301.07 Basis of Payment**

Ditches, terraces, coarse aggregate, riprap, geotextile, erosion control blanket, and turf reinforcement mat will be paid for in accordance with the Schedule of Supplemental Unit Prices

Supplemental Unit Item **Unit Symbol**

	Coarse Aggregate, No. <u> (number) </u>	TON
	Ditch, <u> (type) </u>	LFT
	Erosion Control Blanket	SYS
	Geotextile	SYS
70	Riprap, Class <u> (class) </u>	TON
	Riprap, Revetment	TON
	Riprap, Uniform	TON
	Terrace, <u> (type) </u> , <u> (width) </u> , <u> (height) </u>	LFT
	Turf Reinforcement Mat	SYS

The cost of all labor, tools, and equipment necessary to construct ditches and terraces as shown on the plans, including excavation, placing earth fill, and grading, shall be included in ditches and terraces.

80 The cost of all labor, tools, and equipment necessary to place or install coarse aggregates, riprap, geotextile, erosion control blankets, and turf reinforcement mats shall be included in the cost of the respective item.

SECTION 302 – STOPLOG STRUCTURES

302.01 Description

This work consists of constructing stoplog structures in accordance with the plans.

302.02 Materials

Materials shall be in accordance with the following.

10 Concrete 606.01
 Reinforcing Bars 604.01
 Stop Logs 605.02
 Water..... 606.03

302.03 Stoplog Structures

All stoplog structures shall be constructed to the elevations, dimensions, and locations shown on the plans.

302.04 Method of Measurement

Stoplog structures will be measured per unit.

302.05 Basis of Payment

Stoplog structures will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

Stoplog, (height) , (opening width) x (opening height) EACH

30 The cost of all labor, materials, equipment, and incidentals necessary to construct stoplog structures shall be included in the stoplog item.

SECTION 303 – PIPES AND CULVERTS

303.01 Description

This work shall consist of installing pipes and culverts in accordance with the plans. All pipes and culverts shall be constructed to the elevations, dimensions, and locations shown on the plans.

303.02 Materials

Materials shall be in accordance with the following.

10 Anti-Seep Collars 602.19
 Coarse Aggregate, Class D or Higher 601
 Concrete 606.01
 Drainage Components..... 602
 Geotextile 608
 Metal Pipe 603
 Reinforcing Bars 604.01

20 The maximum particle size of backfill material for corrugated pipe shall be less than one-half the corrugation depth.

303.03

303.03 Excavation

Unless otherwise directed, the trench cross sectional dimensions shall be as shown on the plans. The trench bottom shall give full support to the pipe as shown on the plans. Recesses shall be cut to receive any projecting hubs or bells.

Where pipe is to be placed in fill sections, a portion of the fill shall be constructed prior to installation of the pipe as shown on the plans.

30 Where rock or boulder formation is encountered at or above the proposed trench bottom elevation, the trench shall be excavated at least 8 in. below the proposed grade, backfilled, and compacted.

In case a firm foundation is not encountered at the required grade, the unstable material shall be removed to such depth that when replaced with suitable material and properly shaped, it will produce a uniform and stable foundation along the entire length of the pipe. A timber mat shall be placed to hold the pipe to line and grade if it is necessary.

40 All trenches shall be kept free from water until any joint filling material has hardened sufficiently not to be harmed.

303.04 Laying Pipe

Each section of pipe shall have a full firm bearing throughout its length, true to the line and grade given. All pipes which settle or are not in alignment shall be taken up and re-laid. Pipe shall not be laid on a frozen trench bottom.

Concrete and clay pipe shall be laid with hub upgrade, with the spigot end fully extended into the adjacent hub, and with all ends fitted together tightly.

50 Concrete pipe shall not be laid in muck or sulphate soils.

Except for circular concrete pipe, pipe joints designed to accommodate seals or pipe joints requiring seals shall be sealed with approved rubber type gaskets, caulking, bituminous mastic pipe joint sealer, elastomeric material, or sealing compound. Circular concrete pipe joints shall utilize rubber type gaskets.

If the infiltration of water is a factor, each joint, regardless of the type used, shall be sealed with an approved compression type joint sealer.

60 Joints and stub-tee connections for plastic pipe shall be in accordance with the requirements of the respective material specifications for each type of pipe.

Connections of plastic pipe to manholes, catch basins, and inlets shall be in accordance with the manufacturer's recommendations.

Prior to being lowered into the trench, corrugated metal pipe sections shall be examined closely and so fitted that they will form a true line of pipe when in place. Sections which do not fit together properly shall not be used.

70 At the time of acceptance, all pipes shall have been cleaned and be free from silt and other foreign matter.

Prior to constructing a pipe extension, the existing structure shall be cleaned of all foreign materials. Existing anchors, end sections, or headwalls shall be removed as shown on the plans or as directed. All existing pipes which are damaged by the removal operation shall be replaced.

303.05 Joining Pipe

80 Band couplers for type I and type II corrugated steel pipe and pipe-arches shall have corrugations that mesh with the corrugations of the pipe sections being joined or the annular rerolled ends of those pipe sections. Band couplers with projections (dimples) may be used with pipe having either annular or helical corrugations only when corrugated band couplers will not provide a matching connection to both pipes. Band couplers for type IA and IIA corrugated steel pipe and pipe-arches shall have corrugations that mesh with the corrugations of the pipe or shall be gasketed flat bands.

90 At the connection of a pipe extension to an existing structure where the extension is a different pipe material from that in place, or a satisfactory joint cannot be obtained, a concrete collar shall be constructed. Portions of the existing structure shall be removed as shown on the plans, or as necessary, to ensure proper fit of the extension to the existing pipe. If not shown on the plans, the collar shall have a width of at least 18 in. and a thickness of at least 6 in. around the entire joint.

If rigid pipe connections are of lesser strength than that of the main barrel of a pipe structure, these connections shall be encased with concrete at least 6 in. thick.

Any pipe which is damaged during installation shall be repaired or replaced as directed.

303.06 Tee and Stub-Tee Connections

100 At locations shown on the plans, or where directed, a stub-tee connection of the size specified shall be furnished and placed as a tee connection to corrugated metal pipe, corrugated metal pipe-arch, concrete pipe, reinforced concrete pipe, or reinforced concrete horizontal elliptical pipe.

110 The stub-tee connection to a corrugated metal pipe or pipe-arch shall be constructed of corrugated metal and the length of the stub shall be no less than that which readily accommodates the connecting band. It shall be made by shop welding a stub of corrugated metal pipe to the corrugated metal pipe or pipe-arch at the time of fabrication. Where field conditions warrant, stub-tee or other connections may be field connected by using shop fabricated saddle connectors, welds, flame cut edges, and damaged spelter coating shall be galvanized or painted with zinc dust-zinc oxide paint in accordance with Federal Specification TT-P641, type II or MIL-P-21035. Damaged bituminous coating shall be repaired with asphalt mastic. The pipe

303.07

connection to the stub shall be made by means of connecting bands of required size or by means of concrete collars as directed.

The stub-tee connection to concrete pipe, reinforced concrete pipe, or reinforced concrete horizontal elliptical pipe may be field constructed or factory constructed. The concrete used in the stub shall be of the same proportions as that used in the construction of such pipe. The length of the concrete stub shall be no less than 6 in. or more than 12 in. The pipe connection to the concrete stub shall be made by means of a cement mortar bead or concrete collar or as directed.

120

303.07 Backfilling

All pipes shall be backfilled as shown on the plans or as directed.

Prior to placing flowable backfill, all standing water shall be removed from the trench. If the water cannot be removed from the trench, structure backfill shall be used in lieu of flowable backfill to an elevation 2 ft above the groundwater. The remainder of the trench shall be backfilled as shown on the plans.

130

All pipes, except underdrains, will be visually inspected for acceptance a minimum of 30 days after the completion of backfill operations. Pipes that cannot be visually inspected shall be video inspected for acceptance. The Engineer will determine the sections of pipe to be video inspected.

Backfill material shall be of such nature that compacts readily. That portion around and for 6 in. above the top of the pipe shall be free from large stones. This material shall be placed in layers not to exceed 6 in, loose measurement, and each layer compacted thoroughly by means of mechanical tamps. Where coarse aggregate No. 8, No. 9, or No. 11 is used for structure backfill, geotextile shall be installed.

140

An adequate earth cover, as shown on the plans, shall be placed over the structure before heavy equipment is operated over it.

303.08 Pipe End Sections, Anchors, and Safety Metal End Sections

Pipe end sections, anchors, and safety metal end sections shall be constructed as shown on the plans or as directed.

150

Straps or hook bolts required for anchors shall be as shown on the plans or as directed. Anchor straps shall be placed at both the upstream and downstream end of each corrugated aluminum alloy, corrugated steel, or structural plate pipe or pipe-arch with a diameter or span of 42 in. or greater. Hook bolts and anchor straps shall be placed at both the upstream and downstream end of each corrugated aluminum alloy, corrugated steel, or structural plate pipe or pipe-arch with a diameter or span of 84 in. or greater.

A dimpled connection band shall be used for connecting pipe end sections and safety metal end sections to ends of corrugated metal pipe whose end corrugations are not perpendicular to the centerline of the pipe.

303.09 Re-Laid Pipe

160 Where shown on the plans or as directed, existing pipe shall be taken up, re-laid, and if necessary, extended.

303.10 Anti-Seep Collars

Anti-seep collars shall be of the size and for the pipe diameter as shown on the plans or the Schedule of Supplemental Unit Prices. Anti-seep collars shall be installed as shown on the plans or as directed by the Engineer. Anti-seep collars shall be in accordance with 602.19.

303.11 Method of Measurement

170 Pipe, culverts, extensions, and the relaying of pipes and culverts will be measured by the linear foot along the centerline of the pipe.

Anchors, end sections, and anti-seep collars will be measure by the unit.

303.12 Basis of Payment

Pipe, culverts, extensions, relaying of pipe, culverts, anchors, end sections, and anti-seep collars will be paid for in accordance with the Schedule of Supplemental Unit Prices

Supplemental Unit Item	Unit Symbol
____ (material) Pipe, ____ (shape) ____, ____ (size) _____	LFT
____ (material) Pipe Extension, ____ (shape) ____, ____ (size) _____	LFT
____ (material) ____, Pipe, Relaid, ____ (shape) ____, ____ (size) _____	LFT
Anti-Seep Collar, ____ (pipe diameter) Pipe, ____ (width) ____ x ____ (height) _____	EACH
Concrete Anchor, ____ (size) _____	EACH
Pipe End Section, ____ (size) _____	EACH
Safety Metal End Section, ____ (size) _____	EACH

190 The cost of all labor, materials, and equipment necessary to install, construct, or re-lay pipes, culverts, end sections, anchors, and anti-seep collars including, but not limited to, excavation, placing of earthfill, grading, concrete, rebar, geotextile, and plastic pipe shall be included in the pipe and culvert items.

SECTION 304 – RESERVED (CONCRETE BOX STRUCTURES)

DIVISION 04 – REVEGETATION

SECTION 401 – SEEDING, MULCHING, AND FERTILIZER

401.01 Description

This work shall consist of revegetating all disturbed and barren areas within the project limits with lime, fertilizer, seed, and mulch.

401.02 Materials

Materials shall be in accordance with the following.

10	Agricultural Lime.....	607.03
	Fertilizer.....	607.02
	Grass Seed.....	607.04
	Grass Seed, Temporary.....	607.01
	Leguminous Inoculants.....	607.06
	Mulch.....	607.05

401.03 General

Work under this specification shall proceed only in calm weather and on ground free of frost, snow or ice.

20

401.04 Soil Test

Upon completion of rough grading of cover material, the Contractor shall take representative soil samples of the disturbed areas. Each composite sample shall consist of 5 sub samples. The samples shall be tested at locations as designated by the Engineer.

The soil samples shall be tested for pH, SMP buffer pH, weak Bray P1 phosphorus, ammonium acetate extractable potassium, CEC, Lime Index and texture. Prior to the application of any lime or fertilizer, the Contractor shall submit to the Engineer one copy of the lab’s test results and recommendations.

30

401.05 Preparation of Seedbed

Seedbed preparation consists of tilling the top 6 in. of soil material along the contour and removing all stones and foreign matter over 6 in. in diameter. All disturbed and barren areas within the project limits require seedbed preparation, unless otherwise directed by the Engineer. The seedbed shall be tilled until a uniform consistency is obtained as approved by the Engineer.

401.06 Lime and Fertilizer

Agricultural lime or pelletized lime and fertilizer shall be spread evenly over all disturbed and barren areas within the project limits and incorporated to a minimum depth of 6 in. The Contractor shall use an implement with two gangs of discs that move soil in opposite directions. The discs shall have a diameter between 32 in. and 42 in. and be spaced at 20 in. The application rate for final grade of soil cover shall be as directed by the Engineer. Incorporation of the amendments shall occur within 2 days of spreading. For agricultural lime applications rates greater than 60 tons/acre, more than one incorporation pass shall be required when determined by the Engineer. The seedbed shall be tilled until a uniform consistency is obtained.

40

Fertilizer shall be applied in composition, dry, and free flowing.

401.07 Seeding

50 Seed mixes shall be placed as shown on the plans. If seed mix is not specified, 401.08(a) applies (field mix). Seed may be applied by drill, hydro-seeder or broadcast method. The drill depth shall range from 0.25 in. to 0.50 in. If seed is applied with the broadcast method, seed to ground contact shall be ensured by use of culti-packer or other means as approved by the Engineer.

Legume seed shall be inoculated with the proper bacterial cultures prior to mixing into the seed mix. If the Contractor uses a hydroseeder, the inoculant rate shall be doubled and the pH of the slurry shall be kept above 5.0 by adding hydrated lime.

60 All seeding rates shall be based on PLS. The germination and purity test results, as determined by the State Seed Commission, shall be used to determine the PLS. PLS equals germination rate multiplied by purity.

No seed shall be used after one year from the test date shown on the bag tag.

On areas where mechanical application or incorporation is unfeasible as determined by the Engineer, the Contractor shall apply lime, fertilizer, seed, and mulch, by hand or other approved means as determined by the Engineer at the time of application.

70 401.08 Seed Mixes

(a) Field Mix

	<u>Seed</u>	<u>lbs/ac</u>
	Common Oat (<i>Avena Sativa</i>)	50
	Little Bluestem (<i>Schizachyrium scoparium</i>)	5
	Orchard Grass (<i>Dactylis glomerata</i>)	5
	Perennial Ryegrass (<i>Lolium perenne</i>)	8
	Smooth Brome (<i>Bromus inermis</i>)	5
80	Switchgrass (<i>Panicum virgatum</i>)	5
	Weeping Lovegrass (<i>Eragrostis curvula</i>)	2
	Red Clover (<i>Trifolium pratense</i>)	8

(b) Tree Compatible Mix

	<u>Seed</u>	<u>lbs/ac</u>
	Common Oat (<i>Avena Sativa</i>)	50
	Alfalfa (<i>Medicago Sativa</i>)	3
	Switchgrass, cave-in-rock (<i>Panicum virgatum</i>)	2
90	Partridge pea (<i>Chamaecrista fasciculata</i>)	1

(c) Prairie Mix

	Permanent Grass/Sedge <u>Seed</u>	<u>lbs/ac</u>
	Big Bluestem (<i>Andropogon gerardii</i>)	2
	Little Bluestem (<i>Schizachyrium scoparium</i>)	3
	Indiangrass (<i>Sorghastrum nutans</i>)	2
	Switchgrass (<i>Panicum virgatum</i>)	2
100	Sideoats Grama (<i>Bouteloua curtipendula</i>)	3
	Canada Wildrye (<i>Elymus canadensis</i>)	1
	FORBS	
	Illinois Bundleflower (<i>Desmanthus illinoensis</i>)	0.5
	Maximilian Sunflower (<i>Helianthus maximiliani</i>)	0.5
	Partidge Pea (<i>Chamaecrista fasciculata</i>)	0.5
	Black-eyed Susan (<i>Rudbeckia hirta</i>)	0.5
	Temporary Cover <u>Seed</u>	<u>lbs/ac</u>
110	Annual Ryegrass	6
	Common Oat	24

(d) Wetland Mix

	Permanent Grass/Sedge <u>Seed</u>	<u>*PLS oz/ac</u>
	Fox Sedge (<i>Carex vulpinoidea</i>)	6
	Blunt Spikerush (<i>Eleocharis obtusa</i>)	1
	Virginia Wildrye (<i>Elymus virginicus</i>)	48
120	Common Rush (<i>Juncus effuses</i>)	5
	Green Bulrush (<i>Scirpus atrovirens</i>)	5
	Woolgrass (<i>Scirpus cyperinus</i>)	4
	Softstem Bulrush (<i>Scirpus validus</i>)	5
	Forbs <u>Seed</u>	<u>*PLS oz/ac</u>
	American Water Plantain (<i>Alisma subcordatum</i>)	4
	Swamp Milkweed (<i>Asclepias incarnata</i>)	2
	Nodding Beggartick (<i>Bidens cernua</i>)	4
130	Allegheny Monkeyflower (<i>Mimulus ringens</i>)	1
	Broadleaf Arrowhead (<i>Sagittaria latifolia</i>)	6
	Swamp Verbena (<i>Verbena hastata</i>)	2
	Temporary Cover <u>Seed</u>	<u>lbs/ac</u>
	Annual Ryegrass	6
	Common Oat	24

401.09 Mulching

140 Mulch shall be applied with or immediately after seeding. Mulch shall be applied until the ground is completely covered at an average rate of 3 tons per acre.

Mulch material shall be punched into the soil along the contour with a mulch stabilizer such as a Finn Krimper. In areas inaccessible to mulch stabilizing equipment, mulch shall be stabilized by hand using netting or other approved means. Slopes greater than 3:1 shall be netted with an extruded plastic mesh with approximately 2 in. square openings. This netting shall be biodegradable.

401.10 Warm-season Grass Planting

150 The Contractor shall plant warm-season grass mixes to ensure the seed to soil contact that is essential for seed germination. The seedbed shall be firm and free of large clumps. Under no circumstances shall the seed be placed deeper than 1/4 in. Seeds shall be pressed firmly into the soil either by packing wheels on a drill or by using a culti-packer. Seeding shall be completed between April 1 and June 30, unless otherwise authorized by the Engineer.

The Contractor shall seed using a warm-season grass drill specifically designed for warm-season grass seeding applications, such as a Truax or Great Plains equipped with a chaffy seed box. The Contractor may use a broadcast method when approved by the Engineer. Grain drills or cool-season grass drills modified to plant warm-season grasses will not be acceptable. 160 Seed shall be thoroughly mixed to ensure adequate distribution. All warm-season grass and forb seed shall be certified PLS.

401.11 Wetland Seed Planting

Wetland seed mixes and seed planting shall be as shown on the plans.

Good seed-to-soil contact is essential for seedling germination. The seedbed shall be firm and free of large clumps. The seed shall be thoroughly mixed and spread by hand or broadcast method. Very light raking is acceptable but, it is critical that the seed be placed no deeper than 1/4 in. and pressed firmly into the soil with a roller, cultipacker or other similar implement 170 approved by the Engineer.

The wetland seed mixes shall be PLS tested by a reputable native plant nursery and must be approved by the Engineer prior to planting. Excluding the cover crops, no non-native or invasive aquatic species will be allowed in wetland mixes.

401.12 Vegetation Map

180 The Contractor shall prepare an as-built vegetation map on the plans, or other approved record by the Engineer, that depicts the vegetation process. This map shall show areas revegetated and include: soil sample locations and analysis, lime and fertilizer rates and dates of application, seeding rates and dates of application, seeding method and mulch rates and dates of application. This vegetation map shall be presented to the Engineer upon completion of the project.

401.13

401.13 Warranty

190 Soil erosion is critical on this project. The Contractor shall take all necessary measures to prevent and repair any erosion areas for a period of one year after the date of final completion. In the event erosion or seed failure is observed, the Contractor shall be notified in writing and will have a period of 30 days to take measures to stabilize the affected area to the satisfaction of the Engineer. The actual area of erosion and extent of the repair or prevention shall be at the discretion of the Engineer.

401.14 Method of Measurement

Agricultural lime will be measured by the ton. Fertilizer, nitrogen, phosphate, and potash will be measured by the pound. Pelletized lime will be measured per each 50lb bag. 12-12-12 Fertilizer will be measured per each 50lb bag. Soil Tests will be measured per unit. Revegetation will be measured by the acre.

200 Weight receipts for supplemental unit items measured by the ton or pound shall be retained by the Contractor and presented to the Engineer upon request.

401.15 Basis of Payment

Seeding and mulching will be paid for in accordance with the approved Schedule of Values unless Revegetation is included in the schedule of supplemental unit prices.

Agricultural lime, fertilizer, nitrogen, phosphate, potash, and soil tests will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items **Unit Symbol**

210	Pelletized Lime, 50lb Bag.....	EACH
	12-12-12 Fertilizer, 50 lb Bag.....	EACH
	Agricultural Lime.....	TON
	Fertilizer <u> (% N) </u> - <u> (% P₂O₅) </u> - <u> (% K₂O) </u>	LBS
	Nitrogen	LBS
	Phosphate	LBS
	Potash.....	LBS
	Soil Test	EACH
	Revegetation.....	ACRE

220 The cost of all labor, materials, equipment, tools, and incidentals for seed and mulch shall be included in the base bid unless revegetation is included in the schedule of supplemental unit prices.

The cost of seedbed preparation, seeding, and mulching shall be included in the cost of revegetation.

Cost of 12-12-12 fertilizer, 50 lb bag, is based on 18 lb total of N+P+K (active ingredient) in each bag. Cost adjustment for alternate calculated weight of active ingredient may be made for alternatively sized bags and concentrated products.

230

The cost of all labor, materials, equipment, tools, and incidentals for Pelletized lime, 12-12 fertilizer, agricultural lime, fertilizer, nitrogen, phosphate, potash, soil tests and revegetation shall be included in the cost of the respective item.

SECTION 402 – TREE PLANTING

402.01 Description

This work shall consist of planting tree seedlings on reclaimed mine sites.

402.02 Materials

10 Tree seedlings will be provided by the Division for pick-up by the Contractor at the state's Vallonia Nursery. The Contractor shall notify the Project Manager prior to picking up the trees and provide the Project Manager with a plan for storage, the location of storage, identify when planting is to be performed. The Contractor shall maintain all trees in good condition prior to planting. Replacement of improperly, carelessly, or roughly treated tree seedlings shall be at the Contractor's expense.

