IOWA | DOT

EROSION CONTROL TECHNICIAN REFERENCE MANUAL

2026

TECHNICAL TRAINING AND CERTIFICATION PROGRAM

TECHNICAL TRAINING AND CERTIFICATION PROGRAM
CONTACT INFORMATION

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Jennifer Strunk	FieldManager/FieldBook/Doc Express	641-344-0044
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Jeff DeVries	Materials Testing Engineer	515-239-1237
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Brian Worrel	Traffic Safety Engineer	515-239-1471
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Iowa Limestone Producers Association
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Urbandale, IA 50322
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www.limestone.org

Iowa Concrete Paving Association
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Ankeny, IA 50021
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www.concretestate.org

Iowa Ready Mix Concrete Association
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Ankeny, IA 50021
Greg Mulder 515-963-0606
www.iowareadymix.org

Iowa Prestress Association
Dennis Drews 402-291-0733

FEDERAL CODE 1020 and IOWA CODE 714.8

I.M. 213 discusses the Unsatisfactory Notice that Certified Technicians are given when they are not performing their job duties satisfactorily. This can be given for a number of reasons including, improper sampling and/or testing, not performing their duties and reporting in the time frame required, reporting incorrect information, etc. The technician is given one written notice, the second notice is three-month certification suspension, and the third notice is decertification. According to I.M. 213 the Certified Technician can automatically be decertified for false statements without going through the Unsatisfactory Notice procedure. The Certified Technician also needs to be aware of the false statement clause that is applicable to all federal-aid projects and the fraudulent practice clause that applies to all non-federal aid projects. **Certified Technicians need to read and be aware of U.S.C. 1020 and Iowa Code 714.8 since these do apply to them.** They read as follows:

FEDERAL AID PROJECTS

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS
18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in

connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than $10,000 or imprisoned not more than 5 years or both"

NON-FEDERAL AID PROJECTS

lowa Code 714.8, subsection 3, defines fraudulent practices. "A person who does any of the following acts is guilty of a fraudulent practice. Subsection 3, Knowingly executes or tenders a false certification under penalty of perjury, false affidavit, or false certificate, if the certification, affidavit, or certificate is required by law or given in support of a claim for compensation, indemnification, restitution, or other payment." Depending on the amount of money claimed for payment, this could be a Class C or Class D felony, with potential fines and/or prison.

The above codes refer to the individual making the false statement. **Standard Specification Article 1102.03, paragraph C. section 5 refers to the Contractor.**

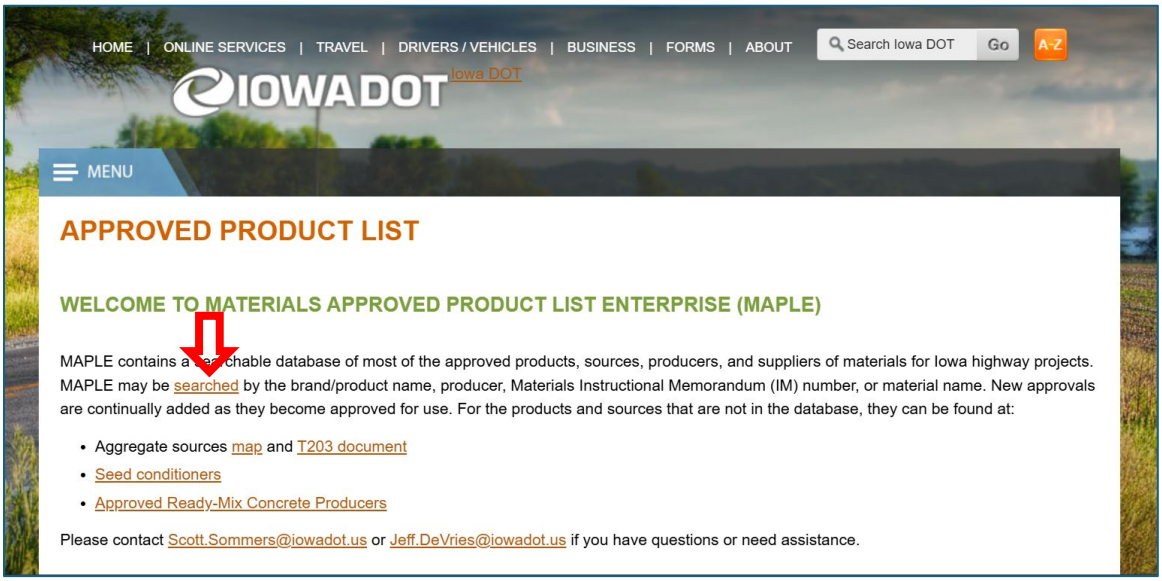
Article 1102.03, paragraph C, section 5 states, "A contractor may be disqualified from bidder qualification if or when: The contractor has falsified documents or certifications, or has knowingly provided false information to the Department or the Contracting Authority."

User's Guide for
Materials Approved List Enterprise (MAPLE)

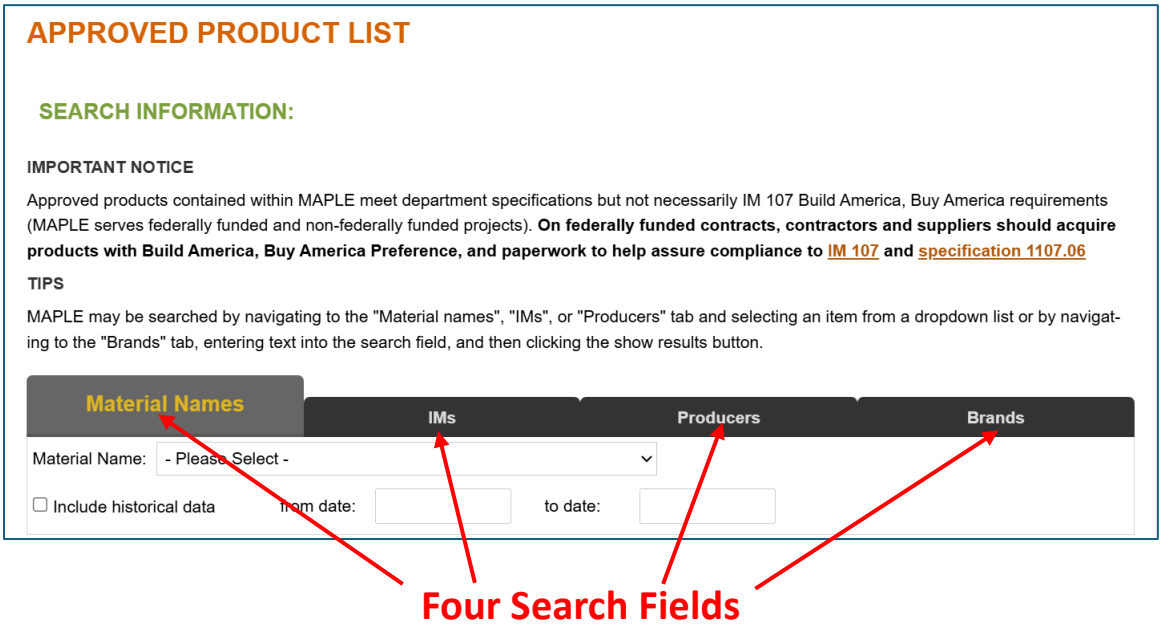
1. **Introduction**
   The Iowa DOT Materials Approved List Enterprise (MAPLE) has been in service for all users since July 2014. The MAPLE allows users to check all products approved in Iowa from a single data base. This document is to provide instruction on how to use the MAPLE.

2. **How to get to MAPLE**
   The MAPLE can be found at: https://maple.iowadot.gov/

3. **Searching MAPLE**
   Click on the **Searched** link as shown below

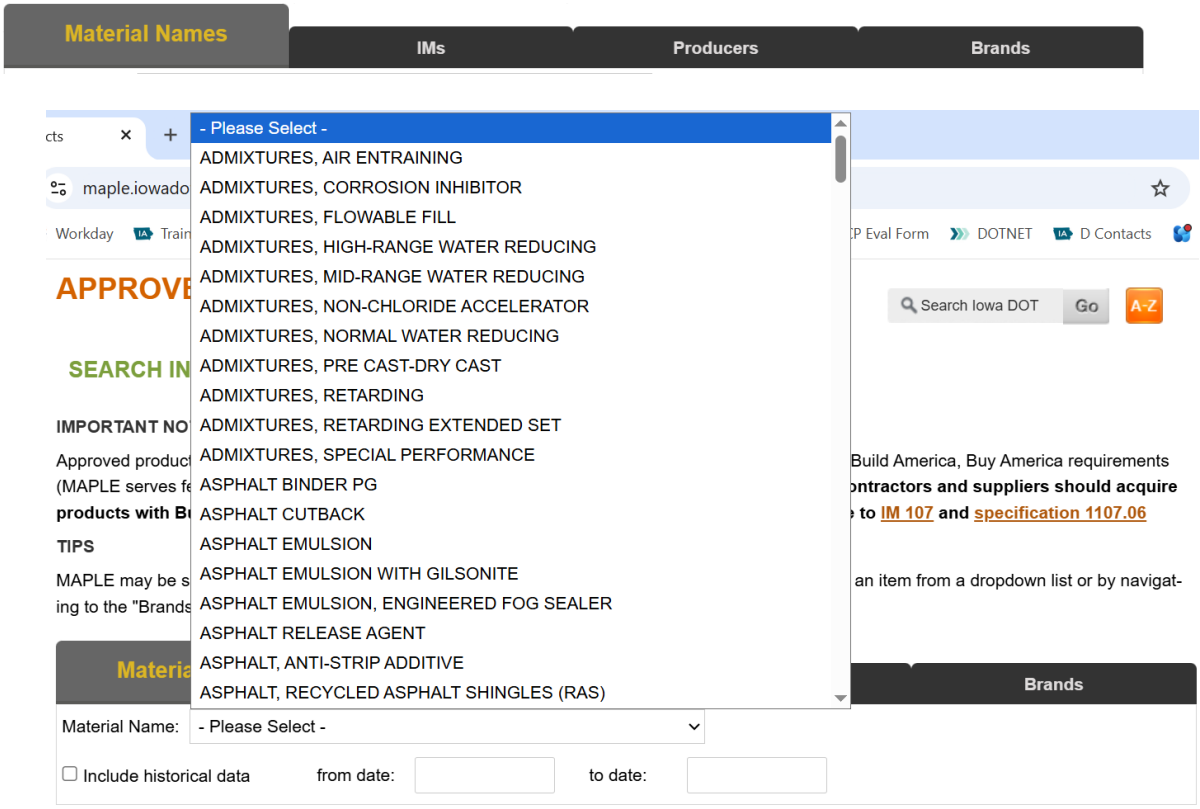


The user can search **MAPLE** through one of four fields listed: **Material Names, IMs, Producers, and Brands.**



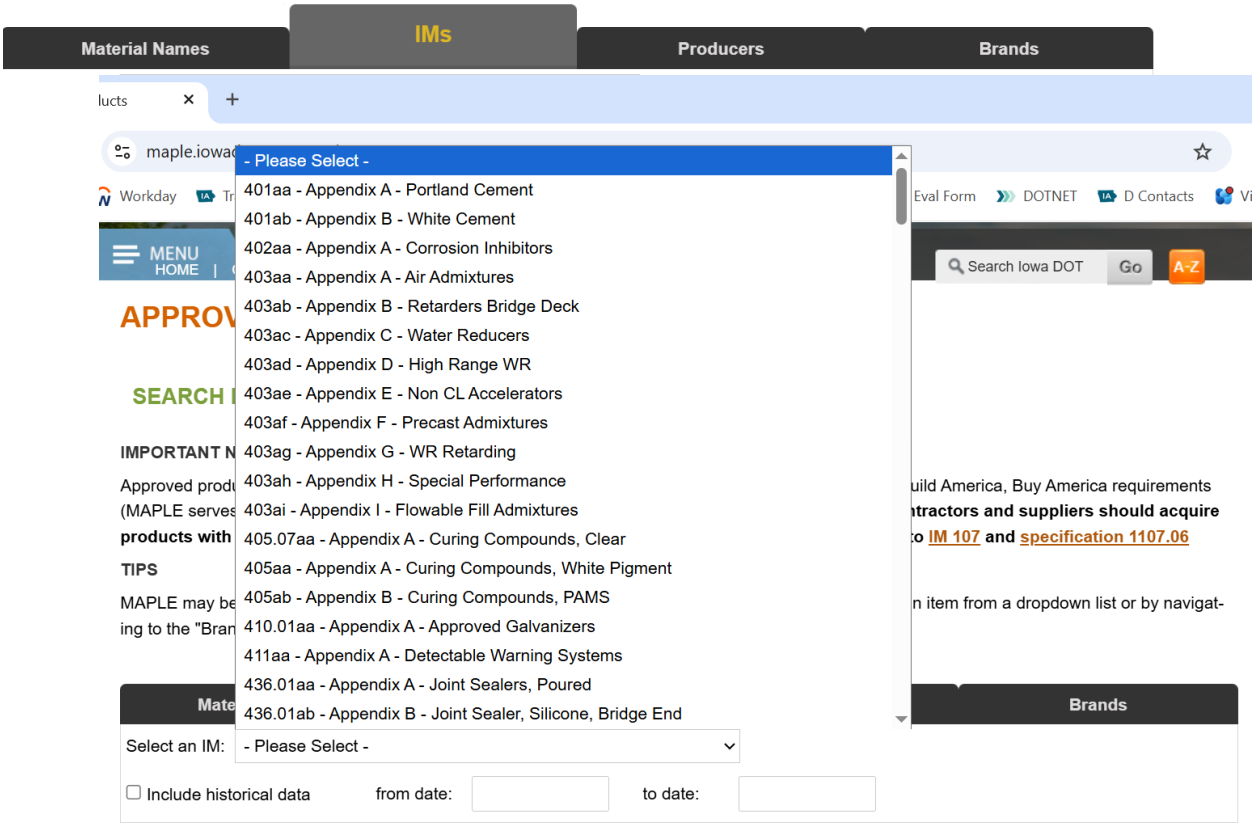
4. Search by Material Names

Click on the **Material Names** tab to search by type of material. Click on the arrow ⌄ and a list will appear as shown. Click on any of the material names to produce an approved product list.



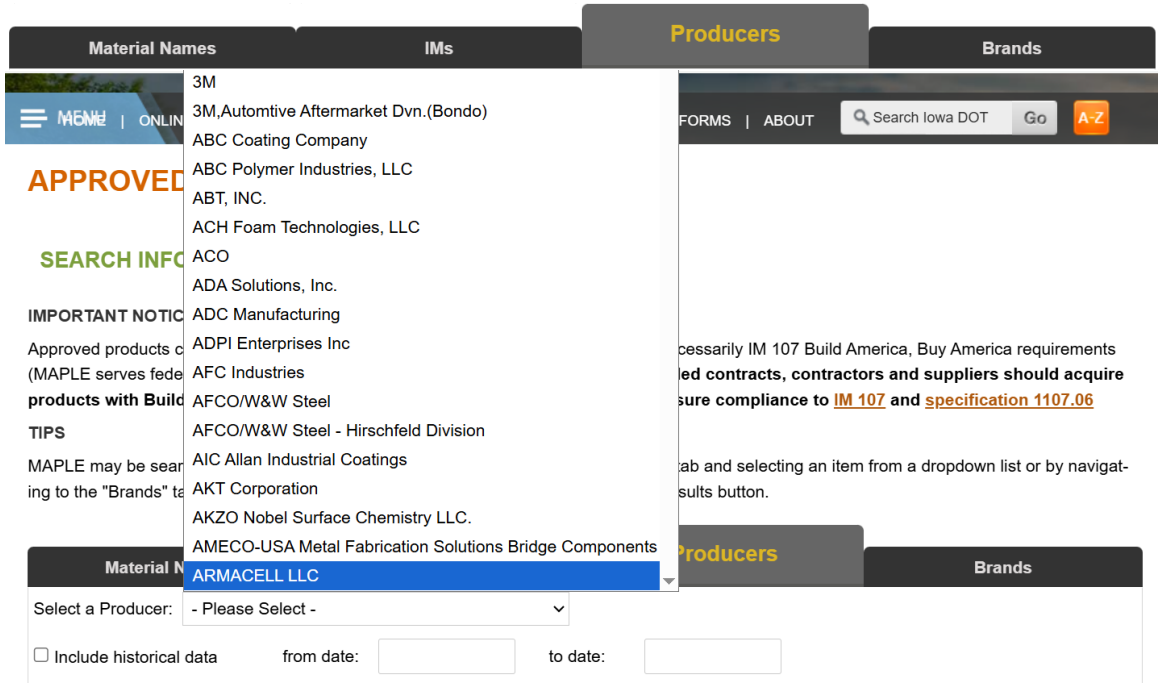
5. Searching by IMs

Click on the **IMs** tab to search by IM number. Click on the arrow ⌄ and a list will appear as shown. Click on any of the IM's listed to produce a list of approved products in that IM.



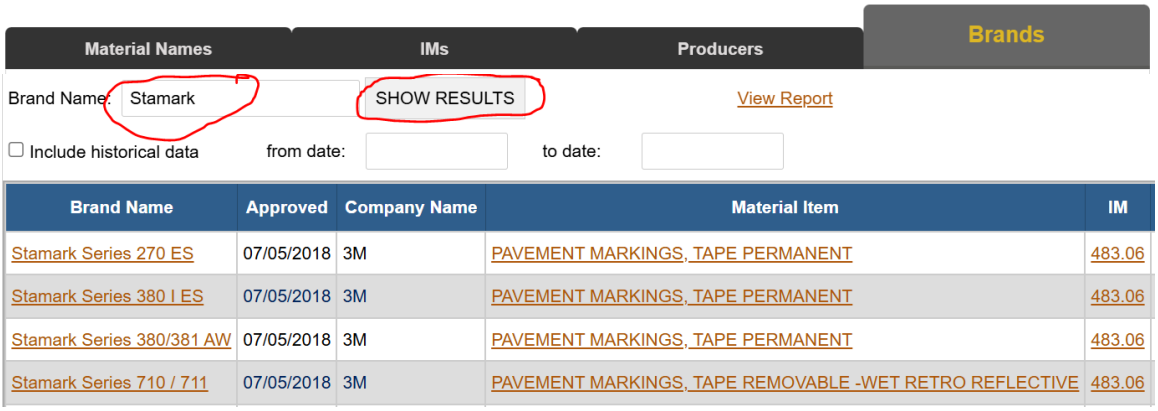
6. Searching by Producers

Click on the **Producers** tab to search by producer. Click on the arrow ⌄ and a list will appear as shown. Click on any producer for a list of all approved products manufactured by that specific producer.



7. Searching by Brand Name

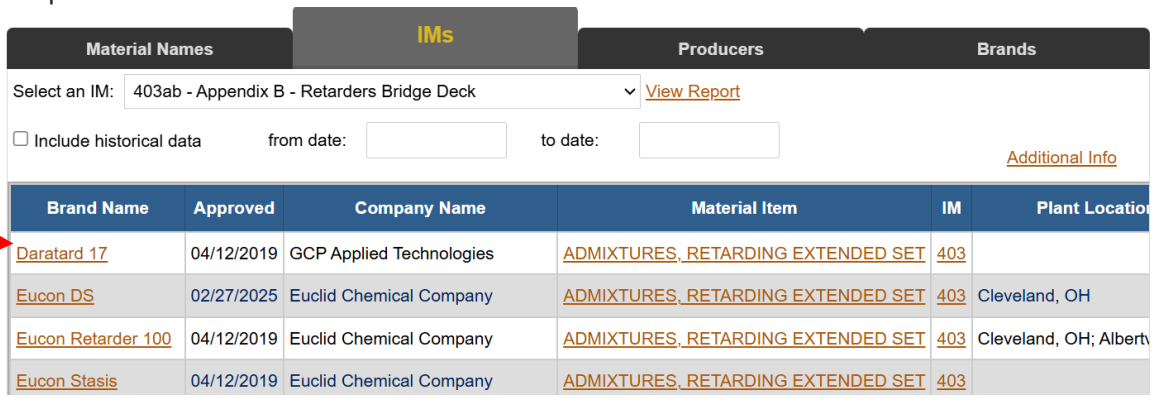
Click on the Brands tab to search by freeform typing the brand name of the product. Click SHOW RESULTS



Brand Name	Approved	Company Name	Material Item	IM
Stamark Series 270 ES	07/05/2018	3M	PAVEMENT MARKINGS, TAPE PERMANENT	483.06
Stamark Series 380 I ES	07/05/2018	3M	PAVEMENT MARKINGS, TAPE PERMANENT	483.06
Stamark Series 380/381 AW	07/05/2018	3M	PAVEMENT MARKINGS, TAPE PERMANENT	483.06
Stamark Series 710 / 711	07/05/2018	3M	PAVEMENT MARKINGS, TAPE REMOVABLE -WET RETRO REFLECTIVE	483.06

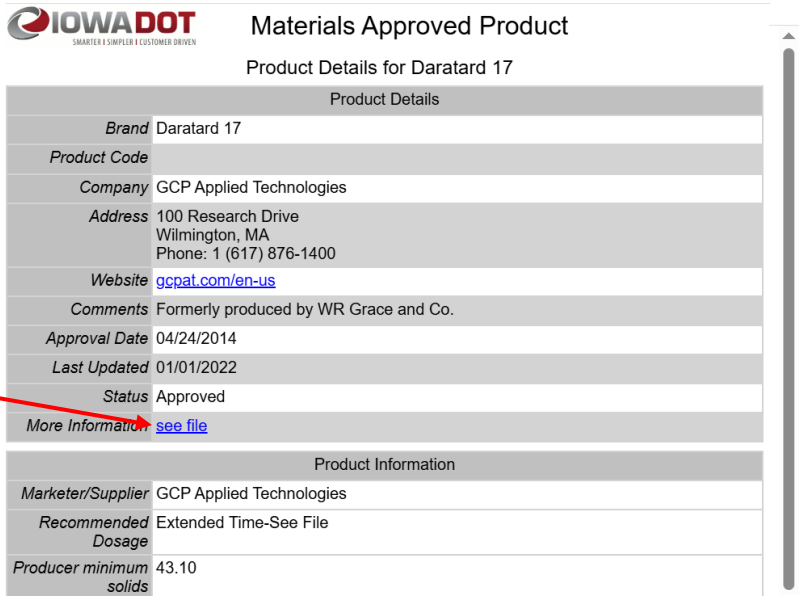
8. Selecting a Product

After a list of products has been displayed, click on the individual Brand Name to display more information about the product.



Brand Name	Approved	Company Name	Material Item	IM	Plant Locatio
Daratard 17	04/12/2019	GCP Applied Technologies	ADMIXTURES, RETARDING EXTENDED SET	403	
Eucon DS	02/27/2025	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH
Eucon Retarder 100	04/12/2019	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH; Albert
Eucon Stasis	04/12/2019	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	

You can use the scroll bar on the right of the screen to scroll down for more information.



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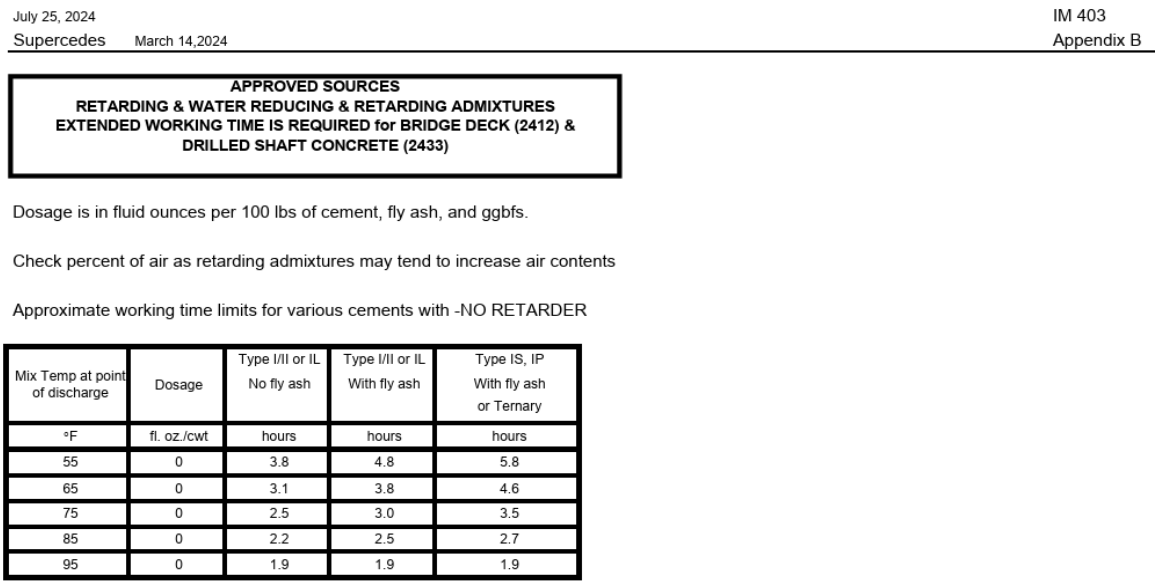
Materials Approved Product

Product Details for Daratard 17

Product Details	
Brand	Daratard 17
Product Code	
Company	GCP Applied Technologies
Address	100 Research Drive Wilmington, MA Phone: 1 (617) 876-1400
Website	gcpat.com/en-us
Comments	Formerly produced by WR Grace and Co.
Approval Date	04/24/2014
Last Updated	01/01/2022
Status	Approved
More Information	see file

Product Information	
Marketer/Supplier	GCP Applied Technologies
Recommended Dosage	Extended Time-See File
Producer minimum solids	43.10

Some products may have a link in the **More Information** field. A pdf with the additional information will appear after clicking on see file. More information may be found on the following IM's: 403ab, 445.01ab, 451ad, 455.02aa, 455aa, 462aa, and 557ab.



July 25, 2024 IM 403
Supercedes March 14,2024 Appendix B

APPROVED SOURCES
RETARDING & WATER REDUCING & RETARDING ADMIXTURES
EXTENDED WORKING TIME IS REQUIRED for BRIDGE DECK (2412) & DRILLED SHAFT CONCRETE (2433)

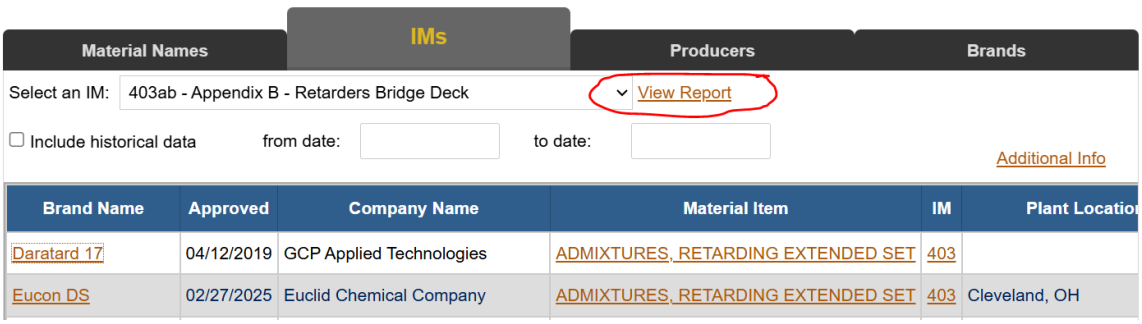
Dosage is in fluid ounces per 100 lbs of cement, fly ash, and ggbfs.

Check percent of air as retarding admixtures may tend to increase air contents

Approximate working time limits for various cements with -NO RETARDER

Mix Temp at point of discharge	Dosage	Type I/II or IL No fly ash	Type I/II or IL With fly ash	Type IS, IP With fly ash or Ternary
°F	fl. oz./cwt	hours	hours	hours
55	0	3.8	4.8	5.8
65	0	3.1	3.8	4.6
75	0	2.5	3.0	3.5
85	0	2.2	2.5	2.7
95	0	1.9	1.9	1.9

Clicking on **View Report** from any of the four **Search Fields**. This will open a new window and enable the user to export the list to Excel, Word, or a PDF file.



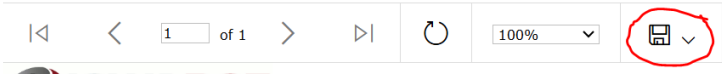
Material Names | IMs | Producers | Brands

Select an IM: 403ab - Appendix B - Retarders Bridge Deck View Report

Include historical data from date: to date:

Additional Info

Brand Name	Approved	Company Name	Material Item	IM	Plant Locatio
Daratard 17	04/12/2019	GCP Applied Technologies	ADMIXTURES, RETARDING EXTENDED SET	403	
Eucon DS	02/27/2025	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH



Materials Approved Products List

403ab - Appendix B - Retarders Bridge Deck

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Dosage
Daratard 17	04/12/2019	GCP Applied Technologies	ADMIXTURES, RETARDING EXTENDED SET	403		GCP Applied Technologies		Extended Time-See File
Eucon DS	02/27/2025	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH	Euclid Chemical Company		4 fl oz./100 lbs
Eucon Retarder 100	04/12/2019	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH; Albertville, MN; Marengo, IA	Euclid Chemical Company		Extended Time-See File
Eucon Stasis	04/12/2019	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403		Euclid Chemical Company		Extended Time-See File
Eucon WR-91	04/12/2019	Euclid Chemical Company	ADMIXTURES, RETARDING EXTENDED SET	403	Cleveland, OH; Albertville, MN; Marengo, IA	Euclid Chemical Company		Extended Time-See File
Mapecrete Resolve	01/19/2024	Mapei Corporation	ADMIXTURES, RETARDING EXTENDED SET	403		Mapei Corporation		2 fl oz./100 lbs

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Standard Specifications Section 4169 (Erosion & Sediment Control Materials)

Materials IM 469.02 – Seed Acceptance and 469.04– Mulch

Materials IM 469.10 & 496.01 – MAPLE lists

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Standard Road Plans – EW

Standard Road Plans – DR

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IM 213
TRAINING PROGRAM

EROSION CONTROL TECHNICIAN DUTIES

Duties of the Erosion Control Technician consist of, but are not limited to the following:

A. Carefully review and be familiar with the details in the contract documents.

B. Assign erosion and sediment control monitoring responsibilities to Erosion & Sediment Control (ESC) Basics trained field staff.

C. Review copies of storm water inspection reports.

D. Provide input on initial Erosion Control Implementation Plan (ECIP) submittal and ECIP updates.

E. Provide onsite reviews when requested by Contracting Authority or Contractor field staff.

TECHNICAL TRAINING & CERTIFICATION PROGRAM

GENERAL

The purpose of the Technical Training & Certification Program is to ensure Quality Control (QC)/Quality Assurance (QA) and Acceptance of Aggregates, Hot Mix Asphalt (HMA), Portland Cement Concrete (PCC), Soils, Erosion Control, Precast and Prestressed Concrete, and Pavement Profiles and to ensure proper documentation of quality control/quality assurance and acceptance procedures and test results by industry and Contracting Authority personnel.

This Instructional Memorandum (IM) explains the requirements to become certified and to remain certified to perform inspection and testing in the State of Iowa. This IM also describes the duties, responsibilities and the authority of persons assigned the position of Certified Technician in any of the above areas for construction or maintenance projects. Appendix C of this IM lists what tests and procedures the technician is qualified to perform for each level of certification they obtain.

Through a cooperative program of training, study, and examination, personnel of the construction industry, State DOT, and other Contracting Authorities will be able to provide quality management and certified inspection. Quality control/quality assurance and acceptance sampling, testing and inspection will be performed by certified personnel and documented in accordance with the IMs.

A technician who is qualified and holds a valid certification(s) shall perform quality control/quality assurance and acceptance at a production site, proportioning plant, or project site. Responsibilities cannot be delegated to non-certified technicians. The duties of a Certified Technician may be assigned to one or more additional Certified Technicians.

The Technical Training & Certification Program will be carried out in accordance with general policy guidelines established or approved by the Highway Division Director. A Board of Certification composed of the following members will advise the Director:

Director – Construction and Materials Bureau
Representative of District Materials Engineers**
Representative of District Construction Engineers**
Representative of Associated General Contractors (AGC of Iowa)
Representative of Iowa Concrete Paving Association (ICPA)
Representative of Asphalt Paving Association of Iowa (APAI)
Representative of Iowa Ready Mixed Concrete Association (IRMCA)
Representative of Iowa Limestone Producers Association (ILPA)
Representative of County Engineers
Representative of American Council of Engineering Companies (ACEC-Iowa)
Coordinator of Technical Training & Certification Program**

** Appointed by Program Director

The Director of the Construction and Materials Bureau will be the Program Director. Coordinators will be appointed by the Program Director to assist in administration of the program and to handle such planning, administration, and coordinating functions as may be needed.

TRAINING

The Iowa DOT will provide the training necessary to become certified. Producers/Contractors are encouraged to conduct their own pretraining program. A complete listing of training opportunities is available at the Technical Training & Certification Program website, https://iowadot.gov/training/technical-training-and-certification-program.

CERTIFICATION REQUIREMENTS

1. A candidate must attend Iowa DOT course instruction and pass the examination(s) for all levels of certification prepared and presented by the Program Director or someone designated by the Program Director. If the new candidate fails the examination, they will have one opportunity to retake the examination. The retake must be completed within six months of the original exam. If they fail the retake of the examination, they will need to attend the training again before taking the examination the third time. If an individual is recertifying they will have only one opportunity to take the examination. If they fail the examination they must take the applicable training before retaking the examination.

2. All prerequisites shall be met before the applicant may attend the next level of training for the certification desired. A listing of certification levels and prerequisites is located in Appendix A.

3. Once the candidate has met all the criteria and has received certification, it is recommended the Certified Technician work under the supervision of an experienced technician until they become efficient in the inspection and testing methods they will be performing.

   An individual requesting to become certified as a Precast/Prestress Concrete Technician is required to obtain forty hours of experience assisting in quality control inspection at an approved plant before certification will be issued. The experience must be documented and shall be approved by the District Materials Engineer. This experience must be completed within two years from the date the individual attended the training.

4. Registered Professional Engineers, engineering graduates, and geology graduates from accredited institutions will be exempt from the training requirement in the areas they have had instruction. It is, however, strongly recommended that they attend the certification classes. In order to obtain certification for any technical level, these persons must pass all applicable written examinations for the level of certification they wish to obtain. If the written examination attempt does not meet the required score, the candidate must take the certification class before another attempt can be made. All certificates issued in accordance with these requirements will be subject to the same regulations concerning expiration, recertification, etc., as applies to certificates obtained via training and examinations.

5. Technicians will be issued certifications by reciprocity when the following criteria are met:

   a. The applicant must be certified in another state or certification program determined equivalent by the Program Director or someone designated by the Program Director, in each level of certification they are requesting.

   b. The applicant must pass an examination for each level of certification desired, which will be administered by the Iowa Department of Transportation. Failure of the examination shall require the applicant to take the full certification class before they can retake the exam.

c. The applicant must follow the prerequisite requirements of the Technical Training & Certification Program.

Reciprocity requests should be made through the Technical Training and Certification office in Ames. Copies of all the applicant's certifications will be required.

CERTIFICATION

Upon successfully completing the requirements for certification, the Program Director will issue a pocket certification card. The certification is not transferable. A certification earned in a training season shall be valid until March 31st of the fifth succeeding training season. A training season is defined as October 1st, XXXX to September 30th, XXXX+1.

CERTIFICATION IDENTIFICATION

The certification card will identify the certificate holder, their certification number, the level(s) of certification, and the expiration date of each level.

RENEWAL OF CERTIFICATION

A certification shall be valid through March 31st of the fifth succeeding training season. If the individual has not renewed their certification by the certification expiration date, they are automatically decertified.

All certified technicians will be required to pass an examination before recertification will be issued. Failure of the examination shall require the applicant to retake the full certification class and pass the examination. If the individual does not take the examination within one year after their certification(s) expire they must retake the full certification class and pass the examination.

If an applicant becomes decertified in any level of certification and that certification is a prerequisite for other levels of certification the applicant will also be decertified in those related levels of certification until the prerequisite certification has once again been obtained.

The certificate holder shall be responsible for applying for certification renewal and for maintaining a current address on file.

PROVISIONAL CERTIFICATION

Provisional certification will be allowed through a special request to the TTCP Director. The request can be mailed or emailed to the TTCP Director and must include the need for a provisional certification, such as, company technician quit and they need to replace, an unforeseen workload, etc. Provisional certifications will only be granted to contractors. If the request is granted the following requirements will apply.

1. The provisional certification applicant must work under the direct supervision of a certified technician until such time that the applicant is competent in the required skills of the certification and has taken the written exam. The applicant must also take the web based review offered by the TTCP in the area they are seeking provisional certification.
2. The applicant must take and pass the written exam for the provisional certification they are requesting. There will be a testing fee in the amount of the TTCP recertification fee due at the time of the exam. CIT funds may not be used for provisional certification testing. The exams will be offered at the District Materials offices or the TTCP office in Ames.
3. The technician must demonstrate proficiency to an Iowa DOT certified technician at the first available opportunity.

4. After the provisional certification applicant has successfully completed the steps in 1 and 2, they will become provisionally certified until the end of the calendar year in which they obtained certification.
5. If the provisional certified technician wishes to keep their certification they must attend the full class at the full class cost for the certification during the training season immediately following their provisional certification.
6. A provisional certification is not intended to be an annual request. The provisional certification will only be allowed for one construction season. Repeated requests for provisional certifications for the technician will be denied.
7. Any prerequisites for the certification must be met prior to number 2 above.
8. HMA Basic Tester is a new certification that may only be used as a provisional certification. This certification follows all the requirements previously listed and the technician will be required to take Level I HMA at the first available opportunity after the provisional expires.
9. Provisional Certification will be offered for:
    a. Aggregate Sampler
    b. Aggregate Technician
    c. Level I PCC
    d. HMA Sampler
    e. HMA Basic Tester

UNSATISFACTORY PERFORMANCE NOTICE

A certified technician failing to perform the required specified duties or inadequately performing these duties, will receive an Unsatisfactory Notice (Materials IM 213, Appendix B). The notice will be from the District Materials Engineer in the District where the failure occurred. This notice and all supporting documentation will be placed in the technician's record with the Iowa Department of Transportation's Technical Training & Certification Program (TTCP). The notice will remain in their file for five years. The notice may be removed prior to the five years upon the recommendation of the District Materials Engineer.

SUSPENSION

A technician receiving two Unsatisfactory Work Performance Notices for work performed under a specific certification will be given a three-month suspension of the applicable certification. Suspended technicians shall not perform any duties governed by the suspended certification, including any duties which require the suspended certification as a prerequisite.

Technicians are eligible to be reinstated after the three-month suspension and successful completion of the applicable recertification test(s).

Technicians are subject to decertification when they receive a third Unsatisfactory Performance Notice.

The suspension will be effective on the date the Program Director issues the suspension.

DECERTIFICATION

Certified Technicians will be decertified for any of the following reasons:

Certifications will be revoked for the following reasons:

1. Failure of the certificate holder to renew the certificate prior to regular expiration as described above.

2. Use of false or fraudulent information to secure or renew a certificate.

3. Use of false or fraudulent documentation by the certificate holder.

4. Use of misleading, deceptive, untrue or fraudulent representations by the certificate holder.

5. Cheating on certification exams or performance evaluations. This includes removing, or attempts to remove, exam questions, answers, or other exam materials from the testing location.

6. Receipt of 3 Unsatisfactory Performance notifications, as stated above under suspension.

The Program Director, or designee, will notify an individual in writing of the intent to suspend or revoke the individual's certification(s). Notice will also be sent to the technician's last known employer. For DOT employees, notice will also be sent to their immediate supervisor.

An individual's certifications will be suspended during the appeal process, and the individual can't perform any duties governed by the certification during this time, until the first day following the end of the appeal process described below.

Technicians that are decertified shall not perform any duties requiring certification.

APPEALS & REINSTATEMENT REQUESTS

An individual has 10 business days to respond to the revocation notice. If the individual fails to respond with an appeal within 10 days of receipt of the original revocation notice, the suspension or revocation becomes effective on the 10th day.

Appeal step 1: First step appeals will be heard by the program director and a representative panel. The individual will have an opportunity to present information to support their continued certification to the panel. The Program Director and representative panel will then render a written decision, taking into account the technician's actions or omissions, the existence of past infractions, and any mitigating factors. This step 1 appeal will become final if further action is not taken as described in appeal step 2 and the suspension or revocation will become effective on the day the decision is issued by the panel.

Appeal step 2: If the individual is not satisfied with the decision of the Program Director and representative panel, the individual shall, within 10 days of receipt of the written decision, submit a request for further review to the Program Director. This appeals request will be considered by the entire Certification Board. The decision of the Certification Board will be the final decision on behalf of Technical Training & Certification Program.

Any violation will remain on the violator's record for five years, at which time the violation will be removed from their record.

A technician may request reinstatement after one year of being decertified unless the Program Director authorized a shorter period of time, which shall not be less than three months. If a reinstatement is authorized, the individual must attend and successfully complete the applicable certification courses.

FUNCTIONS & RESPONSIBILITES

A certificate holder at each production site, project site, proportioning plant, or laboratory will perform duties. The certified technician shall perform quality control testing in accordance with specified frequencies and submit designated reports and records.

The specification requirement for materials testing by a certified technician does not change the supplier's responsibilities to furnish materials compliant with the specification requirements.

The District Materials Engineer and/or Project Engineer will be responsible for monitoring the sampling, testing, production inspection activities and quality control performed by the contractor. A monitor shall have satisfactorily completed the training and be certified for the level of technician they are monitoring.

The District Materials Engineer and/or Project Engineer will have authority and responsibility to question and, where necessary, require changes in operations and quality control to ensure specification requirements are met.

QUALITY CONTROL, TESTING, & DOCUMENTATION

The QC Technician shall be present whenever construction work related to production activity, such as stockpiling or other preparatory work, requires record development and/or documentation is in progress. The QC Technician's presence is normally required on a continuing basis beginning one or more days before plant operation begins and ending after plant shut down at the completion of the project. The work shall be performed in a timely manner and at the established frequencies.

The QC Technician's presence is not normally required during temporary plant shut downs caused by conditions, such as material shortages, equipment failures, or inclement weather.

All quality control activities and records shall be available and open for observation and review by representatives of the contracting authority.

Reports, records, and diaries developed during progress of construction activities will be filed as directed by the Contracting Authority and will become the property of the Contracting Authority.

Quality control activities, testing, and records will be monitored regularly by Contracting Authority representatives. The Project Engineer or District Materials Engineer will assign personnel for this function.

Monitor activities will be reported and filed at prescribed intervals with the Project Engineer, District Materials Engineer, producer, contractor, and the contractor's designated producer.

At no time will the monitor inspector issue directions to the contractor, or to the QC Technician. However, the monitor inspector will have the authority and responsibility to question, and where necessary, reject any operation or completed product, which is not in compliance with contract requirements.

ACCEPTANCE

Completed work will be accepted on the basis of specification compliance documented by acceptance test records, and monitor inspection records. Specification noncompliance will require corrective action by the producer, contractor, or by the contractor's designated producer, and review of events and results associated with noncompliance by the Project Engineer.

CERTIFICATION LEVELS

CERTIFICATION LEVEL	TITLE	PRE-REQUISITES
	AGGREGATE	
Aggregate Sampler	Certified Sampling Technician	None
Aggregate Technician	Certified Aggregate Technician	None
	EROSION CONTROL	
Erosion Control	Erosion Control Technician	None
	HOT MIX ASPHALT	
HMA Sampler	HMA Sampler	None
Level I HMA	HMA Technician	Aggregate Technician
Level II HMA	HMA Mix Design Technician	Level I HMA
	PORTLAND CEMENT CONCRETE	
Level I PCC**	PCC Testing Technician	None
Level II PCC	PCC Plant Technician	Agg. Technician & Level I PCC
Level III PCC	PCC Mix Design Technician	Level II PCC
	PRESTRESS	
Prestress	Prestress Technician	Level I PCC or ACI Grade I If the technician will be performing gradations, they will need to be Aggregate Technician certified.
	RIDE QUALITY	
Ride Quality	Ride Quality Technician	None
	SOILS	
Soils	Soils Technician	None

**American Concrete Institute (ACI) Grade I certification will be acceptable as a portion of the Level I PCC training.

UNSATISFACTORY PERFORMANCE NOTICE

Issued To: _____ Date: _____

_____

_____

This notice is to inform you that your performance as a Certified Inspector/Technician was unsatisfactory for the reason(s) listed below.

This notice and all supporting documentation will be placed in your record with the Iowa Department of Transportation's Technical Training & Certification Program (TTCP).

The goal of the Technical Training and Certification Program (TTCP) is to work with contractors, producers, cities, counties, and consultants to continually improve the quality of Iowa's construction projects. We hope you will work with us to achieve this goal.

Unsatisfactory Performance:

_____

_____

_____

_____

_____

_____

_____

_____
District Materials Engineer

cc: Program Director –Construction and Materials Engineer, Ames
TTCP Coordinator
Resident Construction Engineer

CERTIFIED TECHNICIANS QUALIFICATIONS

Tests and Procedures the Certified Technician is qualified to perform for each level of certification.

AGGREGATE SAMPLER

- IM 204 - Inspection of Construction Project Sampling & Testing (when material is incorporated)
- IM 209, App. C - Aggregate Specification Limits & Sampling & Testing Guide (when material is produced)
- IM 301 - Aggregate Sampling Methods
- IM 336 – Methods of Reducing Aggregate Field Samples to Test Samples

AGGREGATE TECHNICIAN

- IM 204 - Inspection of Construction Project Sampling & Testing (when material is incorporated)
- IM 209, App. C - Aggregate Specification Limits & Sampling & Testing Guide (when material is produced)
- IM 210 – Production of Certified Aggregate From Reclaimed Roadways
- IM 216 - Guidelines for Verifying Certified Testing Results
- IM 301 - Aggregate Sampling Methods
- IM 302 - Sieve Analysis of Aggregates
- IM 306 - Determining the Amount of Material Finer Than #200 (75µm) Sieve in Aggregate
- IM 307 - Determining Specific Gravity of Aggregate
- IM 308 - Determining Free Moisture & Absorption of Aggregate
- IM 336 - Methods of Reducing Aggregate Field Samples to Test Samples
- IM 344 - Determining the Amount of Shale in Fine Aggregate
- IM 345 - Determining the Amount of Shale in Coarse Aggregate
- IM 368 – Determining the Amount of Clay Lumps & Friable Particles in Coarse Aggregate
- IM 409 – Source Approvals for Aggregate

HMA BASIC TESTER (This is for Provisional Certification Only)

- IM 321 - Method of Test for Compacted Density of Hot Mix Asphalt (HMA) (Displacement Method)
- IM 322 - Method of Sampling Uncompacted Hot Mix Asphalt
- IM 323 - Method of Sampling Asphaltic Materials
- IM 325G - Method of Test for Determining the Density of Hot Mix Asphalt (HMA) Using the Superpave Gyratory Compactor (SGC)
- IM 350 - Maximum Specific Gravity of Hot Mix Asphalt (HMA) Mixtures
- IM 357 - Preparation of Hot Mix Asphalt (HMA) Mix Samples for Test Specimens
- All forms must be signed by an HMA I or HMA II certified technician

HMA SAMPLER

- IM 320 – Method of Sampling Compacted Asphalt Mixtures
- IM 321 – Method of Test for Compacted Density of Hot Mix Asphalt (HMA) (Displacement Method)
- IM 322 - Method of Sampling Uncompacted Hot Mix Asphalt

- IM 323 - Method of Sampling Asphaltic Materials

LEVEL I HMA

- IM 204 - Inspection of Construction Project Sampling & Testing
- IM 208 - Materials Laboratory Qualification Program
- IM 216 - Guidelines for Verifying Certified Testing Results
- IM 320 - Method of Sampling Compacted Asphalt Mixtures
- IM 321 - Method of Test for Compacted Density of Hot Mix Asphalt (HMA) (Displacement Method)
- IM 322 - Method of Sampling Uncompacted Hot Mix Asphalt
- IM 323 - Method of Sampling Asphaltic Materials
- IM 325G - Method of Test for Determining the Density of Hot Mix Asphalt (HMA) Using the Superpave Gyratory Compactor (SGC)
- IM 337 - Determining Thickness of Completed Courses of Base, Subbase, & Hot Mix Asphalt
- IM 350 - Maximum Specific Gravity of Hot Mix Asphalt (HMA) Mixtures
- IM 357 - Preparation of Hot Mix Asphalt (HMA) Mix Samples for Test Specimens
- IM 501 - Asphaltic Terminology, Equations & Example Calculations
- IM 508 - Hot Mix Asphalt (HMA) Plant Inspection
- IM 509 - Tank Measurement & Asphalt Cement Content Determination
- IM 511 - Control of Hot Mix Asphalt (HMA) Mixtures

LEVEL II HMA

- IM 380 - Vacuum-Saturated Specific Gravity & Absorption of Combined or Individual Aggregate Sources
- IM 510 - Method of Design of Hot Mix Asphalt (HMA) Mixes
- AASHTO T176 - Plastic Fines in Graded Aggregate & Soils by use of Sand Equivalent Test
- AASHTO T304 - Uncompacted Void Content of Fine Aggregate
- ASTM D 4791 - Flat Particles, Elongated Particles, or Flat & Elongated Particles in Coarse Aggregate
- AASHTO T283 Resistance of Compacted Hot Mix Asphalt (HMA) to Moisture-Induced Damage

LEVEL I PCC

- IM 204 - Inspection of Construction Project Sampling & Testing
- IM 208 - Materials Laboratory Qualification Program
- IM 216 - Guidelines for Verifying Certified Testing Results
- IM 315 - Method of Protecting, Curing, Making & Testing Concrete Cylinders
- IM 316 - Flexural Strength of Concrete
- IM 317 - Slump of Hydraulic Cement Concrete
- IM 318 - Air Content of Freshly-Mixed Concrete by Pressure
- IM 327 - Sampling Freshly-Mixed Concrete
- IM 328 - Making, Protecting, and Curing Concrete Flexural Specimens
- IM 340 - Weight Per Cubic Foot, Yield, & Air Content (Gravimetric) of Concrete
- IM 347 – Measuring Length of Drilled Concrete Cores
- IM 383 - Testing the Strength of PCC Using the Maturity Method
- IM 385 - Temperature of Freshly-Mixed Concrete

- IM 525 - Designing Flowable Mortar
- AASHTO T97 - Third Point Loading

LEVEL II PCC

- IM 527 - Paving Plant Inspection
- IM 528 - Structural Concrete Plant Inspection
- IM 529 - PC Concrete Proportions

LEVEL III PCC

- IM 530 - Quality Management & Acceptance of PC Concrete Pavement
- IM 531 - Test Method for Combining Aggregate Gradations
- IM 532 - Aggregate Proportioning Guide for Portland Cement Concrete Pavement

PRESTRESS

- IM 570 - Precast & Prestressed Concrete Bridge Units

RIDE QUALITY

- IM 341 - Determining Pavement & Bridge Ride Quality

SOILS

- IM 309 – Determining Standard Proctor Moisture Density Relationship of Soils
- IM 312 – Sampling of Soils for Construction Project
- IM 335 – Determining Moisture Content of Soils
- ASTM D-2937 – Field density by drive-cylinder method

NPDES PERMIT

NPDES PERMIT

Copy of Permit: Effective 3/1/23 to 2/29/28

Sample Authorization

Written and issued by Iowa DNR on behalf of EPA

Note: Comments, underlining, and highlighting have been added to emphasize sections of the permit

IOWA DEPARTMENT OF NATURAL RESOURCES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT NO. 2

5 year permit

EFFECTIVE DATES

MARCH 1, 2023 THROUGH FEBRUARY 29, 2028

FOR

STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES

Permit provides permision to discharge clean storm water from project site

NPDES GENERAL PERMIT NO. 2
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PART I. COVERAGE UNDER THIS PERMIT

Permit coverage must be obtained for construction sites disturbing 1 acre or more

A. PERMIT AREA

This permit covers all areas of the State of Iowa.

B. ELIGIBILITY

1. **Authorizations.**
   - **a.** Except for discharges identified under Parts I.B.2. and I.B.3., this permit may authorize the discharge of storm water associated with industrial activity from construction sites, (those sites or common plans of development or sale that will result in the disturbance of one or more acres total land area, including the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more), (hereafter referred to as storm water discharge associated with industrial activity for construction activities), occurring after the effective date of this permit (including discharges occurring after the effective date of this permit where the construction activity was initiated before the effective date of this permit), including storm water discharge associated with industrial activity from areas that are dedicated to producing earthen materials, such as soils, sand and gravel, for use at a single construction site. This permit may also authorize areas where soil is placed permanently or temporarily, also known as fill sites.
   - **b.** This permit may authorize storm water discharge from a construction site that is mixed with storm water discharge associated with industrial activity from sources other than construction activities provided that the storm water discharge from the industrial (non-construction) source is in compliance with the terms of a NPDES general permit, other than this general permit, or an individual permit authorizing such discharge. In addition, the storm water other than from construction shall be in compliance with Part IV.D.6. of this permit.
2. **Limitations on Coverage.** The following discharges associated with industrial activity for construction activities are NOT authorized by this permit:
   - **a.** storm water discharges that are mixed with sources of non-storm water other than discharges identified in Part III.A.2. of this permit;
   - **b.** discharges associated with industrial activity for construction activities which are covered by an individual NPDES permit or which are issued a permit in accordance with Part I.C. of this permit. discharges authorized by an existing individual NPDES permit this general permit as the existing individual permit expi
   - **c.** storm water discharges associated with industrial activity for construction activities that the Iowa Department of Natural Resources has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard;
   - **d.** new or expanded storm water discharge associated with industrial activity that discharges to Outstanding Iowa Waters or to Outstanding National Resource Waters; and
   - **e.** discharges from concrete washout activities and from wet sawing of concrete. Waste from concrete washout and wet sawing of concrete is not allowed to be discharged to surface waters and is not allowed to adversely affect a water of the state.

Concrete washout and waste slurry is not approved to be discharged

To discharge to these waters requires an individual permit

3. **Exclusions.** The following storm water discharges associated with industrial activity from construction activities do not require a NPDES permit: discharges from soil disturbing activities from sites where less than 5 acres is disturbed and the soil disturbing activities are due to routine maintenance that is performed to maintain the original line and grade, hydraulic capacity or original purpose of the site and discharges from agricultural and silvicultural activities including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands, but not discharges from concentrated animal feeding operations as defined in 40 CFR Section 122.23, concentrated aquatic production facilities as defined in 40 CFR Section 122.24, discharges to aquaculture projects as defined in 40 CFR Section 122.25, and discharges from silvicultural point sources as defined in 40 CFR Section 122.27.

These activities do not require a permit

C. REQUIRING AN INDIVIDUAL PERMIT

1. The Department may require any person authorized by this permit to apply for and obtain an individual NPDES permit. The Department may require any owner or operator authorized to discharge under this permit to apply for an individual NPDES permit only if the owner or operator has been notified in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the owner or operator to file the application, and a statement that on the effective date of the individual NPDES permit, coverage under this general permit shall automatically terminate. If an owner or operator fails to submit an individual NPDES permit application required by the Department under this paragraph, coverage of this general permit automatically is terminated at the end of the day specified for submittal of the individual NPDES application.
2. Any person authorized to discharge under this permit may apply for an individual NPDES permit. In such cases, the discharger shall submit the following in accordance with the requirements of subrule 567 IAC 64.3(4):
   a. an individual application, using industrial application Form 1, Form 2F, and Form 5; and,
   b. all applicable fees identified in rule 567 IAC 64.16.
3. When an individual NPDES permit is issued to a discharger covered under this general permit, the applicability of this general permit to the individual NPDES permittee is automatically terminated on the effective date of the individual NPDES permit. When an individual NPDES permit is denied to an applicant subject to this permit, the applicability of this permit to the individual NPDES permittee is terminated on the date of such denial, unless otherwise specified by the Department.

NOI must be submitted in order to obtain permit coverage

D. AUTHORIZATION

A discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part II of this permit in order for storm water discharge associated with industrial activity for construction activities pursuant to Part I.B. of this permit to be authorized to discharge under this general permit.

PART II. NOTICE OF INTENT (NOI) REQUIREMENTS

For projects where DOT is Contracting Authority, NOI is completed by designer and submitted by Bureau of Construction and Materials

A. DEADLINES FOR NOTIFICATION

For storm water discharge associated with industrial activity for construction activities, such activities shall not commence until an authorization has been issued for the project by the Department.

B. FAILURE TO NOTIFY

Dischargers who fail to notify the Department of their intent to be covered by this permit and discharge pollutants to water of the United States within Iowa, without an NPDES permit, are in violation of the Iowa

NOI must be submitted and approved prior to soil disturbing activities

C. CONTENTS OF AN NOI

A complete NOI shall include the items described in Parts II.C.1., II.C.2., and II.C.3. of this permit.

1. A completed NOI form, DNR Form 542-1415, signed in accordance with Parts VI.H. and VI.I of this permit. The information on the form shall include all of the following:
   a. Name, address, and location of the construction site for which this notification is submitted. The location shall be provided as the 1/4 section (NE, SE, SW, NW), township, range, and county where the storm water discharge is located;
   b. The owner's name, address, telephone number, and status (federal, state, private, public or other entity);
   c. The name, address and telephone number of any operator (contractor) that has been identified as having a role in the storm water pollution prevention plan (SWPPP) for the site required under Part IV.D.7. of this permit. Contractors (operators) identified after the submittal of the completed NOI shall be identified in the SWPPP;
   d. The type of discharge (new or existing as related to October 1, 1992); whether or not the discharge is to a municipal separate storm sewer system; the date the discharge is to commence; the permit status of the discharge; and, the name of the receiving water(s);

PPP must be developed prior to NOI submital

e. An indication if any existing quantitative data is available describing the conce m water discharges. Existing data should not be included as part of the NOI, it sh he SWPPP;

f. A brief description of the project; an estimated timetable for major activities; and, an estimate of the number of acres of the site on which soil will be disturbed; and

g. A certification that compliance with g.(1). through g.(4). are met:

g.(1). the SWPPP has been developed before the NOI is submitted to the Department;

g.(2). the SWPPP will be implemented on October 1, 1992 for any existing storm water discharge associated with industrial activity for construction activities. For a storm water discharge associated with industrial activity for construction activities that commence after October 1, 1992, the SWPPP shall be implemented with the start of construction activities;

g.(3). the NOI will be included and incorporated into the SWPPP and will be updated as required; and,

g.(4). the SWPPP provides compliance with Iowa Code section 161A.64 and local sediment and erosion plans and are consistent with the requirements of Part IV of this general permit.

2. **Applicable Fees.** The applicable fees specified in 567 IAC 64.16.

3. **Public Notification.** A demonstration that the public notice specified in 567 IAC 64.6(1)"*c*"(1) was published at least one day in one newspaper with the largest circulation in the area in which the facility is located or the activity will occur.

D. WHERE TO SUBMIT

Facilities which discharge storm water associated with industrial activity for construction activities must submit items described in Part II.C. of this permit to the Department online at: https://programs.iowadnr.gov/stormwater/pages/home.aspx or by mail to the following address: Storm Water Coordinator, Iowa Department of Natural Resources, 502 E 9th St., Des Moines IA 50319-0034.

E. RENOTIFICATION

Prior to the expiration of an authorization issued under this general permit, the permittee is required to resubmit an NOI (no additional public notice is required) with the Department for coverage under the new general permit. If a new general permit has not been reissued prior to the expiration of the current permit, the provisions and coverage of the current permit are extended until replaced by the adoption of a new general permit.

F. TRANSFER OF COVERAGE UNDER THIS PERMIT

For storm water discharge associated with industrial activity for construction activities where the ownership changes, the Department must be notified of the title transfer within 30 days. Both the previous owner(s) and the new owner(s) are responsible for notifying the Department of the transfer and the new owner's name and contact information. This requirement shall be satisfied upon the Department's receipt of the notification of this information by either the previous owner(s) or the new owner(s).

If a storm water discharge associated with industrial activity for construction activities is covered by this general permit, the new owner(s) shall be subject to all terms and conditions of this general permit. A copy of the notice of transfer that was sent to the Department shall be included in the SWPPP.

For construction activity which is part of a larger common plan of development, such as a housing or commercial development project, if a permittee transfers ownership of all or any part of property subject to this permit, both the permittee and transferee shall be responsible for compliance with the provisions of this permit for that portion of the project which has been transferred including when the transferred property is less than one acre in area. If the new owner(s) agree in writing to be solely responsible for compliance with the provisions of this permit for the property which has been transferred, then the existing permittee(s) shall be relieved of responsibility for compliance with this permit for the transferred property, from and after the date the transfer of responsibility is signed. A copy of the notice of transfer of responsibility shall be included in the SWPPP.

G. NOTICE OF DISCONTINUATION (NOD)

1. Within 30 days after final stabilization at a construction site (as defined in Part VIII of this permit), the operator or owner of the facility shall submit a Notice of Discontinuation (NOD) to the Department.
2. A NOD shall include the following information:
   - **a.** the name of the owner/operator to which the permit was issued;
   - **b.** the general permit number and permit authorization number;
   - **c.** the date the construction site reached final stabilization; and,
   - **d.** the following certification signed in accordance with Part VI.H. of this permit:

     I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized and sediment control measures have been removed or will be removed at an appropriate time. I understand that by submitting this Notice of Discontinuation, that I am no longer authorized to discharge storm water associated with industrial activity for construction activities by Iowa Department of Natural Resources NPDES Permit No. 2. and that discharging pollutants from storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit.

Definition is on p. 13-14 of permit

RCE sends NOD to Bureau of Construction and Materials after final stabilization has been achieved, who submits to DNR

PART III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. PROHIBITION ON NON-STORM WATER DISCHARGES

1. All discharges authorized by this permit shall be composed entirely of storm water except for non-storm discharges listed in Part III.A.2 of this permit.
2. Discharges from firefighting activities; fire hydrant flushings; waters used to wash vehicles in accordance with Part III.C. and Part IV.D.2.c.(2). of this permit; potable water sources including waterline flushings; irrigation drainage; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated groundwater; and foundation or footing drains where flows are not contaminated with process materials such as solvents; may be authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5. of this permit.

Must be uncontaminated and noted in PPP

B. RELEASES IN EXCESS OF REPORTABLE QUANTITIES

Any owner or operator identified in the SWPPP is subject to the spill notification requirements as specified in Iowa Code 455B.386. Iowa law requires that as soon as possible but not more than six hours after the onset of a hazardous condition[1] the Department and local sheriff's office or the office of the sheriff of the affected county be notified.

The SWPPP described in Part IV of this permit must be modified within 7 calendar days of knowledge of the release to provide a description of the release and the circumstances leading to the release and to identify and provide for the implementation of steps to prevent the reoccurrence of such releases and to respond to such releases.

C. FEDERAL CONSTRUCTION AND DEVELOPMENT EFFLUENT GUIDELINES

In addition to all other requirements in this permit, all sites and activities required to be authorized under this permit shall comply with the following federal effluent guidelines as applicable to each site and activity.

1. **Erosion and Sediment Controls.** Design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed and maintained to:
   - **a.** Control storm water volume and velocity to minimize soil erosion in order to minimize pollutant discharges;
   - **b.** Control storm water discharges, including both peak flow rates and total storm water volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points;
   - **c.** Minimize the amount of soil exposed during construction activity;

[1] see Definitions, Part VIII

d. Minimize the disturbance of steep slopes;

e. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff and soil characteristics in f soil particle sizes expected to be present on the site; and

f. Provide and maintain natural buffers around waters of the United States, direct storm water to vegetated areas and maximize storm water infiltration to reduce pollutant discharges, unless infeasible.

0-14 day rule for stabilization

2. **Soil Compaction and Topsoil Preservation.** Practices to minimize soil compaction and preserve topsoil shall be implemented as described in Part IV.D.2.a.(2).iii. of this permit.
3. **Soil Stabilization.** Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. In drought-stricken areas and areas that have recently received such high amounts of rain that seeding with field equipment is impossible and initiating vegetative stabilization immediately is infeasible, alternative stabilization measures must be employed as specified by the Department. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed.
4. **Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.
5. **Pollution Prevention Measures.** Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:
   a. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
   b. Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and storm water. Minimization of exposure is not required in cases where the exposure to precipitation and to storm water will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of storm water contamination (such as final products and materials intended for outdoor use); and
   c. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

Spill Prevention, Control, & Countermeasure (SPCC)

6. **Prohibited Discharges.** The following discharges are prohibited:
   a. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
   b. Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance; and
   c. Soaps or solvents used in vehicle and equipment washing.
7. **Surface Outlets.** When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface, unless infeasible.

SWPPP or PPP

PART IV. STORM WATER POLLUTION PREVENTION PLANS (SWPPP)

A storm water pollution prevention plan (SWPPP) shall be developed for each construction site covered by this permit. SWPPPs shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of the storm water discharge from the construction activities. In addition, the SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharge associated with industrial activity for construction activities at the construction site and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the SWPPP required under this part as a condition of this permit.

A. DEADLINES FOR SWPPP PREPARATION AND COMPLIANCE

1. **SWPPP Preparation Deadline.** The SWPPP shall be completed prior to the submittal of a NOI to the Department to be covered under this permit and shall be updated as appropriate.
2. **SWPPP Compliance Deadline**. The SWPPP shall provide for compliance with the terms and schedule of the SWPPP prior to the initiation of construction activities.

B. SIGNATURE AND SWPPP REVIEW

1. The SWPPP shall be signed in accordance with Part VI.H. of this permit.
2. The permittee shall make SWPPPs available to the Department upon request; or in the case of a storm water discharge associated with industrial activity for construction activities that discharges through a municipal separate storm sewer system with an NPDES permit, shall make the SWPPP available to the municipal operator of the system.
3. The Department may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. After such notification from the Department, the permittee shall make changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Unless otherwise provided by the Department, the permittee shall have 3 business days after such notification to make the necessary changes.
4. All SWPPPs received by the Department from the permittee are considered reports that shall be available to the public under Section 308(b) of the CWA and Iowa Code Chapter 22. However, the permittee may claim any portion of a SWPPP as confidential in accordance with Iowa Code Chapter 22 and 561 IAC 2.5.

C. KEEPING SWPPPS CURRENT

The permittee shall amend the SWPPP whenever any of the following occurs: (1) there is a change in design, construction, operation, or maintenance, that has a significant effect on the potential for the discharge of pollutants to the waters of the U.S. and which has not been addressed in the SWPPP; or (2) if the SWPPP proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in Part IV.D.2. of this permit, or (3) the SWPPP fails to otherwise achieve the general objectives of controlling pollutants in storm water discharge associated with industrial activity for construction activities. In addition, the SWPPP shall be updated to: expeditiously change the site map to include changes at the site, including contractors identified after the submittal of the NOI as Co-permittees, described in Part IV.D.7. of this permit; identify any change in ownership or transference of the permit and permit responsibilities; or, if required, by the occurrence of a hazardous condition (as defined in Part VIII of this permit). Amendments to the SWPPP may be reviewed by the Department in the same manner as Part IV.B.2 of this permit.

Spec 2602 requirement to amend site map

D. CONTENTS OF THE SWPPP

The SWPPP shall include the following items:

1. **Site Description.** Each SWPPP shall provide a description of the following:
   - **a.** a description of the nature of the construction activity;
   - **b.** estimates of the total area of the site and the area of the site that is expected to be disturbed by excavation, grading, or other activities;
   - **c.** an estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;
   - **d.** a site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of structural and nonstructural controls identified in the SWPPP, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water; and
   - **e.** the name of the receiving water(s) and the ultimate receiving water(s).
2. **Controls.** Each SWPPP shall include a description of controls that will be implemented at the construction site. The SWPPP will clearly describe the intended sequence of major activities and for each activity, the appropriate control measures and the timing during the construction process that the measures will be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing

Contractor's ECIP to provide info

necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description of controls shall address the following minimum components:

a. Erosion and Sediment Controls

a.(1). **Stabilization Practices.** A description of temporary and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Stabilization practices may include: temporary or permanent seeding after germination and establishment of vegetative cover of sufficient density and height to preclude erosion has been achieved, as well as mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Temporary or continued stabilization must be implemented and maintained when necessary to prevent erosion of seeded areas prior to the establishment of vegetative cover of sufficient density and height to preclude erosion.

Can't just seed. Need other controls in addition to seeding.

a.(2). **Structural Practices.** A description of structural practices to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff from exposed areas of the site. Such practices may include silt fences, earth dikes, brush barriers, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA.

a.(2).i For common drainage locations that serve an area with more than 10 disturbed acres at one time, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained shall be provided where attainable until final stabilization of the site has been achieved. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. For drainage locations which serve more than 10 disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained is not attainable, sediment traps, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

Storage capacity required

a.(2).ii For drainage locations serving 10 or fewer acres, sediment traps, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area or a sediment basin providing for 3,600 cubic feet of storage per acre drained.

a.(2).iii Unless infeasible, the following measures shall be implemented at all sites: utilize outlet structures that withdraw water from the surface when discharging from basins, provide and maintain natural buffers around surface waters and direct storm water to vegetated areas to both increase sediment removal and maximize storm water infiltration.

The permittee(s) shall minimize soil compaction and, unless infeasible, preserve topsoil. "Infeasible" shall mean not technologically possible, or not economically practicable and achievable in light of the best industry practices. "Unless infeasible, preserve topsoil" shall mean that, unless infeasible, topsoil from any areas of the site where the surface of the ground for the permitted construction activities is disturbed shall remain within the area covered by the applicable General Permit No. 2 authorization. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. The permittee(s) shall control storm water volume and velocity to minimize soil erosion in order to minimize pollutant discharges and shall control storm water discharges, including both peak flowrates and total storm water volume, to minimize channel and stream bank erosion

and scour in the immediate vicinity of discharge points. An affidavit signed by the permittee(s) may be submitted to demonstrate compliance.

For construction activity which is part of a larger common plan of development, such as a housing or commercial development project, in which a new owner agrees in writing to be solely responsible for compliance with the provisions of this permit for the property which has been transferred or in which the new owner has obtained authorization under this permit for a lot or lots (as specified in subrule 567 IAC 64.6(6)), the topsoil preservation requirements described above must be met no later than at the time the lot or lots have reached final stabilization as described in this permit.

The topsoil preservation requirement described above shall be implemented for projects that have not received an authorization under this permit prior to October 1, 2012. The topsoil preservation requirements are not required to be implemented for projects that have been authorized prior to October 1, 2012. In residential and commercial developments, a plat is considered a project. For other large areas that have been authorized for multiple construction sites, including those to be started at a future date, such as those located at industrial facilities, military installations and universities, a new construction project not yet surveyed and platted out is considered a project. This stipulation is intended to be interpreted as requiring the topsoil preservation requirements on development plats and construction activities on other extended areas that may have several construction projects permitted under the same authorization to be implemented on those projects not yet surveyed and platted out prior to October 1, 2012 even if other plats and construction activities in the same development or other extended area were authorized prior to October 1, 2012.

b. Storm Water Management. A description of measures that will be installed during construction to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the CWA. This permit only addresses the installation of storm water management measures and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

b.(1). Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; and infiltration of runoff onsite; and sequential systems (which combine several practices). A goal of 80 percent removal of total suspended solids from those flows which exceed predevelopment levels should be used in designing and installing storm water management controls (where practicable). Where this goal is not met, the permittee shall provide justification for rejecting each practice based on site conditions.

b.(2). Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions present prior to the initiation of construction activities).

c. Other Controls.

c.(1). Waste Disposal. All wastes composed of building materials must be removed from the site for disposal in permitted disposal facilities. No building material wastes or unused building materials shall be buried, dumped, or discharged at the site.

c.(2). Off-site vehicle tracking of sediments shall be minimized.

Off-site tracking

c.(3). The SWPPP shall ensure and demonstrate compliance with applicable State or local waste disposal, sanitary sewer or septic system regulations.

d. Approved State or Local Plans. A SWPPP that is submitted by a facility that discharges storm water associated with industrial activity for construction activities must include the procedures and requirements specified in any applicable sediment and erosion site plans or storm water management plans approved by State or local officials. Any requirements specified in sediment and erosion plans, site permits, or storm water management plans approved by State or local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, incorporated by reference and are enforceable under this permit even if they are not specifically included in the SWPPP.

Operators of facilities seeking alternative permit requirements shall submit an individual permit application in accordance with Part I.C.2. of this permit along with a description of why the requirements in approved State or local plans should not be applicable as a condition of an NPDES permit.

3. **Maintenance.** A description of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures identified in the site plan.
4. **Inspections.** Qualified personnel (provided by the discharger) shall inspect disturbed areas of the construction site that have not been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion at least once every seven calendar days. Unless erosion is evident or other conditions warrant them, regular inspections are not required on areas that have been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion.
   a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. When discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
   b. Based on the results of the inspection, the storm water pollution prevention measures identified in the SWPPP shall be revised at the construction site as appropriate as soon as practicable after the inspection and added to the SWPPP within 7 calendar days of the inspection. If the permittee determines that making these changes at the construction site within 72 hours of the inspection is impracticable, the permittee shall document in the SWPPP why it is impracticable and indicate an estimated date by which the changes will be made.
   c. A report shall be made and retained as part of the SWPPP for at leas ation has been achieved and a NOD has been submitted to the Department. The report shall be signed in accordance with Part VI.H. of this permit. The report shall contain the following: a summary of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP and actions taken in accordance with Part IV.D.4.b. of this permit.

What to inspect

Completion of items after inspection

Inspection report requirements

5. **Non-Storm Water Discharges.** Sources of non-storm water listed in Part III.A.2 combined with storm water discharges associated with industrial activity from construct ntified in the SWPPP. Flows from firefighting activities are exempt from this requirement. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.
6. **Additional Requirements for Storm Water Discharge from Industrial Activities Other than Construction, Including Dedicated Asphalt Plants and Dedicated Cement Plants.** This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where all of the following conditions are met:
   a. the industrial source other than construction is located on the same site as the construction activity;
   b. storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and,
   c. storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants and dedicated cement plants) are in compliance with the terms and conditions, including applicable NOI or

application requirements, of a different NPDES general permit or individual permit authorizing such discharges.

7. **Contractors.**
   a. The SWPPP must clearly identify, for each measure in the SWPPP, the contractor(s) and/or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part IV.D.7.b. of this permit in accordance with Part VI.H. of this permit. Upon signing the certification, the contractor or sub-contractor is a co-permittee with the owner and other co-permittee contractors. All certifications must be included in the SWPPP.
   b. **Certification Statement.** All contractors and subcontractors identified in a SWPPP in accordance with Part IV.D.7.a. of this permit shall sign a copy of the following certification statement before conducting any professional service at the site identified in the SWPPP:
   I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site as part of this certification. Further, by my signature, I understand that I am a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the Iowa Department of Natural Resources NPDES General Permit No. 2 for Storm Water Discharge Associated with Industrial Activity for Construction Activities at the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act and the Code of Iowa, to ensure compliance with the terms and conditions of the storm water pollution prevention plan (SWPPP) developed under this NPDES permit and the terms of this NPDES permit.
   The certification must include the following:
   b.(1). The name and title of the person providing the signature;
   b.(2). The name, address and telephone number of the contracting firm;
   b.(3). The address (or other identifying description) of the site; and
   b.(4). The date the certification is made.