Herbicide shall be applied at the rate of one quart of Roundup, 8 ounces Transline, and one ounce of Oust, per treated acre unless otherwise directed by the Project Manager. The Contractor shall incorporate indicator dye and surfactant into the herbicide mixture as directed by the Project Manager. All other herbicide chemicals shall be approved by the Project Manager prior to use.

20 402.03 Tree Planting Plan

The Division will provide the Contractor with a specific tree planting plan detailing the planting requirements for each site. Tree planting plans may detail multiple areas within a site requiring alternate planting schemes. Sites will generally require planting more than ten species of trees while maintaining a minimum four species per row. A tree planting plan may also contain a target planting date. An example tree planting plan is available at the Division's Jasonville field office.

402.04 Seedling Care

30 The Contractor shall keep all tree seedlings in good condition during transportation, preparation, and just before planting. If seedlings for multiple sites are picked up, they will be organized by site. The Contractor shall not expose tree seedlings to direct sunlight except briefly during preparation time (unbundling and sorting) and while the trees are on the planter during planting operation. The Contractor shall keep tree seedling roots moist at all times. The Contractor shall keep tree seedlings cool at a temperature between 35°F and 55°F. If ambient temperatures are above 55°F, mobile refrigerated storage shall be required.

402.05 Planting

40 Except when approved by the Project Manager, the Contractor shall plant all seedlings between March 6th and May 30th. Mechanical transplanting pattern shall be along the contour. Mechanical transplanter must be robust enough to plant through boulders and other debris common on abandoned mine sites. All sites shall be planted mechanically unless slopes are

402.06

steeper than 3:1, obstructed, or wetland. Planting tractors must be “wide-track” or equipped with dual rear wheels in order to safely traverse steep sites.

The Contractor shall plant the seedlings in accordance with the following:

- 1. Straight, with the angle between the stem and the ground no less than 70 degrees
- 2. Roots shall be placed into the trench and properly covered up to the root collar
- 3. Roots shall not be twisted, balled up, or “J-rooted”
- 50 4. Roots shall be covered with packed soil, eliminating air pockets
- 5. Lifting planted trees should require greater than 1 pound of pressure

Root pruning shall not be performed unless approved by the Project Manager. When approved, the minimum root length shall be eight inches from the root collar.

When approved by the Project Manager, the Contractor shall perform hand planting of seedlings. The Contractor shall not hand plant slopes flatter than 3:1, unless otherwise directed by the Project Manager. The Contractor shall use mattocks for hand planting on rocky or hard ground when directed by the Project Manager.

60

402.06 Herbicide Application

The Contractor shall apply herbicide at the time of planting when directed by the Project Manager. Herbicide application shall be done in a pre-planting fashion with a sprayer nozzle mounted to the planting tractor ahead of the mechanical transplanter. The Contractor shall apply herbicide in three-foot strips consisting of a solution of one quart of Roundup or equivalent, 8 ounces Transline or equivalent, one ounce of Oust or equivalent, and surfactant per treated acre unless otherwise directed by the Project Manager. Care shall be taken to protect personnel on the transplanter from exposure to herbicide. When hand planting tree seedlings, the Contractor shall apply herbicide in three foot diameter circles around the tree. The Contractor, the Contractor’s employees, and all subcontractors performing herbicide application work shall be licensed herbicide applicators or registered technicians in accordance with state laws and regulations.

70

402.07 Method of Measurement

Trees will be individually measured on an each basis. Bundle tags shall be retained by the Contractor and provided to the Project Manager when directed. The number of trees in a bundle will be determined by the nursery of origin.

402.08 Basis of Payment

80 Tree planting will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items	Unit Symbol
Tree, Plant, Less than 10 acre site.....	EACH
Tree, Plant, 10 to 50 acre site.....	EACH
Tree, Hand Plant	EACH

The cost of all labor, materials, equipment, and tools necessary to apply herbicide in accordance with these specifications shall be included in the cost of tree planting.

90

The cost of all labor, materials, equipment, and tools necessary to plant trees shall be included in the cost of tree planting.

501.01

DIVISION 05 – MISCELLANEOUS CONSTRUCTION

SECTION 501 – PROJECT SIGNS

501.01 Description

This work shall consist of furnishing, installing, and maintaining a project sign or signs as shown on the plans.

501.02 Materials

Materials shall be in accordance with the following.

10

Project Signs 605.01

501.03 Installation

Project sign installations shall be as shown on the plans. Project sign installations shall be plumb and the backfill of postholes shall be well tamped to properly support the sign in position throughout the life of the contract.

501.04 Painting

20 The sign and posts shall be given one base coat and two finish coats before lettering. Lettering and trim shall be applied to one side only and of the color, style, and size shown on the plans.

501.05 Maintenance and Removal

The project sign shall be maintained in good condition and be repaired if necessary. If the Engineer does not direct the removal of the project sign by the end of the contract, the sign shall remain the property of the Division and shall remain on the site. If the Engineer directs the project sign to be removed, the project sign shall become property of the Contractor and shall be removed from the site.

30

501.06 Basis of Payment

Project signs will be paid for in accordance with the approved Schedule of Values.

The cost of all labor, materials, equipment, tools, and incidentals necessary for the installation, maintenance, and removal of project signs shall be included in the base bid.

SECTION 502 – ACCESS ROUTES AND STAGING AREAS

502.01 Description

This work shall consist of clearing vegetation, grading, placing compacted aggregate, and restoring vegetation of grassed areas of the routes and areas shown on the plans to provide access to and staging areas on the site for equipment, materials, and labor.

502.02 Materials

Materials shall be in accordance with the following.

10

Compacted Aggregate, Class D or higher.....601

502.03 General

Access routes shall be maintained and repaired as necessary. The staging areas shall be kept in a clean and orderly condition free of trash and debris as directed by the Engineer. Access routes and staging areas that cross lawn or similar type maintained areas shall be repaired and revegetated as directed by the Engineer.

502.04 Method of Measurement

20 Compacted aggregate will be measured by the ton. Weight receipts for compacted aggregate shall be retained by the Contractor and presented to the Engineer upon request.

502.05 Basis of Payment

Access route and staging area construction will be paid for in accordance with the approved Schedule of Values.

Compacted aggregate will be paid for in accordance with the Schedule of Supplemental Unit Prices.

30	Supplemental Unit Item	Unit Symbol
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	Compacted Aggregate, No. <u> (number) </u>	TON
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The cost of all labor, materials, equipment, tools, and incidentals necessary for access routes and staging areas, except compacted aggregate, shall be included in the base bid.

The cost of all labor, materials, equipment, tools, and incidentals necessary for placing and compacting aggregate on access roads and on staging areas shall be included in compacted aggregate.

40

SECTION 503 – RIPRAP

503.01 Description

This work shall consist of placing riprap as shown on the plans and as directed by the Engineer.

503.02 Materials

Materials shall be in accordance with the following.

10	Geotextile.....	608
	Riprap.....	601.03

503.03 Placing Revetment, Class 1, and Class 2 Riprap

Revetment, class 1 and class 2 riprap may be placed by dumping and shall be placed to the required thickness. The finished surface shall be free from clusters of small stones or of large

503.04

ones. The finished surface shall vary from a true plane no more than 9 in. for revetment riprap or 18 in. for class 1 or class 2 riprap but shall not be less than the minimum depth specified.

503.04 Placing Uniform Riprap

20 Uniform riprap shall be placed to produce a surface of approximate regularity with edges having projections no more than 3 in. above the required cross section. The material shall be hand laid or placed by other approved means.

503.05 Installation of Geotextile Under Riprap

30 Storage and handling of geotextiles shall be in accordance with the manufacturer's recommendations, except that the geotextile shall not be exposed to direct sunlight, ultraviolet rays, water, temperature greater than 140°F, mud, dirt, dust, and debris, to the extent that its strength, toughness, or permeability requirements are diminished. Each geotextile roll shall be labeled or tagged to provide product identification sufficient for inventory and quality control purposes. Exposure of geotextiles to the elements between lay down and cover shall be a maximum of 14 days. At the time of installation, the geotextile shall be rejected and replaced with no additional payment if defects, rips, flaws, deterioration or damage incurred during manufacture, transportation, storage, or construction is evident.

The surface to receive the geotextile shall be prepared to a relatively smooth condition free of obstructions, depressions, and debris within the limits indicated on the plans.

40 Geotextiles used along channels shall be placed with the machine direction of the geotextile parallel to the channel. Successive geotextile sheets shall be overlapped in such a manner that the upstream sheet is placed over the downstream sheet and the upslope sheet over the downslope sheet.

Geotextiles used for 2:1 slopes or greater shall be placed with the machine direction of the geotextile sheets perpendicular to the toe of slope. The geotextile sheets shall be overlapped in the direction of the anticipated movement of water.

50 Adjacent pieces of geotextile may be joined by sewing if approved, or by overlapping and pinning. The minimum overlap shall be 18 in. except when placed under water. When placed under water, the overlap shall be a minimum of 3 ft. Securing pins shall be steel, 3/16 in. in diameter, 18 in. long, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of no less than 1.5 in. Securing pins with washers shall be inserted through both strips of overlapped geotextile at spacing intervals in Table 1 along a line through the midpoint of the overlap. The geotextile strip shall be placed so that the lower strip will be overlapped by the next higher strip. Pins shall be driven until the washer bears against the geotextile and secures it firmly to the ground.

Whether the fabric is joined by sewing or pinning, additional pins shall be installed as necessary to prevent any slippage of the fabric regardless of location.

TABLE 1

Slope	Pin Spacing
Steeper than 3:1	2 ft
3:1 to 4:1	3 ft
4:1 or flatter	5 ft

60 The geotextile shall be placed in such a manner that placement of the overlying materials will not excessively stretch or tear the geotextile and will not pull the required overlap or seam apart. Construction equipment will not be allowed on the exposed geotextile. Placement of riprap or stone shall start from the base of the slope, moving upslope and from the center outward. Riprap shall not be allowed to roll downslope and the height of drop for riprap shall be kept to less than 2 ft.

503.06 Method of Measurement

70 Geotextiles will be measured by the square yard. Revetment, class 1, class 2, and uniform riprap will be measured by the ton. Weight receipts for supplemental unit items measured by the ton shall be retained by the Contractor and presented to the Engineer upon request.

503.07 Basis of Payment

Geotextiles, revetment riprap, class 1 riprap, class 2 riprap, and uniform riprap will be paid for in accordance with the Schedule of Supplemental Unit Prices

Supplemental Unit Items	Unit Symbol
Geotextile.....	SYS
Riprap, Class <u> (class) </u>	TON
Riprap, Revetment	TON
Riprap, Uniform.....	TON

80 The cost of all labor, materials, equipment, and incidentals necessary to place geotextiles, revetment riprap, class 1 riprap, class 2 riprap, and uniform riprap shall be included in the cost of respective item.

SECTION 504 – COARSE AGGREGATE

504.01 Description

This work consists of placing coarse aggregate and compacting the aggregate when specified as shown on the plans and as directed by the Engineer.

504.02 Materials

Materials shall be in accordance with the following.

10	Coarse Aggregate, Class F or Higher	601
	Geotextile.....	608

504.03

504.03 Compacted Aggregate

Coarse aggregate shall be compacted with 3 passes of a vibratory roller when specified.

504.04 Installation of Geotextile Under Coarse Aggregate

The placing of geotextile under coarse aggregate shall be in accordance with 503.05.

504.05 Partial Load Surcharge

20 When requested by the Engineer, the Contractor shall furnish a partial load of riprap or aggregate for use at the site.

504.06 Method of Measurement

Coarse and compacted aggregate will be measured by the ton. Geotextile will be measured by the square yard.

Weight receipts for supplemental unit items measured by the ton shall be retained by the Contractor and presented to the Engineer upon request.

30 Partial load surcharges will be measured for each partial load requested by the Engineer. A partial load surcharge will only be considered for tandem or tri-axle trucks. For such trucks, a partial load will be considered anything less than 75% of the truck manufacturer's recommended weight capacity for hauling riprap and aggregate.

504.07 Basis of Payment

Compacted aggregate, coarse aggregate, and geotextiles will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items	Unit Symbol
Coarse Aggregate, No. <u> (number) </u>	TON
Compacted Aggregate, No. <u> (number) </u>	TON
Geotextile	SYS
Geotextile for Subgrade	SYS
Partial Load Surcharge	EACH

40 The cost of all labor, materials, tools, equipment, and incidentals necessary to place coarse aggregate, compacted aggregate, and geotextiles shall be included in the cost of the respective item.

50 The Contractor shall furnish to the Engineer satisfactory evidence of a truck manufacturer's recommended capacity for hauling riprap and aggregate. No payment for partial load surcharge will be made without these documents.

SECTION 505 – BENTONITE CLAY

505.01 Description

This work shall consist of placing and grading bentonite clay or mixing bentonite clay with soil then placing and grading the mixture.

505.02 Materials

Bentonite clay shall consist of commercially processed granular fragments of pure bentonite, without additives.

10

505.03 General Requirements

Bentonite clay shall be mixed with soil when shown on the plans. The bentonite clay or bentonite clay-soil mixture shall be placed and graded as shown on the plans or as directed by the Engineer. Bentonite clay shall be mixed with soil at a ratio of 1:10, respectively, unless otherwise noted on the plans or directed by the Engineer.

505.04 Method of Measurement

Bentonite clay will be measured by the pound or the ton in accordance with the Schedule of Supplemental Unit Prices. Receipts for bentonite clay shall be retained by the Contractor and provided to the Engineer upon request.

20

505.05 Basis of Payment

The accepted quantities of bentonite clay will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

Bentonite Clay	LBS
	TON

30

The cost of all labor, materials, equipment, and tools necessary to place and grade bentonite clay or a bentonite clay-soil mixture shall be included in the cost of bentonite clay.

SECTION 506 – FENCES AND ACCESS GATES

506.01 Description

This work shall consist of the construction of fence and access gates as shown on the plans.

506.02 Materials

Materials shall be in accordance with the following.

10

Barbed Wire	604.03(b)
Chain Link Fabric	604.03(b)
Concrete, Packaged Dry.....	606.02
Field/Woven Wire.....	604.03(a)

506.03

Fence Posts.....	604.02
Tension Wire.....	604.03(b)
Water.....	606.03

506.03 General Requirements

20 The area necessary for the construction of fence and access gates shall be cleared and grubbed in accordance with 201.

At locations where breaks in a run of fencing are required, or at intersections with existing fences, appropriate adjustment in post spacing shall be made in accordance with the requirements for the type of closure indicated.

30 When the plans require that posts, braces, or anchors be imbedded in concrete, temporary guys or braces shall be installed, if required to hold the posts in proper position. Unless otherwise permitted, no materials shall be installed on posts or strain placed on guys and bracing set in concrete until 96 hours have elapsed from the time of placing of the concrete.

The tops of all posts shall be set to the required grade and alignment. Cutting of the posts will only be allowed with the approval of the Engineer. Post caps shall be installed at the time the fence fabric is placed on the posts.

Wire or fencing of the size and type required shall be firmly attached to the posts and braces in the manner indicated. All wires shall be stretched taut and installed to the required elevations.

40 At each location where an electric transmission, distribution, or secondary line crosses any of the types of fences covered by these specifications, a ground, conforming to applicable requirements of the National Electric Safety Code, shall be furnished and installed.

506.04 Setting Fence Posts

If an object, such as a tree, is located in way of the fence and is to remain in place, the fence may be adjusted to miss the obstruction. There shall be a gradual offset for at least three posts in each direction of the obstruction.

50 Line posts for field type fence shall be set on 16 ft centers, and for chain link fence on 10 ft centers. In either case, a tolerance of ± 2 ft in spacing will be allowed at special locations as approved. Spacing of these posts shall be as uniform as practicable under the existing conditions. However, additional posts shall be set to maintain the bottom clearance dimensions as required.

Pull posts shall be set at 500 ft maximum intervals in straight runs and at each vertical angle point of 10 degrees or more.

Corner posts shall be set at each horizontal angle point of 10 degrees or more.

60 End, corner, and pull posts for both types of fence, line posts for chain link fence and diagonal braces for field type fence shall be set in concrete made from packaged, dry combined materials for concrete and water as shown on the plans.

Except where rock is encountered, intermediate or line posts shall be driven and furnished with an approved anchor plate or other satisfactory device to hold the post in proper alignment and plumb. The plate or anchor shall be welded or riveted to the post with no less than two rivets.

Access gate posts shall be set in concrete as shown on the plans.

70 Extra length posts shall be required at stream crossings as shown on the plans or as directed and also at ground depressions where it is not practicable for the fencing to follow closely the contour of the ground. These posts shall be set in concrete as shown on the plans.

At small stream crossings and ground depressions, the space below the fence fabric shall be closed with barbed or ground tension wire, either on horizontal lines or fanned, as shown on the plans or as directed. The wires shall be stretched taut between and fastened to the posts to prevent vertical movement of the wires. Barbed or tension wire shall not be placed where its installation would cause collecting drifts in the channel.

506.05 Placing Barbed and Tension Wire and Fabric

80 The bottom of the fabric shall be placed above the ground line as shown on the plans. Over irregular ground, a minimum of 1 in. and a maximum of 4 in. clearance will be permitted.

The tension required to stretch the fabric and wire shall be applied by mechanical fence stretchers and with single wire stretchers designed and manufactured for the purpose, and in accordance with the fence manufacturer's recommendations.

All splices in the fabric and wire shall be securely made in accordance with the best practice and the manufacturer's recommendations, and by the use of tools designed for that purpose.

90 Field fence shall be placed by fastening one end and then applying sufficient tension to remove all slack before making permanent attachments elsewhere. The line wires shall be fastened to end, corner, and pull posts by wrapping the wires around the posts and tying the wire back on itself with no less than 1 1/2 tightly wrapped twists. Tying shall be with tools designed for the purpose in accordance with the fence manufacturer's recommendations. This same method shall be used in placing barbed or tension wire. Fence fabric shall be fastened to intermediate or line posts with at least five wire ties. Barbed or tension wire shall be fastened in the same manner with one fastening device for each post.

100 The top and bottom tension wires of chain link fence shall be placed, stretched taut, and secured at the ends and to all posts before the fabric is placed. The ends of the fabric shall be secured by the use of stretcher-bars threaded through the loops of the fabric and secured to the posts by means of clamps with bolts and nuts. The number of clamps shall be as indicated on the

506.06

plans. The fabric shall be placed by securing one end and then applying tension to remove all slack before making attachments elsewhere. The fabric shall be fastened to the line posts and to the top and bottom tension wires with tie wires spaced as shown on the plans.

506.06 Resetting Fence

110 Resetting fence shall consist of the removal of existing fence within the specified limits and, if necessary, storing and then resetting it in accordance with the plans, or as directed. Resetting fence shall be in accordance with 506.03, 506.04, and 506.05. Damaged or missing parts, including posts shall be replaced.

506.07 Access Gates

120 Access gate installations shall be in accordance with the plans. ANSI Schedule steel pipe shall be used as shown and be welded together. Access gates shall be given two coats of paint. A lockbox approved by the Engineer shall be welded to the gate. The lockbox shall provide for double locking. The access gate shall be maintained throughout the contract in good condition and be repaired as necessary.

506.08 Method of Measurement

Fence and resetting fence will be measured by the linear foot for the type specified. Measurement will be made along the top of the fence from outside to outside of end posts for each continuous run of fence.

Access gates will be measured as complete units of the size and type specified.

506.09 Basis of Payment

130 The accepted quantities of fence, resetting fence, and access gates will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

Access Gate, <u> (width) </u> ft	EACH
Fence, <u> (type) </u> , <u> (height) </u> in.....	LFT
Fence, <u> (type) </u> , Reset.....	LFT
Fence, Field, Barbed Wire, <u> (height) </u> in.	LFT
Fence, Field, Tension Wire, <u> (height) </u> in.	LFT

140 The cost of adding grounding in accordance with the National Electric Safety Code including all materials, and labor shall be included in the cost of the fence.

The cost of fence, and corner, end, line, and pull posts shall be included in the cost of the fence.

The cost of fence, post and miscellaneous hardware shall be included in the cost of fence gate and access gate.

150 The cost of all miscellaneous hardware related to the type of fence including brace connections, caps, clips, clamps, hinges, rivets, ties, truss rods, diagonal braces and stretcher bars shall be included in the cost of the fence.

The cost of clearing and grubbing for the construction or resetting of fence shall be included in the cost of the fence.

The cost of all labor, materials, including the prefabricated lockbox, equipment, tools, and incidentals necessary for the installation and maintenance of access gates shall be included in the cost of the access gate.

SECTION 507 – GUARDRAIL

507.01 Description

This work shall consist of the fabrications, assembly, and installation of guardrail, guardrail transitions, and guardrail end treatments, in accordance with the current INDOT Standard Specifications, the current INDOT Standard Drawings, and as shown on the plans. This work may also consist of the extension of existing guardrail with new guardrail, the removal of existing guardrail, or adjusting the height of existing guardrail.

10 Current INDOT standards are available at <https://www.in.gov/dot/div/contracts/standards/>.

Contractors and subcontractors responsible for guardrail work shall on the current list of INDOT prequalified contractors for Guardrail, Cable Barrier, Crash Attenuators, and Fence. The list is available at <https://www.in.gov/indot/2740.htm>

507.02 Materials

Materials shall be in accordance with the following INDOT Standard Specifications:

	Guardrail Posts.....	INDOT 910.10
20	Rail Accessories, Fittings, and Hardware.....	INDOT 910.11
	Steel W-Beam Rail	INDOT 910.09
	Blockouts	INDOT 911.02(f)

All guardrail, post, accessories, fittings, and hardware shall be supplied from a manufacturer listed on the Qualified Products List of Guardrail Manufacturers in accordance with INDOT 910.09. Guardrail end treatments shall be selected from the Qualified Products List of Guardrail End Treatments in accordance with INDOT 601.07 and impact attenuators shall be selected from the Qualified Products List of Impact Attenuators in accordance with INDOT 601.08.

30 W-beam guardrail, components, assembly, post spacing, post lengths, and installation for each location shall be as shown on the plans. For W-beam guardrail, in locations where conditions will not allow the use of 7 ft posts, 6 ft posts may be substituted when approved.

The base metal thickness of the steel W-beam rail element for a curved guardrail system shall be 0.105 in. The base metal thickness of the steel W-beam terminal connector shall be

507.03

0.138 in. All structural tubing shall be in accordance with ASTM A500. The remaining steel components shall be in accordance with INDOT 910.