Co-permittees

Language on co-permittee certification statement, Form 830215

PART V. RETENTION OF RECORDS

A. For a period of at least three years from the date of the document or the date the site is finally stabilized and a NOD has been submitted, the permittee shall retain copies of SWPPPs, all reports required by this permit, and all records used to complete the NOI.

B. If there is a construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP required by this permit at the construction site from the date of project initiation to the date of final stabilization. If there is no construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP from the date of project initiation to the date of final stabilization at a readily available alternative site approved by the Department and provide it for inspection upon request. If the SWPPP is maintained at an off-site location such as a corporate office, it shall be provided for inspection no later than three hours after being requested.

Where records are to be kept

C. ADDRESSES
All written correspondence to the Department shall be emailed to npdes.mail@dnr.iowa.gov or mailed to the following address: Storm Water Coordinator, Iowa Department of Natural Resources, 502 E 9th St., Des Moines IA 50319-0034.

PART VI. STANDARD CONDITIONS

A. ADMINISTRATIVE RULES
Rules of the Department that govern the operation of a facility in connection with this permit are published in volumes 561 and 567 of the IAC. Reference to the term "rule" in this permit means the designated provision of volume 561 or 567.

B. DUTY TO COMPLY

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Iowa Code and the CWA and is grounds for enforcement action; for termination of coverage under this general permit; or, for denial of a request for coverage under a reissued general permit. Coverage under this general permit does not relieve the permittee of the responsibility to comply with all local, state and federal laws, ordinances, regulations or other legal requirements.
2. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

C. CONTINUATION OF THE EXPIRED GENERAL PERMIT

This permit expires on February 29, 2028. An expired general permit continues in force until replaced by adoption of a new general permit.

D. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

E. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Department, within three hours, any information which the Department may request to determine compliance with this permit. The permittee shall also furnish to the Department upon request copies of records required to be kept by this permit.

G. OTHER INFORMATION

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the Department, he or she shall promptly submit such facts or information.

H. SIGNATORY REQUIREMENTS

All NOIs, NODs, SWPPPs, reports, certifications, or information either submitted to the Department or the operator of a municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed in accordance with subrule 567 IAC 64.3(8) as follows:

64.3(8) *Identity of signatories of operation permit applications.* The person who signs the application for an operation permit shall be:

- **a.** *Corporations*. In the case of corporations, a responsible corporate officer. A responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president in charge of a principal business function or any other person who performs similar policy or decision-making functions; or (2) The manager of manufacturing, production, or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- **b.** *Partnerships*. In the case of a partnership, a general partner.
- **c.** *Sole proprietorships*. In the case of a sole proprietorship, the proprietor.
- **d.** *Municipal, state, federal, or other public agency.* In the case of a municipal, state, or other public facility, either the principal executive officer or the ranking elected official. A principal executive officer of a public

agency includes: (1) The chief executive officer of the agency; or (2) A senior executive officer having responsibility for the overall operations of a unit of the agency.

e. *Storm water discharge associated with industrial activity from construction activities*. In the case of a storm water discharge associated with construction activity, either the owner of the site or the general contractor.

The person who signs NPDES reports shall be the same, except that in the case of a corporation or a public body monitoring reports required under the terms of the permit may be submitted by the person wh the overall operation of the facility from which the discharge originated.

Certification language on PPP and inspection reports

I. CERTIFICATION

Any person signing documents required by this permit shall make the following certification:
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations.

J. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA.

K. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

L. SEVERABILITY

The provisions of this permit are severable. If any provision of this permit is found to be invalid by this Department or a court of law, such a determination shall not affect validity or enforceability of any other permit term or part. Additionally, if the application of any provision to a particular circumstance is found to be invalid by the Department or a court of law, such a determination shall not affect the validity or enforceability of said provision to other circumstances.

M. TRANSFERS

This permit is not transferable to any person except after notice to the Department. The Department may require the discharger to apply for and obtain an individual NPDES permit as stated in Part I.C of this permit.

N. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWPPPs. Adequate laboratory controls and appropriate quality assurance procedures shall be provided to maintain compliance with the conditions of this permit.

O. INSPECTION AND ENTRY

The permittee shall allow the Department or an authorized representative of EPA, the State, or, in the case of a facility which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Provide access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), and
4. Sample or monitor, at reasonable times, to assure compliance or as otherwise authorized by the CWA.

P. PERMIT ACTIONS

Coverage under this permit may be terminated for cause. The filing of a request by the permittee for a permit discontinuance, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Q. ENVIRONMENTAL LAWS

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

PART VII. REOPENER CLAUSE

If there is evidence indicating potential or realized impacts or water quality due to any storm water discharge associated with industrial activity for construction activities covered by this permit, the owner or operator of such discharge may be required to obtain individual permit in accordance with Part I.C of this permit.

PART VIII. DEFINITIONS

"*Best Management Practices*" or *"BMPs"* means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

*"**Construction site**"* means a site or common plan of development or sale on which construction activity, including clearing, grading and excavating, results in soil disturbance. A construction site is considered one site if all areas of the site are contiguous with one another and one entity owns all areas of the site.

"CFR" means the Code of Federal Regulations.

***"CWA"* or "*Clean Water Act*"** means the Federal Water Pollution Control Act.

"Dedicated portable asphalt plant" means a portable asphalt plant that is located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to.

"Dedicated portable concrete plant" means a portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

"Dedicated sand or gravel operation" means an operation that produces sand and/or gravel for a single construction project.

"Department" means the Iowa Department of Natural Resources.

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70%, sufficient to preclude erosion, for the entire disturbed area of the permitted project has been established or equivalent stabilization measures have been employed, or which is

covered by a permanent structure that ensures the ground surface will not be eroded or otherwise impacted by precipitation or runoff, or which has been returned to agricultural production.

"Hazardous condition" means any situation involving the actual, imminent, or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state, or into the atmosphere, which creates an immediate or potential danger to the public health or safety or to the environment. *Iowa Code § 455B.381(4)*

"*Hazardous substance*" means any substance or mixture of substances that presents a danger to the public health or safety and includes but is not limited to a substance that is toxic, corrosive, or flammable, or that is an irritant or that generates pressure through decomposition, heat, or other means. "Hazardous substance" may include any hazardous waste identified or listed by the administrator of the United State Environmental Protection Agency under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, or any toxic pollutant listed under section 307 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous substance designated under section 311 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous material designated by the secretary of transportation under the Hazardous Materials Transportation Act. *Iowa Code § 455B.381(5)*

"IAC" means the Iowa Administrative Code.

"Infeasible" means not technologically possible, or not economically practicable and achievable in light of best industry practices.

"Municipality" means a city, town, borough, county, parish, district, association, or other public body created by or under State law.

"NOD" means Notice of Discontinuation (see Part II.G. of this permit.)

"NOI" means Notice of Intent to be covered by this permit (see Part II of this permit.)

"*Outstanding Iowa Waters*" means those waters which constitute an outstanding state resource such as waters of exceptional recreational or ecological significance. These waters are identified in Appendix B of the Iowa Antidegradation Implementation Procedure manual.

"*Outstanding National Resource Waters*" means those waters which constitute an outstanding national resource such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance. These waters are identified in Appendix B of the Iowa Antidegradation Implementation Procedure manual.

"Permittee" means the owner of the facility or site.

"Qualified personnel" means those individuals capable enough and knowledgeable enough to perform the required functions adequately well to ensure compliance with the relevant permit conditions and requirements of the Iowa Administrative Code.

"*Runoff coefficient*" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Stabilization" **or** ***"Soil Stabilization"*** means the prevention of soil particles from being dislodged and moving therefore preventing erosion from initiating or continuing.

"*Storm Water*" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"*Storm water discharge associated with industrial activity*" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under 40 CFR Part 122. For the categories of industries identified in paragraphs (i) through (x) of this definition, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR Part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.

For the purposes of this definition, material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product, or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in these paragraphs (i) to (xi) of this definition) include those facilities designated under 40 CFR Section 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this definition:

(i) Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards which are exempted under paragraph (xi) of this definition);

(ii) Facilities classified within Standard Industrial Classification 24, Industry Group 241 that are rock crushing, gravel washing, log sorting, or log storage facilities operated in connection with silvicultural activities defined in 40 CFR Sections 122.27(b)(2)-(3) and Industry Groups 242 through 249; 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, 373; (not included are all other types of silviculture facilities);

(iii) Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under Section 40 CFR 434.11(1) because the performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations which have been released from applicable state or federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, by-products or waste products located on the site of such operations; (inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator; inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, nor sites where minimal activities are undertaken for the sole purpose of maintaining a mining claim);

(iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA);

(v) Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this definition) including those that are subject to regulation under Subtitle D of RCRA;

(vi) Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards, including, but not limited to, those classified as Standard Industrial Classifications 5015 and 5093;

(vii) Steam electric power generating facilities, including coal handling sites;

(viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42 (except 4221-4225), 43, 44, 45 and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under paragraphs (i) to (vii) or (ix) to (xi) of this definition are associated with industrial activity;

(ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA;

(x) Construction activity including clearing, grading and excavation, except operations that result in the disturbance of less than one acre of total land area. Construction activity also includes the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more;

(xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, and 4221-4225.

"Storm water discharge associated with industrial activity for construction activities" means activities that fall under subparagraph (x) in the definition of storm water discharge associated with industrial activity.

"SWPPP" means storm water pollution prevention plan.

"Topsoil" means the fertile, uppermost part of the soil containing significant organic matter largely devoid of debris and rocks and often disturbed in cultivation.

"Uncontaminated groundwater" means water that is potable for humans, meets the narrative water quality standards in subrule 567 IAC 61.3(2), contains no more than half the listed concentration of any pollutants in subrule 567 IAC 61.3(3), has a pH of 6.5-9.0 and is located in soil or rock strata.

"Water(s) of the State" means any stream, lake, pond, marsh, watercourse, waterway, well, spring, reservoir, aquifer, irrigation system, drainage system and any other body or accumulation of water, surface or underground, natural or artificial, public or private which are contained within, flow through or border upon the State of Iowa or any portion thereof.

DEPARTMENT OF NATURAL RESOURCES
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
NOTICE OF GENERAL PERMIT COVERAGE UNDER
GENERAL PERMIT NO. 2

STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITY

This notice of general permit coverage for a storm water discharge associated with construction activity is issued pursuant to the authority of section 402 (b) of the Clean Water Act (U.S.C. 1342(b)), Iowa Code 455B.174, and subrule 567--64.4(2), Iowa Administrative Code. A Notice of Intent has been filed with the Iowa Department of Natural Resources that this storm water discharge complies with the terms and conditions of NPDES General Permit No. 2. Authorization is hereby issued to discharge storm water associated with industrial activity as defined in Part VIII of the Iowa Department of Natural Resources NPDES General Permit No. 2 in accordance with the terms and conditions set forth in the permit.

Owner: **IOWA DEPARTMENT OF TRANSPORTATION**
800 LINCOLN WAY
AMES IA 50010
(515)239-1280

Permit Coverage Issued To:

IDOT - MT. VERNON/LISBON BYPASS - CONSTRUCTION
US 30 FROM WEST OF WILCOX RD. TO CHARLES AVE.
in MOUNT VERNON, LINN COUNTY
located at

1/4 Section	Section	Township	Range
SE,NE,NW,SW	7,18,13,17,20,21,22,23,24	82N	4W,5W

Coverage Provided Through: **11/30/2021** ← Site covered by permit until this date

NPDES Permit Discharge Authorization Number: **29951 - 29690** ← Permit Authorization #

Discharge Authorization Date: **11/30/2016** ← Start of permit coverage

Project Description: CONSTRUCTION OF MT. VERNON/LISBON BYPASS 418 ACRES

PPP

POLLUTION PREVENTION PLAN

This project is regulated by the requirements of the Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 OR an Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) individual storm water permit. The Contractor shall carry out the terms and conditions of this permit and the Pollution Prevention Plan (PPP).

This Base PPP includes information on Roles and Responsibilities, Project Site Description, Controls, Maintenance Procedures, Inspection Requirements, Non-Storm Water Controls, Potential Sources of Off Right-of-Way Pollution, and Definitions. This plan references other documents rather than repeating the information contained in the documents. A copy of this Base Pollution Prevention Plan, amended as needed during construction, will be readily available for review.

All contractors shall conduct their operations in a manner that controls pollutants, minimizes erosion, and prevents sediments from entering waters of the state and leaving the highway right-of-way. The Contractor shall be responsible for compliance and implementation of the PPP for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

I. ROLES AND RESPONSIBILITES

A. Designer:
1. Prepares Base PPP included in the project plan.
2. Prepares Notice of Intent (NOI) submitted to Iowa DNR.
3. Is signature authority on the Base PPP. If consultant designed, signature from Contracting Authority is also required.

B. Contractor:
1. Signs a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP. All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Designates a Water Pollution Control Manager (WPCM), who has the duties and responsibilities as defined in Section 2602 of the Standard Specifications.
3. Submits an Erosion Control Implementation Plan (ECIP) and ECIP updates according to Section 2602 of the Standard Specifications.
4. Installs and maintains appropriate controls. This work may be subcontracted as documented through Subcontractor Request Forms (Form 830231).
5. Supervises and implements good housekeeping practices according to Paragraph III, C, 2.
6. Conducts joint required inspections of the site with inspection staff. When Contractor is not mobilized on site, Contractor may delegate this responsibility to a trained or certified subcontractor. Contracting Authority also may waive joint inspection requirement during winter shutdown. In both circumstances, WPCM (or trained or certified delegate from the Contractor) is still responsible to review and sign inspection reports.
7. Complies with training and certification requirements of Section 2602 of the Standard Specifications.
8. Submits amended PPP site map according to Section 2602 of the Standard Specifications.

C. Subcontractors:
1. Sign a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP if: responsible for sediment or erosion controls; involved in land disturbing activities; or perorming work that is a source of potential pollution as defined in this PPP. Subcontracted work items are identified in Subcontractor Request Forms (Form 830231). All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Implement good housekeeping practices according to Paragraph III, C, 2.

D. RCE/Project Engineer:
1. Is Project Storm Water Manager.
2. On projects where DOT is the Contracting Authority, is current with erosion control training or certification.
3. Takes actions necessary to ensure compliance with storm water requirements including, where appropriate, issuing stop work orders, and directing additional inspections at construction project sites that are experiencing problems with achieving permit compliance.
4. Orders the taking of measures to cease, correct, prevent, or minimize the consequences of non-compliance with the storm water requirements of the Applicable Permit.
5. Supervises all work necessary to meet storm water requirements at the Project, including work performed by contractors and subcontractors.
6. Requires employees, contractors, and subcontractors to take appropriate responsive action to comply with storm water requirements, including requiring any such person to cease or correct a violation of storm water requirements, and to order or recommend such other actions as necessary to meet storm water requirements.
7. Is familiar with the Project PPP and storm water site map.
8. On projects where DOT is Contracting Authority, is responsible for periodically monitoring inspection reports to determine whether deficiencies identified in inspection reports were adequately and timely addressed, and if not, has the authority and responsibility to direct immediate actions to correct the deficiencies.
9. Is the point of contact for the Project for regulatory officials, Inspector, contractors, and subcontractors regarding storm water requirements.
10. Is signature authority on Notice of Discontinuation.
11. Maintains an up-to-date record of contractors, subcontractors, and subcontracted work items through Subcontractor Request Forms (Form 830231).
12. Makes information to determine permit compliance available to the DNR upon their request.

E. Inspector:
1. Updates PPP through fieldbook entries and storm water site inspection reports if there is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants from the project.
2. Makes information to determine permit compliance available to the DNR upon their request.
3. Conducts joint required inspections of the site with the contractor/subcontractor.
4. Completes an inspection report after each inspection.
5. Is signature authority on storm water inspection reports.

II. PROJECT SITE DESCRIPTION

A. This Pollution Prevention Plan (PPP) is for the construction of a *Describe Type of Facility*.

B. This PPP covers approximately *Provide # Of Acres* acres with an estimated *Provide # of Acres* acres being disturbed. The portion of the PPP covered by this contract has *Provide # of Acres* acres disturbed.

C. The PPP is located in an area of *Provide # of Types Of Soil Association* soil association (*Provide Soil Association Type or* *Types*). The estimated weighted average runoff coefficient number for this PPP after completion will be *Provide runoff coefficient Number*.

D. Storm Water Site Map is located in the R sheets. Proposed slopes are shown in cross sections, details, or standard road plans. Supplemental information is located in the Tabulations in the C or CE sheets.

E. The base storm water site map is amended by contract modifications and progress payments (fieldbook entries) of completed erosion control work. Also, due to project phasing, erosion and sediment controls shown on project plans may not be installed until needed, based on site conditions. For example, silt fence ditch checks will typically not be installed until the ditch has been

POLLUTION PREVENTION PLAN

installed. Installed locations may also be modified from tabulation locations by field staff. Installed locations will be documented by fieldbook entries and amended PPP site map.

F. Runoff from this work will flow into *List Outlets for Runoff*.

III. CONTROLS

A. The Contractor's ECIP specified in Article 2602.03 of the Standard Specifications for accomplishment of storm water controls should clearly describe the intended sequence of major activities, and for each activity define the control measure and the timing during the construction process that the measure will be implemented.

B. Preserve vegetation in areas not needed for construction.

C. Sections 2601 and 2602 of the Standard Specifications define requirements to implement erosion and sediment control measures. Actual quantities used and installed locations may vary from the Base PPP and amendment of the plan will be documented via fieldbook entries, amended PPP site map, or by contract modification. Additional erosion and sediment control items may be required as determined by the inspector and/or contractor during storm water site inspections. If the work involved is not applicable to any contract items, the work will be paid for according to Article 1109.03 paragraph B of the Standard Specifications.

1. EROSION AND SEDIMENT CONTROLS

a. Stabilization Practices

1) Site plans will ensure that existing vegetation or natural buffers are preserved where attainable and disturbed portions of the site will be stabilized.

2) Initialize stabilization of disturbed areas immediately after clearing, grading, excavating, or other earth disturbing activities have:

a) Permanently ceased on any portion of the site, or

b) Temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.

3) Staged permanent and/or temporary stabilizing seeding and mulching shall be completed as the disturbed areas are completed. Incomplete areas shall be stabilized according to paragraph III, C, 1, a, 2, b above.

4) Permanent and Temporary Stabilization practices to be used for this project are located in the storm water site map, Estimated Project Quantities (100-0A, 100-1A, or 100-1C), and Estimate Reference Information (100-4A) located in the C or R sheets. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation (105-4) in the C or R sheets.

5) Preservation of existing vegetation within right-of-way or easements will act as vegetative buffer strips.

6) Preservation of topsoil: Bid items to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C or R sheets. Additional information may be found in the Tabulations in the C or T Tabulation sheets, or is referenced in Section 2105 of the Standard Specifications.

b. Structural Practices

1) Structural practices will be implemented to divert flows from exposed soils and detain or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Additionally, structural practices may include: silt basins that provide 3600 cubic feet of storage per acre drained or equivalent sediment controls, outlet structures that withdraw water from surface when discharging basins, and controls to direct storm water to vegetated areas.

2) Structural practices to be used for this project are located in the storm water site map, Estimated Project Quantities (100-0A, 100-1A, or 100-1C), and Estimate Reference Information (100-4A) located in the C or R sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the devices to be used on this project can be found on the B or R sheets or are referenced in the Standard Road Plans Tabulation (105-4) located in the C or R sheets.

c. Storm Water Management

Measures shall be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. This may include velocity dissipation devices at discharge locations and along length of outfall channel as necessary to provide a non-erosion velocity flow from structure to water course. If included with this project, these items are located in the storm water site map and Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C or R sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation. The installation of these devices may be subject to Section 404 of the Clean Water Act.

2. OTHER CONTROLS

Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.

a. Vehicle Entrances and Exits - Construct and maintain entrances and exits to prevent tracking of sediments onto roadways.

b. Material Delivery, Storage and Use - Implement practices to prevent discharge of construction materials during delivery, storage, and use.

c. Stockpile Management - Install controls to reduce or eliminate pollution of storm water from stockpiles of soil and paving.

d. Waste Disposal - Do not discharge any materials, including building materials, into waters of the state, except as authorized by a Section 404 permit.

e. Spill Prevention and Control - Implement chemical spill and leak prevention and response procedures to contain and clean up spills and prevent material discharges to the storm drain system and waters of the state.

f. Concrete Residuals and Washout Wastes - Waste shall not be discharged to a surface water and is not allowed to adversely affect a water of the state. Designate temporary concrete washout facilities for rinsing out concrete trucks. Provide directions to truck drivers where designated washout facilities are located. Designated washout areas should be located at least 50 feet away from storm drains, streams or other water bodies. Care should be taken to ensure these facilities do not overflow during storm events.

g. Concrete Grooving/Grinding Slurry – Do not discharge slurry to a waterbody or storm drain. Slurry may be applied on foreslopes or removed from the project.

h. Vehicle and Equipment Storage and Maintenance Areas - Perform on site fueling and maintenance in accordance with all environment laws such as proper storage of onsite fuels and proper disposal of used engine oil or other fluids on site. Employ washing practices that prevent contamination of surface and ground water from wash water. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.

i. Litter Management - Ensure employees properly dispose of litter. Minimize exposure of trash if exposure to precipitation or storm water would result in a discharge of pollutants.

j. Dewatering – Properly treat water to remove suspended sediment before it re-enters a waterbody or discharges off-site. Measures are also to be taken to prevent scour erosion at dewatering discharge point.

3. APPROVED STATE OR LOCAL PLANS

During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

POLLUTION PREVENTION PLAN

IV. MAINTENANCE PROCEDURES

The Contractor is required to maintain all temporary erosion and sediment control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. This shall begin when the features have lost 50% of their capacity.

V. INSPECTION REQUIREMENTS

A. Inspections shall be made jointly by the Contractor and the Contracting Authority's inspector at least once every seven calendar days. Storm water site inspections will include:
   1. Date of the inspection.
   2. Summary of the scope of the inspection.
   3. Name and qualifications of the personnel making the inspection.
   5. Review of erosion and sediment control measures within disturbed areas for the effectiveness in preventing impacts to receiving waters.
   6. Major observations related to the implementation of the PPP.
   7. Identification of corrective actions required to maintain or modify erosion and sediment control measures.

B. Include storm water site inspection reports in the Amended PPP. Incorporate any additional erosion and sediment control measures determined as a result of the inspection. Immediately begin corrective actions on all deficiencies found within 3 calendar days of the inspection and complete within 7 calendar days following the inspection. If it is determined that making the corrections less than 72 hours after the inspection is impracticable, it should be documented why it is impracticable and indicate an estimated date by which the corrections will be made.

VI. NON-STORM WATER DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains) and slope drains. The velocity of the discharge from these features may be controlled by the use of headwalls or blocks, Class A stone, erosion stone or other appropriate materials. This also includes uncontaminated groundwater from dewatering operations, which will be controlled as discussed in Section III of the PPP.

VII. POTENTIAL SOURCES OF OFF RIGHT-OF-WAY (ROW) POLLUTION

Silts, sediment, and other forms of pollution may be transported onto highway right-of-way (ROW) as a result of a storm event. Potential sources of pollution located outside highway ROW are beyond the control of this PPP. Pollution within highway ROW will be conveyed and controlled per this PPP.

VIII. DEFINITIONS

A. Base PPP - Initial Pollution Prevention Plan.
B. Amended PPP - Base PPP amended during construction. May include Plan Revisions or Contract Modifications for new items, storm water site inspection reports, fieldbook entries made by the inspector, amended PPP site map by the Contractor, ECIP, NOI, co-permittee certifications, and Subcontractor Request Forms. Items amending the PPP are stored electronically and are readily available upon request.
C. Fieldbook Entries – This contains the inspector’s daily diary and bid item postings.
D. Controls - Methods, practices, or measures to minimize or prevent erosion, control sedimentation, control storm water, or minimize contaminants from other types of waste or materials. Also called Best Management Practices (BMPs).
E. Signature Authority - Representative authorized to sign various storm water documents.

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____
Signature

_____
Printed or Typed Name

_____
Signature

_____

POLLUTION PREVENTION PLAN

This project is regulated by the requirements of the Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 OR an Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) individual storm water permit. The Contractor shall carry out the terms and conditions of this permit and the Pollution Prevention Plan (PPP).

This Base PPP includes information on Roles and Responsibilities, Project Site Description, Controls, Maintenance Procedures, Inspection Requirements, Non-Storm Water Controls, Potential Sources of Off Right-of-Way Pollution, and Definitions. This plan references other documents rather than repeating the information contained in the documents. A copy of this Base Pollution Prevention Plan, amended as needed during construction, will be readily available for review.

All contractors shall conduct their operations in a manner that controls pollutants, minimizes erosion, and prevents sediments from entering waters of the state and leaving the highway right-of-way. The Contractor shall be responsible for compliance and implementation of the PPP for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

I. ROLES AND RESPONSIBILITES

A. Designer:
1. Prepares Base PPP included in the project plan.
2. Prepares Notice of Intent (NOI) submitted to Iowa DNR.
3. Is signature authority on the Base PPP. If consultant designed, signature from Contracting Authority is also required.

B. Contractor:
1. Signs a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP. All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Designates a Water Pollution Control Manager (WPCM), who has the duties and responsibilities as defined in Section 2602 of the Standard Specifications.
3. Submits an Erosion Control Implementation Plan (ECIP) and ECIP updates according to Section 2602 of the Standard Specifications.
4. Installs and maintains appropriate controls. This work may be subcontracted as documented through Subcontractor Request Forms (Form 830231).
5. Supervises and implements good housekeeping practices according to Paragraph III, C, 2.
6. Conducts joint required inspections of the site with inspection staff. When Contractor is not mobilized on site, Contractor may delegate this responsibility to a trained or certified subcontractor. Contracting Authority also may waive joint inspection requirement during winter shutdown. In both circumstances, WPCM (or trained or certified delegate from the Contractor) is still responsible to review and sign inspection reports.
7. Complies with training and certification requirements of Section 2602 of the Standard Specifications.
8. Submits amended PPP site map according to Section 2602 of the Standard Specifications.

C. Subcontractors:
1. Sign a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP if: responsible for sediment or erosion controls; involved in land disturbing activities; or performing work that is a source of potential pollution as defined in this PPP. Subcontracted work items are identified in Subcontractor Request Forms (Form 830231). All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Implement good housekeeping practices according to Paragraph III, C, 2.

D. RCE/Project Engineer:
1. Is Project Storm Water Manager.
2. Takes actions necessary to ensure compliance with storm water requirements including, where appropriate, issuing stop work orders, and directing additional inspections at construction project sites that are experiencing problems with achieving permit compliance.
3. Orders the taking of measures to cease, correct, prevent, or minimize the consequences of non-compliance with the storm water requirements of the Applicable Permit.
4. Supervises all work necessary to meet storm water requirements at the Project, including work performed by contractors and subcontractors.
5. Requires employees, contractors, and subcontractors to take appropriate responsive action to comply with storm water requirements, including requiring any such person to cease or correct a violation of storm water requirements, and to order or recommend such other actions as necessary to meet storm water requirements.
6. Is familiar with the Project PPP and storm water site map.
7. Is the point of contact for the Project for regulatory officials, Inspector, contractors, and subcontractors regarding storm water requirements.
8. Is signature authority on Notice of Discontinuation.
9. Maintains an up-to-date record of contractors, subcontractors, and subcontracted work items through Subcontractor Request Forms (Form 830231).
10. Makes information to determine permit compliance available to the DNR upon their request.

E. Inspector:
1. Updates PPP through fieldbook entries and storm water site inspection reports if there is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants from the project.
2. Makes information to determine permit compliance available to the DNR upon their request.
3. Conducts joint required inspections of the site with the contractor/subcontractor.
4. Completes an inspection report after each inspection.
5. Is signature authority on storm water inspection reports.

II. PROJECT SITE DESCRIPTION

A. This Pollution Prevention Plan (PPP) is for the construction of a *Describe Type of Facility*.

B. This PPP covers approximately *Provide # Of Acres* acres with an estimated *Provide # of Acres* acres being disturbed. The portion of the PPP covered by this contract has *Provide # of Acres* acres disturbed.

C. The PPP is located in an area of *Provide # of Types Of Soil Association* soil association (*Provide Soil Association Type or* *Types*). The estimated weighted average runoff coefficient number for this PPP after completion will be *Provide runoff coefficient Number*.

D. Storm Water Site Map - Multiple sources of information comprise the base storm water site map including:
1. Drainage Patterns – Plan and Profile sheets and Situation plans.
2. Proposed Slopes – Cross Sections.
3. Areas of Soil Disturbance – Construction limits shown on Plan and Profile sheets.
4. Location of Structural Controls – Tabulations in C sheets.
5. Locations of Non-structural Controls – Tabulations in C sheets.
6. Locations of Stabilization Practices – Generally within construction limits shown on Plan and Profile sheets.
7. Surface Waters (including wetlands) – Project Location Map and Plan and Profile sheets.
8. Locations where Storm Water is Discharged – Plan and Profile sheets.

POLLUTION PREVENTION PLAN

E. The base storm water site map is amended by contract modifications and progress payments (fieldbook entries) of completed erosion control work. Also, due to project phasing, erosion and sediment controls shown on project plans may not be installed until needed, based on site conditions. For example, silt fence ditch checks will typically not be installed until the ditch has been installed. Installed locations may also be modified from tabulation locations by field staff. Installed locations will be documented by fieldbook entries and amended PPP site map.

F. Runoff from this work will flow into *List Outlets for Runoff*.

III. CONTROLS

A. The Contractor's ECIP specified in Article 2602.03 of the Standard Specifications for accomplishment of storm water controls should clearly describe the intended sequence of major activities, and for each activity define the control measure and the timing during the construction process that the measure will be implemented.

B. Preserve vegetation in areas not needed for construction.

C. Sections 2601 and 2602 of the Standard Specifications define requirements to implement erosion and sediment control measures. Actual quantities used and installed locations may vary from the Base PPP and amendment of the plan will be documented via fieldbook entries, amended PPP site map, or by contract modification. Additional erosion and sediment control items may be required as determined by the inspector and/or contractor during storm water site inspections. If the work involved is not applicable to any contract items, the work will be paid for according to Article 1109.03 paragraph B of the Standard Specifications.

1. EROSION AND SEDIMENT CONTROLS

a. Stabilization Practices

1) Site plans will ensure that existing vegetation or natural buffers are preserved where attainable and disturbed portions of the site will be stabilized.

2) Initialize stabilization of disturbed areas immediately after clearing, grading, excavating, or other earth disturbing activities have:

a) Permanently ceased on any portion of the site, or

b) Temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.

3) Staged permanent and/or temporary stabilizing seeding and mulching shall be completed as the disturbed areas are completed. Incomplete areas shall be stabilized according to paragraph III, C, 1, a, 2, b above.

4) Permanent and Temporary Stabilization practices to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C sheets. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation (105-4) in the C sheets.

5) Preservation of existing vegetation within right-of-way or easements will act as vegetative buffer strips.

6) Preservation of topsoil: Bid items to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C sheets. Additional information may be found in Tabulations in the C or T sheets or is referenced in Section 2105 of Standard Specifications.

b. Structural Practices

1) Structural practices will be implemented to divert flows from exposed soils and detain or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Additionally, structural practices may include: silt basins that provide 3600 cubic feet of storage per acre drained or equivalent sediment controls, outlet structures that withdraw water from surface when discharging basins, and controls to direct storm water to vegetated areas.

2) Structural practices to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the devices to be used on this project can be found in the B sheets or are referenced in the Standard Road Plans Tabulation (105-4) located in the C sheets.

c. Storm Water Management

Measures shall be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. This may include velocity dissipation devices at discharge locations and along length of outfall channel as necessary to provide a non-erosion velocity flow from structure to water course. If included with this project, these items are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation (105-4) in the C sheets. The installation of these devices may be subject to Section 404 of the Clean Water Act.

2. OTHER CONTROLS

Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive applicable laws, rules or regulations shall apply.

a. Vehicle Entrances and Exits - Construct and maintain entrances and exits to prevent tracking of sediments onto roadways.

b. Material Delivery, Storage and Use - Implement practices to prevent discharge of construction materials during delivery, storage, and use.

c. Stockpile Management - Install controls to reduce or eliminate pollution of storm water from stockpiles of soil and paving.

d. Waste Disposal - Do not discharge any materials, including building materials, into waters of the state, except as authorized by a Section 404 permit.

e. Spill Prevention and Control - Implement chemical spill and leak prevention and response procedures to contain and clean up spills and prevent material discharges to the storm drain system and waters of the state.

f. Concrete Residuals and Washout Wastes - Waste shall not be discharged to a surface water and is not allowed to adversely affect a water of the state. Designate temporary concrete washout facilities for rinsing out concrete trucks. Provide directions to truck drivers where designated washout facilities are located. Designated washout areas should be located at least 50 feet away from storm drains, streams or other water bodies. Care should be taken to ensure these facilities do not overflow during storm events.

g. Concrete Grooving/Grinding Slurry – Do not discharge slurry to a waterbody or storm drain. Slurry may be applied on foreslopes or removed from the project.

h. Vehicle and Equipment Storage and Maintenance Areas - Perform on site fueling and maintenance in accordance with all environment laws such as proper storage of onsite fuels and proper disposal of used engine oil or other fluids on site. Employ washing practices that prevent contamination of surface and ground water from wash water. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.

i. Litter Management - Ensure employees properly dispose of litter. Minimize exposure of trash if exposure to precipitation or storm water would result in a discharge of pollutants.

j. Dewatering – Properly treat water to remove suspended sediment before it re-enters a waterbody or discharges off-site. Measures are also to be taken to prevent scour erosion at dewatering discharge point.

3. APPROVED STATE OR LOCAL PLANS

During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

POLLUTION PREVENTION PLAN

IV. MAINTENANCE PROCEDURES

The Contractor is required to maintain all temporary erosion and sediment control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. This shall begin when the features have lost 50% of their capacity.

V. INSPECTION REQUIREMENTS

A. Inspections shall be made jointly by the Contractor and the Contracting Authority's inspector at least once every seven calendar days. Storm water site inspections will include:
   1. Date of the inspection.
   2. Summary of the scope of the inspection.
   3. Name and qualifications of the personnel making the inspection.
   5. Review of erosion and sediment control measures within disturbed areas for the effectiveness in preventing impacts to receiving waters.
   6. Major observations related to the implementation of the PPP.
   7. Identification of corrective actions required to maintain or modify erosion and sediment control measures.

B. Include storm water site inspection reports in the amended PPP. Incorporate any additional erosion and sediment control measures determined as a result of the inspection. Immediately begin corrective actions on all deficiencies found within 3 calendar days of the inspection and complete within 7 calendar days following the inspection. If it is determined that making the corrections less than 72 hours after the inspection is impracticable, it should be documented why it is impracticable and indicate an estimated date by which the corrections will be made.

VI. NON-STORM WATER DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains) and slope drains. The velocity of the discharge from these features may be controlled by the use of headwalls or blocks, Class A stone, erosion stone or other appropriate materials. This also includes uncontaminated groundwater from dewatering operations, which will be controlled as discussed in Section III of the PPP.

VII. POTENTIAL SOURCES OF OFF RIGHT-OF-WAY (ROW) POLLUTION

Silts, sediment, and other forms of pollution may be transported onto highway right-of-way (ROW) as a result of a storm event. Potential sources of pollution located outside highway ROW are beyond the control of this PPP. Pollution within highway ROW will be conveyed and controlled per this PPP.

VIII. DEFINITIONS

A. Base PPP - Initial Pollution Prevention Plan.
B. Amended PPP - Base PPP amended during construcion. May include Plan Revisions or Contract Modifications for new items, storm water site inspection reports, fieldbook entries made by the inspector, amended PPP site map by the Contractor, ECIP, NOI, co-permittee certifications, and Subcontractor Request Forms. Items amending the PPP are stored electronically and are readily available upon request.
C. Fieldbook Entries – This contains the inspector’s daily diary and bid item postings.
D. Controls - Methods, practices, or measures to minimize or prevent erosion, control sedimentation, control storm water, or minimize contaminants from other types of waste or materials. Also called Best Management Practices (BMPs).
E. Signature Authority - Representative authorized to sign various storm water documents.

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____
Signature

_____
Printed or Typed Name

_____
Signature

_____
Printed or Typed Name

IOWA DOT FORMS
& INSPECTION INFO

Iowa DOT Forms

Form 830215: Co-Permittee Certification Statement

Form 830214: Storm Water Site Inspection Report

Form 830216: Notice of Discontinuation

QA Inspection Form

Weekly Storm Water Inspection Procedures

QA Storm Water Inspection Procedures

Sample DNR Inspection Report

Link to inspection information:

https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control/stormwater-inspections

Form 830215 (02-20)

CO-PERMITTEE CERTIFICATION STATEMENT

Project No.: _____

County: _____ Proposal ID No.: _____

Prime Contractor: _____

Subcontractor: _____

Address: _____

Telephone No.: _____

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site as part of this certification.

Further, by my signature, I understand that I am becoming a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the Iowa Department of Natural Resources NPDES General Permit No. 2 for Storm Water Discharge Associated with Industrial Activity for Construction Activities at the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act and the Code of Iowa, to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under this NPDES permit and the terms of this NPDES permit.

* Signature: _____

Title: _____

Date: _____

* Certification Statement shall be signed as follows:

Corporation – president,vice-president, secretary or treasurer
Partnership – general partner
Proprietorship – proprietor

830214 (02-20)

IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN

STORM WATER SITE INSPECTION

Inspections Made At Least Once Every Seven Calendar Days

Inspection Date and Time: _____ DNR Auth. No.: IA _____ - _____

Project Number: _____ County: _____

Inspection Made By: _____ Title: _____

Precipitation since previous inspection:

Comments and Observations (Include area inspected, status of site, and erosion/sediment control work performed since previous inspection):

Deficiencies Found (items requiring maintenance or inadequate controls) and Additions Required (new items needed due to status of work) (Include specific locations):

Can Corrective Action(s) be made within 72 hours after inspection? If no, document why it is impracticable.
Note: Permit requires Corrective Actions be completed within 7 calendar days following inspection:

Date of Corrective Action (start within 3 days of inspection) and Corrective Action Performed (document either current week or previous week):

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

			ESC Basics	ECT
Inspector's Signature: _____	Date: _____		☐	☐
Contractor's Signature: _____	Date: _____		☐	☐

IOWA DOT

Form 830216 (07-23)

NOTICE OF DISCONTINUATION

OF A STORM WATER DISCHARGE
COVERED UNDER IOWA NPDES GENERAL PERMIT NO. 2
FOR CONSTRUCTION ACTIVITIES

Name of the Owner or facility to which the storm water discharge general permit coverage was issued: **Iowa Department of Transportation**

COUNTY: _____
PROJECT No.(s): _____
DESCRIPTION: _____

List the complete permit authorization number for the discharge. This number is provided on the bottom of the authorization sheet for General Permit No. 2.

IA - _____ - _____

List the date the construction site reached "final stabilization": _____

"*Final Stabilization*" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70%, sufficient to preclude erosion, for the entire disturbed area of the permitted project has been established or equivalent stabilization measures have been employed, or which is covered by a permanent structure that ensures the ground surface will not be eroded or otherwise impacted by precipitation or runoff, or which has been returned to agricultural production.

The following certification must be signed in accordance with the signatory requirements of the general permit:

"I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time. I understand that by submitting this Notice of Discontinuation, I am no longer authorized to discharge storm water associated with industrial activity for construction activities by Iowa Department of Natural Resources NPDES General Permit No. 2, and that discharging pollutants from storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by an NPDES permit.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations."

_____ _____
Name (print) Title

_____ _____
Signature Date

For projects where the DOT is the Contracting Authority, this form is to be completed within 20 days following "final stabilization" and submitted to the Construction and Materials Bureau.

04-16

IOWA DOT
SMARTER I SIMPLER I CUSTOMER DRIVEN

STORM WATER OVERSIGHT (QUALITY ASSURANCE) INSPECTION

Date & Time of Inspection: _____ DNR Authorization Number: IA _____ - _____

Project No.: _____ County: _____

Prime Contractor: _____ Inspection Made By: _____

Date of Previous QA Inspection _____

Contractor Staff:

	Name	Expiration Date
Erosion Control Technician (ECT)		
(minimum 1 per company)		

Contractor Staff – Individual(s) joining weekly inspections:	ECT Certified?	Expiration Date	ESC Basics Trained?	Expiration Date

DOT Inspection Staff

DOT Staff – Individual(s) completing weekly inspections:	ECT Certified?	Expiration Date	ESC Basics Trained?	Expiration Date

Documentation Review

	Yes	No	N/A
Erosion Control Implementation Plan (ECIP) provided?	☐	☐	
ECIP updated since last inspection?	☐	☐	☐
Subcontractor co-permittee statements provided?	☐	☐	If yes, how many? _____

Comments:

Inspection Reports Review (review reports since last inspection):

	Yes	No
Missing reports?	☐	☐
Lacking information?	☐	☐

Comments:

General Comments/Observations:

Deficiencies Found (including additional items needed):

Deficiencies Found:	Corrective Action Required			Deficiencies Found:	Corrective Action Required		
Item # / Item	**Yes**	**No**	**N/A**	**Item # / Item**	**Yes**	**No**	**N/A**
(1) Silt Fencing	☐	☐	☐	(6) Seeding & Mulch	☐	☐	☐
(2) Ditch Checks	☐	☐	☐	(7) Housekeeping	☐	☐	☐
(3) Perimeter & Slope Sediment Control	☐	☐	☐	(8) Discharge Locations	☐	☐	☐
(4) Rock	☐	☐	☐	(9) Other _____	☐	☐	☐
(5) Silt Basin	☐	☐	☐	(10) Other _____	☐	☐	☐

Item #	Comments/Recommended Improvements	Location

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Inspector's Signature: _____ Date _____

Weekly Storm Water Site Inspection Procedures

WHEN

How often are routine inspections required?

Inspections shall begin once ground is disturbed.

Inspections are required every 7 calendar days. Rainfall inspections are no longer required by the permit.

When can inspections be suspended?

When the site has been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion.

Can inspections be suspended during the winter?

No. The permit does not allow for suspension of weekly inspections during the winter. When a project is suspended during winter suspensions, the requirement for the Prime Contractor's representative to attend site inspections will be waived. However, this does not eliminate the Prime Contractor's responsibility for correcting deficiencies noted on the site inspection report nor does it eliminate the Prime Contractor's responsibility to review and sign weekly inspection reports.

WHO

What are requirements for joint inspections?

Per the Pollution Prevention Plan (PPP), routine inspections shall be completed jointly by the Iowa DOT and the Prime Contractor. However, the following exceptions may apply:

- When a project is suspended, such as winter suspensions, the Prime Contractor's representative is not required to attend all site inspections. However, this does not eliminate the Prime Contractor's responsibility for correcting deficiencies noted on the site inspection report. The Prime Contractor's representative shall also review and sign report. Beginning with the October 2018 letting, this representative shall be the Water Pollution Control Manager (WPCM) or properly trained or certified individual from the Prime Contractor. This may also apply at the end of the project when work is no longer occurring at the site.
- When the Prime Contractor is not mobilized onsite, the responsibility to attend weekly inspections may be delegated to a properly trained or certified subcontractor. Prime Contractor's WPCM or properly trained or certified individual from the Prime Contractor is still required to review and sign the report.

What training or certification is required?

Individuals performing inspections for both the Iowa DOT and Prime Contractor are required to be current on Erosion & Sediment Control Basics (ESC Basics) training. If the individual is an Erosion Control Certification (ECT) technician, then the individual meets this requirement.

Regarding weekly inspections, does the RCE have any responsibilities?

Yes, RCE is responsible to monitor inspection reports on a monthly basis to determine whether deficiencies identified in inspection reports were adequately and timely addressed, and if not, have the authority and responsibility to direct immediate actions to correct the deficiencies.

HOW

How is an inspection performed?

Many controls cannot be effectively inspected by just driving through the jobsite and may require close examinations.

Any required controls that are not installed require corrective action. The corrective action shall be documented in the report.

- Check where water is leaving the site for evidence of erosion and sedimentation.
- Sediment controls (silt fence, perimeter & slope sediment control devices, silt basins, etc.):
    - Check condition of control. Are they installed per standard road plan or detail? If it needs to be maintained or repaired, note location and work required as a corrective action.
    - Are installed controls inadequate? If so, then note additional or new control as a corrective action.
    - Are new controls needed due to construction progress? If so, then note this as additions required.
- Stabilization (seeding and mulching):
    - Do areas of the site comply with the 0/14 day rule? This means stabilization of disturbed areas must be initiated immediately after clearing, grading, excavating, or other earth disturbing activities have: 1) permanently ceased on any portion of the site, or 2) temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.
    - Do areas that were previously stabilized require corrective action due to poor growth or erosion?
- Entrances/Exits:
    - Is there tracking onto adjacent roads?
    - Do stabilized construction entrances need to be installed?
    - Do stabilized construction entrances need to be maintained?
- Stream crossings:
    - Are crossings installed per EW-401 and Specification Section 2547?
    - Do they need to be maintained?

- Temporary stream diversion:
    - Is diversion installed per EW-402 and Specification Section 2418?
- Other housekeeping items:
    - Do fuel tanks provide required secondary containment?
    - Is concrete washout being properly maintained?
    - Is dewatering being properly controlled?

What documentation is required?

Unless project is using Permix software, Form 830214 should be completed.

Inspectors should check they are using the current version of this form. Current form is available here: https://forms.iowadot.gov/FormsMgt/External/830214..pdf

How should an inspection report be filled out?

A set of instructions with examples is provided here: https://iowadot.gov/construction_materials/earthwork-and-erosion-control/stormwater-inspection-instructions

If there has been erosion and sediment control work completed during the past week, you may refer to specific Inspector Daily Reports for detailed information.

Remember to:

1. Clearly identify each deficiency (type and location).
2. Document all actions that need to be undertaken to correct the noted deficiencies and achieve or maintain compliance, or prevent or minimize non-compliance, with storm water permit requirements and Project PPP.
3. Document the date each corrective action is implemented or deficiency otherwise addressed.
4. Clearly indicate each deficiency from the current or prior inspection that was not corrected and reason it was not corrected.

Items 3 and 4 can be noted on the next week's report or on current report. If documented on the next week's report, state on current week's report that corrective actions will be documented on the next report.

Where is report documentation stored?

Unless project is using Permix software, reports should be stored on DocExpress in the Signature Drawer. If project does not exist on DocExpress, then keep hardcopies of reports together in a binder or folder.

Who signs the report and how is it signed?

The report should be signed by both the DOT inspector performing the weekly inspection and by a properly trained or certified individual from the Prime Contractor. Beginning with the October 2018 letting, the Prime Contractor's WPCM or properly trained or certified individual shall sign the report.

For projects using DocExpress, a hardcopy of the report can also be signed in the field, which is then uploaded to DocExpress or the report can be uploaded to DocExpress and then signed in DocExpress.

For projects using Permix, the report will be signed by the Prime Contractor in Permix (if the Prime Contractor has an account) or signed in the field by the Prime Contractor.

Is anything required during weekly inspections with regard to QA (oversight) inspections?

Yes. As noted in the separate QA (oversight) inspection procedures, Oversight Inspector shall provide to Project Inspector their written findings that clearly identifies any missing or deficient controls, and recommendations to correct the deficiencies. These items shall be corrected within 7 days following the next weekly storm water inspection, unless rejected. Completion of these corrective actions or basis for rejecting any finding or recommendation shall be documented by the Project Inspector on a weekly storm water inspection report.

Note: Additional information on Permix software procedures is available here: https://iowadot.gov/construction_materials/permix-information

Storm Water Oversight (Quality Assurance)
Inspection & Follow-Up Procedures

Which projects should have QA inspections?

All projects that disturb five acres or more and are located in an environmentally sensitive area require a QA inspection per the EPA's consent order. However, the Iowa DOT has additionally decided to perform QA inspections on all projects that disturb five acres or more. To verify the amount of disturbed area, refer to a copy of your project's permit authorization.

Who should complete the QA inspections?

This will vary by District. However, individuals completing inspections must be properly certified (see question below). Per the EPA's consent order, they can be completed by Iowa DOT staff or by a consultant.

Additional ideas include: District Construction level - Engineer Tech Seniors, RCE office level – RCE, Engineering Tech Seniors or Construction Tech Supervisors, inspectors from other projects (Construction Tech Senior or Construction Tech).

What type of training or certification is required?

Individuals completing QA inspections must be a certified Erosion Control Technician (ECT). Information on how to become a certified ECT: https://iowadot.gov/training/ttcp/RegBook/ECNew.pdf . Completing the ESC Basics web-based training is not considered adequate.

How often should a QA inspection occur?

At least once every 120 calendar days during any period where there is active construction at a project.

Does the QA inspection need to be unannounced?

No. The intent of the inspection is not as a "gotcha". The goal is to provide assistance with storm water permit compliance. It's another set of eyes that can help us find items that need to be addressed or corrected. As such, it would be good to touch base with the inspector before and after. It's not required for project inspection staff to join the inspection nor is it required for project inspection staff to be onsite. On the flip side, it is also okay if project inspection staff want to join the QA inspection. As QA inspections are typically squeezed into other duties, it will likely depend on what works best for scheduling.

How long should QA inspections take?

This depends on the size of the project. The detail of QA inspection should be similar to the level of detail that would be performed by an EPA inspection.

IOWA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL SERVICES DIVISION
NPDES GENERAL PERMIT #2 INSPECTION REPORT

Facility Name: **NPDES No.:** **Permit Issued:** **Valid Through:**	**Owner:** Iowa Dept. of Transportation 800 Lincoln Way Ames, IA 50010 **Primary Contact:** **Phone Number:**	**Persons Interviewed:**
Type of Inspection: ☐ Routine Compliance Inspection ☐ Follow-Up Compliance Inspection ☒ Complaint Investigation ☐ Site Visit	**Inspection Date:** **Inspection Time:** **Previous Inspection:** NA	**Inspection Weather:** Mostly sunny, 80° **Recent Rainfall:** ☐ Yes ☒ No **Comments:**
Site Location: **Township:** **Range:** **Section**	**Total Site Size (acres):** **Number of Acres Disturbed:**	**Is this site part of a common plan of development?** ☐ Yes ☒ No **If yes, list other site(s):**

Compliance Status: "C" = requirement is "in compliance." "NC" = requirement is "not in compliance." "UC" = requirement is "unknown compliance."	C	NC	UC
1. Was all requested information furnished to the Department within the required time?	☒	☐	☐
2. Plan is signed in accordance with Part VI.H and is retained at the construction site throughout the project?	☒	☐	☐
3. The plan has been updated based on changes in design, construction, operation or maintenance or if SWPPP proved to be ineffective?	☒	☐	☐
4. Pollution Prevention Plan Content:			
1. Does SWPPP describe size of site and acres to be disturbed?	☒	☐	☐
2. Does SWPPP clearly describe the intended sequence of major activities and control measures to be utilized during each activity?	☒	☐	☐
3. Does SWPPP describe and identify the erosion & sediment control measures to be employed?	☒	☐	☐
4. Does SWPPP contain topsoil preservation information?	☒	☐	☐
5. Does SWPPP contain site map?	☒	☐	☐
6. Does SWPPP contain all necessary signed contractor certification statements?	☐	☐	☒
5. Recordkeeping:			
1. Are weekly site inspections being performed as required by permit	☒	☐	☐
2. Has plan been updated based on changes in design, construction, operation, or maintenance, or if SWPPP proved to be ineffective?	☒	☐	☐
3. If deficiencies are noted in site inspection, are they corrected and SWPPP updated within 7 days of discovery?	☒	☐	☐
6.Visual Observations:			
1. Are all necessary erosion and sediment control measures installed/constructed?	☐	☒	☐
2. Erosion and sediment control measures are being maintained properly?	☐	☒	☐
3. Has off-site tracking been controlled?	☐	☒	☐
4. Storm sewer and/or tile intakes have been protected?	☒	☐	☐
5. Control measures have prevented the discharge of sediment off the construction site?	☐	☒	☐

7. Control/Stabilization Measures Utilized:

☐ Earthen Dike	☐ Mulch	☐ Sod
☐ Sediment Basin	☒ Check Dam	☒ Compost Sock
☒ Silt Fencing	☐ Temporary Seeding	☐ None
☐ Geotextiles	☒ Rock/Rip Rap	☐ Other:

STD. SPEC. SEC. 2601
EROSION CONTROL

Section 2601. Erosion Control

2601.01 DESCRIPTION.

Perform the following erosion control measures on areas within and adjacent to the right-of-way according to the contract documents and this specification:

- Seeding and fertilizing,
- Stabilizing crop seeding and fertilizing,
- Overseeding and fertilizing,
- Mulching,
- Composting,
- Sodding,
- Special ditch control,
- Turf reinforcement mat,
- Slope protection,
- Transition mat, and
- Mowing.

2601.02 MATERIALS.

A. Furnish materials meeting the requirements of Section 4169.

B. Apply materials at no less than the minimum rate specified in the contract documents. Apply seed for native grass, wildflower, and wetland grass seeding on a PLS basis, as computed by the Engineer.

C. Additional compensation will not be allowed for materials in excess of that specified, unless directed by the Engineer.

D. If, after application of fertilizer, it is determined by test that the fertilizer fails to comply with minimum requirements, furnish and apply additional fertilizer to comply with minimum requirements as defined in Article 4169.03.

E. Perform work in a manner that provides the Engineer the opportunity to verify the quantity of material furnished and the rate of application. Divide project area into small natural areas that are to be constructed as identifiable units. Furnish a tally of the quantities of each material as it is used on each area. This may include the quantities below:

- Weights from approved scales of truck loads of bulk materials,
- Other scaled weights,
- Counts of containers, bags, or bales, or estimates of partially used packages of materials, as approved by the Engineer.

F. Provide the Engineer with the opportunity to verify quality and quantities in a manner that will allow continuous operation with minimum delays.

G. When handling inoculants and sticking agents, follow safety precautions as specified on the product label.

2601.03 PLACEMENT OF EROSION CONTROL.

A. Equipment.
Use equipment meeting the requirements of Section 2001 and the following, except that other equipment which produces similar results will be considered for approval. Use methods and procedures consistent with equipment manufacturers' recommendations; however, do not operate ground driven equipment at speeds greater than 10 mph.

1. **Disk.**
   When preparing a seedbed on ground having heavy vegetation, use a disk having cutaway blades. Provide for the addition of weight to obtain proper cutting depth.

2. **Slope Harrow.**
   Use a rolling weight attached by heavy chain to a tractor. Use a chain of suitable length, with picks attached and a means of rotating the picks as the rolling weight is pulled in a direction parallel to the movement of the tractor.

3. **Field Tiller.**
   Use equipment designed for preparation of the seedbed to the degree specified.

4. **Rotary Tiller.**
   Use equipment with rotary type blades designed for preparation of seedbed to the degree specified.

5. **Spike Tooth Harrow.**
   Use equipment designed to:
   - Provide adjustment of the spike teeth to level the ground, or
   - Be used as specified by the Engineer.

6. **Compaction Equipment.**
   a. **Cultipacker.**
      1) Use a pull type cultipacker with individual rollers or wheels. Cultipackers having sprocket type spacers between the wheels may be used. Ensure the cultipacker produces a corrugated surface on area being compacted.
      2) Use a cultipacker that operates separate from other operations. Attachment of cultipacker to the seeder or disk will not be permitted, except when the combined cultipacker seeder is manufactured to operate as a unit. Provide for the addition of weight.

   b. **Compaction Rollers.**
      Apply Article 2001.05, A.

   c. **Hand Tamping Equipment.**
      Use base plate type hand tamping equipment adapted to the performance of the work. Obtain the Engineer's approval.

   d. **Expanded Mesh Roller.**
      Use open grid type equipment or the cultipacker type equipment modified by covering with expanded metal mesh.

7. **Hydraulic Seeder and Mulcher.**
   a. Use hydraulic seeding equipment with a pump rated at no less than 100 gallons per minute and is capable of continuous agitation action to uniformly distribute seed over the area. Inoculant, seed, and fertilizer may be applied in a single operation, unless stated otherwise in the contract documents. Apply hydraulic mulch as a separate operation. Ensure the equipment has suitable working pressure and a nozzle adapted to the type of work.
   b. Ensure supply tanks have a means of mechanical agitation. Calibrate the tanks and provide a calibration stick or other approved device to indicate the volume used or remaining in the tank.

8. **Gravity Seeders.**
   a. Ensure gravity seeders:
      - Provide agitation of the seed,
      - Have an adjustable gate opening, and
      - Uniformly distribute seed on the prepared seedbed.
   b. Use a seed hopper equipped with baffle plates spaced no more than 2 feet apart. Ensure baffle plates extend from the agitator shaft to within approximately 2 inches of the top of the seed hopper.

c. Wind guards will be required to facilitate seeding when moderate wind conditions exist and when required by the Engineer. Place wind guards in front or in back (or both) of the seed outlet and extend to near the ground line.

d. This seeder may be used for the application of fertilizer.

9. Endgate Cyclone Seeders.

Ensure endgate cyclone seeders are:

- Suitably mounted,
- Provide movement by mechanical means, and
- Drop through an adjustable flow regulator onto a rotating, power driven, horizontal disk or fan.

10. Hand Cyclone Seeders.

Use a seeder that drops seed through an adjustable flow regulator onto a rotating, hand driven, horizontal disk or fan.

11. Native Grass Seed Drill.

Use a drill that:

- Is free of soil and seed when it arrives on the project,
- Accurately meters and uniformly mixes various seed types throughout drilling operation,
- Provides separate seed boxes to apply both small seeds and a large box with an aggressive picker wheel for continual mixing and applying fluffy bearded seed,
- Has disc furrow openers and packer assembly wheels that compact soil directly over drill rows,
- Contains a no till attachment manufactured by same manufacturer as the drill, and
- Has dimensions to ensure it maintains uniform soil contact over seeded area without bridging.

12. Pneumatic Seeder.

Use a pneumatic (air blower) system with enough power and hose to reach 300 feet.

13. Aerial Equipment.

When aerial application of seed and fertilizer is specified, use aerial equipment capable of providing a uniform distribution of seed and fertilizer on the specified area.

14. Straw Mulching Machine.

Use a type that will uniformly apply mulch material over the desired area without excessive pulverization. Excessive pulverization is the general absence of straw longer than 6 inches after distribution.

15. Mulch Anchoring Equipment.

a. Use mulch anchoring equipment designed to anchor straw or hay mulch into soil by means of dull blades or disks. Use blades or disks that:

- Are flat,
- Are spaced at approximately 8 inch intervals.

b. The blades may have cutaway edges. Pull mulch anchoring equipment using mechanical means.

16. Mechanical Trencher.

Use a machine designed for the specific purpose of constructing a trench for placement of check slots to depth specified.

17. Mowers.

Use rotary, flail, disk, or sickle type mowers that do not bunch or windrow mowed material.

18. Slit Seeder.

Use a gas, diesel, or electric powered mechanical slit seeder that:

- Is capable of cutting vertical grooves a maximum of 1/4 inch deep into the soil with a maximum horizontal blade spacing of 3 inches,
- Deposits metered seed directly behind the vertical grooves, and
- Contains packer wheels that press and firmly pack seed into the soil.

19. Drop Seeder.

One piece of equipment containing the following:

- Pulverizer rollers in front of the seed tubes.
- Ground driven seed meters.
- Max seed tube spacing of 4 inches delivering seed between the pulverizer rollers and packer wheels. If seeder does not have tubes, equipment shall have the ability to uniformly spread seed.
- Packer wheels pressing and firmly packing seed into the soil.

B. Seeding and Fertilizing.

1. On various portions of the right-of-way, except the traveled portion of the roadbed:

- Prepare the seedbed,
- Furnish, sow, and cover the seed, and
- Compact the seedbed.

2. Seed other areas as may be indicated in the contract documents or directed by the Engineer. The limits of areas to be seeded will be clearly marked before seedbed is prepared.

3. Do not disturb areas having a satisfactory growth of desirable grasses or legumes.

4. Sow seed only at times of the year when temperature, moisture, and climatic conditions will promote germination and plant growth. Normal seed application dates are according to Article 2601.03, C for each seed type. Perform seeding according to the following procedures:

a. Seedbed Preparation.

1) Ensure area to be seeded is relatively smooth. Fill washes and gullies to conform to desired cross section. When such fills exceed 6 inches, compact the material with a tractor wheel or other suitable field equipment. Coordinate preparation of ditches designated for special ditch control with the seedbed preparation.

2) Thoroughly work areas accessible to field machinery to a depth of no less than 3 inches. Use mechanical rotary tillage equipment to prepare the seedbed on earth shoulders, urban or raised medians, rest areas, and islands. Hand prepare areas inaccessible to field machinery to a depth of not less than 2 inches. Ensure entire width of shoulder and areas around headwalls, wingwalls, flumes, and other structures are prepared in the manner specified.

3) Where enough vegetative growth exists to sufficiently interfere with proper seedbed preparation, mow vegetative growth before seeding, at no additional cost to the Contracting Authority.

4) Use crawler type or dual wheeled tractors to prepare seedbeds. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross section.

5) Prior to rolling with cultipacker, harrow ridging in excess of 4 inches caused by operation of tillage equipment. Prior to permanent seeding, roll the area with no less than one pass of the cultipacker.

6) Remove ruts that develop during the sequence of operations before subsequent operations are performed.

7) After completing seedbed preparation, pick up and remove debris according to Article 1104.08, including 3 inch diameter or larger stones, logs, stumps, cable, or other objectionable material that may interfere with seeding operation.

b. Application of Fertilizer.

1) Spread fertilizer over the areas at the rate designated in Article 2601.03, C for each seed type, unless specified otherwise in the contract documents. A fertilizer will be considered equivalent when it meets the minimum total pounds per acre of nitrogen (N), available phosphoric acid (P_2O_5), and water soluble potassium (K_2O).

2) Spread with a mechanical spreader which will secure a uniform application rate. Do not use truck mounted spreading equipment for bulk fertilizer. On areas accessible to field machinery, spread after the preliminary preparation of seedbed, but prior to sowing of seed. Disk in fertilizer and roll the area prior to application of permanent seed. If the roller cannot be operated satisfactorily, Engineer may permit substituting a harrow for the roller. Areas inaccessible to field machinery, spread fertilizer after preparation of seedbed and thoroughly rake into the soil.

3) If using a hydraulic seeder, apply fertilizer in combination with seeding as specified in Article 2601.03, B, 4, d, 2. When the contract documents require two applications of fertilizer, perform second application during next permanent seeding period following initial seeding and fertilizer application.

c. Preparation of Seed.

1) For seed mixing, comply with the requirements of Materials I.M. 469.02. Use permanent rural, permanent urban, urban stabilizing, salt tolerant seeding, Native Grass, Wetland Grass, and Wildflower seeding mixtures mixed off-site by a seed conditioner approved by the Iowa Crop Improvement Association or other state's Crop Improvement Association.

2) Inoculate legumes with a standard culture at the rate as specified by manufacturer of inoculant, according to Article 4169.04. Use a type of inoculant specified for each legume seed and approved by the Engineer.

3) Do not allow inoculated seed to be exposed to direct sunlight for more than 30 minutes. Prior to use, reinoculate seed that is not sown within 8 hours after inoculation. Preinoculated seed with manufacturer's recommended protective coating may be used in lieu of seed with Contractor applied inoculant.

4) When gravity or cyclone seeder is used for application of seed, inoculate legume seed according to manufacturer's recommended procedures before mixing with other grass seeds for sowing. If hydraulic seeder is used, inoculant, in quantities specified above, may be applied directly into supply tank with seed, water, and other material. Furnish and apply inoculant.

5) Treat seed with a commercial sticking agent. Apply prior to application of inoculant, or as a mixture when the sticking agent is compatible with other materials, except with hydraulic equipment. A sticking agent optional if a liquid formulation of inoculant is used.

6) Use mechanical mixing equipment to apply sticking agent and inoculant on seed quantities over 50 pounds per batch.

d. Application of Seed.

1) Sowing, Covering, and Compaction

a) On areas accessible to field machinery, seed may be sown with:

- A gravity, cyclone, or hydraulic seeder,
- A native grass seed drill, or
- As specified in the contract documents.

b) On areas inaccessible to field machinery, use of hand cyclone seeders may be used.

c) Sowing of seed shall be performed as a split rate application (no less than two passes).

d) Covering, compaction, rolling, dragging, or raking of seedbed will not be required provided the friable condition exists. For spring seeding (following fall seedbed preparation) after April 1, Contractor shall roll or harrow when, in the opinion of the Engineer, a friable condition does not exist. Cover stabilizing crop seeding and fertilizing with a light disking or other tillage equipment such as a rigid harrow, spring tooth harrow, or field cultivator.

e) Follow sowing of grasses and legumes with at least one complete rolling with cultipacker. Roll shoulders immediately to prevent loss of seed due to air currents caused by passing traffic. For stabilizing crop seeding and fertilizing, follow tillage by rolling area with a cultipacker. If cultipacker cannot be operated satisfactorily, Engineer may permit harrow to be substituted for cultipacker.

f) Where compaction equipment will not operate satisfactorily, lightly drag or rake in seeded area by hand. Roll seedbed with a cultipacker before and after seeding.

2) Hydraulic Seeding.

a) Add 50 pounds of Wood Cellulose Fiber complying with Article 4169.07, B, 1, as a tracer for each 500 gallons of water in hydraulic seeder tank.

b) Use flood type nozzles and manufacture's recommended water volume to apply mixture.

c) Once seed has been added to tank mixture, a 1 hour time limit is set for spreading mixture on soil. Once 1 hour time limit has expired, discard remaining mixture.

d) Perform hydraulic seeding separate from placing hydraulic mulch.

3) Pneumatic Seeding.

Includes furnishing and applying compost to a depth of 1 inch on designated disturbed areas. Apply compost using a pneumatic (air blower) system with sufficient hose to reach 300 feet. Driving on soil to apply compost will not be allowed. Incorporate fertilizer into full depth of compost material. Prepare seedbed according to Article 2601.03, C, 4, a, 1. Apply seed within top 1/4 inch of compost material.

C. Types of Seeding.

1. Stabilizing Crop Seeding and Fertilizing (Rural).

a. Preparation and Application.

1) Prepare seedbed according to Article 2601.03, B, 4, a.

2) Prepare seed according to Article 2601.03, B, 4, c.

3) Apply seed according to Article 2601.03, B, 4, d.

4) For stockpile stabilization seeding, seedbed preparation will not be required for areas not accessible to field equipment.

b. Seed Mixture.

Unless otherwise specified in the contract documents, use rates and schedule shown in Table 2601.03-1.

Table 2601.03-1: Rural Stabilizing Crop Seeding Rates and Schedule

March 1 through October 31	
Oat Grain rye Canada wildrye (Elymus canadensis)	50 lbs. per acre 50 lbs. per acre 5 lbs PLS. per acre
November 1 through February 28 (or 29)	
Oat Grain rye Canada wildrye (Elymus canadensis)	62 lbs. per acre 62 lbs. per acre 7 lbs. PLS. per acre
For stabilizing crop only, Canada wildrye (Elymus canadensis) seed will not be required to be certified as Source Identified Class (Yellow Tag) Source G0-Iowa.	
Canada wildrye (Elymus canadensis) seed shall be debearded or equal to facilitate application of seed.	

c. Fertilizing.

1) Apply to seeded areas at the rate of 250 pounds per acre of 13-13-13 (or equivalent) unless specified otherwise in the contract documents.

2) Apply provisions of Article 2601.03, B, 4, b.

d. Application Dates.

Refer to Table 2601.03-1 for normal seed application dates.

2. Stabilizing Crop Seeding and Fertilizing (Urban).

a. Preparation and Application.

1) Use a rotary tiller for preparation of seedbed according to Article 2601.03, B, 4, a. Prior to application of seed, ensure seedbed is firm, smooth, and free of material 1.5 inches in diameter or greater including clods, rocks, and other debris. Roll seedbed before and

after application of seed. For rolling, use either open grid type equipment or cultipacker type equipment modified by covering with expanded metal mesh.

2) Prepare seed according to Article 2601.03, B, 4, c.

3) Apply seed according to Article 2601.03, B, 4, d.

4) Prepare, roll, seed, and fertilize areas inaccessible to field equipment by hand or using hand operated equipment, including lawn type, hand cyclone, or gravity equipment.

b. Seed Mixture.

Unless specified otherwise in the contract documents, use seeding rates shown in Table 2601.03-2 for urban areas.

Table 2601.03-2: Urban Stabilizing Crop Seeding Rates

Bluegrass, Kentucky[1]	195 lbs. per acre
Ryegrass, Perennial (turf-type variety)[2]	40 lbs. per acre
Fescue, Creeping Red	25 lbs. per acre
1. Choose three different cultivars of Kentucky bluegrass, at 65 lbs. per acre each. 2. Choose two different cultivars of turf-type perennial ryegrass, at 20 lbs. per acre each.	

c. Fertilizing.

1) Apply prior to preparing seedbed.

2) Apply to seeded areas at the rate of 300 pounds per acre of 6-24-24 (or equivalent) unless specified otherwise in the contract documents.

3) Apply provisions of Article 2601.03, B, 4, b.

d. Application Dates.

Seed may be applied throughout the year unless ground conditions are unsuitable for seeding due to moisture or frost.

3. Rural Seeding.

a. Preparation and Application.

1) Prepare seed according to Article 2601.03, B, 4, c.

2) In areas without existing stabilizing crop residue, ~~P~~prepare seedbed according to Article 2601.03, B, 4, a, and apply seed according to Article 2601.03, B, 4, d, using only a drop seeder complying with Article 2601.03, A, 19.

3) In areas with existing stabilizing crop residue, apply seed with a slit seeder or a native grass seed drill with a no till attachment. Seedbed preparation will not be required, except for areas with rills and gullies.

b. Seed Mixture.

Use seeding rates in Table 2601.03-3 for permanent seeding of rural areas, unless otherwise specified in the contract documents:

Table 2601.03-3: Permanent Seed Rates, Rural Areas

Fescue, Tall[1]	100 lbs. per acre
Ryegrass, Perennial[2]	75 lbs. per acre
Bluegrass, Kentucky	20 lbs. per acre
1. All tall fescue shall be endophyte free. 2. Perennial ryegrass shall be cultivars Linn, Amazon, Norlea, or Nui, or a combination thereof.	

c. Fertilizing.

1) Spread over the areas at the rate designated. Unless otherwise specified in the contract documents, use a rate of 300 pounds per acre of 6-24-24 (or equivalent).

2) Apply provisions of Article 2601.03, B, 4, b.

d. Application Dates.

Normal permanent seed application dates are March 1 through May 31, and August 10 through September 30.

4. **Urban Seeding.**
   a. **Preparation and Application.**
      1) Use rotary tiller for preparation of seedbed according to Article 2601.03, B, 4, a. Prior to application of seed, ensure seedbed is firm, smooth, and free of material 1.5 inches in diameter or greater including clods, rocks, and other debris. Roll seedbed before and after application of seed. For rolling, use either open grid type equipment or cultipacker type equipment modified by covering with expanded metal mesh.
      2) In areas with existing urban crop stabilizing of 50% or greater density, full seedbed preparation and rolling will not be required. Apply seed using a slit seeder as defined in Article 2601.03, A, 18.
      3) Prepare seed according to Article 2601.03, B, 4, c.
      4) Apply seed according to Article 2601.03, B, 4, d.
      5) Prepare, roll, seed, and fertilize areas inaccessible to field equipment by hand or using hand operated equipment, including lawn type, hand cyclone, or gravity equipment. Obtain Engineer's approval for such equipment.
   b. **Seed Mixture.**
      Use seeding rates in Table 2601.03-4 for permanent seeding of urban areas, including areas previously maintained as a lawn.

Table 2601.03-4: Permanent Seed Rates, Urban Areas

Bluegrass, Kentucky[1]	195 lbs. per acre
Ryegrass, Perennial (turf-type variety)[2]	40 lbs. per acre
Fescue, Creeping Red	25 lbs. per acre
1. Choose three different cultivars of Kentucky bluegrass, at 65 lbs. per acre each. 2. Choose two different cultivars of turf-type perennial ryegrass, at 20 lbs. per acre each.	

   c. **Fertilizing.**
      1) Apply prior to preparing the seedbed.
      2) Spread over the areas at a rate of 300 pounds per acre of 6-24-24 (or equivalent).
      3) Apply the provisions of Article 2601.03, B, 4, b.
   d. **Application Dates.**
      Normal permanent seed application dates are March 1 through May 31, and August 10 through September 30.

5. **Native Grass Seeding.**
   a. **Preparation and Application.**
      1) Apply seed with native grass seed drill with a no till attachment. Seedbed preparation and cultipacking will not be required. Mowing according to Article 2601.03, B, 4, a, 3, may be required. In areas where rills and gullies are present, prepare seedbed according to Article 2601.03, B, 4, a, and then apply seed with a native grass seed drill with a no till attachment.
      2) Prepare seed according to Article 2601.03, B, 4, c.
      3) Calibrate native grass seed drill to specified seeding rate for the project prior to operation at the project.
      4) Plant seed at a maximum 1/8 inch depth. Do not perform seeding when wet soil conditions would cause seed to be placed deeper than specified.
      5) Fill seed boxes loosely without packing seed to allow agitator wheels to run freely and seed flows freely through drill.
      6) Set no-till coulters to penetrate between 1/4 and 1/2 inch below soil surface.
      7) Operate drill so the drive wheel maintains ground contact. Perform two passes with drill, with second pass being offset from first pass.
      8) Operate tractor between 3 and 5 mph to prevent drill from bouncing.

9) Remove seed remaining in drill at the end of each day. At the completion of seeding, remove remaining seed from drill by vacuum or other means. Hand broadcast remaining seed on project.

b. Seed Mixture.

Use seeding rates in Table 2601.03-5 for areas designated for native grass seeding, unless specified otherwise in the contract documents.

Table 2601.03-5: Native Grass Seed Rates

Species (Scientific Name)	Application Rate (PLS)
Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa. Oats are excluded from this requirement.	
*Big bluestem (Andropogon geradii)	6 lbs. per acre
*Canada wildrye (Elymus canadensis)	2 lbs. per acre
*Indiangrass (Sorghastrum nutans)	6 lbs. per acre
*Little bluestem (Schizachyrium scoparium)	6 lbs. per acre
Blackeyed susan (Rudbeckia hirta)	4 oz. per acre
Blue vervain (Verbena hastata)	1/2 oz. per acre
Gray-headed coneflower (Ratibida pinnata)	3 oz. per acre
Ironweed (Vernonia fasciculata)	3 oz. per acre
New England aster (Symphyotrichum novae-angliae)	2 oz. per acre
Pale purple coneflower (Echinacea pallida)	6 oz. per acre
Partridge pea (Chamaecrista fasciculata)	4 lbs. per acre
Side-oats grama (Bouteloua curtipendula)	4 lbs. per acre
Switchgrass (Panicum virgatum)	1 lbs. per acre
Oats (Avena sativa)	32 lbs. per acre
Butterfly weed (Asclepias tuberosa)	3 oz. per acre
*Note: Canada wildrye, Big bluestem, Indiangrass, and Little bluestem shall be debearded or equal to facilitate the application.	

c. Fertilizing.