40 **507.03 General Requirements**

At all times, assembly and installation shall be supervised or performed by an installer trained and certified by the unit's manufacturer and shall be in accordance with the manufacturer's recommendations at the locations shown on the plans.

A copy of the installer's certificate shall be provided to the Engineer prior to the start of the work.

The Contractor shall provide the Engineer with original copies of all necessary current manufacturer's installation manuals and working drawings in accordance with INDOT 105.02.

50 Posts shall be installed plumb at the spacing and embedment depth shown on the plans. Posts shall be driven where subsurface conditions enable the use of normal driving equipment. Where subsurface conditions prohibit driving the posts a 12 in. diameter hole shall be bored to the required embedment depth. The hole shall be backfilled with suitable material in 6 in. maximum lifts, compacted as directed, and then the posts driven.

Posts damaged during installation shall be repaired or replaced as directed with no additional payment.

60 When new guardrail is being installed to replace existing guardrail and traffic is to be maintained during the work, the installation of the new guardrail shall follow the removal of the existing guardrail as closely as practical. Adequate safety protection shall be provided as directed between the time that the existing guardrail is removed and the time that the installation of the new guardrail is completed.

70 When new guardrail is being installed where there is no existing guardrail and traffic is to be maintained during the work, the mounting of the blockouts and the rail elements to the posts shall be completed as soon as practical after the posts are installed. The time between the installation of the posts and the mounting of the blockouts and rail elements shall not exceed 24 h.

507.04 Guardrail Erection

Blockouts and rail elements shall be erected in a manner resulting in a smooth, continuous installation. All bolts shall be of sufficient length to extend beyond the nuts and shall be drawn tight. Rail installed along a radius of 150 ft or less shall be shop curved. Rail elements shall be lapped as shown on the plans.

507.05 Curved W-Beam Guardrail Systems

80 This work shall consist of the fabrication, assembly, and installation of specified types of curved W-beam guardrail connector system or curved W-beam guardrail terminal system in accordance with the requirements herein and with the current INDOT Standard Specifications and as shown on the plans.

The installation of the terminal end buffer may utilize an alternate single piece having similar dimensional shape to the terminal end buffer as shown on the plans, and which mates with the W-beam guardrail.

90 Where the W-beam terminal connector is lapped on the outside of the guardrail, a galvanized 1 in. inside diameter, 2 in. outside diameter, 0.134 in. thick, narrow plain washer shall be placed under the splice bolt heads.

Nuts for the anchor cable assembly shall be hand tightened, plus one complete turn at the anchor plate end. All other nuts shall be torqued to 50 ft lb.

The installation of the type 5 anchor shall include tightening the cable with the swaged end to eliminate all slack.

100 The W-beam rail in the type 5 anchor shall be attached to the steel pipe with 5/8 in. diameter by 1 1/4 in. button head bolt with no washer. Connection to the post will not be required.

507.06 Guardrail End Treatments

Guardrail end treatments shall be required to terminate guardrail installations at the locations shown on the plans. The type I guardrail end treatment shall be either as shown on the plans or shall be selected from the Qualified Products List of Guardrail End Treatments. The type II guardrail end treatment shall be as shown on the plans. The type OS or MS guardrail end treatments shall be selected from the Qualified List of Guardrail End Treatments. The grading requirements shall be as shown on the plans.

110 Guardrail end treatments shall be installed within 24 h of the completion of the guardrail installation to which they are to be attached. Drums in accordance with INDOT 801.09 shall be placed for overnight marking of the bare end of the guardrail when the installation of the guardrail end treatment will not be completed until the day following the completion of the guardrail installation to which it is to be attached.

507.07 Removal of Existing Guardrail

120 Removal of existing guardrail shall be in accordance with the applicable requirements of INDOT 202 and these requirements. The locations shall be as shown on the plans. When it is specified that the removed guardrail is to become the property of the Division, the rail elements, posts, and blockouts shall be removed without being damaged. The removed material shall be stored as directed.

507.08 Adjusting Existing Guardrail Height

The height of the existing guardrail shall be adjusted by the use of moveable blockouts as shown on the plans. The height shall be measured to the top of the rail element along the face of the rail. Existing fixed blockouts shall be replaced with moveable blockouts installed at the proper height. Existing moveable blockouts shall be disconnected from the posts and re-mounted at the proper height.

507.09

130 **507.09 Resetting Guardrail**

This work shall consist of the removal of existing guardrail, storing it if necessary, and re-erecting it where shown on the plans or as directed.

507.10 Method of Measurement

Guardrail, guardrail with rub rail, shop curved guardrail, adjusting guardrail height, guardrail removal, and resetting guardrail will be measured by the linear foot along the top of the rail element, complete in place.

140 Guardrail transitions, W-beam terminal anchors, and guardrail end treatments will be measured per each, complete in place.

Guardrail buried end treatments type II will be measured per each.

The curved W-beam guardrail connector system and the curved W-beam guardrail terminal system will be measured per each for the type specified.

Grading at guardrail end treatments, the reflectorization of guardrail end treatments, and concrete used in anchoring guardrail end treatments will not be measured for payment.

507.11 Basis of Payment

150 W-beam guardrail will be paid for at the contract unit price per linear foot for the specified post spacing. W-beam guardrail cable terminal anchor will be paid for at the contract unit price per each, complete in place.

Shop curved guardrail, adjusting guardrail height, guardrail removal, and resetting guardrail will be paid for at the contract unit price per linear foot.

Guardrail transitions and guardrail end treatments will be paid for at the contract unit price per each for the type specified.

160 Guardrail buried end treatments type II will be paid for at the contract unit price per each, complete in place. The curved W-beam guardrail connector system and curved W-beam guardrail system will be paid for at the contract unit price per each for the type specified, complete in place.

Where existing guardrail height is adjusted, such work will be paid for at the contract unit price per linear foot.

170 The cost of removal, all necessary storage, new adjustable post brackets, attachment of rail section, and miscellaneous nuts and bolts as required shall be included in the cost of adjust guardrail height

Supplemental Unit Items**Unit Symbol**

	Guardrail End Treatment <u> (type) </u>	EACH
	Guardrail, Adjust Height.....	LFT
	Guardrail, Remove.....	LFT
	Guardrail, Reset	LFT
	Guardrail, Terminal System, W-Beam Curved, <u> (type) </u>	EACH
	Guardrail, W-Beam Curved, <u> (height) </u> ft., <u> (height) </u> in. Spacing	LFT
180	Guardrail, W-Beam, Cable Terminal Anchor.....	EACH
	Guardrail, W-Beam Shop Curved, <u> (height) </u> ft., <u> (height) </u> in. Spacing	LFT

For W-beam guardrail, the substitution of 6 ft posts for 7 ft posts where conditions will not allow the use of the longer post will be at the same contract unit price of the longer post.

The cost of resetting guardrail shall include the removal, necessary storage, resetting and replacement of damaged or missing parts and new posts as required.

190 The cost of reflectorization of guardrail end treatments shall be included in the respective pay items.

The cost of all grading required for the guardrail buried end treatment shall be included in the cost of guardrail end treatment, type II

The cost of all materials, including replacing damaged or missing parts, labor, and necessary incidentals required to reset impact attenuators, shall be included in the cost of impact attenuator, reset.

SECTION 508 – ORGANIC SUBSTRATE**508.01 Description**

This work shall consist of the earthwork, supplying of materials, hauling of materials, mixing of materials to create organic substrate, and placing the organic substrate as shown on the plans to construct wetlands.

508.02 General

10 Earthwork shall be in accordance with . Material shall be placed as shown on the plans or as directed by the Engineer.

508.03 Materials

Organic substrate shall be a homogeneous mixture of wood chips, agricultural lime, straw, hay, and compost. Materials for organic substrate shall be in accordance with the following:

(a) Wood Chips

20 Wood chips shall be in accordance with 201.04(b) . At the time of weighing, wood chips shall be free of excess moisture to the extent that the chips generally do not clump or stick together when stirred by hand or by machinery. Wood chips shall be free of rotted or composted

508.03

materials. No treated wood products, glued wood products, mill sawdust or other deleterious materials shall be included in the wood chips.

(b) Agricultural Lime

Agricultural lime shall be in accordance with 607.03.

(c) Straw/Hay

30 The straw/hay component of the substrate shall consist of both straw and hay homogeneously blended in a manner approved by the Engineer. The maximum amount of either straw or hay used in the mixture shall not exceed 60% of the total of straw and hay by weight. Hay and straw shall have been cut and baled within 12 months prior to delivery unless approved by the Engineer. The percent moisture of straw shall be determined with a hay moisture meter or by air drying in accordance with 508.06 at the time of weighing. Straw moisture testing may be waived if the Engineer determines by examination that the straw is free of mold and that moisture content is well within 10%. If requested by the Engineer, hay moisture shall be determined using an electronic hay moisture tester at the time of weighing and should generally be between 15 and 22% for large round bales. Hay shall be generally free of mold, dust, and excess moisture and shall have retained its nutritional value to the satisfaction of the Engineer. Hay that is determined by the Engineer to be excessively moist at the time of weighing due to storage or does not otherwise meet standards will be rejected. Straw and hay bales shall be shredded. The baling straps, netting, wires, or wrap shall be removed prior to shredding.

(d) Compost

Compost shall consist of three parts by volume carbon-based material such as straw, hay, corn stalks, leaves and/or wood chips and one part by volume of nitrogen-based materials such as grass clippings, green silage, green haylage, or other similar materials approved by the Engineer.

50 The above ingredients shall be blended and composted to a uniform consistency. The temperature during composting shall remain between 105 °F and 145 °F. The compost shall result in a dark brown or black, humic material in which the initial constituents are no longer recognizable and further degradation is not noticeable.

Heavy metal, organic chemical and pathogen concentrations of the compost shall be within the limits established by federal and state environmental regulations. A representative sample shall be tested for the above to ensure compliance.

Material shall not contain more than 40% moisture by weight. The product may be damp but should not drip when squeezed.

60 Compost shall have an earthy smell when wetted and placed in a sealed plastic bag after 72 hours. The finished compost shall not heat when stacked in a pile.

Materials shall not be loaded at the source, weighed, hauled, delivered, or mixed if there has been precipitation within the previous 48 hours unless approved by the Engineer.

The Engineer will reject all materials not in accordance with the above criteria.

508.04 Mixing of Materials

70 The substrate materials shall be proportionally mixed at a location shown on the plans or approved by the Engineer, hauled, and placed in the wetland cells as shown. Mixing shall be done in a manner that does not permit contamination by soil or mud and shall be performed using loaders and excavators on an approved hard surface such as concrete, 6 in. of compacted No. 53 stone, using batching equipment, or a pug mill specifically suited for mixing of substrate. If hard surfaces are not available at the designated mixing site, the contractor shall provide and construct such a surface, the cost of which shall be included in the contract base bid. Substrate shall be placed within the same day that mixing begins. Material shall be wetted before blending agricultural lime and compost into the mixture. Mixture shall be placed by end dumping from trucks and leveling with an excavator or shall be placed and leveled with an excavator to minimize compaction. Equipment will not be allowed on top of the finished mixture.

80

The following organic substrate mixtures shall be used when shown on the plans:

(a) Anaerobic Wetland Mixture

<u>Material</u>	<u>Percent Volume</u>
Wood Chips	30%
Agricultural Lime	10%
Straw/Hay	50%
Compost	10%

90

(b) Vertical Flow Pond Mixture

<u>Material</u>	<u>Percent Volume</u>
Wood Chips	60%
Agricultural Lime	15%
Straw/Hay	20%
Compost	5%

Other mixtures to be used will be shown elsewhere in the contract documents.

100

508.05 Method of Measurement

Wood chips, agricultural lime, straw, hay, and compost will be measured by the ton. Weight receipts shall be retained by the Contractor and presented to the Engineer upon request. Loads of material determined by the Engineer to have an excessive moisture content will be rejected.

508.06 Basis of Payment

Wood chips supplied by the Contractor will be paid for in accordance with the Schedule of Supplemental Unit Prices.

110

Agricultural lime will be paid for in accordance with the Schedule of Supplemental Unit Prices.

508.06

Straw, hay and compost will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items **Unit Symbol**

120	Wood Chips	TON
	Agricultural Lime.....	TON
	Straw/Hay	TON
	Compost	TON

The cost of all labor, materials, equipment, and tools necessary to stockpile, handle, mix, and place wood chips, straw, hay, and compost supplied by the Contractor shall be included in the respective item. Any materials not incorporated into the substrate shall be weighed and deducted from the final pay quantities. The cost of removing unused material from the site shall be the responsibility of the Contractor.

130 If materials are identified as being provided by the Division in stockpiles on-site or in stockpiles at an off-site location, or if on-site chipping of trees to produce wood chips is specified in accordance with 201, the Contractor shall include the hauling, delivery, stockpiling, handling, mixing, and placing such materials in their base bid.

The cost of earthwork shall be included in the base bid.

140 The percent of moisture shall be determined at the time the straw and hay materials are weighed. Facilities shall be provided for weighing. Arrangements shall be made in advance so that the percent of moisture will be determined at the time of weighing and that the weight of the material will be checked. Moisture content of the straw will be determined on the basis of air-dry weight as follows:

$$\text{Moisture Content \%} = \frac{\text{Wet Weight of Sample} - \text{Air Dry Weight of Sample}}{\text{Air Dry Weight of Sample}} \times 100$$

The gross, or wet, weight of straw material furnished and placed will be paid for if the moisture content does not exceed 10%. If the moisture content exceeds 10%, the weight to be paid for will be the gross, or wet, weight minus the weight of excess moisture computed as follows:

$$150 \quad \text{Weight to be paid for} = G \times \frac{110}{(100 + M)}$$

where:

- G = Gross, or wet, weight of mulching material
- M = Moisture content, %, in the mulching material to the nearest 0.5%.

SECTION 509 – RESERVED (MINE SHAFT CAPS)**SECTION 510 – BAT GATES****510.01 Description**

This work shall consist of installing HDPE smooth wall culvert pipe fitted with a bat gate and structural steel bat gates for large openings at mine entrances or subsidences as directed by the Engineer.

510.02 Materials

10 The smooth wall HDPE pipe shall be dual wall, have a smooth interior, and have a corrugated exterior.

The culvert bat gate shall be fabricated by welding the structural steel components together in accordance with the standard drawings. Structural steel shall be in accordance with 604.04.

20 Bat gate tubes may be partially backfilled with polyurethane foam when directed by the Engineer. Foam shall be two-part with water blown activation. Expanded foam shall be at least 2.5 pounds per cubic foot. Foam must be expanded in place. Forms should be constructed with plywood or geotextile to prevent obstruction of the pipe. After initial set, foam shall be covered in a manner approved by the Engineer to protect against photodegradation.

Bat gates for large openings at mine entrances or subsidences shall consist of welded and painted in place materials in accordance 604.04 and the standard drawings.

Fabricated items shall be cleaned painted with one coat of rust inhibiting primer and three coats of exterior enamel after construction. Entry gates shall be painted a yellow color approved by the Engineer. Bat gates shall be painted a brown or black color as approved by the Engineer.

510.03 General

30 Bat gate installations shall occur between April 21 and September 15. Loose debris at the opening shall be removed.

The culvert pipe shall be a minimum of 6 ft long. The culvert pipe shall be installed into the opening far enough to have competent rock above and shall extend from the opening far enough that the exposed end will not be covered by debris from opening creep. The space between the bars shall be 5 ¾ in. from the bottom of one bar to the top of the bar below.

510.04 Method of Measurement

40 Profile wall HDPE culvert pipe will be measured in accordance with 303.11.

Culvert bat gates will be measured by each gate installed.

Polyurethane Foam will be measured by the pound.

510.05

Bat gates for large openings will be measured by the linear foot of structural steel installed.

510.05 Basis of Payment

50 Culvert bat gates, profile wall HDPE pipe, and bat gates for large openings will be paid for in accordance with the Schedule of Supplemental Unit Prices.

Supplemental Unit Items

Unit Symbol

<u> (size) </u> Metal Bat Gate	EACH
Profile Wall HDPE Pipe, Round, <u> (size) </u>	LFT
Polyurethane Foam	LBS
Structural Steel, <u> (size) </u>	LFT

60 The cost of all labor, materials, tools, equipment, and incidentals necessary to fabricate, transport, and install profile wall HDPE pipe with a culvert bat gate, and bat gates for large openings shall be included in the cost of the respective item.

The cost of any welding, excavation, drilling, cutting, installation of the embedded 1 in. round bars, and any work to complete the installation shall be included in the cost of the respective item.

DIVISION 06 – MATERIALS

Shipments of material to be used by the contractor or subcontractor under this contract should be delivered to the job site only during regular working hours. If materials are delivered outside of regular working hours of the contractor or subcontractor, his authorized agent must be on duty to receive such material. Materials must not be installed until approved by the Engineer.

SECTION 601 – AGGREGATES

601.01 Aggregates

10 Aggregates shall consist of natural or manufactured materials produced from but not limited to limestone, dolomite, gravels, sandstones, steel furnace slag, air-cooled blast furnace slag, granulated blast furnace, wet bottom boiler slag, or other geologic rock types approved by the Engineer. All aggregates shall come from a certified aggregate producer on INDOT's most current approved materials list unless approved otherwise by the Engineer.

At time of use, aggregates shall be free from lumps or crusts of hardened or frozen materials.

601.02 Coarse Aggregate

20 Coarse aggregates are defined as having a minimum of 20% retained on the No. 4 sieve. Coarse aggregates shall not contain adherent fines that are detrimental to the end product.

The coarse aggregate shall comply with the quality requirements and the additional requirements in accordance with 601.02(a) . However, coarse aggregate may be rejected based on previous performance service records. Class AP is defined as the highest classification and Class F the lowest. Blending of material for compliance with gradation or crushed particle requirements may be permitted when requested in writing. Blending of aggregate products to improve the quality classification of the finished product will not be permitted.

(a) Classification of Aggregates

30

Characteristic Classes	AP	AS	A	B	C	D	E	F
Quality Requirements								
Freeze and Thaw Beam Expansion, % Max. (Note 1).....	.060							
Los Angeles Abrasion, % Max. (Note 2)	40.0	30.0	40.0	40.0	45.0	45.0	50	
Freeze and Thaw, AASHTO T 103, Procedure A, % Max. (Note 3)	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Sodium Sulfate Soundness, % Max. (Note 3).....	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Brine Freeze and Thaw Soundness, % Max. (Note 3).....	30	30	30	30	40	40	50	60
Absorption, % Max. (Note 4)	5.0	5.0	5.0	5.0	5.0			
Additional Requirements								
Deleterious, % Max.								
Clay Lumps and Friable Particles	1.0	1.0	1.0	1.0	2.0	4.0		
Non-Durable (Note 5).....	4.0	4.0	4.0	4.0	6.0	8.0		
Coke.....					(See Note 6)			
Iron.....					(See Note 6)			
Chert	3.0	3.0	3.0	5.0	8.0	10.0		
Weight per Cubic Foot for Slag, lbs, Min. ..	75.0		75.0	75.0	70.0	70.0	70.0	
Crushed Particles, % Min								
Asphalt Seal Coats.....			70.0	70.0				
Compacted Aggregate			20.0	20.0	20.0	20.0		
Notes:	<ol style="list-style-type: none"> Freeze and thaw beam expansion for concrete slabs. Los Angeles abrasion requirements shall not apply to blast furnace slag. Aggregates may, at the option of the Engineer, be accepted by the Sodium Sulfate Soundness or Brine Freeze and Thaw Soundness requirements. Absorption requirements apply only to aggregates used in concrete and asphalt mixtures except they shall not apply to blast furnace slag. Non-durable particles include soft particles and other particles which are structurally weak, such as soft sandstone, shale, limonite concretions, coal, weathered schist, cemented gravel, ocher, shells, wood, or other objectionable material. Air cooled blast furnace slag and steel furnace slag coarse aggregate shall be free of objectionable amounts of coke, iron, and lime agglomerates. The bulk specific gravity of chert shall be based on the saturated surface dry condition. The amount of chert less than 2.45 bulk specific gravity shall be determined on the total weight of material retained on the 3/8 in. sieve for sizes 2 through 8, 43, 53, and 73 and on the total weight of material retained on the No. 4 sieve for sizes 9, 11, 12, and 91. Crushed particle requirements shall apply to gravel coarse aggregates used in compacted aggregates, and seal coats except seal coats used on shoulders. Determination of crushed particles shall be made from the weight of material retained on the No. 4 sieve in accordance with ASTM D 5821. 							

(b) Sizes of Coarse Aggregates

Sieve Sizes	COARSE AGGREGATE SIZES (PERCENT PASSING)									
	COARSE GRADED								DENSE GRADED	
	2	5	8	9	11	12	43 ⁽¹⁾	91	53 ⁽¹⁾	73 ⁽¹⁾
4 in.										
3 1/2 in.										
2 1/2 in.	100									
2 in.	80-100									
1 1/2 in.		100					100		100	
1 in.	0-25	85-98	100				70-90	100	80-100	100
3/4 in.	0-10	60-85	75-95	100			50-70		70-90	90-100
1/2 in.	0-7	30-60	40-70	60-85	100	100	35-50		55-80	60-90
3/8 in.		15-45	20-50	30-60	75-95	95-100				
No. 4		0-15	0-15	0-15	10-30	50-80	20-40		35-60	35-60
No. 8		0-10	0-10	0-10	0-10	0-35	15-35		25-50	
No. 30						0-4	5-20		12-30	12-30
No. 200 ⁽²⁾							0-6.0		5.0-10.0 ⁽⁴⁾	5.0-12.0
Decant (PCC) ⁽³⁾		0-1.5	0-1.5	0-1.5	0-1.5	0-1.5		0-1.5		
Decant (Non-PCC)	0-2.5	0-2.5	0-3.0	0-2.5	0-2.5	0-2.0		0-2.5		

Notes: 1. The liquid limit shall not exceed 25 (35 if slag) and the plasticity index shall not exceed 5. The liquid limit shall be determined in accordance with AASHTO T 89 and the plasticity index in accordance with AASHTO T 90.
2. Includes the total amount passing the No. 200 sieve as determined by AASHTO T 11 and T 27.
3. Decant may be 0-2.5 for stone and slag.
4. When slag is used for separation layers, the total amount passing the No. 200 sieve shall be 10.0 to 12.0.

601.03 Riprap

Riprap shall consist of sound stone, stone masonry, or other approved material, free from structural defects and of approved quality. Stone containing shale, unsound sandstone, or other material that will disintegrate readily, shall not be used.