Not required unless specified otherwise in the contract documents.

d. Application Dates.

Normal seed application dates are April 1 through May 31 and November 1 until ground conditions are unsuitable for seeding due to moisture or frost.

6. Wetland Seeding.

a. Preparation and Application.

1) In areas without existing stabilized crop seeding residue, prepare seedbed according to Article 2601.03, B, 4, a. Seed areas accessible to field equipment with a native grass seed drill, gravity, or broadcast equipment. Cultipack as specified in Article 2601.03, B, 4, d. Broadcast seed other areas and follow with a light dragging or hand raking.

2) In areas with existing stabilized crop residue, apply seed with a native grass seed drill with a no till attachment. Seedbed preparation and cultipacking will not be required. Seedbed preparation is required for areas with rills and gullies.

3) Prepare seed according to Article 2601.03, B, 4, c.

b. Seed Mixture.

Use the seeding rates in Table 2601.03-6 for areas designated for wetland grass seeding, unless specified otherwise in the contract documents.

Table 2601.03-6: Wetland Grass Seed Rates

Common Name	Scientific Name	PLS (per ac)
Blue vervain	Verbena hastata	1 oz.
Boneset	Eupatorium perfoliatum	1 oz.
Nodding bur marigold	Bidens cernua	8 oz.
Swamp milkweed	Asclepias incarnata	1 lb.
Sneezeweed	Helenium autumnale	2 oz.
Water plantain	Alisma plantago-aquatica	4 oz.
Arrowhead	Sagittaria latifolia	4 oz.
New England aster	Symphyotrichum novae-angliae	2 oz.
Big Bluestem	Andropogon gerardii	1 lb.
Switchgrass	Panicum virgatum	8 oz.
Prairie cordgrass	Spartina pectinata	1 lb.
Virginia wild-rye	Elymus virginicus	5 lbs.
Bluejoint grass	Calamagrostis	1 oz.
Rice cutgrass	Leersia oryzoides	4 oz.
Dark Green bulrush	Scirpus atrovirens	1 oz.
Fox sedge	Carex vulpinoidea	4 oz.
Softstem bulrush	Schoenoplectus tabernaemontani	8 oz.
Spike rush	Eleocharis palustris	4 oz.
Porcupine sedge	Carex hystericina	8 oz.
Broom sedge	Carex scoparia	2 oz.
Tussock sedge	Carex stricta	2 oz.

c. Fertilizing.

Not required unless specified otherwise in the contract documents.

d. Application Dates.

Normal seed application dates are April 1 through June 30.

7. Wildflower Seeding.

a. Preparation and Application.

1) Uniformly apply seed to areas with the seedbed prepared as in Article 2601.03, B, 4, a.

2) Seed areas accessible to field equipment using a native grass seed drill at an approximate depth of 1/8 inch, or using gravity or broadcast equipment. Cultipack as specified in Article 2601.03, B, 4, d. Broadcast seed other areas and follow with a light dragging or hand raking.

3) In areas with existing stabilized crop seeding residue, apply seed with a native grass seed drill with a no till attachment. Seedbed preparation and cultipacking will not be required.

b. Seed Mixture.
As specified in the contract documents.

c Fertilizing.
Not required unless specified otherwise in the contract documents.

d. Application Dates.
Normal seed application dates are April 1 through May 31 and November 1 until ground conditions are unsuitable for seeding due to moisture or frost.

8. Special Seed.

a. Preparation and Application.

1) Apply at the rate specified in the contract documents or as directed by the Engineer as a separate operation either immediately before or immediately after sowing the regular grass mixture.

2) No additional work other than sowing of the seed will be required unless specified otherwise in the contract documents.

3) On limited areas, this seed may be applied by hand cyclone seeders.

9. Salt Tolerant Seeding.

a. Preparation and Application.

1) Prepare seed according to Article 2601.03, B, 4, c.

2) Prepare seedbed according to Article 2601.03, B, 4, a, and apply seed according to Article 2601.03, B, 4, d using only a drop seeder according to Article 2601.03, A, 19.

b. Seed Mixture.
Use seeding rates in Table 2601.03-7 for permanent seeding of rural areas, unless otherwise specified in the contract documents:

Table 2601.03-7: Salt Tolerant Seed Rates

Alkali grass	109 lbs. per acre
Turf-type Tall Fescue	109 lbs. per acre
Perennial ryegrass	66 lbs. per acre
Crested wheatgrass	66 lbs. per acre
Hard fine fescue	44 lbs. per acre
Sheep fine fescue	44 lbs. per acre

c. Fertilizing.

1) Spread over the areas at the rate of 300 pounds per acre of 6-24-24 (or equivalent).

2) Apply provisions of Article 2601.03, B, 4, b.

d. Application Dates.
Normal permanent seed application dates are March 1 through May 31, and August 10 through September 30.

D. Overseeding and Fertilizing.

1. Seedbed preparation will not be required, provided overseeding is applied when ground is friable from frost action after February 1 and before April 1 or as directed by the Engineer.

2. When, in the opinion of the Engineer, a friable soil condition does not exist, roll with a cultipacker or harrow.

3. Areas with rills or gullies require seedbed preparation according to Article 2601.03, B, 4, a.

4. Apply fertilizer according to Article 2601.03, B, 4, b.

5. Prepare seed according to Article 2601.03, B, 4, c.

6. Apply seed according to Article 2601.03, B, 4, d unless specified otherwise in the contract documents.

7. Overseeding will not be allowed on more than 1 inch of snow cover.

E. Mulching.

Mulch seeding areas unless otherwise designated otherwise in the contract documents. For disturbed areas that are mulched only, scarify area to a 3 inch depth prior to mulching.

1. **Time of Mulching.**
   Apply to areas requiring mulch as soon as seed is sown and final rolling completed.
2. **Application of Mulch.**
   a. **Straw Mulch.**
      1) Distribute evenly and uniformly and anchor it into the soil. Use an application rate for reasonably dry material of approximately 1.5 tons per acre of dry cereal straw, native grass straw, or other approved material, depending on the type of material furnished.
      2) In all accessible mulched areas, anchor mulch into the soil using mulch anchoring equipment with a minimum of two passes. Operate equipment along the contour. Use crawler type or dual wheel tractors for mulching operation. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross section.
      3) Crimp/tuck straw to a minimum of 2 inches below ground surface.
      4) Do not operate mulch-blowing equipment on slopes steeper than 2.5:1 or on slopes that may rut. Use blower attachments to apply mulch without traversing slopes. Hydraulic mulching, as described in Article 4169.07, B, 2, may be substituted at no additional cost to the Contracting Authority.
      5) Do not mulch when wind velocities are greater than 15 mph.
   b. **Hydraulic Mulches.**
      1) Apply at no less than 3000 pounds per acre using standard hydraulic mulching equipment, unless specified otherwise in the contract documents.
      2) If using with hydraulic seeding, apply as a separate operation.

3. **Organic Fiber Matrix.**
   a. Apply at no less than 4500 pounds per acre using standard hydraulic mulching equipment, unless specified otherwise in the contract documents.
   b. If using with hydraulic seeding, apply as a separate operation.

F. Composting.

Compost may be used as a top dress application or as an incorporated soil amendment.

1. Top dress applications may be used for urban seeding or on soils that are highly erosive or sloped soils to prevent surface or rill erosion and to provide organic material and nutrients needed for vegetative establishment. Ensure areas top dressed with compost have little or no drainage onto them.

2. In highly erosive soils or sloped embankments with drainage onto the area, incorporate compost by mixing it into the top soil a minimum of 2 inches to prevent the compost from washing off the slope.

G. Sodding.

1. Refer to the contract documents for areas to be sodded. Engineer may designate other areas for sodding.

2. Prior to shaping the sodbed, Engineer will define upon the ground the limits of areas to be sodded, and indicate the center lines of waterways. Cover the designated areas with live sod meeting requirements of Article 4169.06.

3. Closely place and properly fit sod against structures and adjacent sod according to the following provisions:

a. Preparation of Sodbed.

1) Shape and prepare surfaces to be sodded. Ensure areas are firm and even surfaces. Ensure they are free of material 1.5 inches in diameter or greater including clods, rocks, and other debris. Ensure ditch channels, slopes, and flumes to be sodded have a typical cross section as shown in the contract documents.

2) Construct ditch channel to secure a relatively level, flat bottom ditch cross section with a minimum depth of 6 inches, measured from the finished sodbed ground line at the edge of the ditch. Scarifying prior to shaping may be necessary to assure the minimum depth. A minimum sod ditch overall width of 7.5 feet (sloping sides) will be required.

3) Use a soil compaction roller complying with Article 2601.03, A, for compaction and reshaping of ditches. Limit layers of fill materials to no more than 8 inches in depth.

4) After the surface of the layer has been smoothed and before material for the next layer is deposited upon it, compact the layer:

- With no less than one pass of a soil compaction roller per inch of loose thickness of the layer, and
- Until the roller is supported entirely on its tamping feet.

5) The roller will be considered entirely supported on its tamping feet when the tamping feet penetrate no more than 3 inches into an 8 inch layer being compacted. A single section roller may be necessary for this operation in some locations.

6) Extend the compacted area approximately 6 inches to 12 inches beyond the width of the ditch.

7) After compaction, shape the ditch.

b. Fertilizer for Sod.

1) Two applications are required (initial and prior to final acceptance). After sodbed preparation and prior to placing sod, fertilize the area to be sodded and the adjacent disturbed area at a rate of 10 pounds per 1000 square feet. Use a commercial fertilizer specified for the project.

2) Place the final application of fertilizer at a rate of 10 pounds per 1000 square feet within 5 calendar days of the end of the 30 calendar day watering period and prior to final acceptance of the project. Place the final application when the grass is dry and with a dry form of fertilizer.

3) For both of the above applications, if the type of fertilizer is not specified, apply 13-13-13 (or equivalent). Spread with a mechanical spreader which will secure a uniform rate of application. Manipulation or mixing with the soil, other than that incidental to Article 2601.03, G, 3, d, will not be required.

c. Placing Sod.

1) Do not place sod between May 31 and September 1, or on frozen ground unless otherwise directed by the Engineer.

2) Place in rows or strips. On slopes, place strips transverse to the flow of water over the area. On sides and bottoms of ditches and channels, place strips at right angles to center line of channel. Place tightly against each other so that no open joints are apparent.

3) Stagger joints at the ends of sod strips at least 1 foot on adjacent rows or strips of sod. Cut sod to be placed in road ditch channels, intercepting ditches, or sod flumes where the total sodded width is less than 7.5 feet into strips having lengths equal to the width of the sodded area. At the top of slope or at the edge of a channel, lay sod so water from adjacent areas will have free flow onto the sodded area. In road ditch channels and flumes, begin sodding at the outlet or lower end and progress upward. On slopes, begin sodding at the bottom and progress upward. If necessary to protect sod already laid, furnish (without extra compensation) ladders or planks for workers to use.

4) The Engineer may order sod flumes, slopes, and ditch channels to be staked to minimize erosion loss before establishment. Stake sod as shown in the contract documents and as required by the Engineer.

d. Finishing Sod.

1) Firm the soil along the edge of the sodded area. Properly shape and smooth the adjacent disturbed area to allow surface water to flow into the sod ditch. Excessive soil placed over the edge of the sod will not be permitted.

2) Prepare and seed the seedbed for all rural disturbed areas adjacent to the sod. Rake the seed in. Seed the disturbed area with the following seed mixture at the rate of 2 pounds per 1000 square feet:

Fescue, Fawn	80%
Ryegrass, Perennial	20%

3) For urban projects adjacent to sod, use the seed mixture specified for the project. Mulch disturbed area with grass, hay, or straw at the rate of 70 pounds per 1000 square feet.

4) After sodding and seeding, water the sod, sodbed, and disturbed areas according to Article 2601.03, I, 2.

5) When sod ditches are constructed after October 1, overseed grasses the following spring, between March 1 and April 1, when weather and soil conditions are favorable.

6) When initial watering of the sod does not secure adequate bond between the sod and soil, the Engineer may require rolling. If sod is allowed to be placed between May 31 and August 10, and it is not to be staked, roll the sod using equipment approved by the Engineer. Remove from the project sod rejected from sod ditches. Remove from the site any other material not otherwise incorporated into the work.

7) In urban areas, islands, and rest areas, roll the sod prior to or following the initial watering using a hand operated, lawn type roller approved by the Engineer.

e. Urban, Island, and Safety Rest Area Sodding.

1) Prepare areas to be sodded, except ditch channels, according to Article 2601.03, C, 4, a.

2) During the total watering period, mow sod once to a 3 inch height approximately 3 weeks after placement.

H. Special Ditch Control, Turf Reinforcement Mat, Slope Protection, and Transition Mat.
Use material meeting the requirements of Article 4169.10. Engineer will designate areas for each type of work.

1. Preparation of Area to be Treated with Special Ditch Control, Turf Reinforcement Mat, Slope Protection, and Transition Mat.

a. Shape ditch channel in the same manner as preparing a ditch for sod as provided in Article 2601.03, G, 3, a.

b. Apply provisions of Article 2601.03, B, 4, a.

c. Remove material 1.5 inches in diameter or greater, including clods, rocks, and other debris, which may prevent contact of the specified material with the seedbed.

d. Coordinate preparation and placement of the specified material with the seedbed preparation, seeding (including sticking agent and inoculant), fertilizing, and mulching of the adjacent area of right-of-way.

2. Special Ditch Control.

a. Seeding.

1) Prepare seed according to the provisions of Article 2601.03, B, 4, c. Sow seed prior to placement of special ditch control material according to Article 2601.03, B, 4, d.

2) Seed ditches and depressed medians using the following seeding rates in Tables 2601.03-8 and 2601.03-9:

Table 2601.03-8: Ditches - Outside Shoulder Adjacent to Native Grass Seedings

Oats	25 lbs/Acre
Grain Rye	25 lbs/Acre
Switchgrass (Panicum virgatum)	3 lbs PLS/Acre
Side-oats grama (Bouteloua curtipendula)	4 lbs PLS/Acre
Canada wildrye (Elymus canadensis)	9 lbs PLS/Acre

Virginia wildrye (Elymus virginicus)	5 lbs PLS/Acre
Partridge pea (Chamaecrista fasciculata)	4 lbs PLS/Acre
Note: Canada wildrye shall be debearded or equal to facilitate the application.	

Table 2601.03-9: Medians and Ditches - Outside Shoulder Adjacent to Rural Seedings

Fescue, Tall[1]	100 lbs. per acre
Ryegrass, Perennial[2]	75 lbs. per acre
Bluegrass, Kentucky	20 lbs. per acre
1. All tall fescue shall be endophyte free. 2. Perennial ryegrass shall be cultivars Linn, Amazon, Norlea, or Nui, or a combination thereof.	

b. Fertilizing.

1) After the area is prepared and prior to laying the special ditch control material, fertilize at the rate specified. Apply provisions of Article 2601.03, B, 4, b. Spread with a mechanical spreader to secure a uniform rate of application. Manipulation or mixing with the soil other than that incidental to Article 2601.03, H, 7, will not be required.

2) If the type of fertilizer is not specified for the project, apply 300 pounds per acre of 6-24-24 (or equivalent) to Medians and Ditches - Outside Shoulder Adjacent to Rural Seedings (Table 2601.03-9).

3) No fertilizer will be required for Ditches - Outside Shoulder Adjacent to Native Grass Seedings.

c. Application.

1) Space check slots on ditch channels so one check slot occurs within each 50 foot increment on slopes of more than 4%.

2) Apply special ditch control (wood excelsior mat) without tension and in the direction of the flow of water. Where more than one strip is required, lap the lap joint no less than 3 inches. Bury anchor slot on top edge of special ditch control (wood excelsior mat) from 6 inches to 12 inches, as designated by Engineer.

3) On junction slots, bury the upslope end of each strip of wood excelsior mat 6 inches. Firmly tamp the soil. Overlap the ends of the special ditch control (wood excelsior mat) at least 12 inches and staple, with the upgrade section on top.

4) Staple terminal end at bottom of special ditch control (wood excelsior mat).

5) Use staples meeting requirements of Article 4169.10, A. Space staples as shown in the contract documents.

3. Turf Reinforcement Mat (TRM).

a. Seeding.

1) Prepare seed according to provisions of Article 2601.03 B, 4, c. Sow after TRM and soil fill have been placed and prior to laying the special ditch control (wood excelsior mat) according to Article 2601.03 B, 4, d.

2) Apply in ditches and depressed medians using rates in Tables 2601.03-8 and 2601.03-9.

b. Fertilizing.

1) After TRM and soil fill have been placed and prior to laying special ditch control (wood excelsior mat), apply at the rate specified. Apply provisions of Article 2601.03, B, 4, b. Spread with a mechanical spreader to secure a uniform rate of application. Manipulation or mixing with the soil other than that incidental to Article 2601.03, H, 7, will not be required.

2) If the type of fertilizer is not specified for the project, apply 300 pounds per acre of 6-24-24 (or equivalent) to Medians and Ditches - Outside Shoulder Adjacent to Rural Seedings (Table 2601.03-9).

3) No fertilizer will be required for Ditches - Outside Shoulder Adjacent to Native Grass Seedings (Table 2601.03-8).

c. Application.

Place type specified on channel or slope after shaping. Apply according to the contract documents. Furnish and apply a minimum of 1 inch of soil suitable for the establishment of vegetation on the TRM. Furnish and apply seed and fertilizer. Furnish and apply special ditch control (wood excelsior mat) one soil fill.

4. **Special Ditch Control over Sod.**
When shown in the contract documents, place plastic netting or other approved material over sod and staple it in place. Space staples 3 feet apart in the row. Space rows no more than 2 feet apart. Place staples alternately to adjacent rows. No junction slots or check slots are required. Anchor slots and terminal ends will be required.

5. **Slope Protection.**
   a. **Seeding.**
      1) Prepare seed according to Article 2601.03, B, 4, c. Sow prior to placement of slope protection according to Article 2601.03, B, 4, d.
      2) Seed slopes using seeding rates in Tables 2601.03-8 for slopes adjacent to native grass seedings and 2601.03-9 for slopes adjacent to rural seedings.
   b. **Fertilizing.**
      1) After area is prepared and prior to laying slope protection, fertilize at the rate specified. Apply provisions of Article 2601.03, B, 4, b. Spread with a mechanical spreader to secure a uniform rate of application. Manipulation or mixing with the soil other than that incidental to Article 2601.03, H, 7, will not be required.
      2) If the type of fertilizer is not specified, apply 300 pounds per acre of 6-24-24 (or equivalent) to slopes adjacent to rural seedings.
      3) No fertilizer will be required for slopes adjacent to native grass seedings.
   c. **Application on Backslopes.**
      1) Where erosive gullies or rills have developed in backslope, fill with soil and compact prior to placement of mat.
      2) Apply slope protection without tension in a perpendicular direction on backslopes. Where more than one strip is required, lap the lap joint no less than 3 inches.
      3) Bury the slope protection in an anchor slot on the top edge of the backslope from 6 inches to 12 inches, as designated by the Engineer.
      4) On junction slots, bury the upslope end of each strip of slope protection 6 inches. Firmly tamp soil. Overlap ends of slope protection at least 12 inches and staple, with upgrade section on top.
      5) Staple terminal end at bottom of slope protection.
      6) Use staples meeting requirements of Article 4169.10, A. Space staples as shown in the contract documents.
   d. **Application on Foreslopes.**
      1) If erosive gullies or rills have developed adjacent to shoulder material, fill with suitable soil and compact prior to placement of slope protection.
      2) Apply slope protection without tension parallel to the roadway on foreslopes. Where more than one strip is required, butt strips together and staple 3 inches from each edge.
      3) Install staples 3 inches from upside terminal and downside terminal.
      4) Use staples meeting the requirements of Article 4169.10, A. Space remaining staples as shown in the contract documents.

6. **Transition Mat (TM).**
   a. **Seeding**
      1) Prepare seed according to the provisions of Article 2601.03 B, 4, c. Sow prior to placement of TRM and TM according to Article 2601.03 B, 4, d.
      2) Seed outlets or channels using rates in Tables 2601.03-8 and 2601.03-9.
   b. **Fertilizing**
      1) Prior to laying the TRM and TM, apply fertilize to the area at the rate specified. Apply provisions of Article 2601.03, B, 4, b. Spread with a mechanical spreader to secure a uniform rate of application. Manipulation or mixing with the soil other than that incidental to Article 2601.03, H, 7, will not be required.

2) If type of fertilizer is not specified, apply 300 pounds per acre of 6-24-24 (or equivalent) to Medians and Outlets/Channels - Outside Shoulder Adjacent to Rural Seedings (Table 2601.03-9).

3) No fertilizer will be required for Outlets/Channels – Outside Shoulder Adjacent to Native Grass Seedings (Table 2601.03-8).

c. Application

1) Place TM in channels or outlets at locations specified in the contract document.

2) Prior to the placement of the TM, place TRM - Type 2 according to Article 2601.03, H, 3 to extend the entire length and width of the TM. No special ditch control (wood excelsior mat) or soil fill is required under the TM. Seed is placed under the TRM.

3) Place TM panels in such a manner as to produce a planar surface.

4) Place each TM panel longitudinally with the flow. Overlap panels upstream over downstream, and/or upslope over downslope.

5) Secure each TM panel to the soil with bullet anchors driven 30 inches into the ground. Anchors should be driven through both panels at the edges with overlapping panels. A minimum of eight anchors per panel is required.

7. Finishing Adjacent to Special Ditch Control, Turf Reinforcement Mat, Slope Protection Areas, and Transition Mat.

For adjacent areas disturbed, uniformly shape, fertilize, seed, and rake in the seed in the same manner required for disturbed areas adjacent to sod ditches, except use the seed specified in Article 2601.03, H. Complete this work during the normal permanent seeding period or by the date specified to complete seeding.

I. Watering.

1. Watering of Special Ditch Control, Turf Reinforcement Mat, Slope Protection, and Transition Mat.

a. Provide watering equipment and an approved water supply before starting special ditch control, turf reinforcement mat, slope protection, or transition mat work. Water the area no later than the day following placement of the materials. If Contractor fails to water by second day following placement, a price adjustment will be assessed at a rate of $200.00 per calendar day until watering has been completed.

b. Apply three additional waterings at intervals of 5 to 8 calendar days. Perform waterings unless notified by Engineer in writing at least 1 calendar day prior to the day watering is to occur. If Contractor fails to complete watering before the 8th calendar day has elapsed, a price adjustment will be assessed at a rate of $200.00 per calendar day, beginning on the 9th day, until watering is completed.

c. Ensure waterings are sufficient to thoroughly saturate seedbed to a depth of approximately 2 inches.

d. Each watering may require a maximum of 50 gallons of water per square. Apply water as a spray or dispersion to prevent damage to the seedbed. Complete each watering within a 4 hour period.

e. More than one application for each watering may be necessary to provide adequate saturation without runoff.

2. Watering Sod.

a. Provide watering equipment and an approved water supply before beginning sodding operation. Six waterings will be required. Allow no more than 1 hour to elapse between laying and initial watering of sod. Perform second, third, and fourth waterings at 4 calendar day intervals; and fifth and sixth waterings at weekly intervals. Perform waterings unless notified by the Engineer in writing at least 1 calendar day prior to the day watering is to occur. A price adjustment will be assessed at a rate of $200.00 per day for each calendar day that the Contractor fails to complete watering from the day watering is to commence.

b. Ensure waterings are sufficient to thoroughly saturate sod, sodbed, and adjacent disturbed areas to a depth of approximately 4 inches.

c. Each watering may require a maximum of 100 gallons of water per square. Apply water as a spray or dispersion to prevent damage to the sod. Complete each watering within a 4

hour period. More than one application for each watering may be necessary to provide adequate saturation without runoff.

J. Mowing.

1. Mowing may be required prior to permanent seeding and any time during the growing season following permanent seeding. Engineer will notify Contractor in writing prior to each mowing. Notification may be issued as early as 15 calendar days following execution of the contract. Contractor will be given 5 mowing days, plus 1 additional day for each 50 acre increment, that has been requested to be mowed. A mowing day is a calendar day, exclusive of Saturdays, Sundays, or recognized legal holiday, on which weather or other conditions (not under the control of the Contractor) will permit mowing operations to proceed for no less than 3/4 of a normal work day in the performance of a controlling item of work. When multiple projects are combined into a single contract, mowing days will be administered independently for each project. Mowing days will be charged starting on the day following the Contractor's notification. A price adjustment will be assessed at a rate of $200.00 per mowing day after the work was to be completed.

2. Use suitable equipment for mowing. Bunching or windrowing mowed vegetation will not be permitted. When wet soil conditions result in rutting, suspend mowing. Repair rutting damage at the direction of the Engineer at no additional expense to the Contracting Authority. Hand equipment will be required for areas inaccessible to other equipment. Set the cutting height at approximately 6 inches. More than one pass may be required for each mowing.

K. Completion of the Work.

1. Complete all phases of this work, excluding the 30 calendar day maintenance of sodded areas, within the specified construction schedule.

2. If a fertilized or seeded area is damaged by rain prior to the required mulching, refertilize or reseed, or both, that area at a rate not to exceed the specified rate as designated by the Engineer. Perform this work at no additional cost to the Contracting Authority.

3. When any work included in the contract is washed out or damaged prior to final acceptance of the project, the Engineer may order replacement of the damaged portion at contract unit prices. The Engineer will advise the Contractor of the approximate quantity of replacement required. Perform these repairs during the normal seeding period for the seed type. Maintain the work in a manner satisfactory to the Engineer. Should the repair work not be done with reasonable promptness, payment for repair will be limited to the work described at the time of notification.

4. The Contractor is responsible for replacement in addition to the quantity directed by the Engineer to complete the work in an acceptable condition should the Contractor fail to:
- Make this replacement when directed by the Engineer, or
- Perform necessary maintenance to the area.

2601.04 METHOD OF MEASUREMENT.

Measurement for the various items of work involving erosion control, satisfactory completed, will be as follows:

A. Engineer will compute in acres to the nearest 0.1 acre the surface areas of
- Seeding and Fertilizing,
- Stabilizing Crop Seeding and Fertilizing,
- Hydraulic Seeding,
- Native Grass Seeding,
- Wetland Grass Seeding,
- Wildflower Seeding,
- Seeding Special Areas,
- Overseeding and Fertilizing,

- Mulching, and
- Composting.

B. Surface areas of Sodding: squares of 100 square feet calculated from measurements to the nearest foot.

C. Debris picked up and removed according to Article 2601.03, B, 4, a: cubic yards by cross sectional measurement or in the hauling units, at the option of the Engineer.

D. Special Ditch Control, Turf Reinforcement Mat, and Slope Protection: squares of 100 square feet calculated from measurements to the nearest foot. Measurement of actual ditch area covered will be used, but will not exceed an area based on the actual measured length and design width. Materials used for anchor slots, junction slots, check slots, terminal folds, and lap joints are incidental.

E. Transition Mat: square feet calculated from measurements to the nearest foot.

F. Watering: by counting loads from a transporting tank of known volume or by metering.

G. Mobilization for watering: by count. Mobilization for the initial watering required at installation of the plant material will not be measured for count.

H. Mowing described in Article 2601.03, J: acres to the nearest 0.1 acre of surface area.

2601.05 BASIS OF PAYMENT.

A. Payment for the various items of work involved in erosion control will be made as described below.

1. When suitable soil for filling holes, gullies, or washes is not available adjacent to the area to be filled or when soil must be removed, payment for necessary loading and hauling directed by the Engineer will be as extra work according to Article 1109.03, B.

2. Contract unit price per acre to the nearest 0.1 acres for the following. Payment is full compensation for preparing the area and furnishing and applying each material.
- Seeding and Fertilizing,
- Stabilizing Crop Seeding and Fertilizing,
- Hydraulic Seeding,
- Native Grass Seeding,
- Wetland Grass Seeding,
- Wildflower Seeding,
- Seeding Special Areas,
- Overseeding and Fertilizing, and
- Composting.

3. For sowing special seed as directed by the Engineer, but not provided for in the contract documents: delivered cost of the seed plus 10% of the contract unit price for Seeding and Fertilizing.

4. Sodding:
- **a.** Contract unit price per square.
- **b.** Payment is full compensation for:
  - Preparing the sodbed,
  - Furnishing, placing, and finishing the sod,
  - Fertilizing, and
  - Repair of adjacent areas disturbed by the sodding operation.
- **c.** Payment will not be allowed for the Sod until the watering, as specified, has been completed. Replace or repair, at the discretion of the Engineer, Sod areas which are

damaged by weather or other causes before the specified initial watering has been completed, at no additional cost to the Contracting Authority.

5. Squares of staking of sod flumes, slopes, and ditch channels: 25% of the contract unit price for Sodding in addition to payment for Sodding.

6. Mulch furnished and placed: contract unit price per acre to the nearest 0.1 acre for mulching. Payment is full compensation for preparing the area and furnishing and applying mulch.

7. Debris picked up according to Article 2102.03, C, for grading work:
- **a.** Payment for debris pickup of additional boulders resulting from Stabilized Crop Seeding and Fertilizing will be as described in Article 2102.05 for Class 12 boulders. If there is no Class 12 item, payment will be at 10 times the contract unit price for Class 10 excavation.
- **b.** Payment for the number of cubic yards of debris picked up and removed in conjunction with other work will be paid at 25% of the contract unit price for Stabilizing Crop Seeding or Seeding and Fertilizing, as applicable.

8. Squares of Special Ditch Control or Special Ditch Control over Sod with material as specified:
- **a.** Contract unit price per square.
- **b.** Payment is full compensation for the special ditch control preparation and materials. This includes seedbed preparation, seed and fertilizer, special ditch control (wood excelsior mat), stapling and installation of materials.

9. Squares of Turf Reinforcement Mat of the type specified:
- **a.** Contract unit price per square.
- **b.** Payment is full compensation for the Turf Reinforcement Mat, preparation and materials including shaping channels, ditches and slopes, soil fill, seed and fertilizing, and special ditch control (wood excelsior mat).

10. Squares of Slope Protection with material as specified:
- **a.** Contract unit price per square.
- **b.** Payment is full compensation for the slope protection preparation and materials. This includes seedbed preparation, seed and fertilizer, slope protection, stapling, and installation of materials.

11. Square feet of Transition Mat with material as specified:
- **a.** Contract unit price per square feet.
- **b.** Payment is full compensation for Transition Mat, TRM, preparation and materials including shaping outlets/channels, ditches, soil fill (if required), seed, fertilizer and anchors.

12. For the quantity of water applied to sod (Article 2601.03, I, 2), and to special ditch control, TRM, slope protection, and TM (Article 2601.03, H, 8), payment will be the predetermined contract unit price per 1000 gallons.

13. Mobilization for watering: pre-determined unit price for each mobilization for required watering. Payment will not be made for mobilization for watering for projects identified as erosion control or landscaping. Payment will not be made for mobilization for watering if labor and equipment is already onsite.

14. Mowing as described in Article 2601.03, J: contract unit price per acre to the nearest 0.1 acres.

B. Payment for these items is full compensation for furnishing all materials, equipment, tools, and labor necessary to complete the work according to the contract documents.

C. Payment will not be allowed for any area seeded until fertilizer and mulch are placed.

STD. SPEC. SEC. 2602
SEDIMENT CONTROL

Section 2602. Water Pollution Control (Soil Erosion)

2602.01 DESCRIPTION.

A. Temporary control measures for projects to control water pollution caused by soil erosion. Additional measures are described in Section 2601.

B. Projects that are regulated by the requirements of Iowa DNR National Pollutant Discharge Elimination System (NPDES), General Permit No. 2, for Storm Water Discharge Associated with Industrial Activity for Construction Activities, will be identified in the contract documents. The Prime Contractor for these projects will be required to complete, sign, and return, along with the signed contract, a certification statement for storm water discharge associated with industrial activity for construction activities. Affected Subcontractors for the project will be required to sign and return an affidavit identifying them as co-permittees with the Contracting Authority prior to starting work.

C. Coordinate temporary water pollution control work with permanent erosion control work to ensure economical, effective, and continuous erosion control throughout the construction and post construction period.

D. Water Pollution Control Quality Control.

1. For projects regulated by a NPDES storm water permit:

a. Designate a Water Pollution Control Manager (WPCM) from the Contractor prior to initiating any construction activities. The WPCM shall:

1) Complete Iowa DOT Erosion & Sediment Control Basics (ESC Basics) web-based training (which is valid for 2 years) or Erosion Control (ECT) certification (which is valid for 5 years through the Technical Training and Certification Program of the Department);

2) Be authorized by the Contractor and have the authority to supervise all work performed by the Contractor and subcontractors that involves storm water requirements or affects storm water compliance;

3) Be authorized by the Contractor and have the responsibility to order the Contractor's employees and subcontractors to take appropriate corrective action to comply with storm water requirements, including requiring any such person to cease or correct a violation of storm water requirements and to order or recommend such other actions or sanctions as necessary to meet storm water requirements,

4) Be familiar with the Project Pollution Prevention Plan (PPP);

5) Be the point of contact for Contracting Authority regarding storm water compliance;

6) Be responsible for reviewing and signing or delegating review and signing of inspection reports to a trained or certified individual from the Contractor, acknowledging awareness of any deficiencies and ensuring the correction of all deficiencies; and

7) Visit the Project on a frequent basis and in no instance less than once per week during construction activities. When the Contractor is not mobilized onsite, the Contractor may delegate this responsibility to a subcontractor.

b. Maintain an individual that will be onsite daily during construction activities. This individual shall have completed at a minimum ESC Basics training. This individual shall be responsible for coordinating all erosion and sediment control operations. For this daily requirement, the Contractor may subcontract this responsibility.

1) Additional responsibilities of an ESC Basics trained individual that shall not be subcontracted include:

- Attend required storm water inspections with the Contracting Authority. However, when the Contractor is not mobilized onsite, the Contractor may delegate this responsibility to a subcontractor.
- Prepare required initial Erosion Control Implementation Plan (ECIP) submittal and ECIP updates.
- Attend construction progress meetings to discuss erosion and sediment control issues.

2) Contractor's WPCM may fulfill these responsibilities.

c. Maintain an Erosion Control Technician (ECT) on staff, even though the erosion and sediment control portion of the contract may be subcontracted. This individual shall be responsible for overall management of Contractor's quality control program for erosion and sediment control. Contractor's WPCM may fulfill these responsibilities if ECT certified.

2. For projects regulated by a NPDES storm water permit and where the Department is the Contracting Authority, the Department may use Permix, a web-based software application, to record storm water permit compliance information.
- **a.** Project and permit set-up will be performed by the Department.
- **b.** Contractor shall be responsible for:
  - Managing its own company users and adding subcontractor companies.
  - Uploading Erosion Control Implementation Plan and amended PPP documents.
  - Uploading subcontractor co-permittee certifications.
  - Reviewing and signing inspection reports (if not already signed in the field).
- **c.** If Permix is not used on a project, the above referenced documents shall be uploaded to or signed in DocExpress per Section 1113.
- **d.** Costs associated with the use of Permix are incidental to Mobilization.

3. For projects regulated by a NPDES storm water permit, submit an amended PPP site map that identifies erosion and sediment control work performed during the project. Submittal is required prior to payment for corresponding erosion and sediment control contract items from Sections 2601 and 2602, but shall be submitted no later than one week after completion of such items. Submittal of amended PPP site map shall be incidental to payment for erosion and sediment control items.

2602.02 MATERIALS.

Use materials complying with Division 41.

2602.03 CONSTRUCTION.

A. For projects regulated by a NPDES storm water permit, prior to the preconstruction conference furnish the Engineer an initial ECIP for accomplishment of temporary and permanent erosion and sediment control.

In the ECIP, include stages for erosion and sediment control work to address Contractor's timetable and sequence for major activities or stages on the contract. ECIP stages shall consider as a minimum:
- Initial controls required prior to land disturbing activities,
- Intended timetable and sequence of major land disturbing activities,
- Construction staging to limit disturbed areas,
- Sensitive areas requiring special consideration,
- Anticipated suspension of work and stabilization of disturbed areas,
- Compliance with Pollution Prevention Plan (PPP), and
- Method of erosion control on haul roads.

B. Obtain the Engineer's acceptance for the ECIP and methods before commencing work. Schedule and perform all operations so erosion control features are placed according to accepted ECIP. Update ECIP as needed to address changes in schedule of operations or staging, weather changes, or other changes required in order to comply with applicable permit requirements.

C. Provide immediate, permanent or temporary, water pollution control measures to prevent contamination of adjacent watercourses and property. This work may involve:
- Constructing or installing silt fence, silt fence for ditch checks, silt ditches, silt dikes, silt basins, and slope drains,
- Constructing or installing perimeter and slope and ditch check sediment control devices, and
- Using temporary mulches, mats, seeding, or other control devices or methods, as necessary to control erosion and sediment pollution.

D. Unless otherwise specified, use compost as a filter medium in filter socks, filter berms, or filter blankets for sediment control.

E. For projects regulated by an NPDES storm water permit, initiate stabilization of disturbed areas immediately after clearing, grading, excavating, or other earth disturbing activities have:

- Permanently ceased on any portion of site, or
- Temporarily ceased on any portion of site and will not resume for a period exceeding 14 calendar days.