40

(a) Revetment, Class 1, and Class 2 Riprap

The material shall be coarse aggregate, Class F or higher in accordance with 601.02. Gradation shall be in accordance with 601.03(c).

(b) Uniform Riprap

The material shall be coarse aggregate, Class F or higher in accordance with 601.02. Gradation shall be in accordance with 601.03(c). Either type A or type B may be utilized.

601.04

(c) Sizes of Riprap

GRADATION REQUIREMENTS					
Percent Smaller					
Size, in.	Revetment	Class 1	Class 2	Uniform A	Uniform B
30			100		
24		100	85-100		
18	100	85-100	60-80		
12	90-100	35-50	20-40		
8				100	
6	20-40	10-30	0-20	35-80	95-100
3	0-10	0-10	0-10		35-80
1				0-20	0-20
Depth of Riprap, Minimum	18 in.	24 in.	30 in.		

50

601.04 Fine Aggregates

Fine aggregates are defined as 100% passing the 3/8 in. sieve and a minimum of 80% passing the No. 4 sieve.

(a) Sizes of Fine Aggregates

SIZES (PERCENT PASSING)					
Sieve Sizes	23	24	15	16	PP
3/8 in.	100	100			
No. 4	95-100	95-100			100
No. 6			100		
No. 8	80-100	70-100	90-100		85-95
No. 16	50-85	40-80			
No. 30	25-60	20-60	50-75	100	50-65
No. 50	5-30	7-40	15-40		15-25
No. 80				95-100	
No. 100	0-10	1-20	0-10		0-10
No. 200	0-3	0-6	0-3	65-100	

(b) Mortar Sand

Fine aggregate for mortar shall consist of uniformly graded natural sand in accordance with gradation requirements of 601.04 for size No. 15.

60

SECTION 602 – CONCRETE, CLAY, AND PLASTIC DRAINAGE COMPONENTS

602.01 Non-Reinforced Concrete Pipe

This pipe shall be in accordance with AASHTO M 86 for the specified diameter and strength classes. When used for underdrain, each section of pipe shall not exceed 3 ft in length.

602.02 Reinforced Concrete Pipe

10 This pipe shall be in accordance with AASHTO M 170 for the specified diameters and strength classes. Precast concrete units shall be from a source listed on INDOT's List of Certified Precast Concrete Producers. Unless otherwise specified, pipe wall design and use of elliptical reinforcement in circular pipe are optional.

The pipe provided shall be in accordance with the class and D-load rating shown in the plans.

Precast reinforced concrete end sections shall be in accordance with the cited specifications to the extent to which they apply.

20 The manufacturer of the steel reinforcement shall furnish to the pipe manufacturer a mill test report. The pipe manufacturer shall certify, on furnished forms that:

- a. The placement of the steel reinforcement is in accordance with the Standard Specifications.
- b. The area of steel reinforcement per linear foot of pipe is in accordance with or exceeds the specification requirements.
- 30 c. Based on the steel reinforcement manufacturer's mill test report, the steel used in the pipe is in accordance with the specification requirements.
- d. Copies of the steel reinforcement manufacturer's mill test reports shall be on file and available to review for five years.

602.03 Reinforced Concrete Horizontal Elliptical Pipe

This pipe shall be in accordance with AASHTO M 207. Material certification shall be in accordance with 602.02.

602.04 Precast Concrete Manholes, Inlets, and Catch Basins

40 These units shall be in accordance with AASHTO M 199. References to diameter are applicable to corresponding dimensions in other than circular sections. Absorption tests will not be required for flat top or base slabs. Certification shall be in accordance with 602.02.

No more than three holes shall be cast or drilled in each section for the purpose of handling.

In addition to the requirements of AASHTO M 199, the manhole steps shall be permanently marked with the specific step designation, and the manufacturer's identification. This marking shall remain exposed after installation.

50

602.05

602.05 Plastic Pipe Manufacturer Requirements

A list of approved Plastic Pipe, Fittings, Solvent Cement, and Elastomeric Seals is maintained by INDOT. The list specifies the manufacturer, plastic pipe, solvent cement, or elastomeric seals designation. All of these materials shall comply with the applicable AASHTO or ASTM requirements and will only be accepted from qualified manufacturers. The manufacturer is defined as the plant which produces the plastic pipe, fittings, solvent cements, or elastomeric seals.

602.06 Corrugated Polyethylene Drainage Tubing

60 Tubing and fittings shall be in accordance with AASHTO M 252. Perforations shall be required for tubing used as a longitudinal underdrain. Qualification requirements for the manufacturers shall be in accordance with 602.05.

602.07 Corrugated HDPE Pipe

70 Pipe and fittings shall be in accordance with AASHTO M 294. The compound used in manufacturing this pipe shall have a minimum cell class in accordance with 335420C as shown in ASTM D 3350. Qualification requirements for the manufacturers shall be in accordance with 602.05. If corrugated or smooth wall is not specified on the plans or the Schedule of Supplemental Unit Prices, HDPE pipe shall be corrugated.

602.08 Smooth Wall HDPE Pipe

Pipe shall be in accordance with ASTM F 714 for nominal diameters of 39 in. or less. Fittings shall be in accordance with ASTM F 1055. The pipe sizes shall be in accordance with ISO sizing system. The pipe dimension ratio shall be 26 or less. The compound used in manufacturing this type of pipe shall have a minimum cell class in accordance with 335434C as shown in ASTM D 3350. Qualification requirements for the manufacturers shall be in accordance with 602.05. If corrugated or smooth wall is not specified on the plans or the Schedule of Supplemental Unit Prices, HDPE pipe shall be corrugated.

602.09 Solid Wall HDPE Pipe

80 Solid wall HDPE pipe shall be in accordance with ASTM F 714. The maximum standard dimension ratio, SDR, as defined in ASTM F 412 for the liner pipe shall be 32.5. The actual calculated minimum dimension ratio, DR, as defined in ASTM F 412 for the pipe shall be 30.0. The resin used in the manufacture of the pipe shall have a minimum cell classification of 345464C in accordance with ASTM D 3350 or a minimum grade of PE4710 in accordance with ASTM F 714. A 12 in. section of the liner pipe shall show no evidence of splitting, cracking, or breaking when compressed between parallel plates to 40% of its outside diameter within 2 to 5 minutes.

602.10 Profile Wall HDPE Pipe

90 Profile wall HDPE liner pipe shall be in accordance with ASTM F 894. The minimum liner ring stiffness constant, RSC, shall be 160 for circular installations and 250 for deformed installations.

602.11 Profile Wall PVC Pipe

Pipe and fittings shall be in accordance with AASHTO M 304 for nominal diameters of 36 in. or less. Perforations shall be required when used as a longitudinal underdrain. Qualification requirements for the manufacturers shall be in accordance with 602.05.

100 **602.12 Smooth Wall PVC Pipe**

Pipe and fittings shall be in accordance with AASHTO M 278 for pipe sizes 4 in. through 15 in., and ASTM F 679 for pipe sizes 18 in. through 27 in. The compound used in manufacturing pipe shall have a minimum cell class in accordance with 12454C as shown in ASTM D 1784. Qualification requirements for the manufacturers shall be in accordance with 602.05.

602.13 Smooth Wall Pipe for Outlets

Pipe and pipe fittings shall be smooth wall, non-perforated plastic pipe. Qualification requirements for the manufacturers shall be in accordance with 602.05.

110

(a) Type PSM PVC Pipe and Fittings

Pipe and fittings shall be in accordance with ASTM D 3034, SDR 23.5.

(b) Schedule 40 PVC Pipe

Pipe shall be in accordance with ASTM D 1785 and shall have a minimum pipe stiffness of 150 psi at 5% deflection when determined in accordance with ASTM D 2412.

602.14 Solvent Cements for PVC and Pipe Fittings

120 Solvent cement for polyvinyl chloride pipe and fittings shall be in accordance with ASTM D 2564. Qualification requirements for the manufacturers of this material shall be in accordance with 602.05.

602.15 Reserved (Thermoplastic Pipe Liners)**602.16 Rubber Type Gaskets**

130 Ring gaskets for pipe shall be in accordance with AASHTO M 315, Standard Gasket. Material furnished under this specification shall have a certification that shall be prepared by the manufacturer. It shall show the limits of test values for the specified tests and shall certify that the materials furnished comply with the specifications. The applicable specification shall be referred to in the certification. The tests may be conducted in the laboratory of the manufacturer or in another qualified laboratory.

602.17 Bituminous Mastic Pipe Joint Sealer

This is a cold applied, mineral filled, joint sealing compound for joints of bell and spigot or tongue and groove concrete or clay pipe. Joint sealing compound shall be in accordance with AASHTO M 198.

(a) General Requirements

140 This sealer shall be a smooth uniform mixture, not thickened or livered, and shall show no separation which cannot be overcome easily by stirring. The material shall be of such

602.18

consistency and proportions that it can be applied readily with a trowel, putty knife, or caulking gun without pulling or drawing. It shall exhibit good adhesive and cohesive properties when applied to metal, concrete, or vitrified clay surfaces. It shall not be damaged by exposure to below freezing temperatures and shall be applicable when the temperature of the air is between 20°F and 100°F.

(b) Certification

150 Material furnished under this specification shall have a certification that shall be prepared by the manufacturer and shall certify that the materials furnished are in accordance with the specifications. The applicable specification shall be referred to in the certification.

602.18 Elastomeric Seals

Elastomeric seals for joining plastic pipe shall be in accordance with ASTM F 477. Qualification requirements for the manufacturers of this material shall be in accordance with 602.05.

602.19 Anti-Seep Collars

Anti-seep collars shall be constructed of a wood frame with neoprene or of HDPE sheets.

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(a) Neoprene Anti-seep Collar

Neoprene anti-seep collars shall be used for pipes with smooth walled exteriors. Neoprene anti-seep collars shall be constructed of a wood frame with a neoprene insert. The frame shall be constructed of one 1 in. nominal dimension sheet of lumber with two 1 in. by 4 in. nominal dimension lumber members attached on the top and bottom to hold the neoprene. The neoprene shall face upstream. The hole in the sheet of lumber shall be cut to the outside diameter of the pipe. The hole in the neoprene shall be cut at 25% the diameter of the pipe.

(b) HDPE Anti-seep Collar

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HDPE anti-seep collars shall be used for pipes with corrugated exteriors. HDPE anti-seep collars shall be constructed of 1/4 in. HDPE sheets. The hole for the pipe shall be cut into two HDPE sheets to create an overlap of 2 in. The diameter of the hole shall be the inner corrugated dimension. Plastic bolts shall be used to join the sheets and be placed 4 in. on center. A mastic sealant shall be used on seam between the two sheets, bolt holes, and joint between the pipe and the anti-seep collar to prevent leaks.

SECTION 603 – METAL PIPE

603.01 Corrugated Steel Pipe and Pipe-Arches

Corrugated steel pipe and pipe-arches shall be type I, IA, II, or IIA in accordance with AASHTO M 36.

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Corrugated steel pipe, pipe-arches, and coupling bands shall be zinc coated steel or aluminum coated steel in accordance with AASHTO M 36, except as noted herein. They may be fabricated with circumferential corrugations and riveted lap joint construction or with helical corrugations with continuous lock or welded seam extending from end to end of each length of pipe. Reforming the ends of helical corrugated pipe to form circumferential corrugations will be

permitted to allow use of circumferential corrugated coupling bands. The reforming shall be limited to the length required to accommodate the coupling bands and in such a manner that there is no appreciable slippage of the seam nor a plane of weakness created.

Polymer precoated galvanized corrugated steel pipe type IA and pipe-arch type IIA have an outer shell of corrugated sheet with helical corrugations and an inner liner of smooth sheet attached to the shell with a helical lock seam.

20 Fittings, including stub-tee connections and saddle connectors shall be shop fabricated. Damage to the coating on fittings shall be repaired in accordance with AASHTO M 36.

Sheet metal used to fabricate pipe shall be the same brand from the same manufacturer in any one length of finished pipe.

30 The manufacturer shall furnish to the fabricator a certified mill report for materials shipped to the fabricator. This certified mill report shall list the kind of base metal, actual test results of the chemical analysis and mechanical tests of each heat, the thickness, the weight of coating, and shall certify that the material complies with specified requirements for the type of metal furnished.

The fabricator shall certify, on furnished forms that:

- a. the fabricated structure has been manufactured in accordance with these Standard Specifications;
- b. based on the sheet manufacturer's certified mill report, the materials used in fabricating the structure were tested and the test results are in accordance with the specified requirements; and
- 40 c. copies of the sheet manufacturer's certified mill report shall be on file and available to review for five years.

603.02 Corrugated Aluminum Alloy Pipe and Pipe-Arches

Pipes, pipe-arches, and coupling bands shall be in accordance with AASHTO M 196. The pipe shall be type I, IA, II, or IIA.

50 The sheet manufacturer's certified mill report and the fabricator's certification shall be in accordance with 603.01, except the documents shall be in accordance with the applicable requirements of AASHTO M 196.

Where aluminum alloy pipe culvert is furnished, aluminum alloy end sections shall also be furnished. All component parts shall be aluminum alloy.

603.03

603.03 Metal End Sections

The end section's metal shall be in accordance with AASHTO M 36 or M 196, whichever is applicable. The sheet metal manufacturer's certified mill report and the fabricator's certification shall be in accordance with 603.01 or 603.02, whichever is applicable.

60 End sections consisting of multiple panels shall have lap seams which shall be tightly jointed with 3/8 in. galvanized rivets or bolts.

All steel pipe end sections shall have a toe plate anchor constructed of 0.138 in. thick galvanized steel. The toe plate anchor shall be match punched to fit holes in the skirt lip, and shall be supplied loose, and complete with 3/8 in. diameter galvanized bolts.

Straps for pipe end sections shall be either galvanized No. 6 reinforcing bars or zinc coated 3/8 in. diameter aircraft cable.

70 603.04 Polymer Precoated Galvanized Corrugated Steel Culvert Pipe and Pipe-Arches

The pipe or pipe-arch and coupling bands shall be in accordance with AASHTO M 245 with additions in accordance with 603.01. The polymer precoated galvanized steel sheets shall be in accordance with AASHTO M 246, Grade 10/10.

603.05 Structural Plate Pipe, Pipe-Arches, and Arches

(a) Steel

80 Steel structural plate pipe, pipe-arches, and arches shall be constructed from individually galvanized corrugated steel plates as described herein. For pipes and pipe-arches having a thickness less than 0.280 in., the bottom plates shall be of the next greater thickness than that specified for the top and side plates, not including corner plates for pipe-arches. The individual plates shall be in accordance with AASHTO M 167 and Section 26 of the AASHTO Standard Specifications for Highway Bridges, Division II.

The materials and fabrication shall be as follows:

- 90
1. The minimum corner plate radius of the arc joining the top and bottom plates of pipe-arches shall be 18 in. for openings up to and including 131 sq ft and 31 in. for openings over 131 sq ft. The minimum radius of the arc shall be 31 in. for openings from 98 sq ft up to and including 214 sq ft.
 2. Assembly bolts shall be in accordance with AASHTO M 164, ASTM A 325, or ASTM A 449. Nuts shall be in accordance with ASTM A 563, grade C; AASTHO M 164; or ASTM A 325. Assembly bolts, nuts, and washers shall be galvanized in accordance with ASTM A 153, or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C.

- 100 3. The sheet manufacturer's certified mill report and the fabricator's certification shall be furnished in accordance with 603.01, except the documents shall be in accordance with the applicable requirements of AASHTO M 167.

(b) Aluminum Alloy

Aluminum alloy structural plate pipe, pipe-arches, and arches shall be in accordance with AASHTO M 219. The sheet manufacturer's certified mill report and the fabricator's certification shall be furnished in accordance with 603.01.

603.06 Cast Iron Soil Pipe

- 110 This pipe shall be in accordance with ASTM A 74. Markings shall be in accordance with ASTM A 74 or ANSI A 40.1.

603.07 Steel Pipe

This item shall be electric-fusion, arc-welded steel pipe in accordance with ASTM A 139, grade B, or electric-resistance welded pipe in accordance with ASTM A 53, Type E, Grade B, as applicable. Material furnished under this specification shall have a certification that shall be prepared by the manufacturer and shall certify that the materials furnished are in accordance with the specifications. The applicable specification shall be referred to in the certification.

- 120 **603.08 Straps, Hook Bolts and Nuts Used in Anchors**

Straps shall be of the type and size shown on the plans. Reinforcing bars used for straps shall meet the applicable requirements of 604.01 and shall be galvanized in accordance with ASTM A 767, class I. Aircraft cable used for straps shall be made of zinc coated steel wire, 3/8 in. nominal diameter, consisting of seven 19 wire flexible steel strands, with a minimum breaking strength of 14,000 lb. The cable shall be in accordance with Military Specification MIL-W-83420D.

- 130 Hook bolts and nuts shall be of the size shown on the plans, shall be in accordance with ASTM A 307, and shall be galvanized in accordance with ASTM A 153. Threads shall be American Standard Coarse Thread Series Class 2 fit. Threads shall be cleaned after galvanizing to provide a free running fit. Maximum oversizing of the nut threads shall be 1/64 in.

SECTION 604 – METAL MATERIALS

604.01 Reinforcing Bars

(a) General

Unless otherwise specified, bars for concrete reinforcement shall be deformed billet steel, grade 60. Tie bar assemblies used in lieu of bent tie bars shall be in accordance with the minimum total ultimate strength and minimum total yield strength requirements specified for bent tie bars; bend test and elongation will not be required.

- 10 Reinforcement used in precast concrete structural members, including deck panels, shall be in accordance with ASTM A 615 grade 60 or ASTM A 706 grade 60.

604.02

Reinforcing bars shall be furnished by selecting bars made by a manufacturer on INDOT's list of Certified Uncoated Reinforcing Bar Manufacturers. Material furnished under this specification shall have a certification that shall be prepared by the manufacturer and shall certify that the materials furnished are in accordance with the specifications. The applicable specification shall be referred to in the certification.

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(b) Specific Requirements

1. Billet Steel Bars

Billet steel bars shall be in accordance with ASTM A 615.

2. Threaded Tie Bar Assembly

The threaded tie bar assembly shall be deformed billet steel, grade 60 or higher, in accordance with 604.01(b) 1 and a coupling device. The tie assembly shall achieve a minimum load of 76.144 kip/in.2.

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3. Splicing Systems

Reinforcing bar splicing systems shall be selected from INDOT's list of approved Reinforcing Bar Splicing Systems.

(c) Inspection, Sampling, and Testing

All reinforcing bars may be inspected, sampled, and tested after delivery to the project.

604.02 Steel Fence Posts

40 Tubular steel fence posts and line posts shall meet the following specifications and the requirements as shown on the plans.

(a) Line Posts

Line posts shall be in accordance with AASHTO M 281 and galvanized in accordance with AASHTO M 111, Coating grade 65. Line posts for field fence shall be furnished with anchor plates. End, corner, pull, and gate posts for field type fence shall be furnished with braces and all fittings and details required to make a complete installation as shown on the plans.

(b) Tubular Steel Fence Posts

50 Tubular section posts shall have heavy malleable iron caps or pressed galvanized steel caps. Such caps shall be made to provide a drive fit over the outside of the section to exclude moisture. The weight per foot for tubular posts and braces shall be no less than 90% of the weight specified.

Tubular steel fence posts shall be hot-dipped zinc-coated and shall be in accordance with ASTM F 1083. The weight per foot will be acceptable provided it is at least 90% of the specified weight.

End, corner, and pull posts shall be 2 in. nominal diameter and shall weigh 3.65 lbs/ft. The diagonal brace shall be 1 1/4 in. nominal diameter and shall weigh 2.27 lbs/ft. Line posts shall weigh 1.33 lbs/ft.

(c) Fence Fastenings

When fastenings are necessary for attaching the field fence to the posts, they shall be either galvanized or aluminum coated No. 9 wire, or galvanized or aluminum coated clamps of the manufacturer's standard design. The coating weights shall be a minimum of 0.60 oz/sq ft and 0.30 oz/sq ft for galvanized and aluminum coated, respectively. A sufficient quantity of individual tie wires or clamps shall be furnished to provide for five attachments of the fencing to each line post and one tie wire for each strand of barbed or tension wire.

Line posts for chain link type fence shall be furnished with the necessary tie wires or fabric bands for fastening the fabric to the posts. These fastenings shall be made of aluminum strip or wire of approved gage and design or of galvanized steel wire and may be in accordance with the manufacturer's standard design. If galvanized steel wire ties are furnished, the wire shall be no smaller than No. 9 gage. A sufficient quantity of individual ties or bands shall be furnished to provide for attaching the fabric to each line post each 1 ft or as called for on the plans.

604.03 Fence, Fittings, and Gates

(a) Field or Woven Wire Fence

This fence shall be in accordance with ASTM A 116. The wire shall be No. 9 gage. The design shall be 1047-6-9. The coating shall be class 3. The method of securing the vertical stays to the horizontal wires may be either of those shown on the plans. Diagonal braces shall be in accordance with 910.18(b)3.

(b) Steel Fabric Chain Link Fence

This fence shall be in accordance with ASTM A 392 for galvanized steel fabric or ASTM A 491 for aluminum coated steel fabric. The height of the fabric shall be 48 in. unless otherwise specified. It shall be of No. 9 gage wire woven in 2 in. mesh. The fabric shall be knuckled at the top and bottom selvages when the height is less than 72 in. Fabric of 72 in. in height or higher shall be knuckled at the top and shall have the twisted and barbed finish at the bottom. For galvanized fabric, coating shall be done after weaving and shall be class II, average of 2 or more specimens no less than 2.0 oz/sq ft and no less than 1.8 oz/sq ft for any individual specimen. For aluminum coated fabric, coating shall be class II, 0.40 oz/sq ft minimum.

The fabric shall be furnished with ties required for fastening it to the top and bottom tension wires. These fastenings may be of aluminum wire or strip of approved gage and design, or of galvanized steel wire in accordance with the manufacturer's standard design. If galvanized steel wire ties are furnished, the wire shall be no smaller than No. 12 gage. Sufficient ties shall be furnished to provide for attaching to the top and bottom tension wires each 24 in. Fittings necessary to make complete installation shall be pressed or rolled steel, forged steel, cast steel, or malleable iron.

Steel fabric chain link fence shall be as shown on the plans and as set out above.

1. Tension Wire

110 Tension wire intended for use on the top or bottom of steel chain link fence or on the bottom of field fence when specified shall be spring coil or crimped steel wire with an initial diameter of 0.177 ± 0.005 of an in., a minimum breaking load of 1,950 lb, and a coating of either zinc or aluminum. The minimum weight of coating shall be 0.80 oz/sq ft for galvanized wire and 0.40 oz/sq ft for aluminum coated steel wire. The weight of aluminum coating shall be determined in accordance with ASTM A 428.

2. Stretcher Bars, Truss Rods, and Turnbuckles

Stretcher bars shall be 3/16 by 3/4 in. flat bars. These bars, truss rods, turnbuckles, and necessary fittings shall be of good commercial quality steel, malleable iron, or wrought iron. They shall be galvanized in accordance with ASTM A 153 after fabrication. The turnbuckles shall be made from drop forged malleable iron. They shall have a minimum take up of 4 in. The fittings may be pressed or rolled steel, forged steel, cast steel, or malleable iron.

120 3. Braces

Braces shall be made of steel pipe with bolted steel couplings or connections. Steel pipe shall be in accordance with ASTM F 1083. They shall be galvanized as set out therein. Fabrication or manipulation that causes minor damage to the galvanized coating shall be corrected by approved application of a high zinc dust-zinc oxide paint conforming to the requirements of Federal Specification TT-P-641 type II or Military Specifications DOD-P-21035. When spray paints are used, two coats shall be applied. Damaged braces will be rejected.

4. Barbed Wire

130 Barbed wire used at the top and bottom of field fence, or as otherwise specified, and in accordance with 0 shall be in accordance with applicable provisions of ASTM A 121. It shall be composed of No. 12 1/2 gage galvanized or aluminum coated steel wire with four round 14 gage barbs at approximately 5 in. spacing. The galvanized coating shall be in accordance with class 3 in Table 2. The minimum aluminum coating shall be in accordance with class 60 for the line wire and class 20 for the barb wire. The weight of coating shall be determined in accordance with ASTM A 428. The use of aluminum barbs, in accordance with ASTM B 211, alloy 5052-H38, nominal diameter No. 14 gage, will be permitted.

140 The use of barbed wire with No. 15 1/2 gage, high tensile strength line wires, and No. 16 1/2 gage barbs will be permitted. The barbs shall be round with four points and spaced at approximately 5 in. intervals. The barbed wire shall be in accordance with ASTM A 121. The galvanized coating shall be in accordance with class 3 in Table 2.

(c) Aluminum Fabric Chain Link Fence

This fence shall be in accordance with the applicable requirements of 604.03(b except for composition of materials. Requirements for the various component parts of aluminum fence shall be as shown in Table 1.

TABLE 1

ITEM	ASTM REFERENCE	ALLOY	ADDITIONAL INFORMATION
Fabric	B 211	Alclad 5056 or 6061-T94	
Barbed Wire-Line	B 211	5062-0, H38, or 6061-T89	2-strand dia. 0.110 in. 4-pt barb. dia. 0.080 in. 5 in. space
Barbs	B 211	5052-H38	
Tension Wire	B 211	Alclad 5056 or 6061-T94	Dia. 0.192 in.; Note 1
Hog Ring Fasteners	B 211	6061-T94	Dia. 0.110 in.
Wire Ties	B 211	1100-H18	Dia. 0.148 in.
Flat band ties	B 211	3003-H14	1.2 in. wide; 0.06 in. thick
Stretcher Bars	B 211	6063-T6	3/4 in. by 1/4 in.; square edges
Truss and Brace Rods	B 211 or B 221	6061-T6	Dia. 3/8 in.
Turn Buckles	B 26 (cast parts), B 211 (wrought)	356.0-T6 6061-T6	
Bands	B 221	6063-T6	1/8 in. by 1 in. beveled edge
Bolts	B 211 or B 221	2024-T4	ASA B 18.2 hexagon threads class 2, 2A, or 2B
Nuts	B 211 or B 221	6061-T6	
Expansion Sleeves	B 210	3003-H18	1.695 in. ID by 0.078 in.; wall drawn type. 6 in. long; self centering
Post Tops, Rail And Brace Ends	B 26 or B 108	356.0T6	Fabricated in permanent molds or sand castings
Top and Brace Rails	B 241 and B429	6063-T6	1 1/4 in. pipe; Note 2
Barbed Wire Extension Arms	B 26 or B 108	356.0T6	1 1/4 in. pipe; Note 2
Line Posts	B 241 and B429	6063-T6	2 in. pipe; Note 2
Corner Posts	B 241 and B429	6063-T6	2 1/2 in. pipe; Note 2
Note 1:	Aluminum coated steel wire in accordance with 604.03(b) may be used.		
Note 2:	ANSI schedule 40 pipe, plain ends.		

604.04 Structural Steel

150 Structural steel shall conform ASTM A36. Welding methods shall be shielded metal arc welding or gas metal arc welding.

SECTION 605 – WOOD MATERIALS

605.01 Project Signs

Project signs shall be constructed of good sound materials suitable for the purpose. Lumber shall be of softwood, No. 2 or Standard grade.

All project sign hardware shall be of commercial quality and of the sizes shown in the detail on the plans.

- 10 The base coat shall be primer paint. The finish coats shall be exterior oil paint. Letters and trim shall be enamel paint.

605.02 Stop Logs

Stop logs shall be constructed of 2 in. by 12 in. treated lumber. Stop logs shall be grooved on the bottom and tongued on the top.

SECTION 606 – CONCRETE MATERIALS

606.01 Concrete

Concrete shall have a 28 day compressive strength of 4,000 psi. The cement content in pounds per cubic yard of concrete shall be 564. The maximum water/cement ratio in pounds of water per pound of cement shall be 0.490. Slump shall be no less than 1 in. or more than 4 in. All concrete shall have an air content of 6.5% \pm 1.5% by volume. Relative yield shall be within \pm 2%. Batch weights shall be included on or with all concrete delivery tickets.

- 10 Concrete shall not be placed on frozen ground. Concrete shall be wet cured (wet burlap and plastic) for a minimum of 72 hours. Concrete slabs shall be wet cured for a minimum of 168 hours. Cure time can be suspended when tests indicate the concrete has met the compression strength requirements. When the atmospheric air is expected to be below 40 degrees Fahrenheit, a minimum temperature of 50 degrees Fahrenheit shall be maintained at the concrete surface for a minimum of 72 hours. No load shall be applied to concrete prior to 28 days after placement or until tests indicate compression requirements are met, whichever comes first. Alternate curing methods shall be approved by the Engineer

- 20 Slump tests shall be in accordance with ASTM C 143. Compression test specimens shall be in accordance with ASTM C 31 or ASTM C 42. Compressive strength tests shall be in accordance with ASTM C 39. Air content shall be determined in accordance with AASHTO T 152 or ASTM C173. Relative yield shall be determined in accordance with AASHTO T 121.

606.02 Packaged, Dry, Combined Materials for Mortar and Concrete

These materials shall be in accordance with ASTM C 387. All packages shall be identified as conforming to ASTM C 387. The markings shall also show the kind and type of material, the net weight in each bag, the yield in cubic feet or yield in square feet per inch of thickness, and the amount of water recommended for mixing to produce a 2 in. to 3 in. slump.

30 **606.03 Water**

Water used in mixing or curing of concrete shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substance injurious to the finished product. Water will be tested in accordance with AASHTO T 26. Water shall be in accordance with the requirements as follows.

- (a) pH 6 to 8
- (b) Chloride Ions less than 300 ppm
- (c) Sulphate (SO₄) less than 500 ppm
- (d) Total Solids less than 1500 ppm

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In addition, water containing algae will be unacceptable for use in concrete. Water known to be of potable quality may be used without test. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

SECTION 607 – REVEGETATION MATERIALS

607.01 Temporary Seed

Temporary seed will be approved for use by visual inspection of the Engineer. Temporary seed may be purchased from any commercial source provided the seed's package is clearly marked and labeled by the manufacturer as to its content and weight.

607.02 Fertilizer

10 Fertilizer shall be commercial fertilizer with an analysis of percent nitrogen-phosphate-potash. Fertilizer may be purchased from any commercial source provided the fertilizer's package is clearly marked and labeled by the manufacturer as to its content and weight.

Tests will not be required, but fertilizer standards shall be governed by the rulings of the Indiana State Seed Commissioner.

607.03 Agricultural Lime

Agricultural lime shall be raw, ground agricultural limestone meeting the following requirement:

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1. Fineness, percent passing the No.8 sieve, shall be no less than 80.
2. The total neutralizing value, calcium carbonate equivalent shall be no less than 90.
3. The product of the two factors, fineness multiplied by the calcium carbonate equivalent, shall be no less than 8500.

607.04 Grass and Legume Seed

30 Grass and legume seed in the quantities and varieties required shall be furnished full-tagged and delivered in properly designated packages or bags as directed. Seeds shall be in accordance with the following requirements.

Seed of warm season grasses, forbs, or aquatic species shall be delivered to the project site individually packaged by species. Warm season grass and forb seed shall be purchased from lots for which test results are provided. Testing will not be required for aquatic species. When normal germination testing is not practical for forb species, a tetrazolium test shall be conducted to determine seed viability.

40 Seeds shall contain none of the noxious weeds listed herein nor any that are listed in the Acts of the General Assembly of the State. Noxious weeds are Canada Thistle, Field Bindweed, Johnson Grass, Perennial Peppergrass, Perennial Sowthistle, Quack Grass, Russian Knapweed, and Wild Garlic.

Clover shall be free from dodder with no tolerance allowed.

Requirements noted above are minimums and trade allowances will not be permitted.

50 Seed shall be of known origin and quality. Seed shall be purchased from sources of supply that have been sampled, tested, and reported by the State Seed Commissioner, Purdue University, West Lafayette, Indiana, and found to be satisfactory. Seed of warm season grasses shall be tested by the State Seed Commissioner or an independent laboratory. Seed of forbs shall be tested by an independent laboratory. Test results by independent laboratories shall be signed by a Registered Seed Technologist. Test results shall be submitted to the State Seed Commissioner, and a copy to the Division. This report is required before seed is sown. Such test report shall be no more than nine months old at the time seed is used and the use of the seed shall be subject to approval.

60 Each bag of seed shall bear a tag showing the purity and germination test results, the testing date, and that the seed meets the requirements of the Commission. Receipts or tags indicating the seed mix is in compliance with the specifications shall be retained by the Contractor and presented to the Engineer upon request.

Seed which has been tested by the State Seed Commissioner may be used without further testing provided each bag of seed bears a tag showing the seed meets the requirements of the Standard Specifications.

607.05 Mulch

(a) Mulch for Seeding

70 Mulch for seeding may consist of straw; excelsior mulch; wood cellulose fiber mulch; excelsior blanket; paper mat; or straw mat. All mulch shall be reasonably free from primary noxious weeds.

1. Straw

Straw mulch shall consist of clean straw from agricultural crops and contain no more than 50 percent moisture at time of delivery. Straw mulch containing more than 50 percent moisture shall be rejected.

2. Excelsior Mulch

80 Excelsior mulch shall consist of wood fibers cut from sound green timber. The average length of the fibers shall be 4 in. to 6 in. The cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to the natural grain of the wood so as to cause splintering of the fibers when weathering in order to provide adherence to each other and to the soil.

3. Wood Cellulose Fiber

90 Wood cellulose fiber mulch shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when disbursed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed, and fertilizer when allowed, to form a homogeneous slurry. The mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface. The mulch shall be heat processed so as to contain no germination or growth inhibiting factors. It shall be non-toxic and colored green. Material containing more than 15% will be rejected. The ash content shall not exceed 1.5%. One hundred grams of oven dried material saturated in water, drained, and weighed shall hold a minimum of 1,000 grams of water.

4. Excelsior Blanket

100 Excelsior blanket shall consist of a machine produced mat of wood excelsior with 80% of the fibers to be 6 in. or longer. The wood from which the excelsior is cut shall be properly cured to achieve curled and barbed fibers. The blanket shall have a consistent thickness, with the fibers evenly distributed over the entire area of the blanket. The excelsior blanket shall be covered on the top side with a 3 by 1 in. leno weave, twisted kraft paper yarn netting having a high wet strength, or a biodegradable extruded plastic mesh netting having an approximate minimum opening of 5/8 by 5/8 in. to an approximate maximum opening of 2 in. by 1 in. The netting shall be entwined with the excelsior mat for maximum strength and ease of handling. The minimum roll width shall be 4 ft. The mass of the material shall be not less than 0.7 lb/sq yd, constant mass, air dry. The rolls shall be packaged with suitable protection for outdoor storage on the project site in a manner which protects them from biodegradation prior to use.

5. Paper Mat

110 Paper mat shall consist of a knitted construction of photodegradable, polypropylene yarn with uniform openings interwoven with strips of biodegradable paper. The rolls shall be packaged with suitable protection for outdoor storage at a construction site in a manner which protects them from biodegradation prior to use. The mass of the paper shall be a minimum of 0.125 lb/sq yd. Roll sizes shall have a minimum width of 5 ft.

6. Straw Mat

120 Straw mats shall consist of a machine produced mat consisting of at least 90% of the total dry mass being clean straw from agricultural crops, with the exception that up to 30% of the total dry mass may be coconut fibers in lieu of an equal percentage of straw. Paper or paper related products shall not be permitted as component in the straw mat. The straw shall be evenly distributed throughout the mat to form a thickness of 1/2 in. \pm 1/8 in. The top side of the mat shall be covered with a photodegradable/biodegradable plastic mesh which shall be substantially

607.06

adhered to the straw by a knitting process using photodegradable/biodegradable thread. The rolls shall be packaged with suitable protection for outdoor storage at a construction site in a manner which protects them from biodegradation prior to use. The average dry mass of the straw shall not be less than 0.7 lb/sq yd. The minimum roll width shall be 6 ft.

7. Compost Mulch

130 Compost mulch shall consist of well-composted vegetable matter, leaves, yard trimmings, food scraps, composted manures, paper fiber, wood bark, class A bio-solids as defined in Title 40 of the Code of Federal Regulations at 40 CFR Part 503, or any combination thereof. Compost shall be produced using an aerobic composting process in accordance with 40 CFR Part 503 regulations, including time and temperature data indicating effective weed seed pathogen, and insect larvae kill. Compost shall be well decomposed, stable, and weed free. Compost shall be refuse free by less than 1% by weight. Compost shall be free of any contaminants and materials toxic to plant growth. Inert materials shall not exceed 1% by dry weight, pH of 5.5 to 8.0. Carbon-nitrogen ratio shall not exceed 100. Moisture content shall not exceed 45% by dry weight. Variable particle size of the compost shall be a maximum dimension of 3 in. in length 1/2 in. in width, and 1/2 in. in depth. Compost mulch shall not be used in storm
140 water runoff channels or where concentrated flow is anticipated.

(b) Mulch for Plants

Mulch for plants shall consist of broken corncobs, wood chips, chopped bark, size No. 5 gravel, or crushed stone in accordance with 601.04, except 0% to 5% may pass the No. 200 sieve, or other approved materials. The particles of wood chips, chopped bark, and corncobs shall contain no more than 10% passing the 1/2 in. screen and 100% shall pass the 3 in. screen. Wood chips shall be from green, hardened, deciduous trees. Broken corncobs shall be no longer
150 than 4 in.

607.06 Leguminous Inoculants

The inoculants for treating leguminous seeds shall be standard pure culture of nitrogen fixing bacteria. They shall be no more than one year old at the time of use and shall be subject to approval. Directions of the manufacturer on containers of inoculants shall be followed when inoculating seed.

607.07 Miscellaneous Materials

(a) Water

160 Water used in the planting or care of vegetation shall be free from oil, acids, alkalis, salts, or any substance injurious to plant life. Water from streams, lakes, ponds, or similar sources shall not be used unless approved.

(b) Stakes for Bracing and Anchoring

Wood stakes for anchoring straw bales shall be of rough cypress, cedar, locust, oak, or other approved wood free from knots, rot, cross grain, or other defects that would impair the strength of the stake. Wood stakes for anchoring straw bales shall be a minimum of 2 in. by 2 in. square in cross section and of a length that is the height of the straw bale plus 1 ft.

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(c) Tree Wound Dressing

Dressing for treating tree wounds or cuts shall be either:

1. an approved black asphaltum base antiseptic paint;
2. an approved black paint consisting of Bordeaux Mixture, raw linseed oil, and lampblack; or
3. an approved black paint consisting of zinc oxide, raw linseed oil, and lampblack.

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SECTION 608 – GEOSYNTHETIC AND EROSION CONTROL PRODUCTS**608.01 General Requirements**

Geosynthetics are polymer based products used for separation, filtration, reinforcement, liquid containment, soil and aggregate confinement, and many other soil related purposes within many conventional civil engineering structures.

608.02 Geotextile

10 The geotextile shall be either non-woven or woven and consist of at least 85% long-chain synthetic polymers. The geotextile shall contain stabilizers or inhibitors added to the base polymer mix to make the filaments and yarns resistant to deterioration caused by ultraviolet radiation exposure. The geotextile shall be produced such that the yarns and fibers retain their relative positions. The non-woven geotextile shall be needle punched, heat bonded or resin bonded.

All damaged geotextile shall be replaced for the entire width of the roll. The Contractor shall furnish the product labeled that clearly indicates the manufacturer's or supplier's name, product identification, lot number, manufactured date, and roll dimensions.

20 608.03 Geotextile for Riprap and Retention Applications

This material shall be non-woven. Silt film geotextiles will not be allowed unless approved.

This geotextile shall meet the physical requirements of INDOT's geotextile properties for riprap and retention applications Type 1A and be selected from INDOT's QPL list.

608.04 Geotextile for Underdrains and Drainage Applications

This material shall consist of a non-woven needle punched or heat bonded geotextile.

30 This geotextile shall meet the physical requirements of INDOT's geotextile properties for underdrain and drainage applications Type 1A and be selected from INDOT's QPL list.

608.05 Geotextile for Pavement or Subgrade Stabilizations

This material shall consist of a woven geotextile made from 100% polypropylene.

608.06

This geotextile shall meet the physical requirements of INDOT’s geotextile properties for pavement and subgrade stabilizations Type 1A and be selected from INDOT’s QPL list.

608.06 Geotextile for Silt Fence

40 The silt fence fabric shall consist of woven or non-woven geotextile.

This geotextile shall meet the physical requirements of INDOT’s geotextile properties for silt fence, wire fence supported or self supported, and be selected from INDOT’s QPL list.

608.07 Rolled Erosion Control Products

(a) Erosion Control Blankets

50 Excelsior blankets and straw mats may be used where erosion control blanket is specified as long as the following requirements are met:

- (a) the ECB shall have a net openings of 2 in. minimum width or be constructed of a loose woven (leno weave) netting, and
- (b) if the ECBs contains netting, it shall be 100% biodegradable

The following products are pre-approved:

	MANUFACTURER	PRODUCT NAME
60	East Coast Erosion Control	ECS-1B
	North American Green	BioNet S150BN
	Western Excelsior Corporation	Excel SS-2 All Natural

The Contractor may request approval of other materials from the Engineer. Criteria to be considered for approval will be meeting the above specifications, benefits to wildlife, and being constructed of non-plastic material.

(b) Turf Reinforcement Mat

70 The following products are pre-approved:

	MANUFACTURER	PRODUCT NAME
	North American Green	SC250
	SI Geosolutions	Landlok TRM 1051
	Tenax	Multimat 100

The Contractor may request approval of other materials from the Engineer. Criteria for approval will be based on specific project needs.

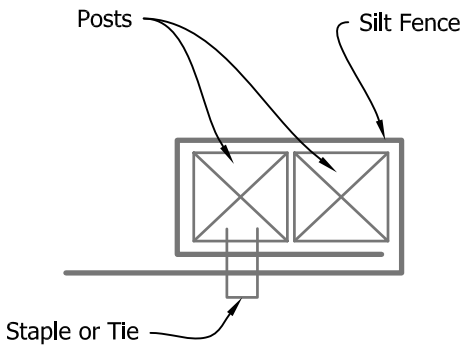
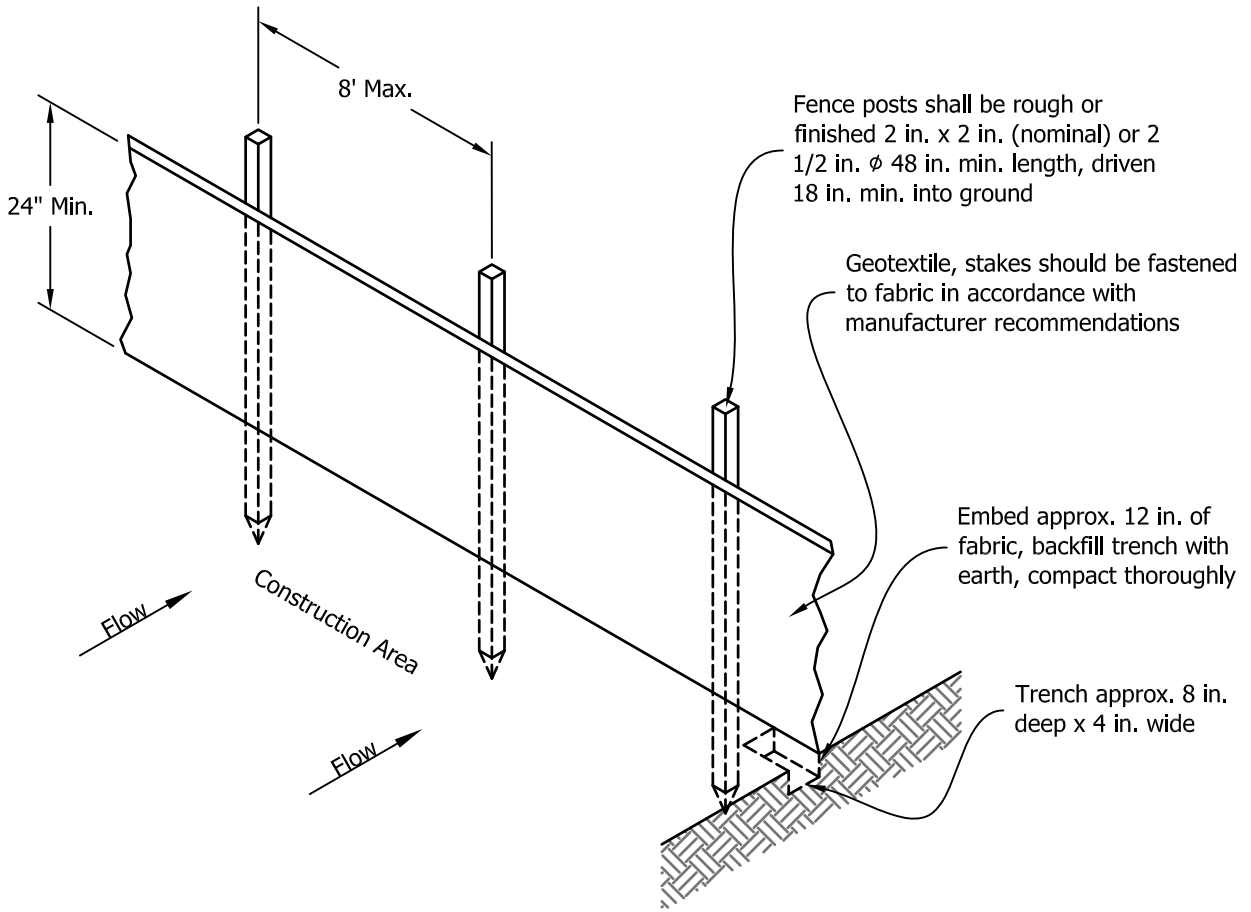
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608.08 Fabric for Waterproofing

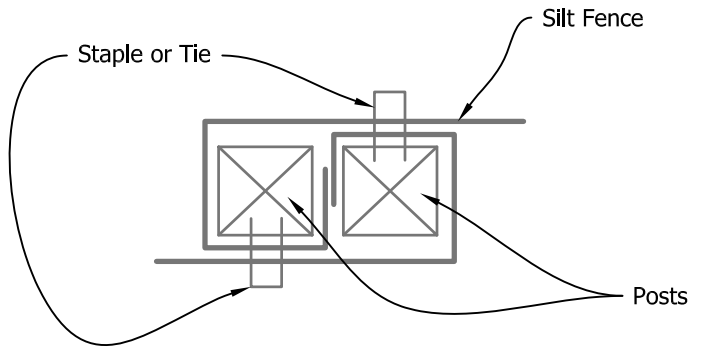
Fabric for waterproofing shall be treated cotton in accordance with ASTM D173, woven glass in accordance with ASTM D1668, or glass fiber mat in accordance with ASTM D2178. A type C certification in accordance with 916 shall be provided for the fabric.