Stabilization measures include temporary seeding, permanent seeding, mulching, sod, or other methods the Engineer approves. If stabilization measures are not initiated as required by the NPDES storm water permit, there will be a deduct of $750 per calendar day, unless such delay is authorized by the Engineer. Additionally, if stabilized areas are re-disturbed within 7 days after completion of stabilization measures, the amount paid for stabilization of the area will be deducted from payment, unless such re-disturbance is directed by the Engineer.

F. Incorporate all erosion control features into the project at the earliest practical time, as outlined in the accepted schedule. Construct water pollution control measures:

- At locations shown in the contract documents and as determined by the Contractor,
- At locations where conditions develop during construction that were unforeseen during design, or
- Where needed to control water pollution that develops during normal construction practices.

G. Maintain water pollution control features in appropriate functional condition from initial construction through completion of the project. Restore siltation control features to their original condition where siltation has reduced their capacity by 50% or more.

H. Maintenance of Silt Fence and Silt Fence for Ditch Check includes excavation and disposal of silt material trapped by the silt fence or silt fence for ditch checks. Shaping of the ditch bottom to the original ditch template is incidental to this item. Dispose of the silt material off the project unless Engineer approves a suitable site within the project limits. Maintenance also includes repair of silt fence due to undermining, leaning, or fabric becoming unattached from posts. Repair requiring new fabric will be paid for under type of silt fence properly installed and will not be considered maintenance.

I. Limit clearing and grubbing, excavation, borrow, and embankment operations in progress to an area commensurate with their capability. Progress in keeping the finish grading, mulching, seeding, and other pollution control measures current according to the accepted work schedule. The Engineer may suspend operations if the Contractor fails to provide adequate erosion control measures in a timely manner.

J. In the event of conflict between these requirements and water pollution control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations will apply.

K. The Contractor is responsible for water pollution control for work outside the right-of-way or easement obtained by the Contracting Authority.

L. Mobilizations, Erosion Control.

1. Mobilizations, Erosion Control, applies to projects not identified as erosion control or landscaping and contain a Storm Water Pollution Prevention Plan (SWPPP).
2. Only one mobilization will be paid for each stage of work described in the ECIP. Within the scope of work defined for each single mobilization described in the ECIP, additional movement due to weather delays or at the option of the Contractor will not be counted as a mobilization.
3. Separate mobilizations needed for different crews performing work such as silt fence, seeding, or ditch checks will be counted, however, multiple mobilizations will not be paid for a single crew

performing different items of erosion control work. Multiple mobilizations will also not be paid for the same equipment used to perform different items of erosion control work.

4. Payment for mobilization applies to contract items from Sections 2601 and 2602, excluding watering, mowing, debris pickup, monitoring well, or removal items.

5. Additional mobilizations not outlined in the ECIP must be approved by the Engineer.

6. Payment for mobilization to correct items not properly installed will not be approved. Payment for mobilization will also not be approved if labor, equipment, and materials to perform erosion control are used for other non-erosion control work onsite.

7. Mobilize within 72 hours of a written order with sufficient labor, equipment, and materials to perform erosion and sediment control work included in ECIP or PPP, or as ordered or approved by Engineer. Complete work within 7 calendar days of a written order.

8. Failure to mobilize and complete work within such time period, will result in a deduction of $750.00 per calendar day from payment due under the contract, except when Engineer extends such time period.

9. Mobilizations, Erosion Control, will not include work provided under the item of Mobilizations, Emergency Erosion Control.

M. Mobilizations, Emergency Erosion Control.
Mobilizations, Emergency Erosion Control, applies to projects not identified as erosion control or landscaping and containing a Storm Water Pollution Prevention Plan (SWPPP).

An emergency will be considered to be a sudden occurrence of a serious and urgent nature which is beyond normal maintenance of erosion control items. Emergency work requires immediate mobilization and movement of necessary labor, equipment, and materials to the emergency site, followed by immediate installation of temporary erosion control measures.

1. Mobilize with sufficient labor, equipment, and materials on job site within 8 hours of Engineer's written order to install temporary erosion control items on an emergency basis. Engineer's written order will include a description of required work. Only one mobilization will be paid for work described in the written order.

2. Failure to mobilize within 8 hours of written order, will result in a deduction of $1500.00 per calendar day from payment due under the contract, except when Engineer extends such time period.

N. Removal of Silt Basins.
Fill silt basin with Class 10 material and a minimum of 4 inches of topsoil. Furnish Class 10 material according to Section 2107 and compact by driving over a minimum of two times. Furnish and place topsoil according to Section 2105. Smooth surface of topsoil and leave in a finished condition that drains properly.

O. Stabilized Construction Entrance.
Construct stabilized construction entrance to prevent tracking of material onto roadways. Construct according to the contract documents at locations approved by the Engineer.

2602.04 METHOD OF MEASUREMENT.
Measurement for water pollution control items will be as follows:

A. Silt Ditches.
Linear feet to the nearest 0.1 foot.

B. Silt Fence.
Linear feet to the nearest 0.1 foot.

C. Silt Fence for Ditch Checks.
Linear feet to the nearest 0.1 foot.

D. Silt Dikes.
Linear feet to the nearest 0.1 foot.

E. Silt Basins.
By count for each silt basin.

F. Removal of Silt Fence or Silt Fence for Ditch Check.
Linear feet to the nearest foot.

G. Removal of Silt Basins.
By count for each silt basin removed.

H. Maintenance of Silt Fence or Silt Fence for Ditch Check.
Linear feet to the nearest foot.

I. Perimeter and Slope or Ditch Check Sediment Control Device.
Linear feet to the nearest foot of each size.

J. Removal of Perimeter and Slope or Ditch Check Sediment Control Device.
Linear feet to the nearest foot.

K. Mobilizations, Erosion Control.
By count for each mobilization in the accepted ECIP and acceptably performed, as well as additional mobilizations ordered or approved by Engineer and acceptably performed. For multi-project contracts, count will be on a per project basis, except for projects where limits are overlapping or contiguous.

L. Mobilizations, Emergency Erosion Control.
By count for each mobilization directed in writing by Engineer and acceptably performed.

M. Rock Check Dam.
Linear feet to the nearest 0.1 feet.

N. Maintenance of Rock Check Dam.
By count.

O. Removal of Rock Check Dam.
By count.

P. Temporary Sediment Control Basin.
By count.

Q. Maintenance of Temporary Sediment Control Basin.
By count.

R. Removal of Temporary Sediment Control Basin.
By count.

S. Open-throat Curb Intake Sediment Filter.
Feet to the nearest foot.

T. Maintenance of Open-throat Curb Intake Sediment Filter.
By count.

U. Removal of Open-throat Curb Intake Sediment Filter.
By count.

V. Stabilized Construction Entrance.
Linear feet shown in the contract documents adjusted for:
- Any decrease based on site restrictions approved by the Engineer, or
- Any extensions approved by the Engineer to prevent tracking of material onto roadways.

2602.05 BASIS OF PAYMENT.

A. Payment for water pollution control items will be the contract unit price as described below. Payment for construction of water pollution control items is full compensation for labor, equipment and materials necessary to construct the items according to the contract documents.

1. **Silt Ditches.**
Per linear foot for the length of silt ditches properly constructed.

2. **Silt Fence.**
Per linear foot for the length of silt fence properly installed.

3. **Silt Fence for Ditch Checks.**
Per linear foot for the length of silt fence for ditch checks properly installed.

4. **Silt Dikes.**
Per linear foot for the length of silt dikes properly constructed.

5. **Silt Basins.**
Each for properly constructed silt basins.

6. **Removal of Silt Fence or Silt Fence for Ditch Check.**
Per linear foot for the length of silt fence or silt fence for ditch check properly removed.

7. **Removal of Silt Basins.**
Each. Payment is full compensation for providing, preparing, transporting, and placing Class 10 material and topsoil. Contractor has the option, at no additional cost to the Contracting Authority, of stripping and stockpiling Class 10 material and topsoil from constructing silt basins for later use in silt basin removal.

8. **Maintenance of Silt Fence or Silt Fence for Ditch Check.**
Per linear foot for silt fence or silt fence for ditch check properly cleaned out or repaired.

9. **Perimeter and Slope or Ditch Check Sediment Control Device.**
Per linear foot for length of device of each size properly installed.

10. **Removal of Perimeter and Slope or Ditch Check Sediment Control Device.**
Per linear foot for the length of device removed.

11. **Rock Check Dam.**
Per linear foot. Payment is full compensation for all materials, labor, and equipment required to construct the Rock Check Dam. Class 10 excavation required to cut trench and engineering fabric installed prior to placing revetment are incidental and will not be paid for separately.

12. **Maintenance of Rock Check Dam.**
Each occurrence. Payment is full compensation for clean out and disposal of material when capacity reaches 50%, and for any repair that is needed during the project.

13. **Removal of Rock Check Dam.**
    Each. Payment is full compensation for all labor and equipment required to remove all rock and material above original ditch grade. Rock, silt, and engineering fabric that is flush with and/or below final ditch grade will be allowed to remain in the excavation trench.

14. **Temporary Sediment Control Basin.**
    Each. Payment is full compensation for furnishing all equipment, labor, and materials required to construct the Temporary Sediment Control Basin as shown.

15. **Maintenance of Temporary Sediment Control Basin.**
    Each occurrence. Payment is full compensation for clean out and disposal of material when capacity reaches 50%, and for any other repair needed during the project.

16. **Removal of Temporary Sediment Control Basin.**
    Each. Payment is full compensation for all labor and equipment required to remove all rock and material above designed ditch grade and to place topsoil. Rock and engineering fabric that is flush with and/or below designed ditch grade will be allowed to remain in place.

17. **Open-throat Curb Intake Sediment Filter.**
    Per foot. Payment is full compensation for furnishing all equipment, labor, and materials required to install the Open-throat Curb Intake Sediment Filter as shown.

18. **Maintenance of Open-throat Curb Intake Sediment Filter.**
    Each occurrence. Payment is full compensation for clean out and disposal of material when sediment accumulation depth reaches 2 inches, and for any other repair needed during the project.

19. **Removal of Open-throat Curb Intake Sediment Filter.**
    Each. Payment is full compensation for all labor and equipment required for removal.

20. **Stabilized Construction Entrance.**
    Per linear foot. Payment is full compensation for furnishing all materials and work necessary for installation, maintenance, and removal of stabilized construction entrance. Maintenance includes installing additional material or cleaning required to maintain the entrance in a functional condition.

B. Payment for Mobilizations, Erosion Control, and Mobilizations, Emergency Erosion Control, will be at unit prices stipulated in the proposal. If bid items are not included in the proposal then mobilizations for erosion control will paid at unit prices stipulated below. Mobilization for Erosion Control costs are not included as part of the contract item for "Mobilization" described in Section 2533.

1. **Mobilizations, Erosion Control.**
   The quantity will be paid for at the unit price of $600.00 each for Mobilizations, Erosion Control, which is full compensation for staged movement of labor, equipment, and materials; and labor, tools, equipment, and incidentals necessary to complete the movement.

2. **Mobilizations, Emergency Erosion Control.**
   The quantity will be paid for at the unit price of $1,200.00 each for Mobilizations, Emergency Erosion Control, which is full compensation for movement of labor, equipment and materials; and for labor, tools, equipment, and incidentals necessary to complete the movement.

C. When it is necessary for the Contractor to clean out, repair, or reconstruct a silt ditch, dike, or basin, the additional payment will be 100% of the contract unit price for construction of that item. Dispose of cleaned-out silt material off the project unless Engineer approves a suitable site within the project limits. When applicable bid items are not in the contract documents, payment for clean out, repair, or reconstruction will be according to Article 1109.03, B.

D. If water control measures (including clean-out or repair of installed items) are required due to the Contractor's negligence, carelessness, or failure to install the controls as a part of the work as scheduled, and are ordered by the Engineer, perform this work at no additional cost to the Contracting Authority.

E. All water pollution control features are to be in functional condition before final acceptance of the contract.

STD. SPEC. SEC. 4169
EC MATERIALS

Section 4169. Erosion Control Materials

4169.01 DESCRIPTION.

All materials required to be furnished and described in this section.

4169.02 SEEDS.

A. Furnish seeds approved for use according to requirements of this section, including specified purity and germination, as shown in Tables 4169.02-1 and 4169.02-2.

Table 4169.02-1: Seeds (Common Names, Scientific Names, Purity, and Germination)

Common Name	Scientific Name	Purity (%)	Germination (%)
DOMESTIC GRASSES			
Alkali Grass	Puccinellia Distans	90	95
Bluegrass, Kentucky	Poa pratensis	85	80
Bluegrass, Ky. RAM-1	Poa pratensis-RAM-1	95	85
Bluegrass, Ky. PARK	Poa pratensis-PARK	95	85
Brome, smooth-LINCOLN	Bromus inermis	90	85
Fescue, tall, FAWN	Festuca arundinacea-FAWN	98	85
Fescue, tall, turf-type	Festuca Arundinacea	90	95
Fescue, chewings, red	Festuca rubra var. commutate	98	90
Fescue, creeping, red	Festuca rubra	98	85
Fescue, hard fine	Festuca Ovina Spp. Duriuscula	90	95
Fescue, red-PENNLAWN	Festuca rubra PENNLAWN	98	85
Fescue, Tall, Olympic (Fineleaf)	Festuca arundinacea-Olympic	98	85
Fescue, Tall, Rebel (Fineleaf)	Festuca arundinacea	98	85
Fescue, Sheeps	Festuca ovina	90	95
Orchardgrass	Dactylis glomerata	90	90
Red top	Agrostis alba	92	85
Wildrye, Canada	Elymus Canadensis	95	85
Ryegrass, Perennial	Lolium perenne	95	90
Timothy	Phleum pratense	99	85
Wheatgrass, crested	Agropyron Cristatum	90	95
LEGUMES			
Alfalfa, RANGER/VERNAL	Medicago sativa	99	90[(a)]
Alfalfa, Travois	Medicoa spp.	99	90[(a)]
Red Clover, medium	Trifolium pretense	99	90[(a)]
NURSE CROP OR STABILIZING CROP			
Oats	Avena sativa	97	90
Rye	Secale cereale	97	90
[(a)] Includes hard seed.			

Table 4169.02-2: Seeds (Common Names, Scientific Names, and PLS)

Common Names	Scientific Names	PLS (%)
*Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.		
NATIVE GRASSES		
Big Bluestem*	Andropogon gerardii	30
Little Bluestem*	Andropogon scoparius	30
Switchgrass*	Panicum virgatum	63
Indiangrass*	Sorghastrum nutans	30
Sorghastrum nutans	Bouteloua curtipendula	30
Western Wheatgrass*	Agropyron smithii	56
Buffalograss*	Buchloe dactyloides	60
Sand Bluestem*	Andropogon gerardii, var. paucipilus	30
Blue Grama	Bouteloua gracilis	30
Intermediate Wheatgrass	Agropyron intermedium	70
Slender Wheatgrass	Agropyron trachycaulum, var. unilaterale	70
Prairie Dropseed	Sporobolus heterolepis	65
Sand Dropseed	Sporobolus cryptandrus	65
Sand Lovegrass	Eragrostis trichodes	65
Weeping Lovegrass	Eragrostis curvula	65
Hairy Wood Chess	Bromus purgans	60
Blue-joint grass	Calamagrostis Canadensis	47
Bottlebrush sedge	Carex comosa	62
Tussock sedge	Carex stricta	78
Fox sedge	Carex vulpinoidea	64
Virginia wild-rye	Elymus virginicus	60
Reed manna grass	Glyceria grandis	50
Fowl manna grass	Glyceria striata	72
Common rush	Juncus effuses	80
Rice Cut Grass	Leesia oryzoides	62
Rye grass, annual	Lolium italicum	89
Fowl bluegrass	Poa palustris	72
Green bulrush	Scirpus atrovirens	45
Wool grass	Scirpus cyperinus	78
Soft-stem bulrush	Scirpus vallidus	78
Indian grass	Sorghastrum nutans	60
Spike Rush	Eleocharis palustris	71
FORBS		
Canada anemone	Anemone Canadensis	72
Marsh milkweed	Asclepias incarnate	25
New England aster	Aster novae-angliae	25
Swamp aster	Aster puniceus	25
Showy tic-trefoil	Desmodium canadense	25
Joe-pye weed	Eupatorium maculatum	66
Boneset	Eupatorium perfoliatum	41
Ox Eye sunflower	Heliopsis helianthoides	38
Blue-flag iris	Iris virginica-shrevii	19
Meadow blazingstar	Liatris ligulistylis	24
Tall blazingstar	Liatris pycnostachya	24
Great blue lobelia	Lobelia siphilitica	13
Reed manna grass	Glyceria grandis	50
Fowl manna grass	Glyceria striata	72
Common Rush	Juncus effuses	80
Rice Cut Grass	Leesia oryzoides	62

B. Furnish all seeds, including grass, legume, forbs, and cereal crop seeds, from an established seed dealer or certified seed grower. Ensure they meet requirements of the Iowa Department of Agriculture regulations (Iowa Seed Law) and are labeled accordingly. Ensure the test date to determine the percentage of germination requirement was completed within a 9 month period exclusive of the calendar month in which the test was completed. Ensure the seed analysis on the label is mechanically printed.

C. Approval of all seed for use will be based on the accumulative total of PLS specified for each phase of the work, so that the PLS is not less than the accumulative total of the PLS specified. PLS is obtained by multiplying purity times germination.

D. If the seed does not comply with minimum requirements for purity and germination and such seed cannot be obtained, the Engineer may approve use of the seed on a basis of PLS or may authorize a suitable substitution for the seed specified.

E. The accumulative total of Pure Live Seed (PLS) is the product obtained by multiplying the pounds (kilograms) of each seed by the purity and germination percentages expressed as decimals. Calculations will be based on test results of samples taken by the Contracting Authority. If the seeds were not sampled or if these test results are not available, the PLS will be calculated from information shown on the label.

4169.03 FERTILIZER.
Furnish fertilizer of the grade, type, and form specified and that complies with Iowa Department of Agriculture rules and the following requirements:

A. Fertilizer grade will be identified according to the percent nitrogen (N), percent available phosphoric acid, (P_2O_5), and percent water soluble potassium, (K_2O), in that order. Approval will be based on that identification.

B. Furnish all fertilizer from an established fertilizer dealer. Ensure guaranteed analysis is provided either through mechanically printed commercial fertilizer bags or through a manufacturer's (not a distributor's) bill of lading.

C. Fertilizer inspection and acceptance will be according to Materials I.M. 469.03.

D. Furnish fertilizer of a type that can be uniformly distributed by the application equipment. Fertilizer may be chemically combined or may be furnished as separate ingredients. If supplying chemically combined fertilizer, have each unit of fertilizer chemically combined. Ensure the manufacturer’s guarantee indicates compliance with this agreement. If supplying fertilizer as separate ingredients, comply with the following:
- Each of the separate ingredients of uniform size,
- Analysis guaranteed by the manufacturer.
- Mixed using a drum mixer, grinder mixer, or other mechanical mixers.
- Mixed only by the fertilizer dealer.

E. When 6-24-24 chemically combined commercial fertilizer has been specified, a combination of ammoniated phosphate (either monoammonium phosphate (11-52-0) or diammonium phosphate (18-46-0)), muriate of potash (granular form), and urea (granular form) may be used.

F. When 13-13-13 chemically combined commercial fertilizer has been specified, a combination of ammoniated phosphate (either monoammonium phosphate (11-52-0) or diammonium phosphate (18-46-0)), muriate of potash (granular form), and urea (granular form) may be used.

G. Fertilizer may be furnished in a dry or liquid form.

H. Furnish a list of the number of containers and a corresponding scale ticket from an approved scale for the fertilizer to be used in the work.

I. Official samples taken by the Contracting Authority may be tested. A tolerance of minus 1.0% from the guaranteed analysis for each nutrient will be considered substantial compliance.

J. Ground limestone is to be of the type known as No. 1 fine (70% passing No. 200 sieve) with an analysis of elemental calcium of no less than 37% or no more than 40%.

4169.04 INOCULANT FOR LEGUMES.
An inoculant is a culture of bacteria specifically formulated for legume seeds (alfalfa, clovers, lespedeza, birdsfoot trefoil, hairy vetch, and crownvetch). Ensure the manufacturer's container indicates the specific

legume seed to be inoculated and the expiration date. Use inoculant that meets the requirements of the Iowa Seed Law. Follow the safety precautions specified on the product label.

4169.05 STICKING AGENT.
A sticking agent is a commercial material recommended by the manufacturer to improve adhesion of inoculant to the seed. For quantities less than 50 pounds, the sticking agent need not be a commercial agent; however, the Engineer's approval is required. Apply separately prior to application of inoculant. Follow safety precautions specified on the product label. A sticking agent is not required if a liquid formulation of inoculant is used.

4169.06 SOD.

A. Use sod consisting of approximately 1 inch of well established turf consisting of live Kentucky bluegrass, unless otherwise specified. Ensure sod is free from roots of trees or brush, stones, and other objectionable materials. Ensure sod is free from all noxious weeds and reasonably free of all other weeds.

B. Ensure sod is cut in strips of uniform width and thickness with ends square. The Engineer may order the thickness adjusted to meet the sod conditions. Cut sod to the length specified for the use intended. If not specified, cut to a minimum length of 3 feet. Mow sod areas to a height of approximately 1 1/2 inches to 2 inches prior to cutting.

C. Ensure sod was regularly maintained prior to cutting. Apply pre-emergence weed control chemicals and weed control chemicals for broadleaf weeds.

D. Roll or stack sod within 1 hour after being cut. The Engineer may approve other methods of handling sod. Take precautions to prevent drying or heating. Do not use sod damaged by heat or dry conditions, or sod cut more than 18 hours before being incorporated into the work.

E. Sod will be subject to inspection by the Engineer at the job site, and approval of the work constitutes approval of the material.

4169.07 MULCH.

A. Straw Mulch.
Material used as mulch may consist of dry cereal straw or native grass straw. Use Certified Noxious Weed Seed Free Mulch certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations. Bail cereal or native grass straw the same growing season as the grain was harvested from the plant.

B. Hydraulic Mulches.
Materials used shall be safe to the applicator and adjacent workers, and nontoxic to plants, fish, and other wildlife when properly applied according to EPA and other regulatory agencies.

1. Wood Cellulose Fiber.
- **a.** Natural or cooked cellulose fiber processed from whole wood chips, or a combination of (50%-50%) cellulose fiber produced from whole wood chips and recycled fiber from sawdust, recycled paper, chipboard, or corrugated cardboard.
- **b.** Contains a colloidal polysaccharide tackifier adhered to the fiber to prevent separation during shipment and avoid chemical coagglomeration during mixing.
- **c.** Forms a homogeneous slurry of fibers, tackifier, and water that can be applied with standard hydraulic mulching equipment and be dyed to facilitate visual metering during application.
- **d.** Contains no growth or germination inhibiting factors, and has a minimum pH of 4.8.

2. Bonded Fiber Matrix.
- **a.** Manufactured to be applied with standard hydraulic mulching equipment and dyed to facilitate visual metering during application.

b. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.
c. Meet the following requirements:
1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1 or ASTM D 8151.
2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
3) Hydraulic mulch that is completely photo-degradable or biodegradable.
4) Have a rainfall event (R-factor) of 140 < R according to ASTM D 6459.
5) Have a cover factor of C ≤ 0.03 according to ASTM D 6459.
6) Vegetation Establishment of 400% minimum according to ASTM D 7322.
7) Water Holding Capacity 600% minimum according to ASTM D 7367.

3. Mechanically-Bonded Fiber Matrix.
a. Manufactured to be applied with standard hydraulic mulching equipment and dyed to facilitate visual metering during application.
b. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.
c. Meet the following requirements:
1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1 or ASTM D 8151.
2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
3) Hydraulic mulch that is completely photo-degradable or biodegradable.
4) Have a rainfall event (R-factor) of 162 < R according to ASTM D 6459.
5) Have a cover factor of C ≤ 0.01 according to ASTM D 6459.
6) Vegetation Establishment of 500% minimum according to ASTM D 7322.
7) Water Holding Capacity of 700% minimum according to ASTM D 7367.

4. Organic Fiber Matrix.
Provide hydraulic organic fiber matrix (OFM) meeting the following characteristics and requirements:
a. Premixed formulation.
b. Contains a minimum of 88% organic material derived from compost, peat moss, wood cellulose, straw fibers, wood bark, biochar, flax fibers, or other organic fibers.
c. Phyto-sanitized to eliminate potential pathogens and weed seeds.
d. Contains one or more of the following: humus, enzymes, vitamins, natural sugars, plant proteins, auxins, or amino acids.
e. Contains zero ecotoxicity as per EPA 2021.0 in 48 hours.
f. Passes EPA 503 Metal Limits.
g. Passes 40 CFR 503 Class A for pathogen reduction.
h. pH: 5.5 to 8.5 according to ASTM D 1293.
i. Water Holding Capacity: 400% minimum according to ASTM D 7367.
j. Vegetation Establishment: 400% minimum according to ASTM D 7322.
k. Moisture Content: 10% minimum and 40% maximum according to ASTM D 2974.
l. Use with a tackifier that is either applied separately within 24 hours of the organic material, or is premixed according to the manufacture's recommendations. Tackifier shall meet the following requirements:
- Safe to the applicator, adjacent workers, and the environment when properly applied according to EPA and other regulatory agencies.
- Nontoxic to plants, fish and other wildlife and 100% biodegradable.

4169.08. COMPOST.
A. Use an organic substance produced by the biological and biochemical decomposition of source-separated compostable materials separated at the point of waste generation. Organic substances may include, but are not limited to:

- Leaf and yard trimmings,
- Food scraps,
- Food processing residues,
- Manure and/or other agricultural residuals,
- Forest residues and bark, and
- Soiled and/or unrecyclable paper and biosolids.

B. Compost is to contain no visible admixture of refuse or other physical contaminants nor any material toxic to plant growth. Compost is to meet the additional requirements below. All physical requirements are to comply with the United States Composting Council, "Testing Methods for the Examination of Composting and Compost" (TMECC).

1. **Minimum organic material:** 30% (dry weight basis) as determined by loss on ignition.

2. **Moisture content:** 30% to 60%. Organic material shall be loose and friable and not dusty.

3. **Soluble salts:** less than 5.0 ds/m.

4. **Stability:** Carbon dioxide evolution rate less than 8 according to TMECC 5.08-B. Growth screening: Emergence a minimum of 80% for all compost to be vegetated.

5. **pH:** 6.0 - 8.0.

6. **Fecal Coliform:** Comply with TMECC 07.01-B.

7. **Heavy Metals:** Comply with TMECC 04.06 and TMECC 04.13-B.

8. Comply with the following for particle size:
   - **Pneumatic Seeding (Urban):** 100% passing the 1/2 inch screen.
   - **Pneumatic or Mechanical Seeding (Rural):** 100% passing the 1 inch screen, 80% to 90% passing the 3/4 inch screen, and 70% to 80% passing the 1/2 inch screen.
   - **Filter Sock, Filter Berm, and Filter Blanket:** 100% passing the 2 inch screen, 70% to 90% passing the 1 inch screen, and 50% to 70% passing the 1/2 inch screen.

4169.09 STAKES FOR HOLDING SOD.

Use either wood or metal wire stakes for holding sod. Use wood stakes in sandy soils or when the Engineer requires.

A. Wood Stakes.
- 1 to 1 1/2 inches wide, 1/4 to 1/2 inch thick, and 12 inches long.
- Where this length of stake does not provide firm bearing, the Engineer may require stakes of sufficient length to secure firm bearing.

B. Wire Stakes.
- Staples made from No. 11 wire or heavier and with a minimum 2 inch flat spread on the top of the sod.
- Legs at least 6 inches long. The Engineer may require wire legs longer than 6 inches.

4169.10 SPECIAL DITCH CONTROL, TURF REINFORCEMENT MAT, SLOPE PROTECTION, AND TRANSITION MAT.

Comply with the following and meet the requirements of Materials I.M. 469.10.

A. Wire Staples.
Meet the following requirements for wire staples:

1. U-shaped wire staples.

2. Each leg a minimum of 6 inches long for special ditch control and slope protection and 10 inches long for turf reinforcement mat. In sandy soil conditions the Engineer may require the length of each leg to be a minimum of 12 inches.

3. Minimum No. 11 diameter wire for hand installation. Machine installation with minimum No. 13 diameter wire allowed for installation of slope protection and special ditch control.

4. Staples of sufficient hardness to facilitate installation without bending.

B. Special Ditch Control.

1. Wood Excelsior Mat.
A mat of interlocking wood fibers. Meet the following requirements:
- Plastic netting applied to both sides for holding the excelsior in place.
- Nontoxic to growth of plants and germination of seeds.
- Minimum dry weight of 0.68 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a minimum uniform width of 48 inches, with a tolerance of ~~minus~~ -1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

2. Coconut Fiber Mat.
At the Contractor's option, coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch control. Meet the following requirements:
- Uniform thickness with the coconut fiber evenly distributed over the entire area of the mat.
- Both sides of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight of 0.40 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of ~~minus~~ -1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

3. Biodegradable Mat.
At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch control. Meet the following requirements:
- Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides or a netless mat made of natural fibers mechanically interlocked. Straw is not approved for use as all-natural, biodegradable fibers.
- Minimum dry weight (mass) of 0.40 pounds per square yard for coconut fiber or 0.68 for pounds per square yard for wood excelsior according to ASTM D 6475.
- Minimum shear stress (according to D 6460 or equivalent) of 2.0 psf.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of -1 inch and a minimum length of 80 feet.
- Furnished in bags or otherwise protected to prevent damage from weather and handling.

C. Slope Protection.
~~Wood excelsior mat, coconut fiber mat, straw mat, or straw coconut mat may be used for slope protection.~~

1. Wood Excelsior Mats.
A mat of interlocking wood fibers meeting the requirements of Article 4169.10, B, 1. with the following exceptions:
- Plastic netting applied to one or both sides for holding the excelsior in place. ~~Mats without netting where the excelsior is mechanically stitched together to hold it in place may be allowed.~~
- Minimum dry weight of 0.50 pounds per square yard according to ASTM D 6475.

2. Straw Mat, Straw-Coconut Fiber Mat, or Coconut Fiber Mat.
At the Contractor's option straw mat, straw-coconut fiber mat, or coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:

- Consistent thickness with the straw, straw-coconut fiber, or coconut fiber evenly distributed over the entire area of the mat.
- The top side of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight (mass) of 0.40 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a uniform width of 48 inches, with a tolerance of ~~minus~~ -1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather or handling.

3. Biodegradable Mat.
At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:

- Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides or a netless mat made of natural fibers mechanically interlocked.
- Minimum dry weight (mass) of 0.40 pounds per square yard for straw, straw-coconut, or coconut fiber or 0.50 for pounds per square yard for wood excelsior according to ASTM D 6475.
- C Factor (according to ASTM D 6459) less than or equal to 0.10 or minimum shear stress (according to D 6460 or equivalent) of 1.0 psf.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of -1 inch and a minimum length of 80 feet.
- Furnished in bags or otherwise protected to prevent damage from weather and handling.

D. Netting.

~~1.~~ Comply with the following mesh netting sizes. A tolerance of ~~plus or minus~~ 0.10 inch applies to netting size.

- Netting applied on wood excelsior mats: no more than 1 inch by 2 inches.
- Netting applied on coconut fiber only mats for channel and slope: no more than 3/4 inch by 3/4 inch or 1/2 inch by 1 inch.
- Netting applied on the top side of straw and straw-coconut fiber mats for slopes only: no more than 1/2 inch by 1~~/2~~ inch.

~~2. A minimum weight of 9 pounds per 1000 square yards is required for netting for special ditch control or slope protection~~.

E. Turf Reinforcement Mat (TRM).

1. **Type 1 TRM:** constructed of a web of mechanically or melt-bonded polymer netting, or monofilaments fibers entangled to form a strong and dimensionally stable mat. Bonding methods include polymer welding, thermal or polymer fusion, or the placement of synthetic fibers between two high-strength, biaxially-oriented nets, mechanically bound by parallel stitching with polyolefin thread. Products may contain a degradable component.

2. **Type 2 and 3 TRM:** constructed of a web of mechanically or melt-bonded polymer netting, or monofilaments, or fibers that are entangled to form a strong and dimensionally stable mat. Non-woven bonding methods include polymer welding, thermal or polymer fusion, or the placement of fibers between two high-strength, biaxially oriented nets, mechanically bound by parallel stitching with polyolefin thread. Components are to be 100% synthetic and resistant to biological, chemical, and ultraviolet degradation.

3. **Type 4 TRM:** a high performance/survivability TRM composed of monofilament yarns woven into a resilient uniform configuration. Use mats consisting of a matrix exhibiting very high interlock and reinforcement capacities with both soil and root systems and demonstrating a high tensile modulus. TRMs manufactured from discontinuous or loosely held together by stitched or glued, netting, or composites will not be allowed in this category. Components are to be 100% synthetic and resistant to biological, chemical, and ultraviolet degradation. Use this category when field conditions exist with high loading and/or high survivability requirements.

4. Comply with Table 4169.10-1 for minimum material property and performance requirements:

Table 4169.10-1: Minimum Material Property and Performance Requirements

Property	Property	Test Method	Type 1	Type 2 [d]	Type 3 [d]	Type 4 [d]
Material	Thickness	ASTM D 6525	0.25 in	0.25 in	0.25 in	0.25 in
Material	Tensile Strength[a, b]	ASTM D 6818	125 lb/ft	240 lb/ft	750 lb/ft	3000 lb/ft
Material	UV Resistance	ASTM D 4355	80% @ 500 hrs	80% @ 1000 hrs	80% @ 1000 hrs	90% @ 3000 hrs
Performance	Maximum Shear Stress (Channel Applications)[c]	ASTM D 6460	7-9 lb/ft^2	10-11 lb/ft^2	12-14 lb/ft^2	15-16 lb/ft^2

a. Minimum Average Roll Values, machine direction only.
b. Tensile Strength of structural components retained after exposure.
c. Maximum shear stress that fully-vegetated TRM can sustain without physical damage or excess erosion (1/2 inch soil loss) during a 30 minute flow event in large scale testing. Acceptable large scale testing protocol includes ASTM D 6460 or independent testing conducted by the Texas Transportation Institute, Colorado State University, Utah State University, or other approved testing facility. Bench scale testing is not acceptable.
d. Type 2, 3, and 4 TRM may include additional degradable components as long as material and performance requirements are met by the 100% synthetic components.

F. Transition Mat.

1. **Mat.**
   - **a.** Constructed of 85% minimum UV resistant material with a maximum ground cover of 80%.
   - **b.** Meet the requirements of Table 4169.10-2:

Table 4169.10-2: Material Property and Performance Requirements

Property	Test Method	Value
Mass/Unit Area (max)	ASTM D 6566	3 lbs/ft2
Thickness (min)	ASTM D 6525	0.4 in
Thickness (max)	ASTM D 6525	1.1 in
Tensile Strength (TD)	ASTM D 6818	550 lbs/ft
Percent Open Area (min)	ASTM D 6567	20%
UV Stability	ASTM D 4355	85%

2. **Anchoring Devices.**
   - **a.** Furnish bullet tip style anchors made of a metal alloy attached to a wire rope.
   - **b.** Anchors capable of withstanding a minimum 300 pounds of pull out resistance in cohesive soils.
   - **c.** Wire rope a minimum of 30 inches in length with a minimum breaking strength of at least 300 pounds.
   - **d.** The top washer a minimum of 3 inches in diameter and constructed of a UV resistant plastic or metal alloy.
   - **e.** Each anchor equipped to allow the retightening of the anchor when deemed necessary by the Engineer.

4169.11 FILTER FABRIC.

Furnish nonwoven polypropylene, UV stabilized filter fabric complying with Table 4169.11-1.

Table 4169.11-1: Filter Fabric Properties

Property	Typical	Minimum
Tensile Strength, lbs	130	115
Grab Elongation, %	70	50
Trapezoidal Tear Strength, lbs	60	50

4169.12 PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE.

A. General.

1. Provide wattles, sediment logs, and filter socks consisting of the following materials contained in a tube of photo degradable fabric or synthetic netting:
   - **a.** Wattles: Cereal straw or native grass straw certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations as Certified Noxious Weed Seed Free Mulch. Wattles with observed seed heads of any type will not be accepted.
   - **b.** Sediment logs: Wood excelsior fibers with 80% of the wood excelsior fibers being 6 inches long or longer.
   - **c.** Filter socks: Compost (from an approved source meeting Article 4169.08), wood chips, or mulch.

2. Fill wattles, sediment logs, and filter socks using a mechanical device. Hand filling of wattles, sediment logs, and filter socks will not be allowed.

3. Ensure wattles, sediment logs, and filter socks do not contain:
   - A visible admixture of refuse or other physical contaminants,
   - Germination or growth inhibiting factors, or
   - Material toxic to plant growth.

4. Ensure wattles, sediment logs, and filter socks have waterproof identification tags printed using permanent ink and containing manufacturer's name and address. For wattles and sediment logs, tags shall be attached to the inside of the netting of each wattle or sediment log. For filter socks, tags shall be attached to the outside of each sock.

5. Approved sediment logs, wattles, and filter socks are listed in Materials I.M. 469.10, Appendix E.

6. Use wire staples meeting the requirements of special ditch control and slope protection staples in Article 4169.10, A.