608.08

DIVISION 07 – STANDARD DRAWINGS



End Post Detail Plan View



Joint Detail Plan View

Notes:

1. Ends of individual rolls of fabric shall be securely fastened to a common post and overlapped 3 in. min.
2. The last 10 ft of fence shall be turned up slope.



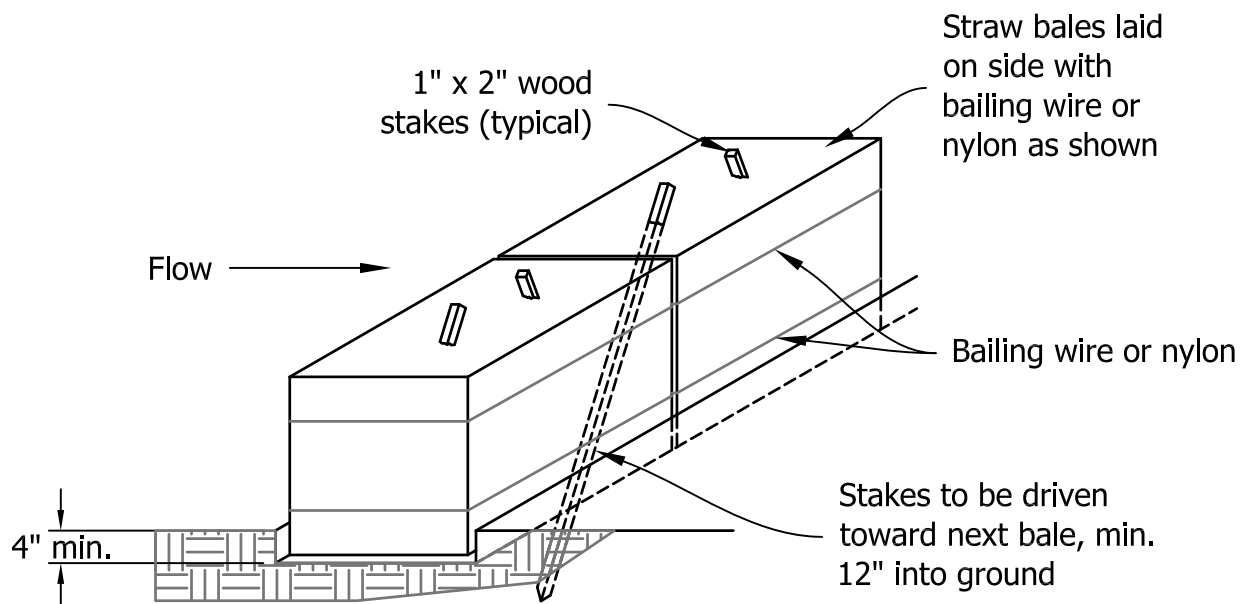
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 DIVISION OF RECLAMATION

SILT FENCE

STANDARD DETAIL NO. 205-01


NOT TO SCALE

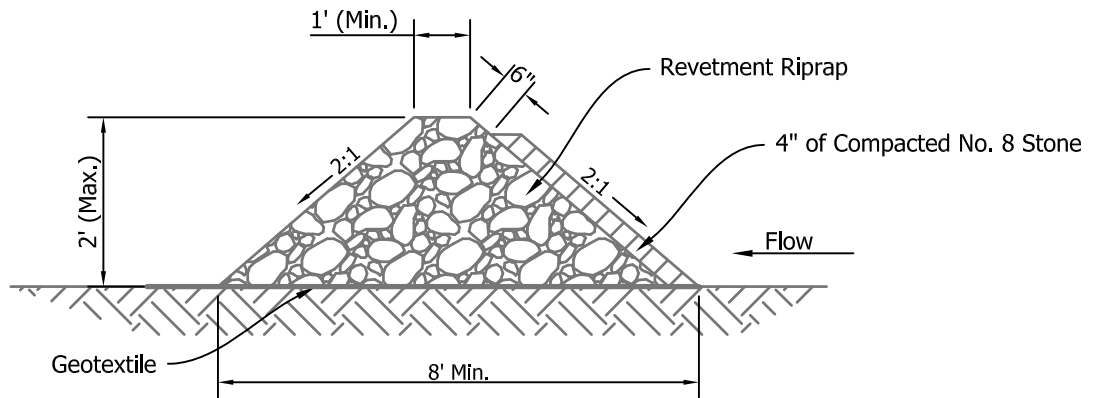
02/01/2022



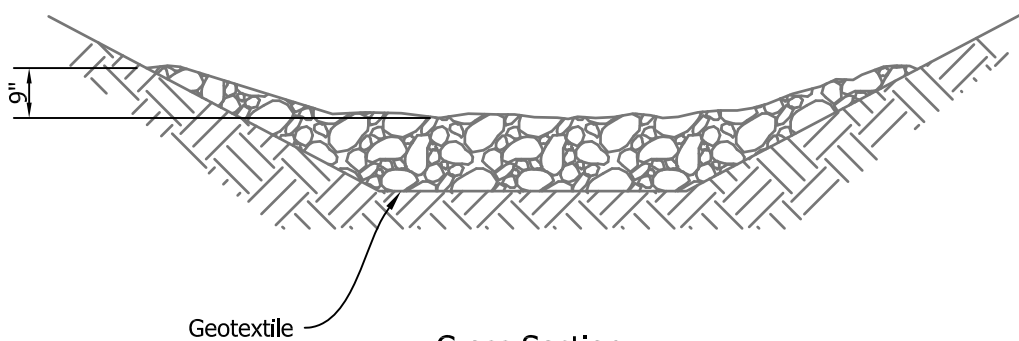
Notes:

1. Place bales perpendicular to the flow with ends tightly abutting. Use straw, rocks, or filter fabric to fill any gaps and tamp backfill material to prevent erosion or flow around the bales.
2. Inspect after each significant rain event, maintain and repair promptly.

	STATE OF INDIANA	
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	DIVISION OF RECLAMATION	
	TEMPORARY CHECK DAM, STRAW BALE	
STANDARD DETAIL NO. 205-02		
NOT TO SCALE	02/01/2022	



Profile



Cross Section

Notes:

1. Riprap check dams shall be spaced such that the top of the downstream check dam is at the same elevations as the toe of the adjacent upstream check dam.



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 DIVISION OF RECLAMATION

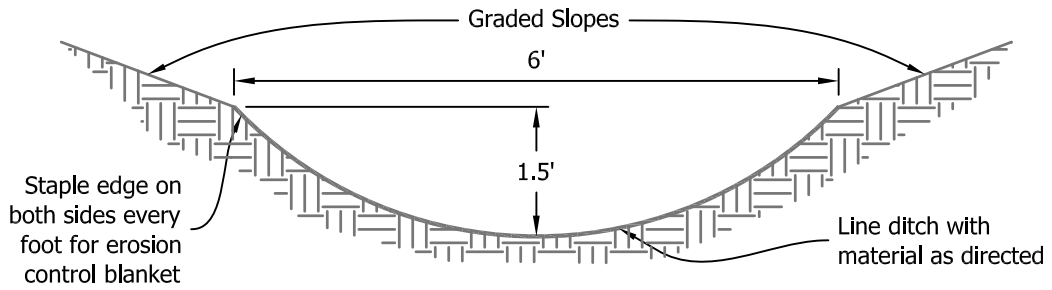
TEMPORARY CHECK DAM, RIPRAP

STANDARD DETAIL NO. 205-03

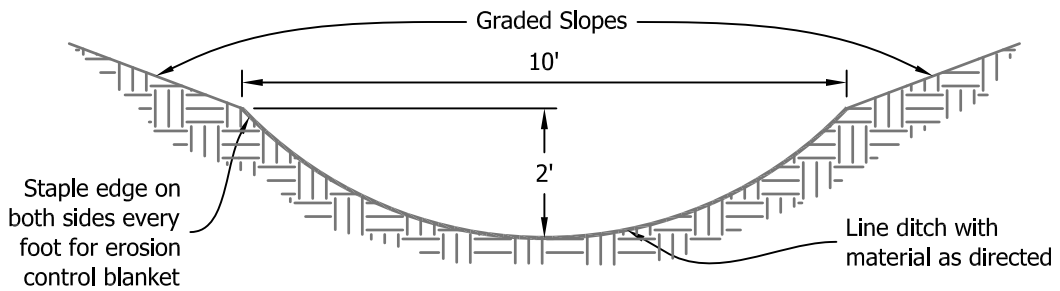
NOT TO SCALE

02/01/2022

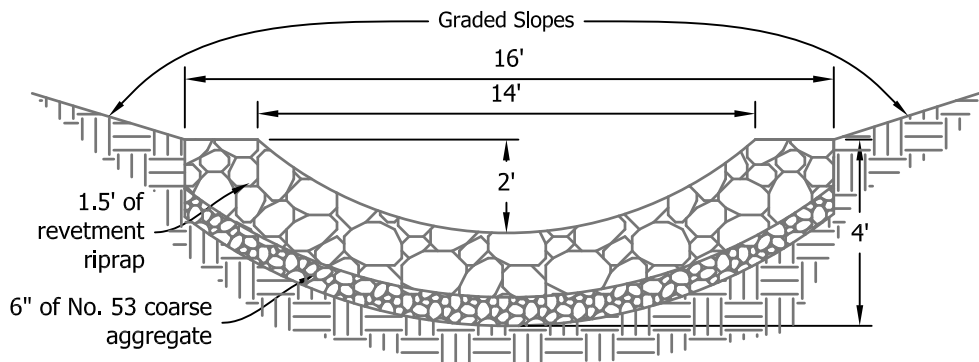
Type M-I Ditch



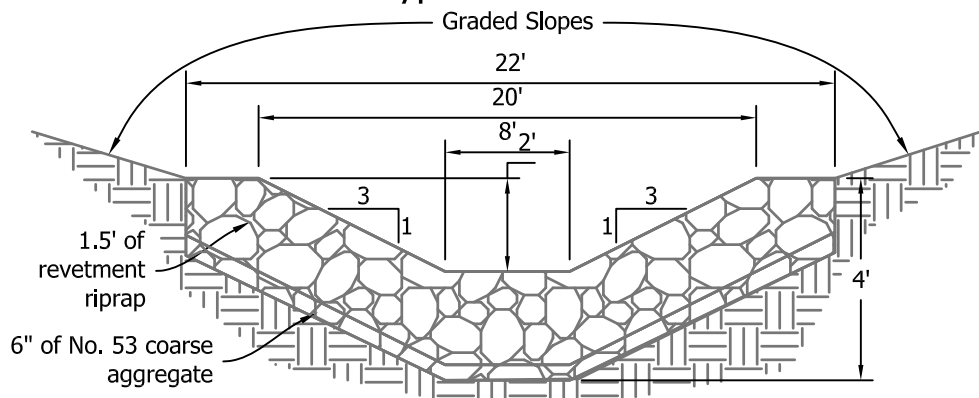
Type M-II Ditch



Type M-III Ditch



Type M-IV Ditch



Note: Erosion control blanket, riprap, aggregate, and other materials placed in ditches as directed will be paid for separately in accordance with the schedule of supplemental unit prices.



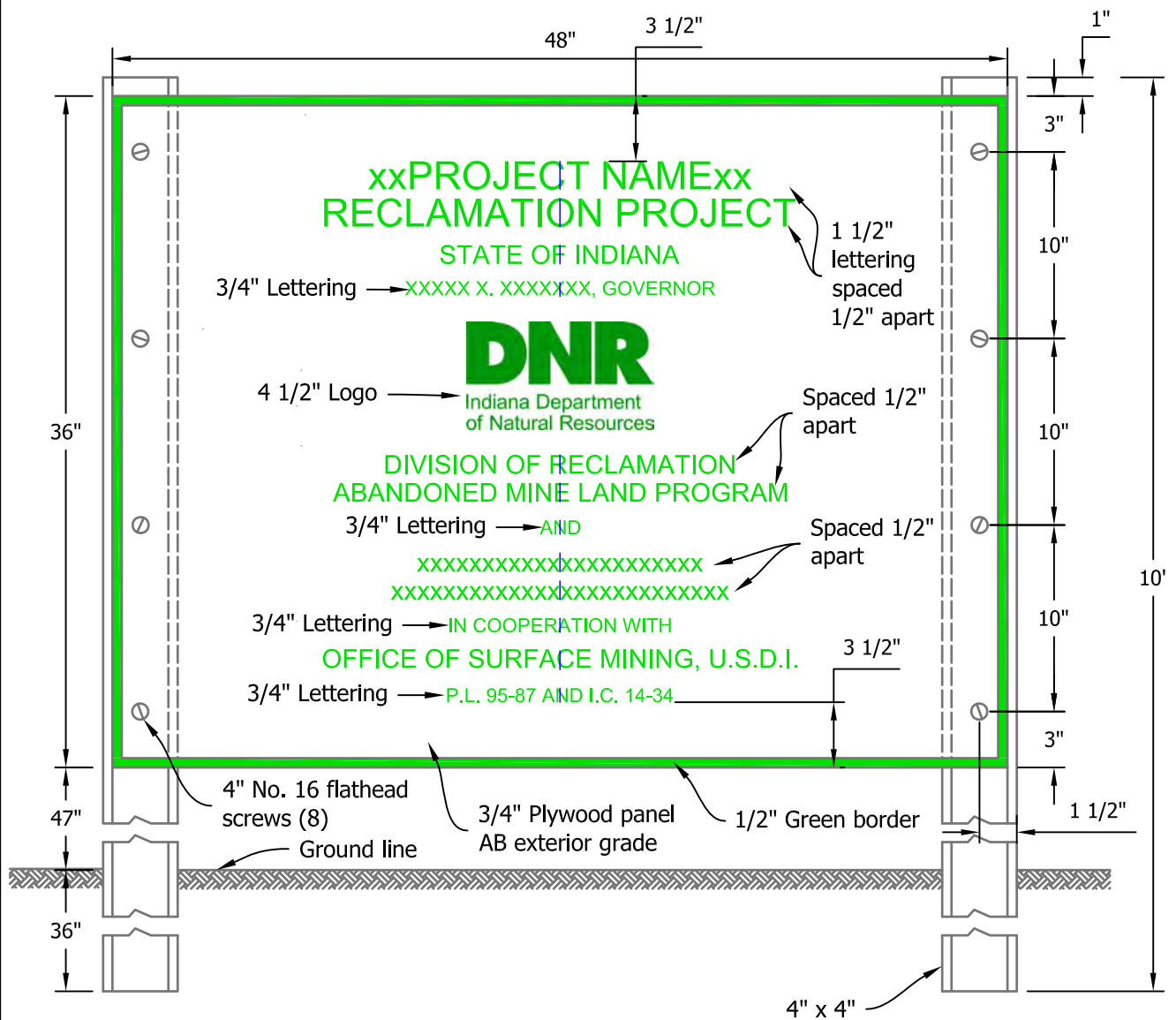
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DITCH TYPES

STANDARD DETAIL NO. 301-01

NOT TO SCALE


02/01/2022

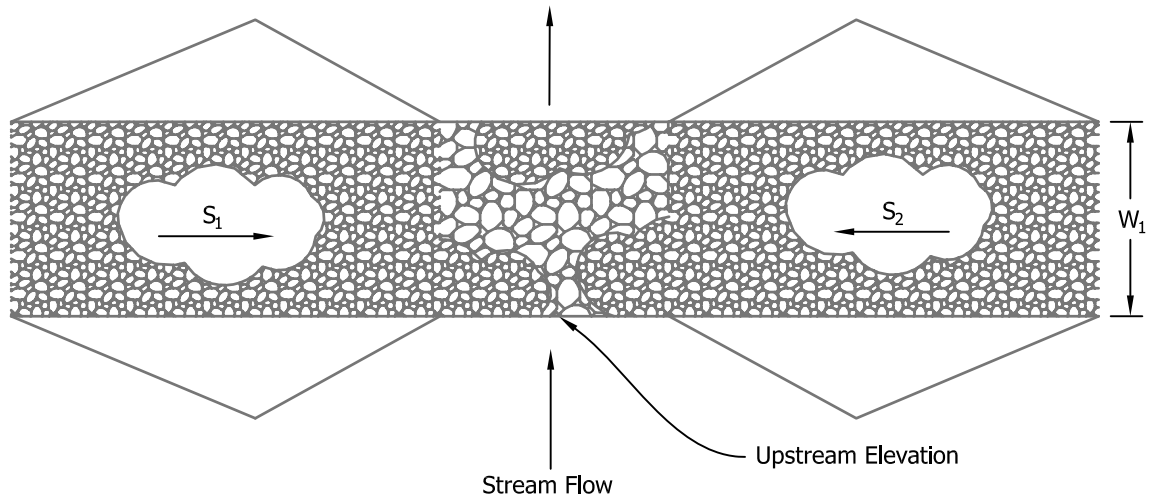


Front View

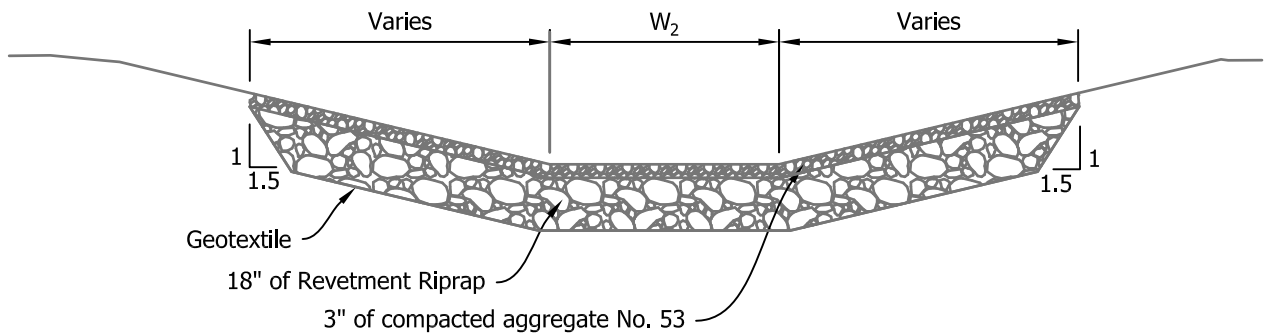
Notes:

1. Yellow background on front and back
2. 1" Green lettering, spaced at 1" apart unless otherwise noted

	STATE OF INDIANA DEPARTMENT OF NATURAL RESOURCES DIVISION OF RECLAMATION
	PROJECT SIGN
	STANDARD DETAIL NO. 501-01
	NOT TO SCALE 02/01/2022



Plan View



Profile Along Center Line of Crossing

Notes:

1. S_1 and S_2 shall have slopes no steeper than 5:1. Typical values for W_1 and W_2 are 12 feet. Should dimensions differ from these typical values, then a table will be provided.
2. Compact surfacing material by equipment travel. The finished top surface of the rock in the bottom of the channel shall be no higher than the ditch bottom at the upstream edge of the crossing. It is expected that surfacing material will have to be replaced following high flow events.
3. Blend approaches.
4. Runoff shall be diverted from the approach.
5. Bottom elevation of low water shall be constructed below the flow line of downstream channel.



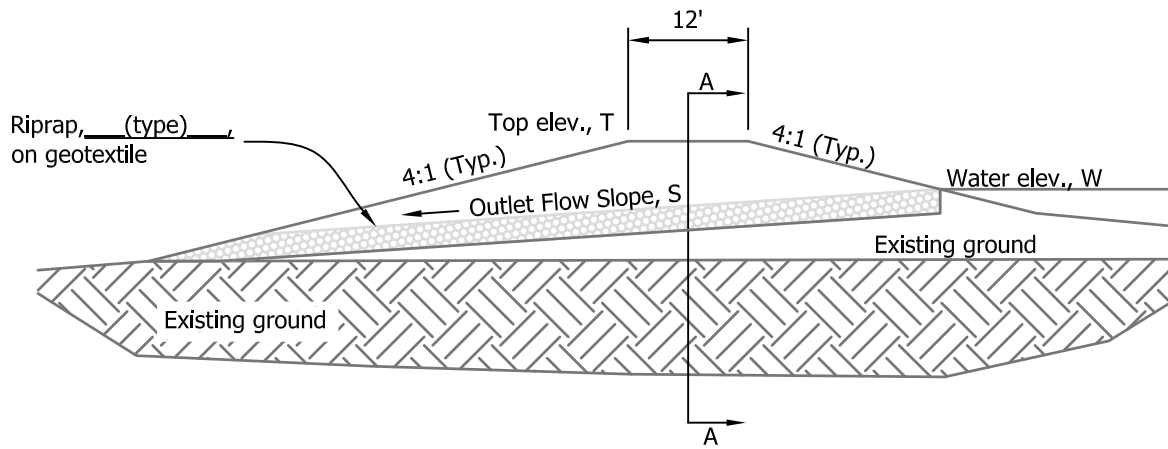
STATE OF INDIANA
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DIVISION OF RECLAMATION

LOW WATER CROSSING

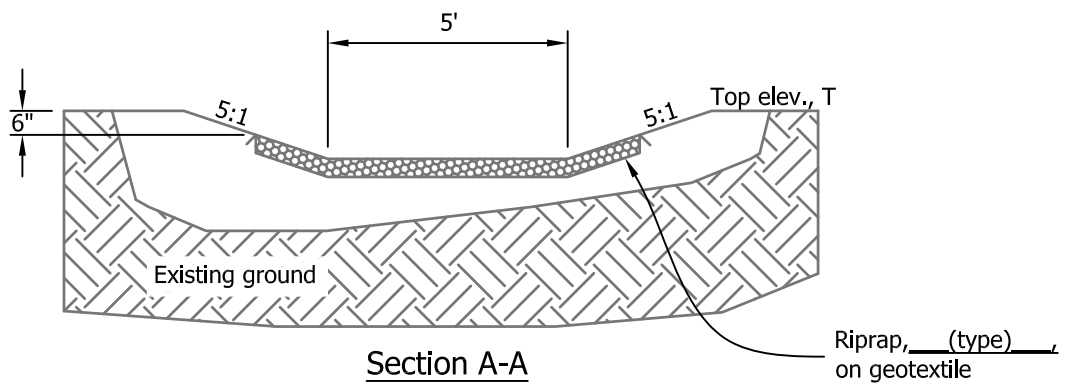
STANDARD DETAIL NO. 503-01

NOT TO SCALE

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Profile View



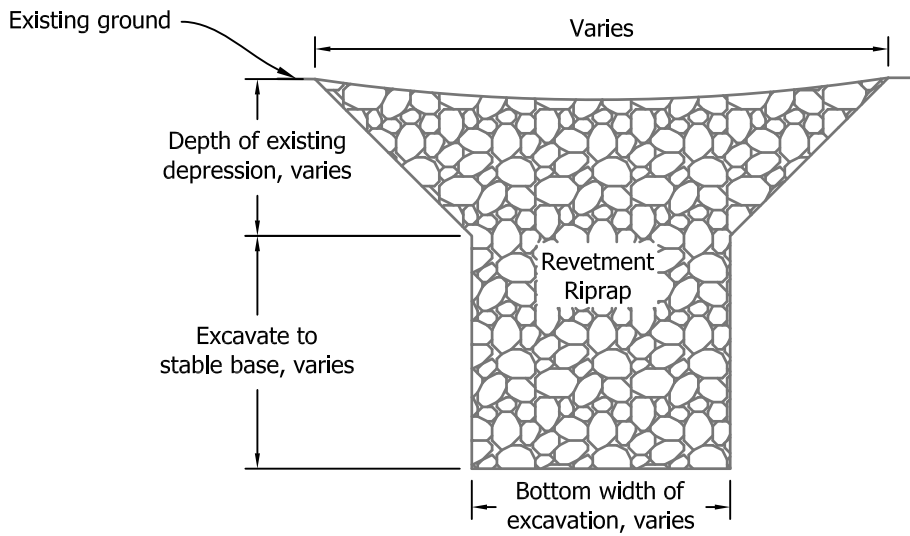
Section A-A

Notes:

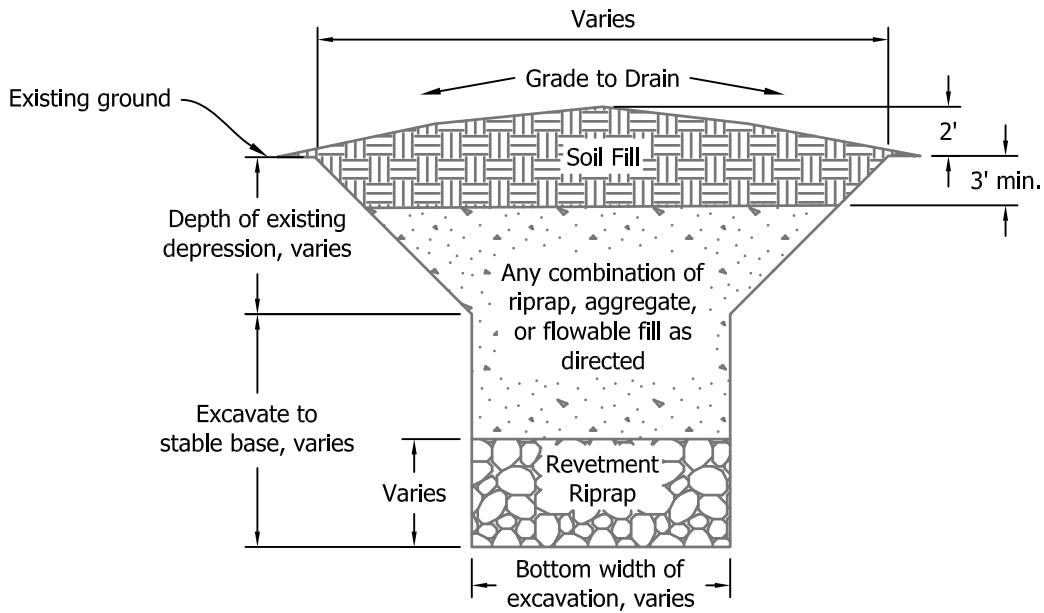
1. The top elevation (T) of the outlet control structure, the water elevation (W), the riprap type, and the outlet flow slope (S) shall be indicated within the project plan sheets.

	STATE OF INDIANA DEPARTMENT OF NATURAL RESOURCES DIVISION OF RECLAMATION	
	OUTLET CONTROL STRUCTURE	
	STANDARD DETAIL NO. 503-02	
	NOT TO SCALE	02/01/2022

Typical Subsidence Backfill Type A



Typical Subsidence Backfill Type B



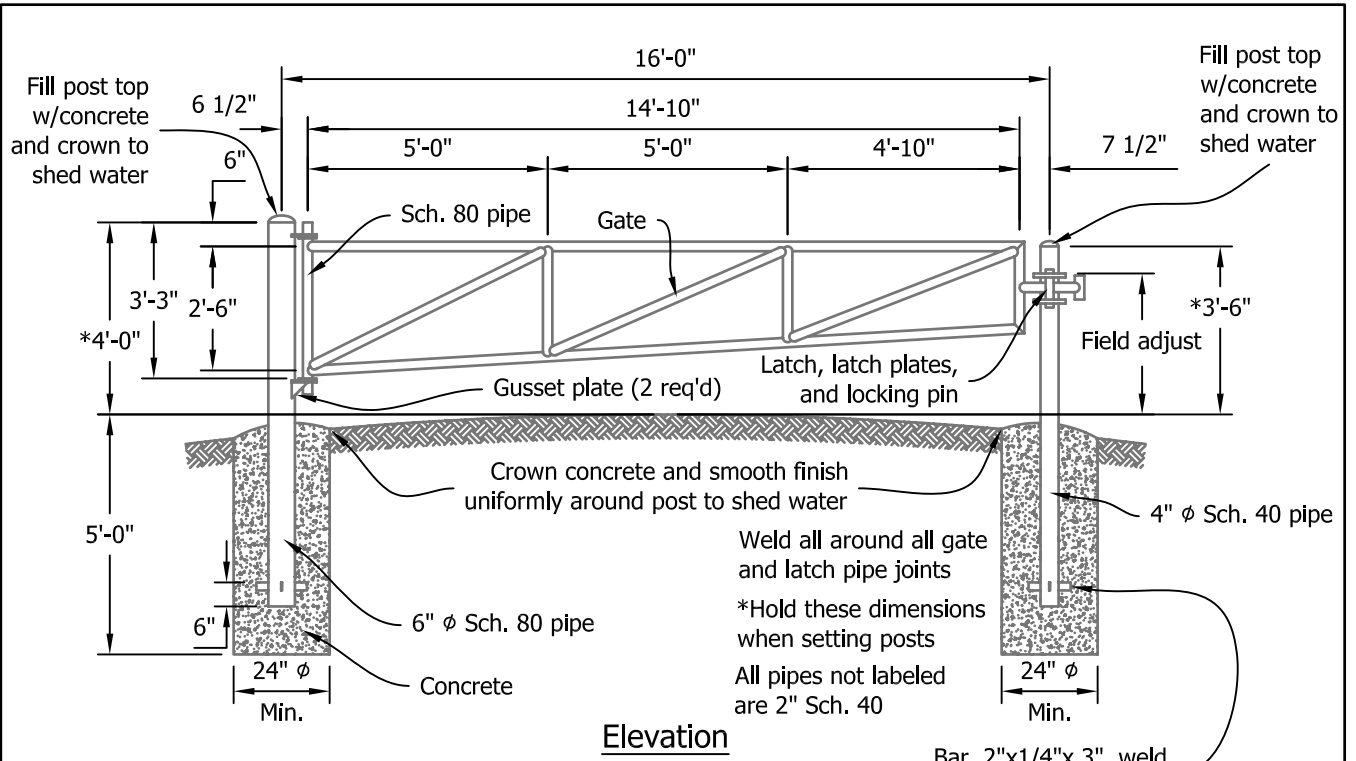
STATE OF INDIANA
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TYPICAL SUBSIDENCE BACKFILLS

STANDARD DETAIL NO. 503-03

NOT TO SCALE

02/01/2022

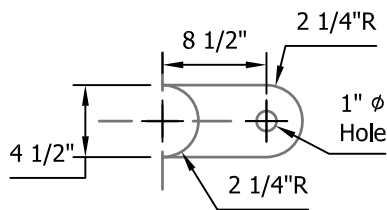


Field weld top hinge plate to gate post after gate is in position

Gusset plate cut from 4"x1/4"x4" Plate
Stop washer 4 1/2" O.D.x2 1/2" I.D.x1/2"

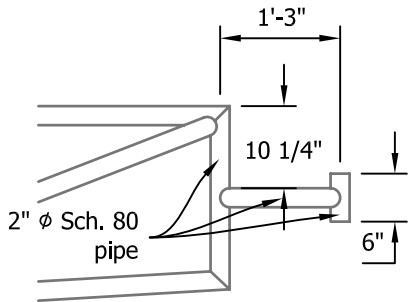
Hinge plate welded to gate post top and bottom w/ stop washers seal welded to gate and ground smooth

Latch plate welded to gate post top and bottom

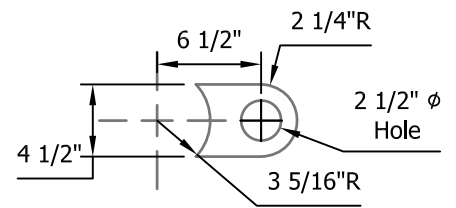


Latch plate cut from 4 1/2"x1/2"x10" plate

Latch Plate Detail



Latch Detail



Hinge plate cut from 4 1/2"x1/2"x7" plate

Hinge Plate Detail

Notes:

1. Paint all swing gate items and gate posts yellow.



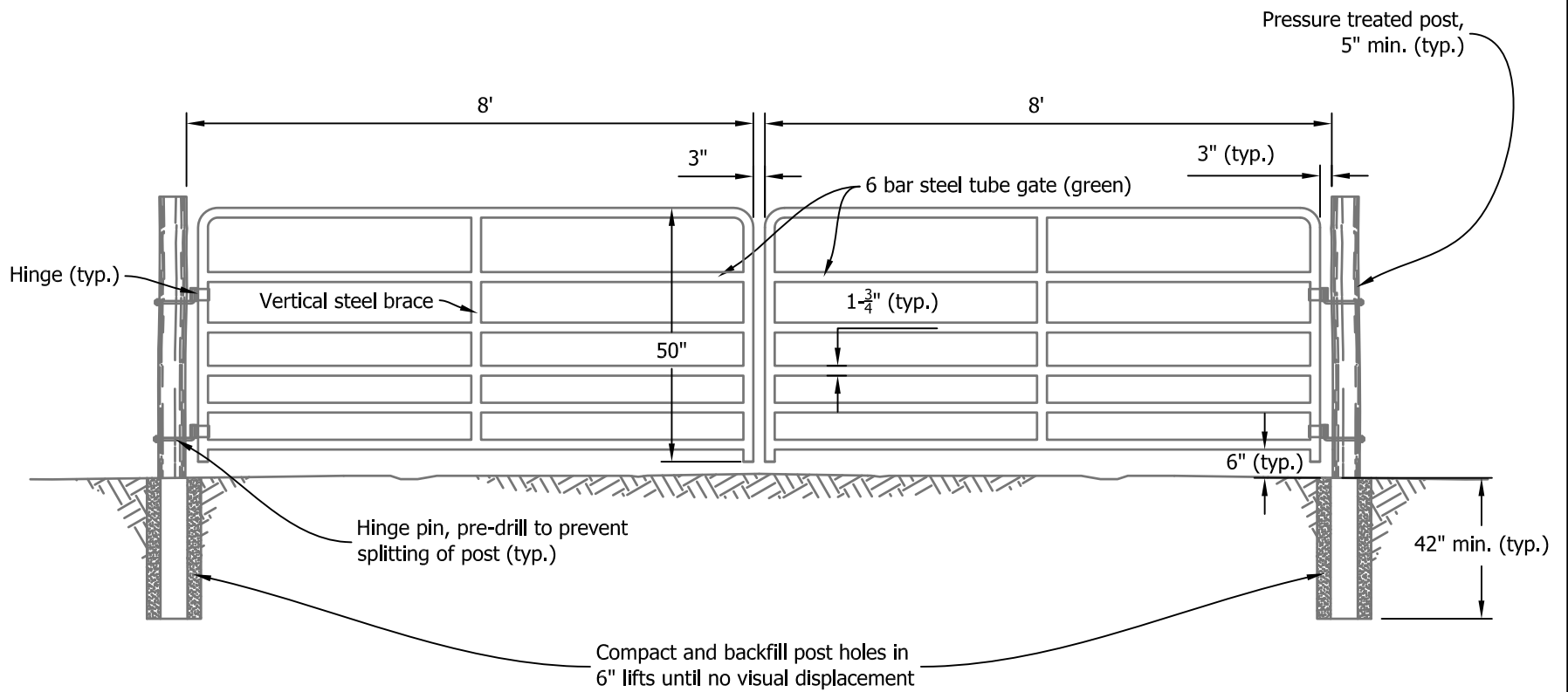
STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RECLAMATION

ACCESS GATE, SINGLE

STANDARD DETAIL NO. 506-01

NOT TO SCALE

02/01/2022

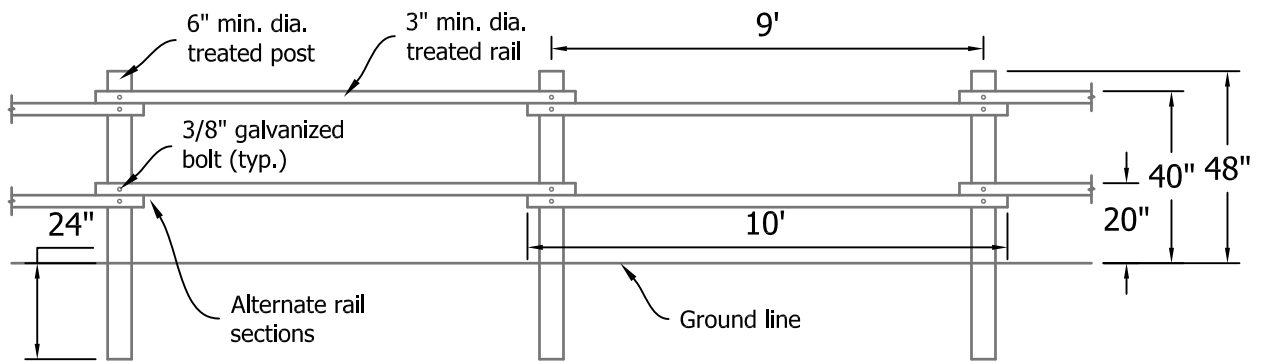



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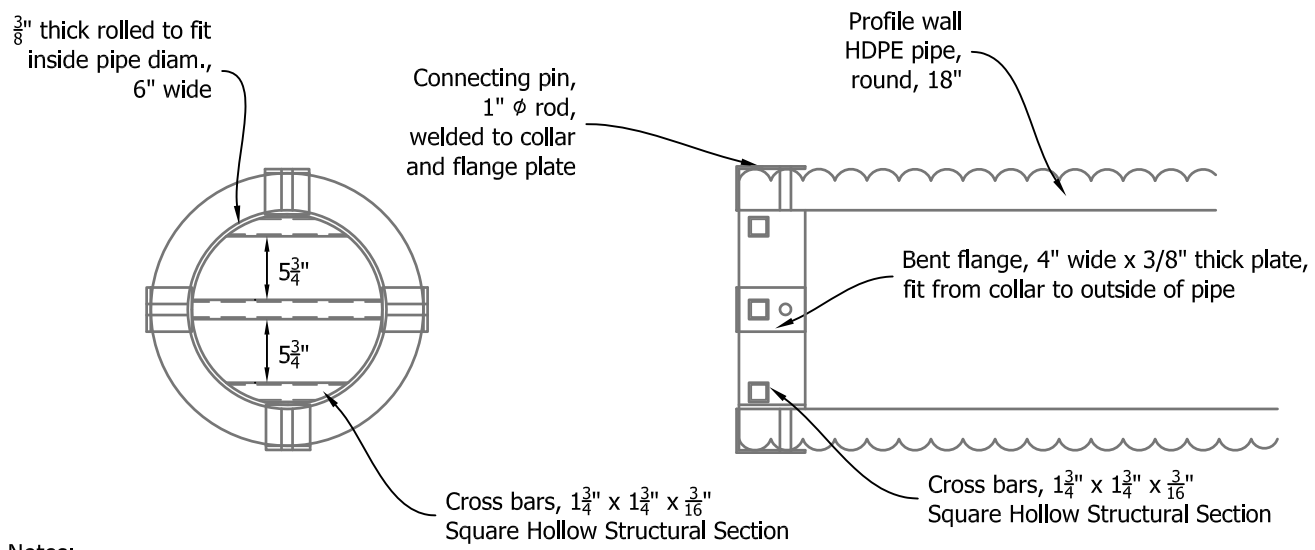
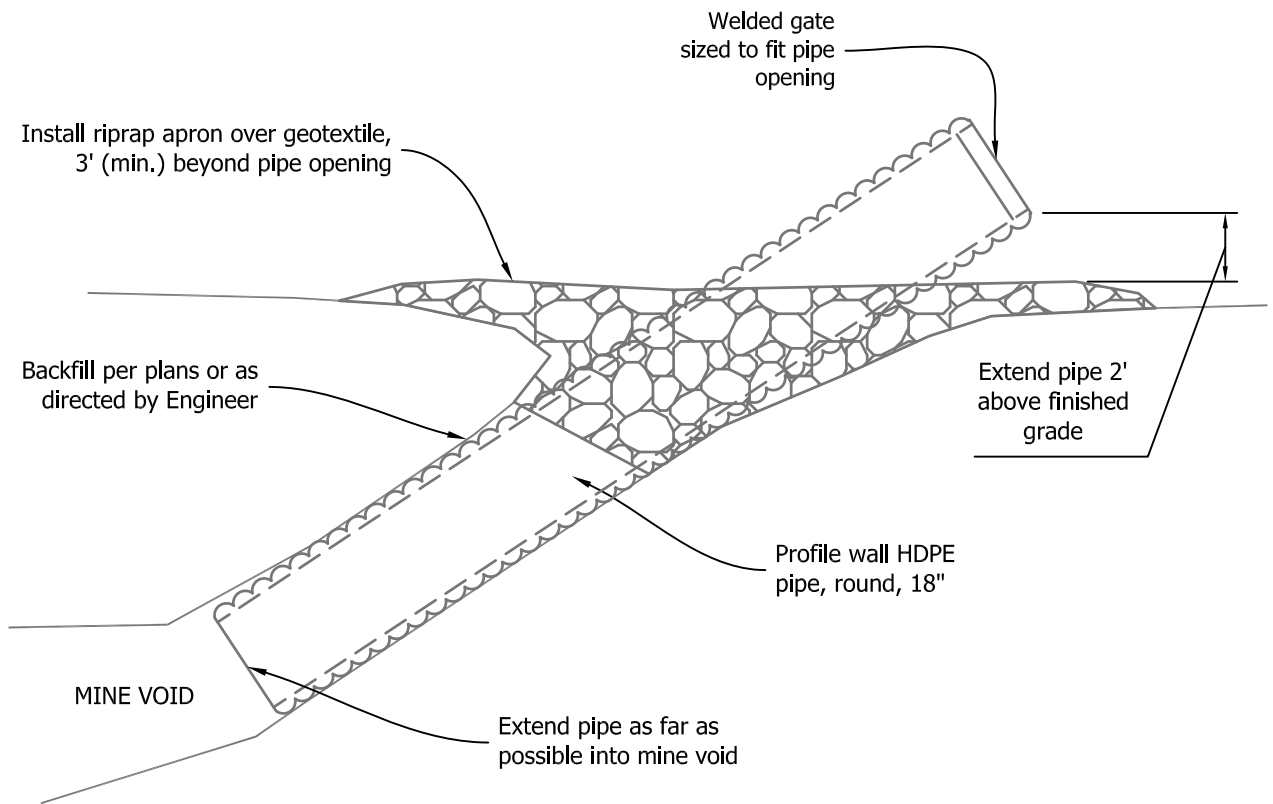
ACCESS GATE, DOUBLE