B. Wattles and Sediment Logs.

Meet the following minimum weight requirements:

- 20 inch sediment logs and straw wattles: 3 pounds per foot with tolerance of 0.25 pounds per foot.
- 12 inch sediment logs and straw wattles: 2 pounds per foot with tolerance of 0.25 pounds per foot.
- 9 inch sediment logs and straw wattles: 1 pound per foot with a tolerance of 0.1 pounds per foot.

C. Filter Socks.

Provide filter socks with a maximum 3/8 inch opening.

IM 469.02
SEED
and
IM 469.04
MULCH

INSPECTION & ACCEPTANCE OF SEED

GENERAL

The provisions of this IM shall apply to seed and seed mixtures defined in the plans and Section 4169 of the Standard Specifications.

ACCEPTANCE

Seed

Seeds shall be furnished and labeled in accordance with laws relating to agriculture seeds and the rules and regulations of Iowa Department of Agriculture. The exception being the information on the tag, ticket, or label shall be mechanically printed. Each unit of seed furnished shall have a label, ticket, or tag containing the name and address of the person or company who labeled said seed, kind and variety, percent purity, percent germination, percent hard seed, if present, and date tested. The test date to determine the percentage of germination shall have been completed within a nine-month period prior to seed application exclusive of the calendar month in which the test was completed (for example, seed tested 8/5/12 shall be applied by 5/31/13. If seed is to be applied after 5/31/13, then seed requires a new test).

Prior to seeding, entire lots of seed to be used should be inspected for damage due to rough handling, exposure to moisture or rodents. Evidence of contamination, or other reasons which would indicate the quality of seed is questionable, should be considered cause for holding until the lots or bags in question have been tested before use. Routine monitoring samples for testing will not be required.

If the seed does not comply with minimum requirements for purity and germination, and such seed cannot be obtained, the Engineer may approve use of the seed on a basis of pure live seed (Germination times Purity equals Pure Live Seed) or may authorize a suitable substitution for the seed specified.

Seed Mixing

- Rural stabilizing crop seeding:

  Seed mixtures mixed on-site or off-site may be incorporated into the project.

  For seed mixed off-site, seed bags shall be tagged with bag weight and test data. Each shipment to a project should be inspected for damage, loss or contamination, and sufficiency to demonstrate required application rate. Bags shall arrive onsite in sealed/unopened bags.

  For seed mixed on-site, prior to seeding operations, the Engineer shall be provided opportunity to inspect seed tickets and witness the mixing of seed varieties for compliance with requirements of the contract requirements. Contractor shall provide weighing equipment or evidence of the weights of pre-bagged seed to demonstrate required application rates.

- All seed mixtures other than rural stabilizing crop seeding:

  Seed mixtures mixed off-site by an approved source (as described in this IM) may be incorporated into the project. Each shipment to a project shall be accompanied by proper report and certification documents described in this IM. Seed bags shall be tagged with bag weight and lot number corresponding to certification documents.

  Each shipment to a project should be inspected for damage, loss or contamination, and sufficiency to demonstrate required application rate. Bags shall arrive onsite from seed conditioner in sealed/unopened bags.

APPROVED SOURCES

Seed mixture from seed conditioners approved by the Iowa Crop Improvement Association or other state's Crop Improvement Association (or equivalent association/agency) may be furnished to Iowa DOT projects on a certification basis.

Seed shall be mixed by an approved seed conditioner as described in this IM, but the seed is not required to come from an approved seed conditioner.

CERTIFICATION DOCUMENTS

Certified seed conditioner shall furnish with each shipment a certified seed mixture report and certification sheet (see Appendix A). Each mixture report shall identify the county, project number, contractor or subcontractor, type of seed mixture and lot numbers. Blank forms are available at the Construction and Materials website.

Certified seed conditioners are allowed to provide certified seed mixture report and certification sheet without project-specific details (such as county, project number, contractor or subcontractor). In these cases, the contractor or intermediate distributor/supplier will be allowed to provide this project specific information.

Each certification sheet shall be signed by a designated responsible company representative. One copy of the above described documents shall be forwarded to the project engineer at the time of shipment to the project or uploaded to DocExpress.

Certified seed mixture reports and seed lot test information for seeds furnished to Department projects shall be kept by the approved seed conditioner for a minimum of three years.

APPROVED SOURCE MONITORING

The District Materials Engineer may perform a supplier monitoring program.

The following items may be evaluated during a monitor inspection and documented on a Seed Monitor Report form (see Appendix B for example form):

- Project number/customer
- Certification date and certifying scale company of all mixing scales
- Intended seed mixture
- Verification of seed varieties, germination percentage, purity percentage, PLS percentage, date tested, and lot number

- Verification of weighed seed increments and bags
- Labeling and certification/documentation

Seed Mixture Report – Native Grass and Wetland Grass

Date: _____

Project No.: _____ Seed Mix Type: _____

County: _____ # of Acres: _____

Contractor: _____ Lot #: _____

Species (Scientific name)	Origin	Lot #	Test Date	Purity (%)	Germination (%)	PLS %	PLS Factor

Species (Scientific name)	# PLS/Acre	# of Acre	Total # PLS	PLS Factor	Total Bulk Lbs.
				Total:	

Lbs/Bag: _____ **Acres/Bag:** _____ **# of Bags:** _____

Seed Mixture Report – Urban and Rural

Date: _____

Project No.: _____ Seed Mix Type: _____

County: _____ # of Acres: _____

Contractor: _____ Lot #: _____

Species (Scientific name)	Origin	Lot #	Test Date	Purity (%)	Germination (%)

Species (Scientific name)	Lbs. /Acre	# of Acre	Total Bulk Lbs.
		Total:	

Lbs/Bag: _____ **Acres/Bag:** _____ **# of Bags:** _____

Certification Statement

The materials itemized in this shipment are certified to be in compliance with the applicable requirements of the Iowa Department of Transportation.

Project No.	
County	
Seed Mixture Type	
# of Acres	
Total Bulk Lbs. of Mixture	
Lbs./Bag	
Acres/Bag	
Lot No.	
# of Bags	
Contractor	
Date	

Company: _____

Name: _____

Signature: _____

Date: _____

List state(s) where company is an approved seed conditioner:

_____

INSPECTION & ACCEPTANCE
STRAW MULCH

GENERAL
Article 4169.07 of the Standard Specifications specifies the requirements for straw mulch.

ACCEPTANCE
Acceptance of straw mulch for Iowa Department of Transportation projects will be based on certification documentation showing mulch is certified Noxious Weed Seed Free from the Iowa Crop Improvement Association or other state's Crop Improvement Association (or equivalent association/agency).

CERTIFICATION DOCUMENTATION
Certification documentation is based on the type of documentation issued by the specific state Crop Improvement Association.

The Iowa Crop Improvement Association certification documentation is either a Transit Certificate (starting in 2025) or a certification label.

Each Transit Certificate or certification label issued by the Iowa Crop Improvement Association has a unique number. Contractor shall not submit a Transit Certificate that represents more than the number of bales shown on the certificate. Contractor shall also not submit the same certification label(s) more than once.

469.10
496.01 MAPLE

IM 469.10 & IM 496.01

IM 469.10: Erosion Control Products

IM 469.10 Appendices from MAPLE

- IM 469.10, Appendix A, Approved Sources – Ditch and Slope Protection Mats
- IM 469.10, Appendix B, Approved Sources – Turf Reinforcement Mats
- IM 469.10, Appendix C, Approved Sources – Hydraulic Mulches
- IM 469.10, Appendix D, Approved Sources – Compost
- IM 469.10, Appendix E, Approved Sources – Perimeter, Slope and Ditch Check Sediment Control Devices
- IM 469.10, Appendix F, Approved Sources – Silt Curtains

IM 496.01: Inspection & Acceptance Engineering Fabric/Fabric Form

IM 496.01 Appendices from MAPLE

- IM 496.01, Appendix A, Approved Sources – Silt Fencing
- IM 496.01, Appendix C, Approved Sources – Embankment Erosion

EROSION CONTROL PRODUCTS

GENERAL

Erosion control products shall meet the requirements of applicable Iowa Department of Transportation Specifications.

SOURCE APPROVAL

To obtain approval, the manufacturer shall submit the following to the Construction and Materials Bureau in Ames, Iowa:

1. Product identification including brand name and product number
2. A sample suitable for testing may be requested by the Construction and Materials Bureau.
3. The AASHTO Product Evaluations and Audit Solutions test data for products covered by the AASHTO Product Evaluations and Audit Solutions workplan along with adherence to AASHTO Product Evaluations and Audit Solutions submission cycles. (For TRM ASTM D6460 testing only, please see table 4169.10-1 note c of the standard specifications for additional information on approved testing facilities). For Hydraulic Mulches, independent test data may be submitted for review and approval. Starting in Calendar year 2026 AASHTO Product Evaluations and Audit Solutions test data for hydraulic Mulches will be required for Approval.
4. Company information with list of contact personnel and any available product literature.
5. For perimeter and slope and ditch check sediment control devices:
   - Filter socks containing compost: Manufacturer shall provide documentation for compost as noted in section below.
   - Wattles: Manufacturer shall provide documentation that material is certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations as Certified Noxious Weed Seed Free Mulch.
6. In the event that a firm is selling their products under private label agreement with another manufacturer, the private label firm shall submit an application identifying the original product designation and a letter of certification from the primary manufacturer verifying the information.

ACCEPTANCE

Acceptance of erosion control products will be on the basis of approved brand name, except grate intake sediment filter bags and open-throat curb intake sediment filters, which will be accepted based on the manufacturer's certification. Compost will be accepted if the material is from a participant in the US Composting Council's Seal of Testing Assurance (STA) Program https://compostingcouncil.org/participants/ or on the basis of satisfactory test results performed by a STA certified lab https://compostingcouncil.org/labs/. For Turf Reinforcement Mats (TRM), higher class/type TRMs are allowed for use as lower class/type TRMs. For example, a TRM Type 3 would be allowed for use as a Type 1, 2, or 3.

Approved brand names are listed by manufacturer in the Materials Approved Products Listing Enterprise (MAPLE). The brand name submitted to the department for AASHTO Product Evaluations and Audit Solutions tested devices will be the same as submitted to the AASHTO Product Evaluations and Audit Solutions program. Company Name changes should be reported to the Construction and Materials Bureau timely.

Signed ~~c~~Certifications for grate intake sediment filter bags and open throat curb intake sediment filters indicating compliance to applicable specifications / standards and contract documents will need to be provided. Example as follows:
“This is to certify that (insert product name) meets the applicable Specifications, Standard Road Plan, and/or other contract document of the Iowa Department of Transportation for (insert item name: grate intake sediment filter bags or open-throat curb intake sediment filters)”

MONITOR SAMPLING & TESTING

The Construction and Materials Bureau may sample and test erosion control products to verify compliance with specifications. Products found to be non-compliant may be rejected.

469.10 Appendix A

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
AEC Premier Coconut	04/24/2014	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Coconut Fiber
AEC Premier Coconut FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Coconut Biodegradable
AEC Premier Straw Coconut	10/07/2014	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw – Coconut Fiber
AEC Premier Straw Double Net FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw Biodegradable
AEC Premier Straw Single Net FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw, Biodegradable
AEC Premier Straw-Double Net	10/07/2014	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw
AEC Premier Straw-Single Net	10/07/2014	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw
AEC Premier Straw/Coconut FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Straw/Coconut Biodegradable

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
C125	02/11/2021	North American Green	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		North American Green		Coconut Fiber
C32	04/24/2014	Erosion Control Blanket Inc.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		Erosion Control Systems, Inc.		Two-Sided Coconut
Curlex Enforcer	05/20/2021	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Wood Excelsior
Curlex I	05/20/2021	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior
Curlex I CL	05/20/2021	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior
Curlex I FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior Biodegradable
Curlex II .98	05/20/2021	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Wood Excelsior

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Curlex II CL	05/20/2021	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior
Curlex II FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior Biodegradable
Curlex III	05/20/2021	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Wood Excelsior
Curlex III FibreNet	05/07/2025	American Excelsior Co.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		American Excelsior Co.		Wood Excelsior Biodegradable
Curlex Net Free	05/20/2021	American Excelsior Co.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		American Excelsior Co.		Wood Excelsior - Biodegradable
ECC-2	04/24/2014	East Coast Erosion Blankets	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		East Coast Erosion Blankets		Double net Coconut Fiber
ECC-3	04/24/2014	East Coast Erosion Blankets	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		East Coast Erosion Blankets		Coconut

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
ECS-1	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		East Coast Erosion Blankets		Straw
ECS-2	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		East Coast Erosion Blankets		Two-sided Straw
ECSC-2	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		East Coast Erosion Blankets		Straw-Coconut
ECSC-3	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		East Coast Erosion Blankets		Straw-Coconut
ECX-2	04/24/2014	East Coast Erosion Blankets	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		East Coast Erosion Blankets		Wood Excelsior
EG-1s	10/07/2014	Ero-Guard, Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Ero-Guard, Inc.		Straw
EG-1sRD	10/07/2014	Ero-Guard, Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Ero-Guard, Inc.		Straw
EG-2S/C	10/07/2014	Ero-Guard, Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Ero-Guard, Inc.		Straw
EG-2s	10/07/2014	Ero-Guard, Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Ero-Guard, Inc.		Straw

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
ETC-100-BN	02/20/2024	Erosion Tech	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		Erosiontech		Coconut Fiber - Biodegradable
ETRS-1	11/10/2022	Erosion Tech	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	MN / WI / PA	Erosiontech		Single net Straw
ETRS-2	11/10/2022	Erosion Tech	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	MN / WI / PA	Erosiontech		Double net Straw
ETX-2	11/10/2022	Erosion Tech	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	MN / WI / PA	Erosiontech		Double net Excelsior
ETX-2-HV	02/20/2024	Erosion Tech	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		Erosiontech		100% Wood Excelsior Fiber
EXCEL CC-4	04/24/2014	Western Excelsior	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		Western Excelsior		Coconut
EXCEL R-1	05/20/2021	Western Excelsior	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Western Excelsior		Wood Excelsior

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
EXCEL S-2	07/09/2024	Western Excelsior	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Western Excelsior		Wood Excelsior
EXCEL S-2X	12/10/2024	Western Excelsior	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		Western Green		Wood Excelsior
EXCEL SR-1	10/07/2014	Western Excelsior	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Western Excelsior		Straw
EXCEL SS-2	10/07/2014	Western Excelsior	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Western Excelsior		Straw
Enviroscape C4000	03/18/2015	Enviroscape ECM Ltd.	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10				
Enviroscape S1000	03/18/2015	Enviroscape ECM Ltd.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10				
Enviroscape S2000	03/18/2015	Enviroscape ECM Ltd.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10				
Enviroscape SC3000	03/18/2015	Enviroscape ECM Ltd.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10				

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Excel CS-3	11/07/2018	Western Excelsior	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	Macon, Georgia	North American Green	Bierschbach Equipment & Supply	Coconut Fiber Mat / Straw Mat
KEP-C100	09/18/2019	Kansas Erosion	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10	Kansas	Cherokee mfg		Coconut Fiber
KEP-S1	09/18/2019	Kansas Erosion	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	Kansas	Cherokee mfg		Straw
KEP-S2	09/18/2019	Kansas Erosion	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	Kansas	Cherokee mfg		Straw
KEP-SC2	09/18/2019	Kansas Erosion	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	Kansas	Cherokee mfg		Straw / Coconut
Landlok C2	04/24/2014	Propex Operating Company, LLC	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		SI Corporation		Coconut Fiber
Landlok CS2	10/07/2014	Propex Operating Company, LLC	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		SI Corporation		Straw-Coconut Fiber
Landlok S1	10/07/2014	Propex Operating Company, LLC	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		SI Corporation		Straw

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Landlok S2	10/07/2014	Propex Operating Company, LLC	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		SI Corporation		Straw
Rhino Erosion King	10/07/2014	Rhino Seed & Turf Supply	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Rhino Seed & Turf Supply		Straw
Rhino Erosion King II	10/07/2014	Rhino Seed & Turf Supply	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Rhino Seed & Turf Supply		Straw
S1000BD	01/21/2022	Enviroscape ECM Ltd.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10				Straw - Biodegradable
S150	02/11/2021	North American Green	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		North American Green		Straw
S31	10/07/2014	Erosion Control Blanket Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Erosion Control Systems, Inc.		One-Sided Straw
S32	10/07/2014	Erosion Control Blanket Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		Erosion Control Systems, Inc.		Two-Sided Straw
S75	02/11/2021	North American Green	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		North American Green		Straw
SC150	02/11/2021	North American Green	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		North American Green		Straw-Coconut Fiber

Materials Approved Products List

469.10aa - Appendix A - Special Ditch Control and Slope Protection Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
US 1S	10/07/2014	US Erosion Control Products	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		US Erosion Control Products		Straw
US 2S	10/07/2014	US Erosion Control Products	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		US Erosion Control Products		Straw
US-1X	10/05/2017	US Erosion Control Products	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		US Erosion Control Products		Wood Excelsior
US-2C	04/24/2014	US Erosion Control Products	EROSION CONTROL, SPECIAL DITCH CONTROL & SLOPE PROTECTION	469.10		US Erosion Control Products		Coconut Fiber
US-2S/C	10/07/2014	US Erosion Control Products	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10		US Erosion Control Products		Straw / Coconut
Winfab S1	05/25/2023	Willacoochee Industrial Fabrics,Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	GA			Straw Slope Protection only
Winfab S2	05/25/2023	Willacoochee Industrial Fabrics,Inc.	EROSION CONTROL, SLOPE PROTECTION ONLY	469.10	GA			Straw Slope Protection only

469.10 Appendix B

Materials Approved Products List

469.10ab - Appendix B - Turf Reinforcement Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
C-350	02/11/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		North American Green		Type 1
Curlex Enforcer	04/24/2014	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		American Excelsior Co.		Type 1
ECP-2	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		East Coast Erosion Blankets		Type 2
ECP-2 10 oz.	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		East Coast Erosion Blankets		Type 2
ECP-3	10/07/2014	East Coast Erosion Blankets	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		East Coast Erosion Blankets		Type 3
EMX350	05/24/2022	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		Western Green		Type 2
Enkamat (R30) / Futerra TRM R45	10/07/2014	Profile Products LLC	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		Profile Products LLC		Type 2
Excel PP5- Xtreme	10/08/2014	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		Western Excelsior		Type 4
Excel PP5- Xtreme.	10/08/2014	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 4	469.10		Western Excelsior		Type 3

Materials Approved Products List

469.10ab - Appendix B - Turf Reinforcement Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Excel PP5-10	10/08/2014	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		Western Excelsior		Type 2
Excel PP5-8	04/24/2014	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		Western Excelsior		Type 1
Futerra 7020	04/15/2025	Profile Products LLC	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		Profile Products, LLC		Type 1
Land Lok 450	10/08/2014	Propex Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		Propex® Inc.		Type 2
Macmat R6G	10/08/2014	Maccaferri, Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		Maccaferri, Inc.		Type 3
Macmat R6P	10/08/2014	Maccaferri, Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		Maccaferri, Inc.		Type 3
Macmat R8G	10/08/2014	Maccaferri, Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 4	469.10		Maccaferri, Inc.		Type 4
Mirafi TM13C	06/06/2019	Tencate Geosynthetics Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 4	469.10		Tencate Geosynthetics Inc.		Type 4
P300	02/11/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10				

Materials Approved Products List

469.10ab - Appendix B - Turf Reinforcement Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
P300-LW	02/11/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		North American Green		Type 1
P42	10/08/2014	Erosion Control Blanket Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		Erosion Control Systems, Inc.		Type 2
P550	02/11/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		North American Green		Type 3
PP5-Pro	02/16/2021	Western Excelsior	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		Western Excelsior corp		Type 3
Pyramat 25	10/08/2014	Propex Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		Propex® Inc.		Type 3
Pyramat 75	10/08/2014	Propex Inc.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 4	469.10		Propex® Inc.		Type 4
Recyclex TRM	10/08/2014	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		American Excelsior Co.		Type 2
Recyclex TRM-V	05/25/2022	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10		American Excelsior Co.		Type 2
S200	07/08/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10				Type 1

Materials Approved Products List

469.10ab - Appendix B - Turf Reinforcement Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
SC250	07/08/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10				Type 1
ScourStop	10/13/2014	Hanes Geo Components	EROSION CONTROL, TRANSITION MAT	469.10				Transition Mats
ShoreMax	02/11/2021	North American Green	EROSION CONTROL, TRANSITION MAT	469.10		North American Green		Transition Mat
T-Recs High Performance TRM	10/08/2014	East Coast Erosion Blankets	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10	Bernville, PA	Landscaping & Construction Solutions.		TRM Type 3
TMax 3k	02/16/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10		North American Green		Type 3
TRINET CURLEX	05/03/2021	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10	Wisconsin			TRM TYPE 1
TRINET Coconut	07/08/2021	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10	Wisconsin			TRM Type 1
TRINET Straw / Coconut	07/08/2021	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 1	469.10	Wisconsin			TRM Type 1
TriNet Recyclex	01/21/2020	American Excelsior Co.	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 3	469.10	Wisconsin			TRM Type 3

Materials Approved Products List

469.10ab - Appendix B - Turf Reinforcement Mats

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
US-2P10	10/05/2017	US Erosion Control Products	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 2	469.10		US Erosion Control Products		Type 2
W3000	02/11/2021	North American Green	EROSION CONTROL, TURF REINFORCEMENT MAT TYPE 4	469.10				

469.10 Appendix C

Materials Approved Products List

469.10ac - Appendix C - Mulch, Wood Cellulose Fiber

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Aspen Tack Mulch	04/24/2014	Western Excelsior	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Western Excelsior		
Aspen Turbo Tack	04/24/2014	Western Excelsior	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Western Excelsior		
Bindex BFM	04/24/2014	American Excelsior Co.	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10		American Excelsior Co.		
Bindex Blend WT	04/24/2014	American Excelsior Co.	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		American Excelsior Co.		
Bindex Wood WT	04/24/2014	American Excelsior Co.	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		American Excelsior Co.		
Earthguard FiberMATRIX (Code mulch)	02/05/2015	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10				
Earthguard FiberMATRIX (Code mulch)	02/05/2015	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-MECHANICALLY BONDED FIBER MATRIX	469.10				
Eco Matrix	04/24/2014	Profile Products LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Profile Products LLC		

Materials Approved Products List

469.10ac - Appendix C - Mulch, Wood Cellulose Fiber

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
EcoFibre Plus Tackifier	04/24/2014	Profile Products LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Profile Products LLC		
Excel Fibermulch II	04/24/2014	American Excelsior Co.	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		American Excelsior Co.		
Flex Guard	05/02/2024	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-MECHANICALLY BONDED FIBER MATRIX	469.10		Mat, Inc.		Mechanically Bonded Fiber Matrix (MBFM)
Flexterra HP-FGM	09/04/2014	Profile Products LLC	EROSION CONTROL, MULCH-MECHANICALLY BONDED FIBER MATRIX	469.10		Profile Products LLC		Mechanically Bonded Fiber Matrix (MBFM)
HH Wood Fiber 100% Wood w Tackifier	02/11/2025	HH Wood Fiber	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10	OH			
HydoStraw BFM	06/07/2017	HydroStraw LLC	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10				
Hydro-Blanket (BFM)	04/24/2014	Profile Products LLC	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10		Profile Products LLC		
LSC 70/30 Fiber Blend Plus	05/02/2024	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		LSC		

Materials Approved Products List

469.10ac - Appendix C - Mulch, Wood Cellulose Fiber

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Mesic Plus	04/30/2024	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Mat, Inc.		Wood Cellulose Fiber Mulch
ProGanics Biotic Soil Media	07/18/2018	Profile Products LLC	EROSION CONTROL, MULCH-ORGANIC FIBER MATRIX	469.10	Buffalo Grove, IL			OFM
ProMatrix	04/24/2014	Profile Products LLC	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10		Profile Products LLC		
Profile Blend Fiber with tackifier	01/21/2020	Profile Products LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Profile Products LLC		
Profile Wood Fiber with Tackifier	01/21/2020	Profile Products LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Profile Products LLC		
SB 50/50	10/31/2022	Profile Products LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10				50 / 50 blend
Soil Guard*	05/02/2024	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10		Mat, Inc.		Bonded Fiber Matrix
Spray Guard	05/02/2024	LSC Environmental Products, LLC	EROSION CONTROL, MULCH-WOOD CELLULOSE FIBER	469.10		Mat, Inc.		
Stronghold BFM	03/20/2023	Cherokee Manufacturing	EROSION CONTROL, MULCH-BONDED FIBER MATRIX	469.10		Cherokee Manufacturing		BFM

Materials Approved Products List

469.10ac - Appendix C - Mulch, Wood Cellulose Fiber

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Stronghold RFM	03/20/2023	Cherokee Manufacturing	EROSION CONTROL, MULCH-MECHANICALLY BONDED FIBER MATRIX	469.10		Cherokee Manufacturing		Mechanically Bonded Fiber Matrix

469.10 Appendix D

Materials Approved Products List

469.10ad - Appendix D - Compost

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Compost list removed April 2019	04/22/2019	CHS	EROSION CONTROL, COMPOST	469.10	See IM 469.10 for approval info			

469.10 Appendix E

Materials Approved Products List

469.10ae - Appendix E - Sediment Control Devices

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
AEC Premier Straw Wattle	04/27/2021	American Excelsior Co.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	WI	NOTE: Starting APRIL 2021 Letting		Straw Wattle
AGgrow Wattle	07/29/2021	Ever-Green Inc.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	Iowa, CR	AGgrow Tech, NC		Wattle
Aspen Excelsior Logs	02/11/2021	Western Excelsior	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10			Indiana	Sediment Log
Aspen Wood Products: AWP Erosion Logs	05/29/2019	Aspen Wood Products	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	Colorado			9" / 12" / 20" Sediment logs
Curlex Sediment Logs	04/24/2014	American Excelsior Co.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		American Excelsior Co.		WOOD EXCELSIOR LOGS
E-tube	03/25/2021	E-Tube	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		NOTE: Starting APRIL 2021 Letting		Filter Sock
EG-9 / EG-12 Straw Wattle	03/30/2021	Ero-Guard, Inc.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	MN	NOTE: Starting APRIL 2021 Letting		Straw Wattle

Materials Approved Products List

469.10ae - Appendix E - Sediment Control Devices

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Erosion Tech Nature Log - Straw	04/15/2025	Erosion Tech	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		Erosion Tech		Straw Wattle, 9", 12", 20"
Erosion Tech Sediment Log 9, 12, 20"	10/23/2024	MKB Company	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		Filtrexx		Sediment Log
Erosion Tech Straw Wattle 9", 12", 20"	10/23/2024	MKB Company	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		Filtrexx		Straw Wattle
Excel Straw Log	03/02/2021	Western Excelsior	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		NOTE: Starting APRIL 2021 Letting		Wattle
Filtrexx Siltsoxx	02/16/2024	MKB Company	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		Filtrexx International		Filter Sock
SILTWORM	04/27/2021	SILTWORM, INC.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	IN	NOTE: Starting APRIL 2021 Letting		Filter Sock 9" / 12"
STR-9, STR 12, STR-20	04/27/2021	Straw Solutions LLC	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	IA	NOTE: Starting APRIL 2021 letting		Straw Wattles

Materials Approved Products List

469.10ae - Appendix E - Sediment Control Devices

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
SW 925, SW 1220, SW 2020	03/14/2024	Storm Water Supply,LLC	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	Iowa			Straw Wattle
SW Series (9,12, 20 inch)	01/18/2022	Kansas Erosion	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10		NOTE: Starting APRIL 2021 Letting		Straw Wattle
SW9, SW12, SW20	07/15/2024	Willacoochee Industrial Fabrics,Inc.	EROSION CONTROL, PERIM & SLOPE/ DITCH CHECK SED CNTRL DEVICE	469.10	GA	WINFAB		Straw Wattle

469.10 Appendix F

Materials Approved Products List

469.10af - Appendix F - Floating Silt Curtains

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Abasco, Type 3	04/24/2014	Abasco	EROSION CONTROL, FLOATING SILT CURTAIN	469.10		Abasco		
Aer-Flo, Type 2 DOT (22 oz.)	04/24/2014	Aer-Flo	EROSION CONTROL, FLOATING SILT CURTAIN	469.10		Aer-Flo		
Elastec Type II Fastwater Screen	10/24/2014	Elastec/American Marine	EROSION CONTROL, FLOATING SILT CURTAIN	469.10				
Enviro-USA, Type 2 (22 oz. and 8 inch float)	04/24/2014	Enviro-USA	EROSION CONTROL, FLOATING SILT CURTAIN	469.10		Enviro-USA		
Type 2 DOT Turbidity Curtain	03/17/2021	BMP Supplies Inc	EROSION CONTROL, FLOATING SILT CURTAIN	469.10		Kleener Image Landscape Supply		

NSPECTION & ACCEPTANCE
ENGINEERING FABRIC/FABRIC FORM

GENERAL

Engineering Fabric shall meet the applicable requirements given in the Standard Specifications.

Engineering Fabric Forms shall meet the requirements of the current DS titled “Fabric Formed Concrete Structure Revetment”.

Approved products are listed in MAPLE.

MANUFACTURER & BRAND NAME APPROVAL FOR ENGINEERING FABRIC/FABRIC FORM

To obtain approval, the manufacturer shall submit the following to the Construction and Materials Bureau:

1. Product Identification including current signed mill certificate and manufacturing facility location identification for the product submitted.
2. Technical information on the use of the product
3. Quality control procedures that indicate product uniformity is reasonably assured. Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) current certificate for the testing lab performing quality control testing on the product submitted (Preferred).
4. Approximately a 1 square yard sample may be required upon request
5. The AASHTO Product Evaluations and Audit Solutions program test results for all classes of Engineering Fabrics. If AASHTO Product Evaluations and Audit Solutions program test data is not available for Triaxial Polymer Grid, then independent lab test data results may be submitted for review.
6. Products which have been tested by the AASHTO Product Evaluations and Audit Solutions program and meet the requirements of Iowa DOT Specification for the class of product may be approved after receiving AASHTO Product Evaluations and Audit Solutions program test results.
7. In the case of silt fence, after receiving the AASHTO Product Evaluations and Audit Solutions program test data for the fabric, the cord / band and the full silt fence assembly may be tested to see if it meets Iowa DOT specifications.
8. In the event that a firm is selling their products under private label agreement with another manufacturer, the private label firm shall submit an application identifying the original product designation and a letter of certification from the primary manufacturer verifying the information.
9. Approval of Engineering Fabric Forms will be based on satisfactory evaluation of a preliminary sample.
10. Certification of compliance to Build America Buy America (BABA) and IM 107 requirements.

To maintain approval of products within MAPLE, Manufacturing facilities of all engineering fabric

classes must submit their product and facilities into the appropriate AASHTO Product Evaluations and Audit Solutions program Audit program and secure and maintain a successful audit thru the AASHTO Product Evaluations and Audit Solutions program for their facility in accordance with the appropriate workplan (GTX, REGEO, SSGEO) within the AASHTO Product Evaluations and Audit Solutions program. Private Labelers must also enter the appropriate Audit program for their products to remain approved. If a product does not fall into an existing AASHTO Product Evaluations and Audit Solutions program workplan, independent laboratory testing, and Quality Control procedures shall be submitted to the Construction and Materials Bureau yearly if the product has changed in any regard.

~~**IMPORTANT**~~ **NOTE:** The AASHTO Product Evaluation & Audit Solutions Committee work plan for Geosynthetics for Subgrade Stabilization is now active. Manufacturers and private labelers need to submit their facilities and products into this Audit Program. Products, Manufacturers, Manufacturing Facilities and private labelers that are not included within the AASHTO Product Evaluation & Audit Solutions Audit Program ~~by January 2025~~ will be removed from MAPLE. See AASHTO M 288 for products covered under this requirement.

ACCEPTANCE FOR ENGINEERING FABRIC/ FABRIC FORM

For products with label or identification, acceptance of Engineering Fabric and Fabric Forms for use on Iowa Department of Transportation projects is based on manufacturer and brand name approval. Approved manufacturers and products are listed in the Materials Approved Products Listing Enterprise (MAPLE).

For products without label or identification, acceptance of Engineering Fabric and Fabric Forms for use on Iowa Department of Transportation projects is based on a statement of certification (Example follows):

Certification Statement

> This is to certify that (insert manufacturer name, product name) this Engineering Fabric or Fabric Form meets the requirements of the (insert applicable specifications article) of the Iowa Department of Transportation.

_____
Authorized Signature & Date

A responsible company representative shall sign the certification statement.

MONITOR SAMPLING & TESTING

The Construction and Materials Bureau may request sampling and testing of Engineering Fabric and Fabric Form for the purpose of monitoring the approval program at any time.

496.01 Appendix A

Materials Approved Products List

496.01aa - Appendix A - Silt Fencing

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Anita -140SF	05/21/2025	Hanes Geo Components	ENGR. FABRIC FOR SILT FENCING	496.01	India			with 150 lb Drawstring
Carthage 15%	04/24/2014	Carthage Mills	ENGR. FABRIC FOR SILT FENCING	496.01		Carthage Mills		
GTF 400 EO	04/24/2014	Thrace-LINQ, Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Thrace-LINQ, Inc.		
Geo 2130D	04/24/2014	Propex Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Propex® Inc.		
Geo Tex 2132 (cord)	04/24/2014	Propex Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Propex® Inc.		
Mirafi FW402	10/01/2019	Tencate Geosynthetics Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Tencate Geosynthetics		
SCF 1500 I	04/24/2014	Fabtex Solutions, Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Fabtex Solutions, Inc.		
SK140SFDT	04/12/2021	S & K Packaging	ENGR. FABRIC FOR SILT FENCING	496.01		Anita Plastics Inc.		
Stronghold 100G DS	01/23/2024	Cherokee Manufacturing	ENGR. FABRIC FOR SILT FENCING	496.01	St Paul, MN	Cherokee Manufacturing, Inc		
Terra-Tex Econofence with netting	04/24/2014	Hanes Geo Components	ENGR. FABRIC FOR SILT FENCING	496.01		Hanes Geo Components		
Terra-Tex SC-32 (belt)	04/24/2014	Hanes Geo Components	ENGR. FABRIC FOR SILT FENCING	496.01		Hanes Geo Components		

Materials Approved Products List

496.01aa - Appendix A - Silt Fencing

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Terra-Tex SC-32 (cord)	04/24/2014	Hanes Geo Components	ENGR. FABRIC FOR SILT FENCING	496.01		Hanes Geo Components		
WINFAB 1215DT	04/24/2014	Willacoochee Industrial Fabrics,Inc.	ENGR. FABRIC FOR SILT FENCING	496.01		Willacoochee Industrial Fabrics,Inc.		
WINFAB 1217DT	04/09/2020	Willacoochee Industrial Fabrics,Inc.	ENGR. FABRIC FOR SILT FENCING	496.01	Geogia	Willacoochee industrial Fabrics, Inc		

496.01 Appendix C

Materials Approved Products List

496.01ac - Appendix C - Embankment Erosion Control Fabric

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
0601 T	10/05/2017	Advanced Drainage Systems, Inc. (ADS)	ENGR. FABRIC FOR EROSION CONTROL	496.01		Advanced Drainage Systems, Inc. (Nylo Plast)	Eagle Grove, Hampton, Mendota, MO, Harrisonville, IL	
150 EX	04/24/2014	Thrace-LINQ, Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		Thrace-LINQ Industrial Fabrics Inc.		
160N	04/24/2014	Tencate Geosynthetics Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		TenCate Geosynthetics		
180N	04/28/2020	Tencate Geosynthetics Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01	GA	Tencate Mirafi		
ACF N060N	04/11/2025	Ferguson Waterworks/Geo & Stormwater	ENGR. FABRIC FOR EROSION CONTROL	496.01				
ACF N070N	04/11/2025	Ferguson Waterworks/Geo & Stormwater	ENGR. FABRIC FOR EROSION CONTROL	496.01				
ACF N080N	04/11/2025	Ferguson Waterworks/Geo & Stormwater	ENGR. FABRIC FOR EROSION CONTROL	496.01				
Dalco 1060	04/03/2024	Dalco - GFT Nonwovens, LLC	ENGR. FABRIC FOR EROSION CONTROL	496.01	NC			
ES600N-US	07/30/2024	Core and Main Geosynthetics	ENGR. FABRIC FOR EROSION CONTROL	496.01	GA			
ES800N-US	07/30/2024	Core and Main Geosynthetics	ENGR. FABRIC FOR EROSION CONTROL	496.01	GA			
FX-60HS	04/24/2014	Carthage Mills	ENGR. FABRIC FOR EROSION CONTROL	496.01		Carthage Mills		
GEOTEX 801	09/15/2017	Propex Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01				

Materials Approved Products List

496.01ac - Appendix C - Embankment Erosion Control Fabric

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
GT160	11/03/2021	SKAPS Industries	ENGR. FABRIC FOR EROSION CONTROL	496.01		Skaps		
Geo Tex 601	04/24/2014	Propex Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		Propex Inc.		
GeoPro 160NP	09/16/2025	Propex Furnishing Solutions	ENGR. FABRIC FOR EROSION CONTROL	496.01	GA	AmeriPro Geotextiles		
GeoPro 180NP	09/16/2025	Propex Furnishing Solutions	ENGR. FABRIC FOR EROSION CONTROL	496.01	GA	AmeriPro Geotextiles		
MacTex N35.1	04/24/2014	Maccaferri, Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		Maccaferi, Inc.		
NW6	04/24/2014	SRW Products	ENGR. FABRIC FOR EROSION CONTROL	496.01		SRW Products		
Stronghold 6oz NW	09/20/2024	Cherokee Manufacturing	ENGR. FABRIC FOR EROSION CONTROL	496.01	NC			
T1300	01/17/2018	Terram Geosynthetics Pvt. Ltd.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
T1800	01/17/2018	Terram Geosynthetics Pvt. Ltd.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
T900	01/17/2018	Terram Geosynthetics Pvt. Ltd.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
TNS R060	04/24/2014	Crown Resources, LLC	ENGR. FABRIC FOR EROSION CONTROL	496.01		Crown Resources, LLC.		
TerraTex N06	04/24/2014	Hanes Geo Components	ENGR. FABRIC FOR EROSION CONTROL	496.01		Hanes Geo Components.		