STANDARD DETAIL NO. 506-02

NOT TO SCALE | 02/01/2022




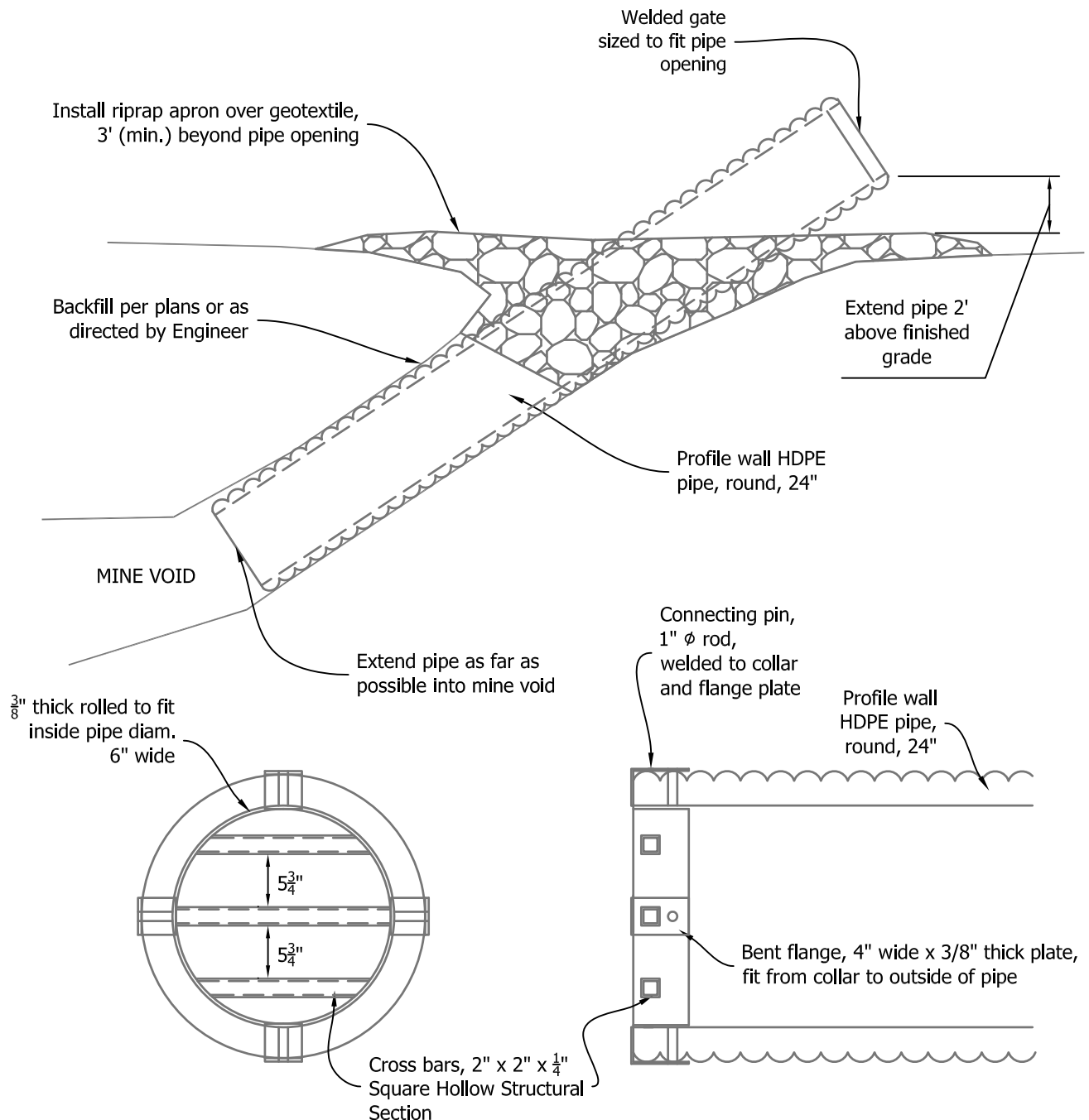
	STATE OF INDIANA	
	DEPARTMENT OF NATURAL RESOURCES	
	DIVISION OF RECLAMATION	
	2-RAIL POST & POLE FENCE	
STANDARD DETAIL NO. 506-03		
NOT TO SCALE	02/01/2022	



Notes:


1. Geotextile shall be required between soil and open graded backfill such as riprap or No. 2 stone.
2. Ensure backfill placement does not obstruct pipe opening into mine void upon completion.
3. Expanded polyurethane foam may be used for backfill material as directed by the Engineer. Backing with geotextile or plywood forms shall be included to ensure that foam expansion does not obstruct pipe opening.
4. Entire welded gate shall be cleaned and painted with rust inhibiting primer, then top coated with high quality enamel paint (black or brown) prior to installation.
5. All gate materials shall be A-36 mild steel.

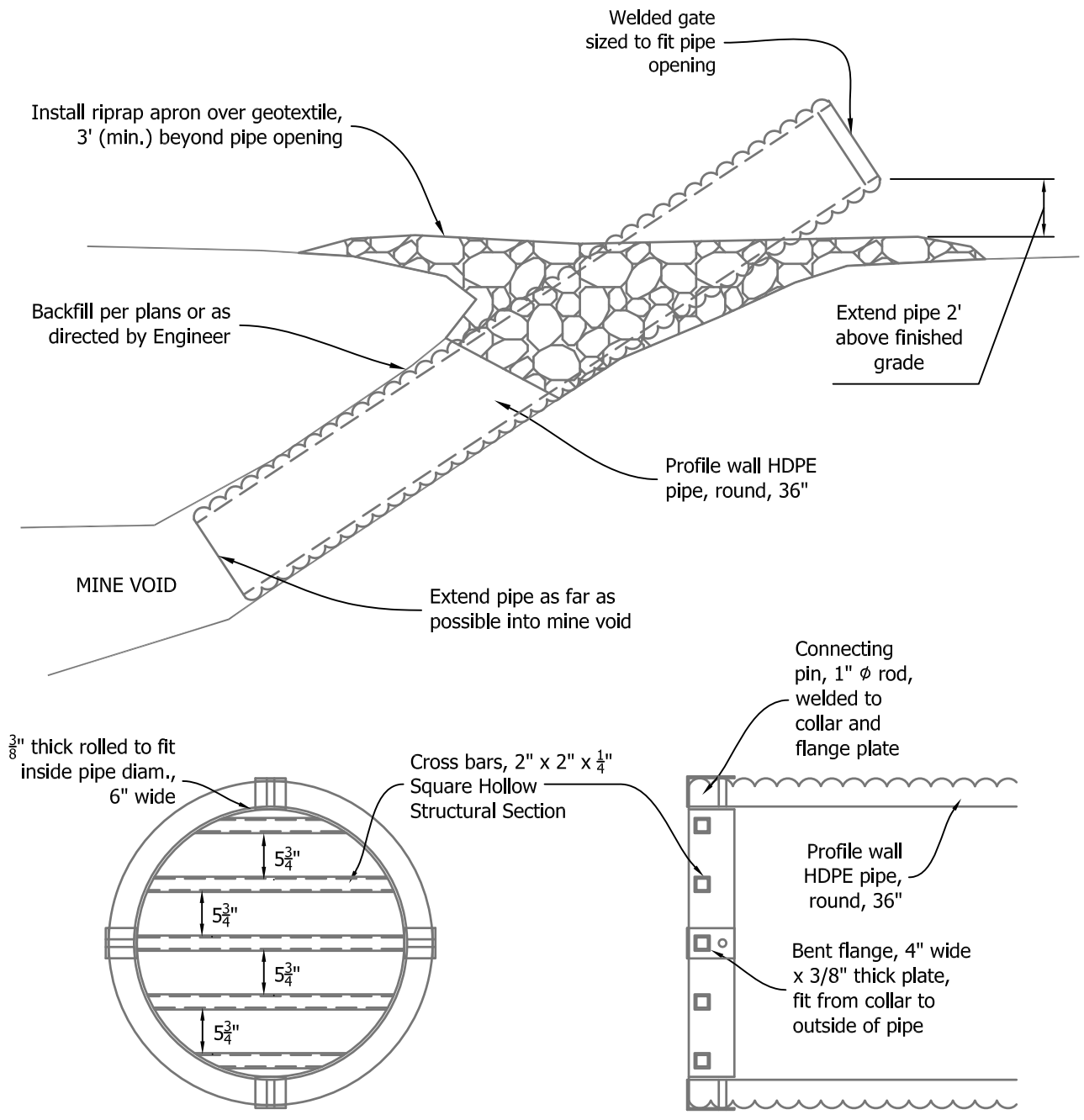
	STATE OF INDIANA	
	DEPARTMENT OF NATURAL RESOURCES	
	DIVISION OF RECLAMATION	
	CULVERT BAT GATE, 18" HDPE PIPE	
STANDARD DETAIL NO. 510-01		
NOT TO SCALE	02/01/2022	




Notes:

1. Geotextile shall be required between soil and open graded backfill such as riprap or No. 2 stone.
2. Ensure backfill placement does not obstruct pipe opening into mine void upon completion.
3. Expanded polyurethane foam may be used for backfill material as directed by the Engineer. Backing with geotextile or plywood forms shall be included to ensure that foam expansion does not obstruct pipe opening.
4. Entire welded gate shall be cleaned and painted with rust inhibiting primer, then top coated with high quality enamel paint (black or brown) prior to installation.
5. All gate materials shall be A-36 mild steel.

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	DIVISION OF RECLAMATION	
	CULVERT BAT GATE, 24" HDPE PIPE	
STANDARD DETAIL NO. 510-02		
NOT TO SCALE	02/01/2022	

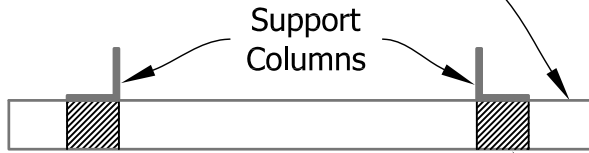


- Notes:**
1. Geotextile shall be required between soil and open graded backfill such as riprap or No. 2 stone.
 2. Ensure backfill placement does not obstruct pipe opening into mine void upon completion.
 3. Expanded polyurethane foam may be used for backfill material as directed by the Engineer. Backing with geotextile or plywood forms shall be included to ensure that foam expansion does not obstruct pipe opening.
 4. Entire welded gate shall be cleaned and painted with rust inhibiting primer, then top coated with high quality enamel paint (black or brown) prior to installation.
 5. All gate materials shall be A-36 mild steel.

	STATE OF INDIANA	
	DEPARTMENT OF NATURAL RESOURCES	
	DIVISION OF RECLAMATION	
	CULVERT BAT GATE, 36" HDPE PIPE	
STANDARD DETAIL NO. 510-03		
NOT TO SCALE	02/01/2022	

Cross Member

2½"x2½"x¼" Square Hollow
Structural Section, A-36 mild steel
Length to fit opening

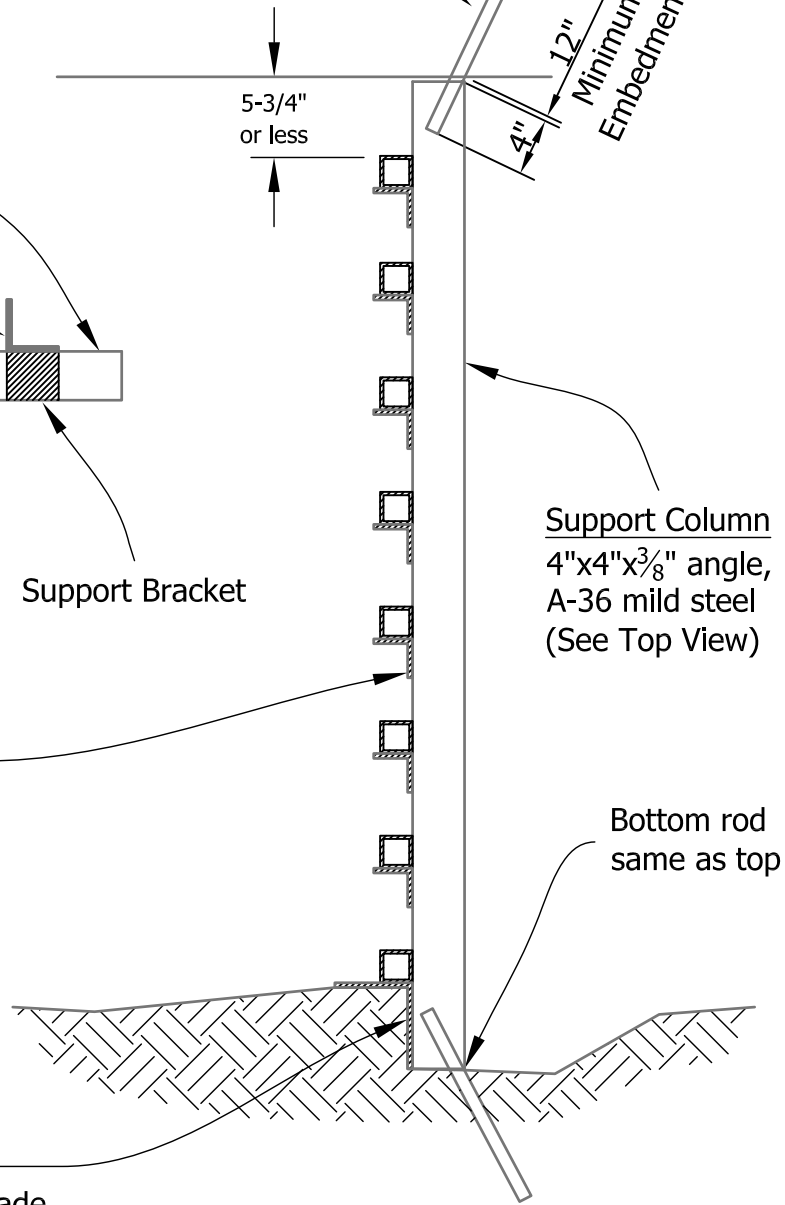


Top View

1" ϕ rod, welded
to Support Column

5-¾"
or less

12"
Minimum
Embedment



Support Column
4"x4"x¾" angle,
A-36 mild steel
(See Top View)

Support Bracket

3"x3"x¾" angle,
4" long, A-36 mild steel,
welded to Support Column

Bottom rod
same as top


Sill Plate

6"x6"x¾" angle, A-36 mild steel
Length to fit opening at or below grade

Side View

Notes:

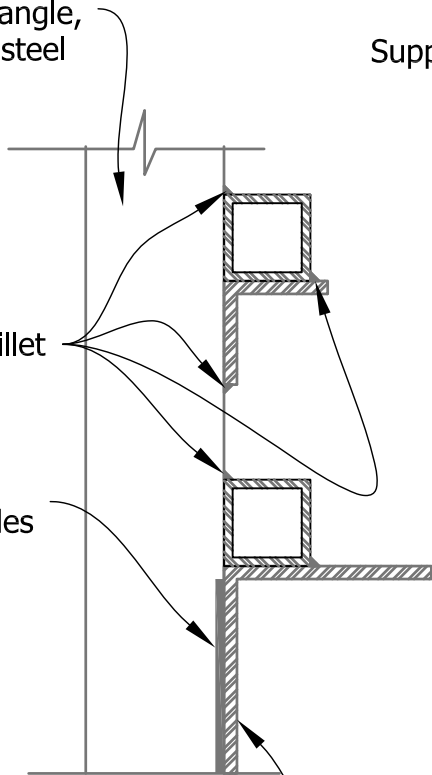
1. Anchor rods embedded in solid material do not require epoxy, but anchor rods embedded in fractured or micro-fractured material shall require epoxy.

	STATE OF INDIANA	
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	DIVISION OF RECLAMATION	
	BAT GATE - SUPPORT COLUMN	
STANDARD DETAIL NO. 510-04		
NOT TO SCALE	02/01/2022	

Support Column
 4"x4"x $\frac{3}{8}$ " angle,
 A-36 mild steel

$\frac{1}{4}$ " fillet

$\frac{1}{4}$ " fillet
 both sides



Side View

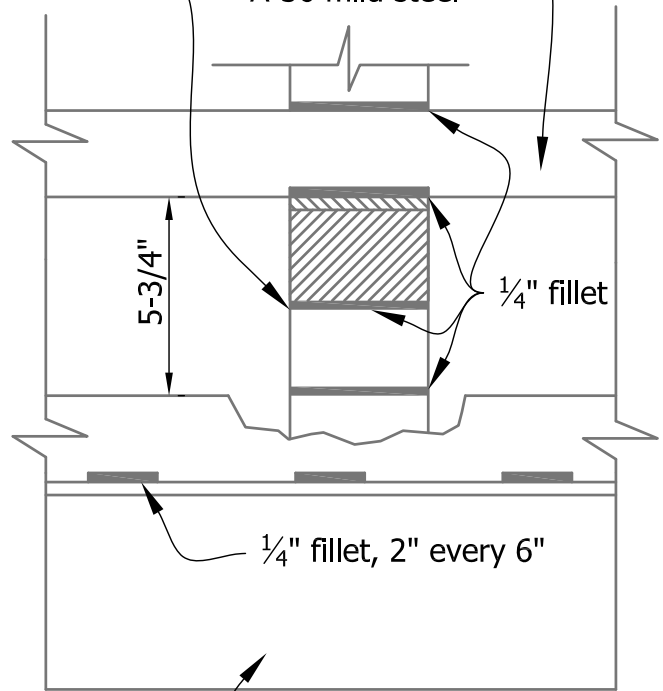
Support Bracket

Cross Member
 $2\frac{1}{2}$ "x $2\frac{1}{2}$ "x $\frac{1}{4}$ "
 Square Hollow
 Structural Section,
 A-36 mild steel

5- $\frac{3}{4}$ "

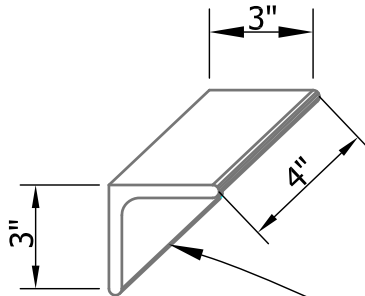
$\frac{1}{4}$ " fillet

$\frac{1}{4}$ " fillet, 2" every 6"



Front View

Sill Plate
 6"x6"x $\frac{3}{8}$ " angle,
 A-36 mild steel



Isometric View

Support Bracket
 3"x3"x $\frac{3}{8}$ " angle,
 4" long,
 A-36 mild steel



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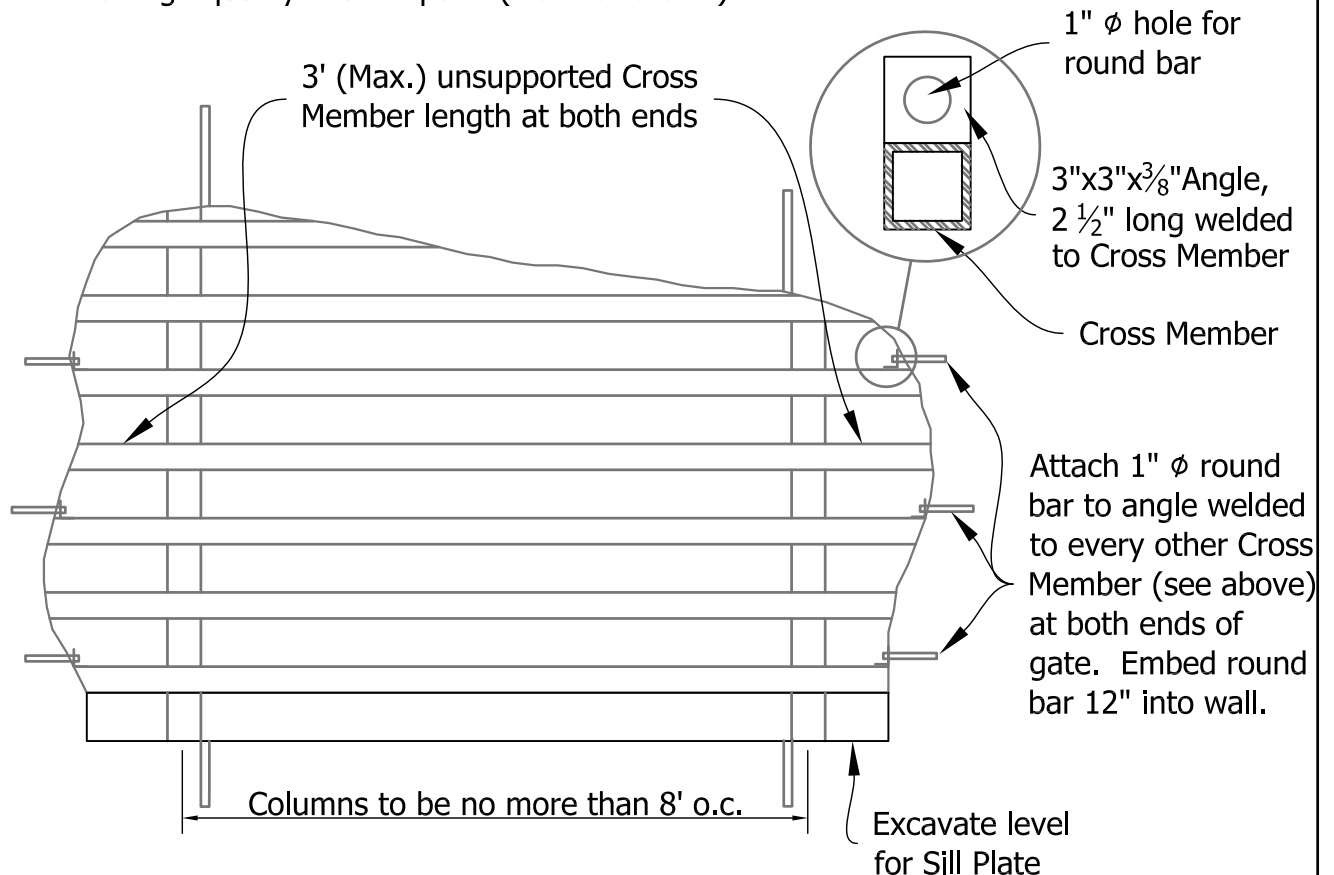
BAT GATE - SUPPORT BRACKET
 STANDARD DETAIL NO. 510-05

NOT TO SCALE

02/01/2022

Typical Sequence of Construction

1. Prepare trench to accept 6"x6"x $\frac{3}{8}$ " Sill Plate
2. Set and level Sill Plate in place
3. Plumb and weld at least two (2) support columns to back of Sill Plate
4. Place and weld first Cross Member to top of Sill Plate
5. Weld Support Brackets (clip angles) at proper spacing
6. Weld Cross Member to Support Bracket
7. Continue to the roof of the opening until less than 5 $\frac{3}{4}$ " remain
8. Clean, then paint entire structure with one coat of rust inhibiting paint and one coat of high quality enamel paint (black or brown)



Notes:

1. Welding rods to be compatible with A-36 mild steel
2. Use $\frac{1}{4}$ " continuous fillet weld unless otherwise noted
3. Each horizontal Cross Member and vertical Support Column shall be individually cut to fit the opening
4. Width and height of gate determined by size of mine opening.



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BAT GATE, TYPICAL VIEW AND NOTES

STANDARD DETAIL NO. 510-06

NOT TO SCALE

02/01/2022