Materials Approved Products List

496.01ac - Appendix C - Embankment Erosion Control Fabric

Brand Name	Approved	Company Name	Material Item	IM	Plant Location	Marketer	Terminal/Supplier	Type
Texel060C	07/14/2017	Texel	ENGR. FABRIC FOR EROSION CONTROL	496.01				
Typar 3501G	04/13/2017	Berry Global, Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
Typar 3601G	04/13/2017	Berry Global, Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
Typar 3801G	04/13/2017	Berry Global, Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
US 160NW	02/01/2021	US Fabrics Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01				
WINFAB 600N	04/24/2014	Willacoochee Industrial Fabrics,Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		Willacoochee Industrial Fabrics		
WINFAB 800N	11/03/2017	Willacoochee Industrial Fabrics,Inc.	ENGR. FABRIC FOR EROSION CONTROL	496.01		Willacoochee Industrial Fabrics		

STD. ROAD PLANS - EC

Standard Road Plans

EC Standards

EC-101: Special Ditch Control

EC-102: Sod for Ditch Protection

EC-103: Wood Excelsior Mat for Slope Protection

EC-104: Turf Reinforcement Mat (TRM)

EC-105: Transition Mat (TM)

EC-201: Silt Fence

EC-202: Floating Silt Curtain

EC-204: Perimeter and Slope Sediment Control Devices

EC-301: Rock Erosion Control (REC)

EC-302: Rock Check Dam

EC-303: Stabilized Construction Entrance

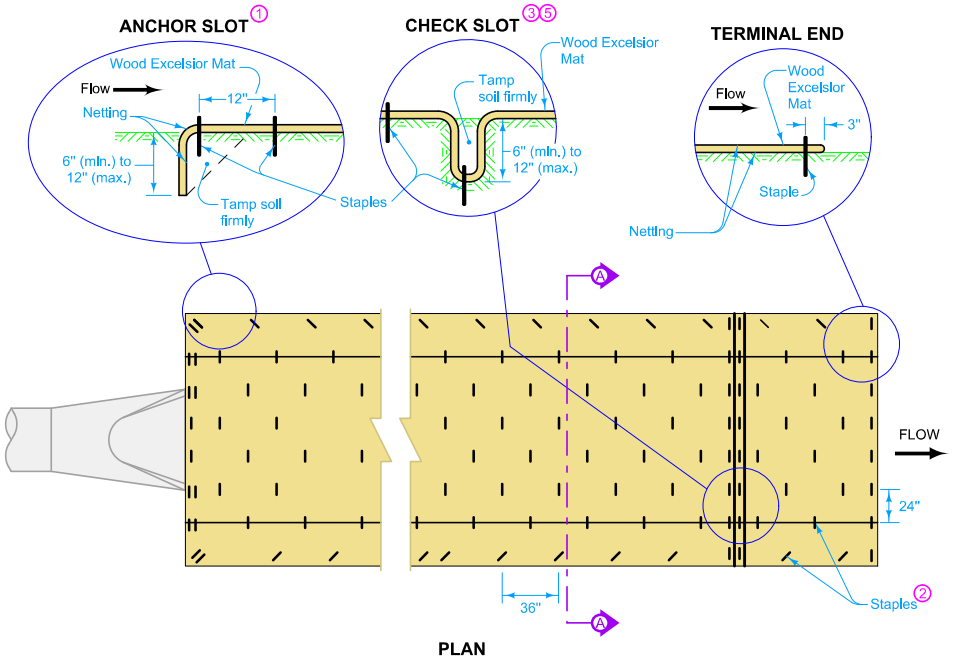
EC-502: Seeding in Rural Areas

EC-601: Temporary Sediment Control Basin

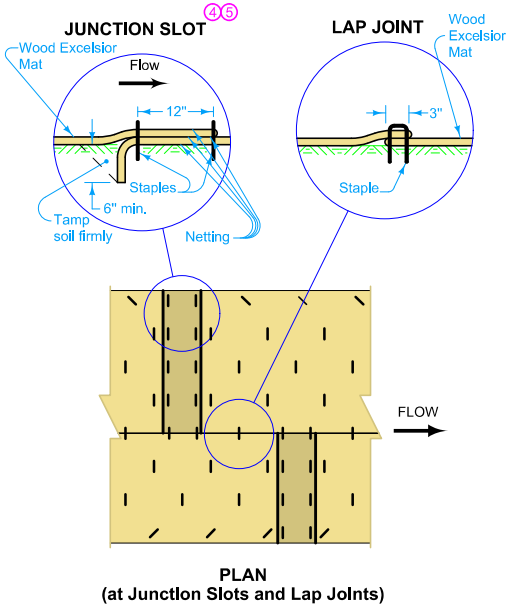
EC-602: Open-Throat Curb Intake Sediment Filter

EC-603: Erosion Control for Intake or Manhole Well

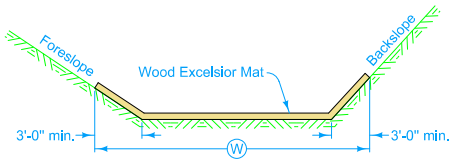
EC-604: Grate Intake Sediment Filter Bag



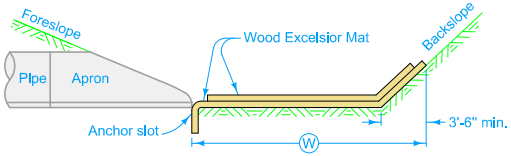
PLAN



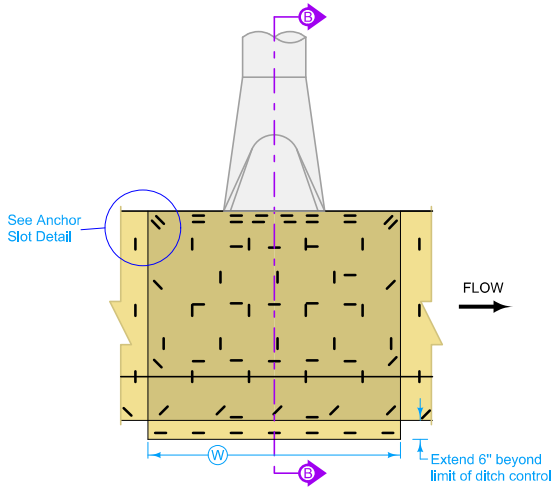
PLAN
(at Junction Slots and Lap Joints)



SECTION A-A



SECTION B-B



PLAN
(at Culvert Tranverse to Ditch)

Provide necessary excavation at locations where silt conditions require shaping of a ditch to provide a proper type of area for installation of wood excelsior mat for special ditch control.

Ensure ground surface adjacent to any channels is shaped to facilitate natural drainage into the protected area.

Use all excavated material to fill low areas, gullies, backslope scours, and otherwise facilitate the free flow of surface water into the channel as directed by the Engineer. Alignment should be smooth and avoid abrupt changes.

① Install anchor slot at the beginning (upstream end) of all wood excelsior mat installations.

② Place staples alternately in rows approximately 24 inches apart. Approximately 30 staples required per square (100 sq. ft.) of wood excelsior mat.

③ Space Check Slots in ditch channel so that one occurs within each 50 feet on slopes of more than 4%.

④ Stagger Junction Slots (end of rolls).

⑤ Do not use Junction Slots or Check Slots when Wood Excesior Mat is placed over Turf Reinforced Mat.

Possible Contract Item:
Special Ditch Control, Wood Excelsior Mat

Possible Tabulation:
100-22

IOWA DOT

REVISION	
2	04-19-16

STANDARD ROAD PLAN

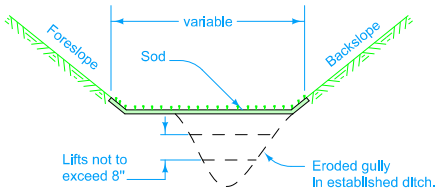
EC-101

SHEET 1 of 1

REVISIONS: Revised to show placement of erosion control beginning at the end of the apron.

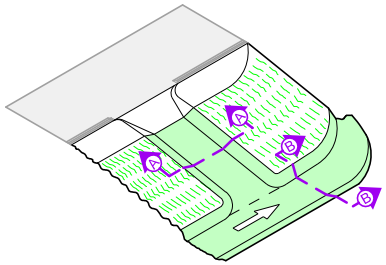
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

SPECIAL DITCH CONTROL

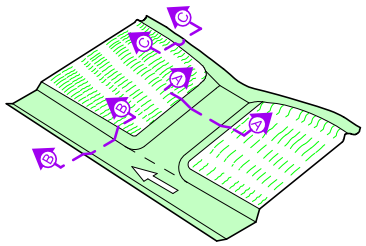


SECTIONS A-A AND B-B

Sod placement for eroded gully.



PERSPECTIVE FORESLOPE FLUME AND ROADWAY DITCH



PERSPECTIVE BACKSLOPE WITH FLUME AND INTERCEPTING DITCH

Through ditches or borrow areas, construct sod channels at the low point. Use all excavated material to fill low areas to facilitate the free flow of surface water into the channel. Alignment should be smooth and avoid abrupt changes.

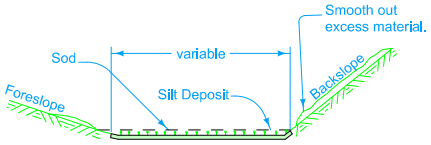
Provide necessary excavation at locations where silt conditions require shaping of a ditch to provide a proper type of area for installation of sod for special ditch control. Dispose excavated material in adjacent area as directed by the Engineer.

At locations where erosion has created gullies in ditches or backslopes, fill and compact gullies in lifts not more than 8-inches thick.

Unless specifically required otherwise by the Engineer, install wire stakes or wood stakes. Stagger wire stakes as shown. Minimum 33 stakes per square. Use wood stakes in sod flumes when designated by the Engineer. When directed by the Engineer, longer stakes may be required for certain soil conditions to properly hold sod in place.

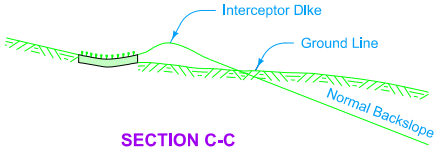
Work for providing proper ditches will not be paid for directly but is incidental to other work on the project.

Shaping and grading work necessary to prepare the ground for sodding adjacent to concrete surfaces will not be paid for separately but is incidental to other work on the project. Such grading and shaping may include the removal and disposal of excess earth, as directed by the Engineer, in order to obtain satisfactory drainage and appearance for the finished work.



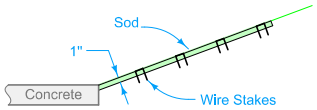
SECTION B-B

Sod placement for silted ditch in cut.



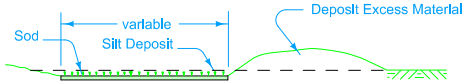
SECTION C-C

Sod placement on Interceptor Dltch



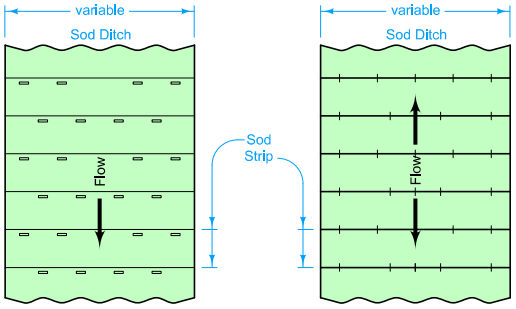
Ground surface shall be graded 1" below the edge of concrete before sod Is placed.

CASE 1
NATURAL GROUND SLOPES TOWARD CONCRETE



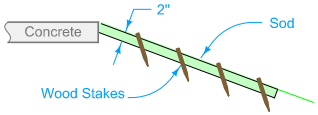
SECTION B-B

Sod placement for silted area in no-ditch section.



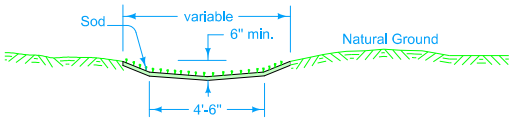
4 Wood Stakes per row, staggered in rows

5 Wlre Stakes per row, staggered in rows



Grade ground surface 2" below the edge of concrete before sod is placed.

CASE 2
NATURAL GROUND SLOPES AWAY FROM CONCRETE

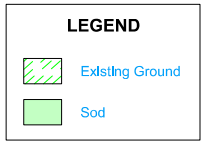


SECTION A-A

Sod placement on slopes where excavation Is required for proper Installation of sod.

WOOD STAKES **WIRE STAKES**

STAKING FOR SOD CHANNELS



IOWA DOT

STANDARD ROAD PLAN

REVISION	
1	04-21-15

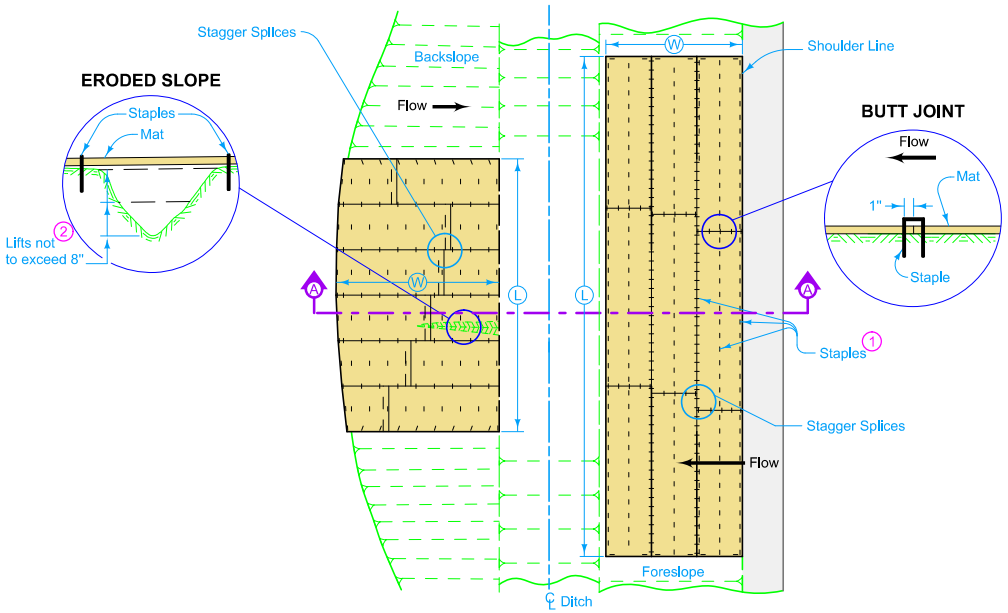
EC-102

SHEET 1 of 1

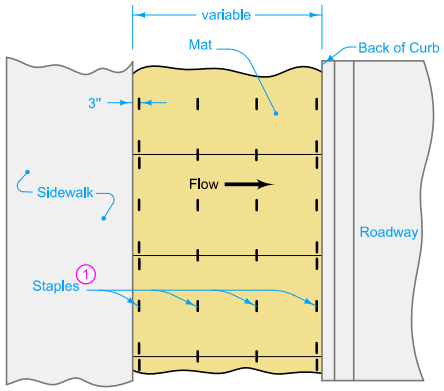
REVISIONS: Replaced DOT logo with new version. Revised Section A-A and B-B drawings to show ditch bottoms being flat.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

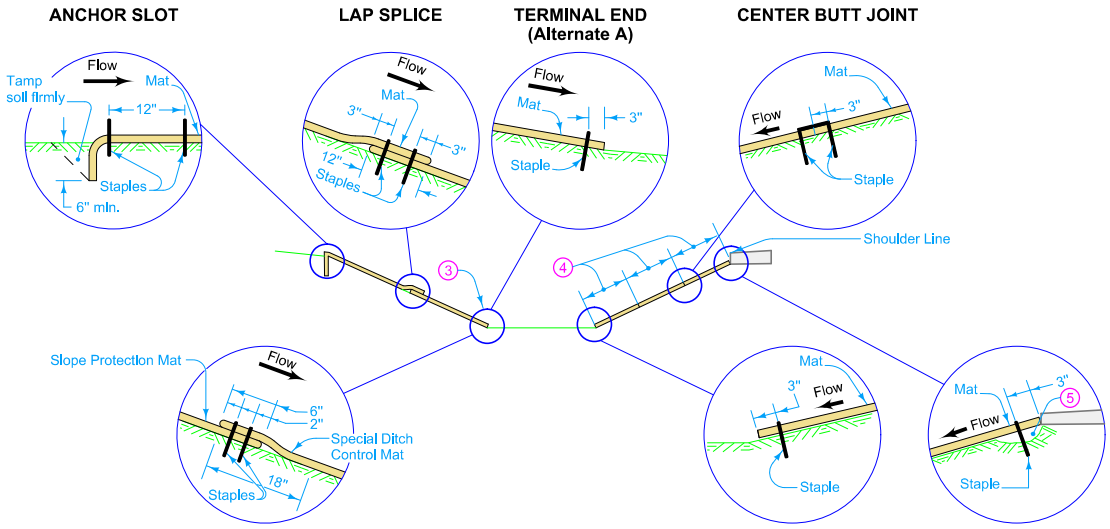
SOD FOR DITCH PROTECTION



PLAN FOR BACKSLOPE AND FORESLOPE PROTECTION



PLAN FOR SIDEWALK ADJACENT TO PAVEMENT



TERMINAL END (Alternate B)

SECTION A-A

DOWNSIDE TERMINAL

UPSIDE TERMINAL

The work of providing suitable earth surface for placement of slope protection is incidental to preparation of seedbed.

Ensure that ground surfaces adjacent to any channels are shaped to facilitate natural drainage into the protected area.

Excelsior mat for backslope protection is installed with strips placed approximately perpendicular to roadway. Locations for slope protection are shown on detail plans.

Excelsior mat for foreslope protection is installed with strips placed approximately parallel to roadway. The location, width, and number of strips are specified on project plans.

1. Space top row of staples at 18 inch centers, bottom row at 36 inch centers, and all others at 24 inch centers. Approximately 30 staples required per square (100 sq. ft) of wood excelsior mat.
2. Where erosive gullies have developed in backslope, fill with soil and compact prior to placement of mat.
3. Where excelsior mat is to be placed as Special Ditch Control, install slope protection to facilitate placement of the ditch control as indicated (Alternate B). Where there is no Special Ditch Control, install slope protection as shown (Alternate A).
4. 4 feet unless specified otherwise for foreslope protection.
5. If erosive rill has developed adjacent to shoulder material, fill with suitable soil and compact prior to placement of mat.

Possible Contract Item:
Slope Protection, Wood Excelsior Mat

Possible Tabulation:
100-22

IOWA DOT

REVISION	
1	04-21-15

STANDARD ROAD PLAN

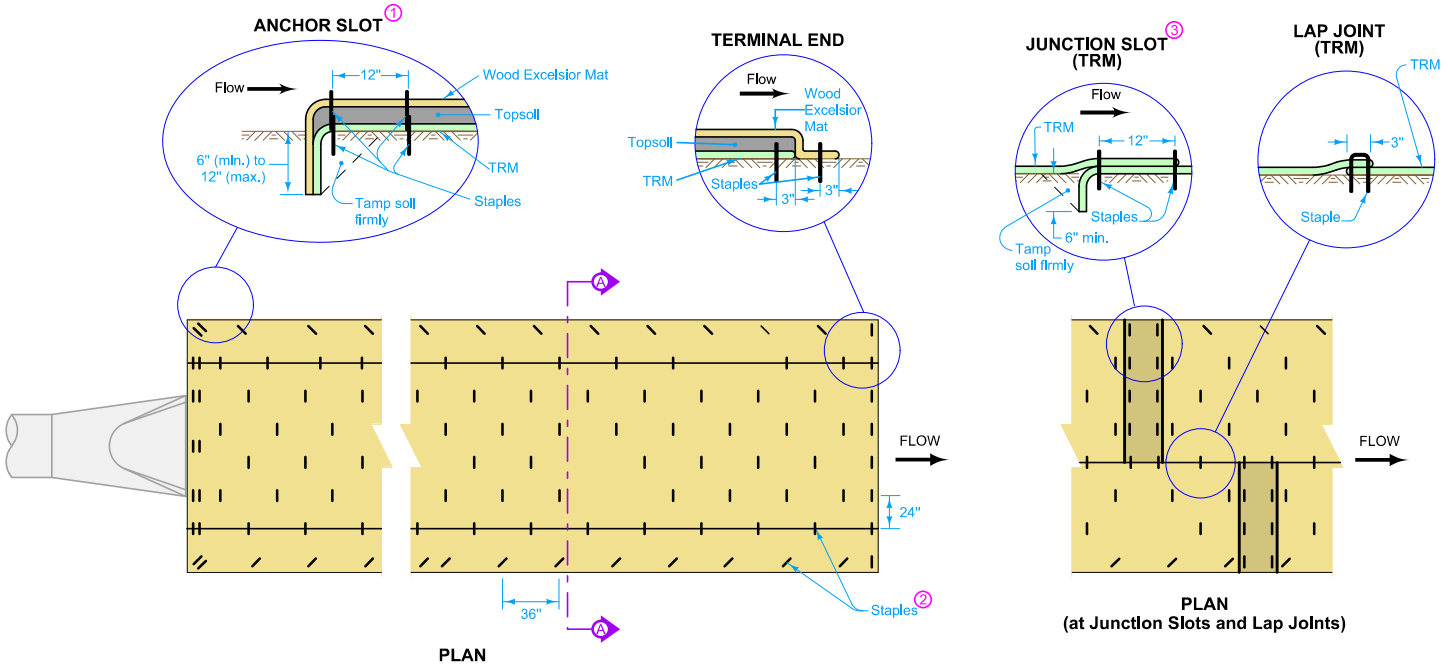
EC-103

SHEET 1 of 1

REVISIONS: Removed language from general notes already in the Specifications. Modified drawings. Added Possible Contract Item and Possible Tabulation.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

WOOD EXCELSIOR MAT FOR SLOPE PROTECTION

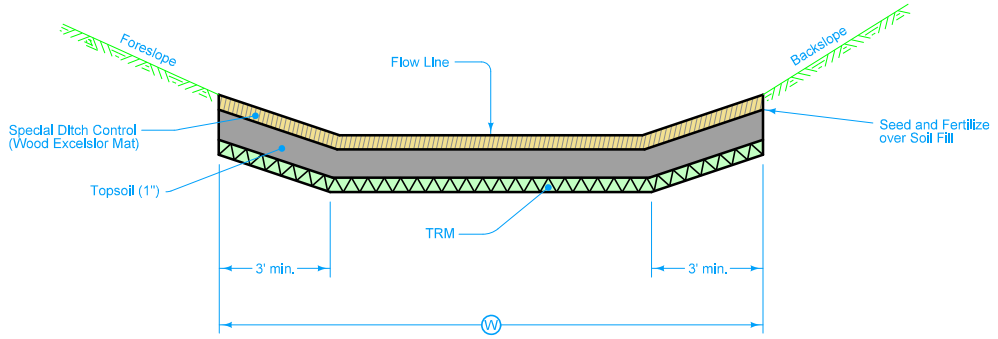


Refer to EC-101 for Special Ditch Control (Wood Excelsior Mat).

① Install anchor slot at the beginning (upstream end) of all mat installations.

② Place staples alternately in rows approximately 24 inches apart. Approximately 30 staples required per square (100 sq. ft.) of each type of mat.

③ Stagger Junction Slots.



SECTION A-A

TRM

Wood Excelsior Mat

Possible Contract Items:
Turf Reinforcement Mat

Possible Tabulation:
100-22

IOWA DOT

STANDARD ROAD PLAN

REVISION	
3	04-17-18

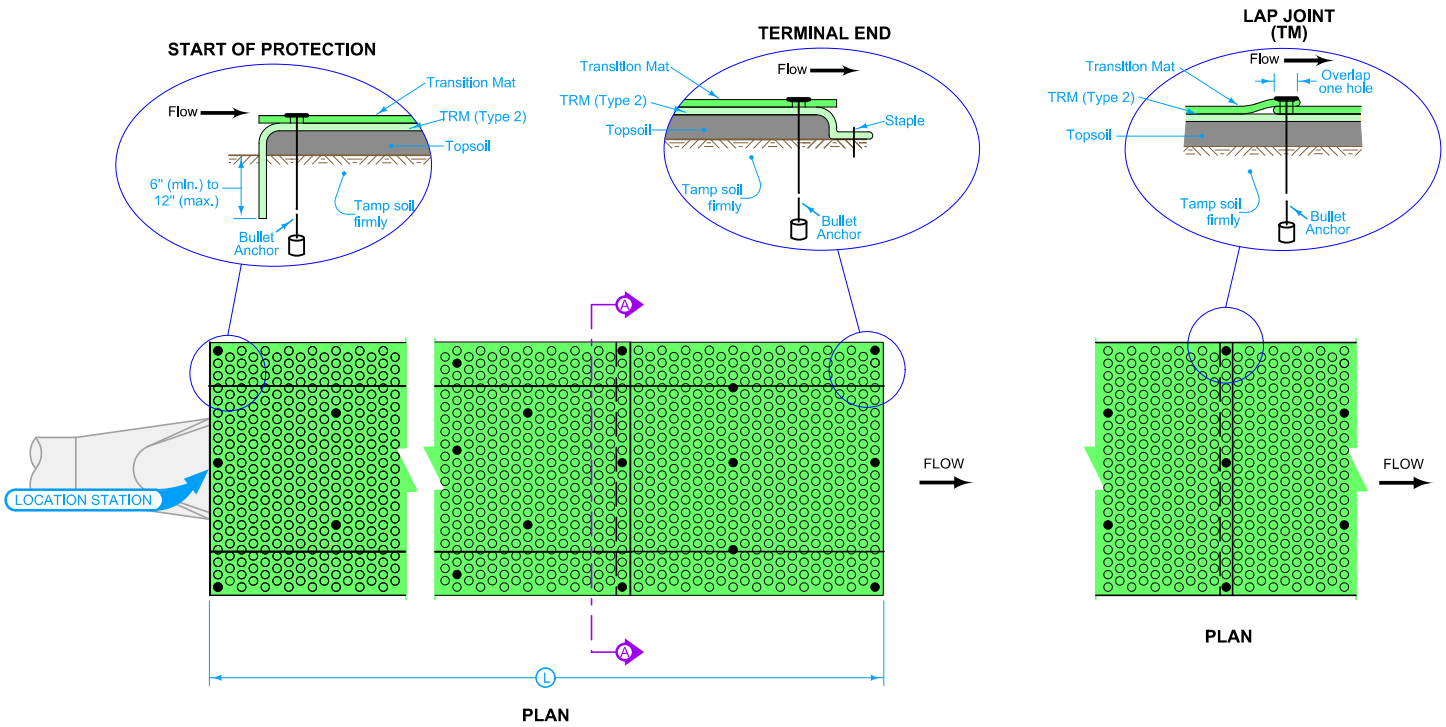
EC-104

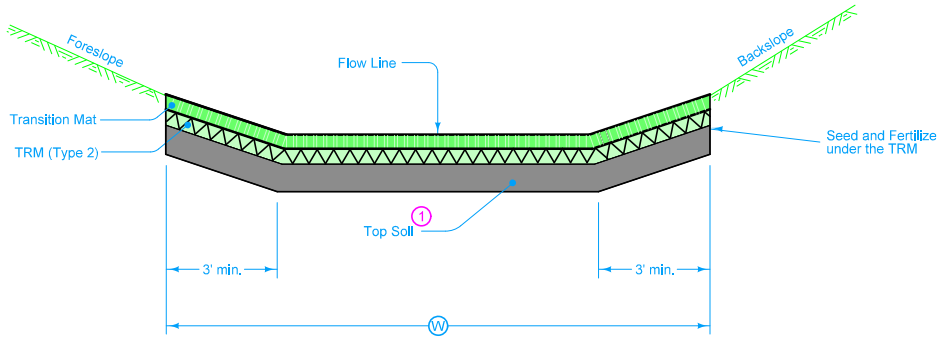
SHEET 1 of 1

REVISIONS: Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TURF REINFORCEMENT MAT (TRM)





SECTION A-A

TM

TRM (Type 2)

Refer to Standard Road Plan EC-104 for the placement of the TRM.

(1) Place at same thickness as surrounding area. Refer to T Sheets to determine topsoil thickness for the surrounding area.

Possible Contract Items:
Transition Mat

Possible Tabulation:
100-09

IOWA DOT

REVISION
3 04-17-18

STANDARD ROAD PLAN

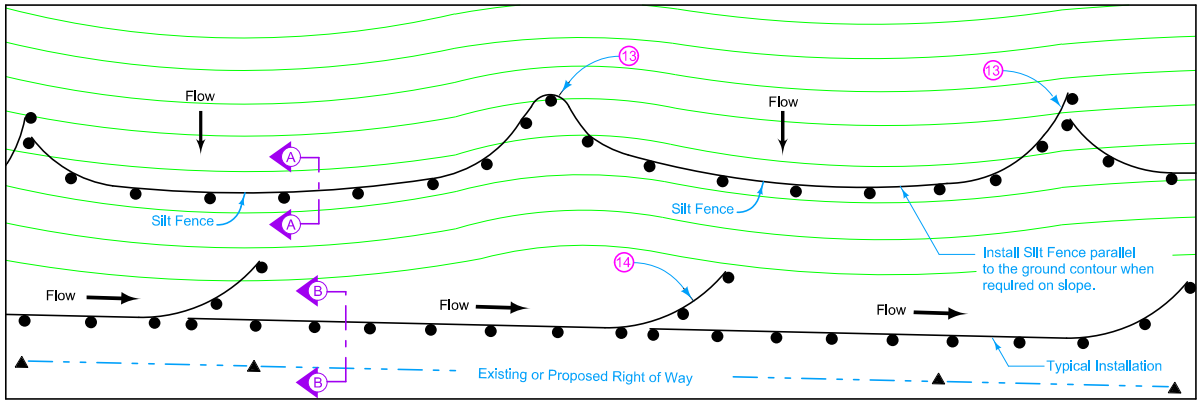
EC-105

SHEET 1 of 1

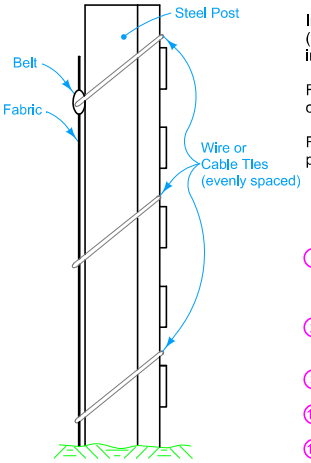
REVISIONS: Changed Possible Contract Items to Transition Mat.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TRANSITION MAT (TM)



PLAN FOR SILT FENCE (11)



PROFILE VIEW ATTACHMENT TO POST

Install all silt fence using a silt fence machine. Use manual (trench) installation if phyical conditions prohibit machine installation.

For machine installation, compact by driving over each side of silt fence at least two times with a rubber-tired vehicle.

For manual installation, compact with a mechanical or pneumatic tamper.

(1) Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire passing through or encompassing the belt. See attachment to post.

(2) For manual installation only, fold engineering fabric along bottom of trench.

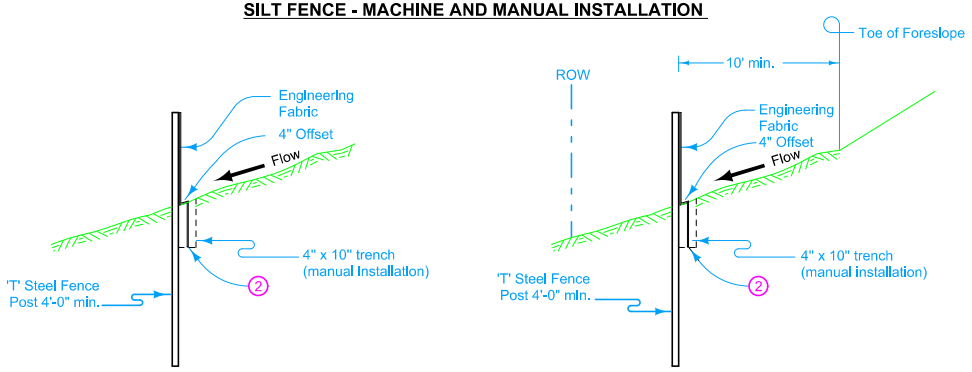
(3) Embed all posts 28 inches below the ground line.

(11) Refer to Tab. 100-17

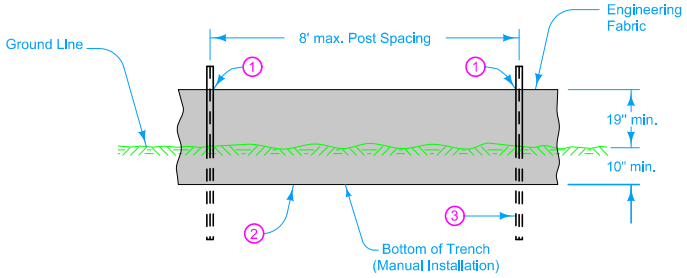
(13) The contractor has two installation options:
- Place silt fence continuously up to a maximum of 200 feet. For every 200 foot segment of fence placed, flare up the slope on both ends 20 feet of the segment to contain runoff as shown, or
- Place silt fence continuously. Every 200 feet, place a hump that extends 20 feet up the slope to contain runoff as shown.

(14) Place silt fence continuously up to a maximum length of 200 feet. For every segment of silt fence that is placed, flare up the slope on both ends 20 feet of the segment to contain runoff as shown.

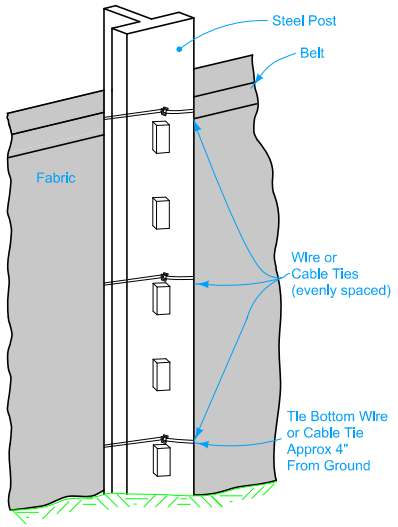
SILT FENCE - MACHINE AND MANUAL INSTALLATION



SECTION A-A **SECTION B-B**



FRONT VIEW



BACK VIEW ATTACHMENT TO POST

Contour Lines

Possible Contract Items:
Silt Fence
Silt Fence for Ditch Checks

Possible Tabulations:
100-17
100-18

IOWA DOT

STANDARD ROAD PLAN

REVISION	
6	04-20-21

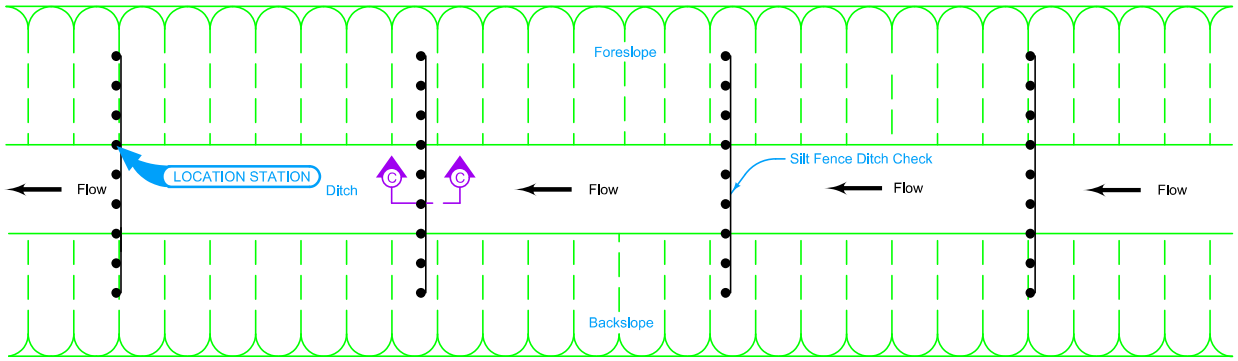
EC-201

SHEET 1 of 6

REVISIONS: Modified trench to 10". Added circle notes 13 & 14.

APPROVED BY DESIGN METHODS ENGINEER

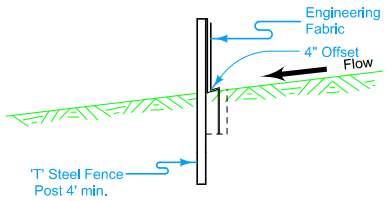
SILT FENCE



PLAN FOR DITCH CHECK (TYPE 1) (12)

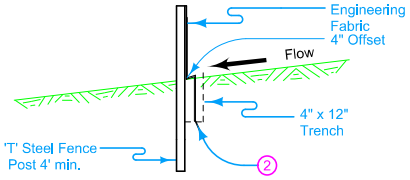
1. Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire passing through or encompassing the belt. See attachment to post.
2. For manual installation only, fold engineering fabric along bottom of trench.
3. Embed all posts 28 inches below the ground line.
4. Locate posts at toe of foreslope and toe of backslope and space remaining posts equally.
5. Minimum end span (in feet) = 2 X Foreslope (H:V).
6. Minimum end span (in feet) = 2 X Backslope (H:V).
12. Refer to Tab. 100-18

DITCH CHECK - MACHINE INSTALLATION

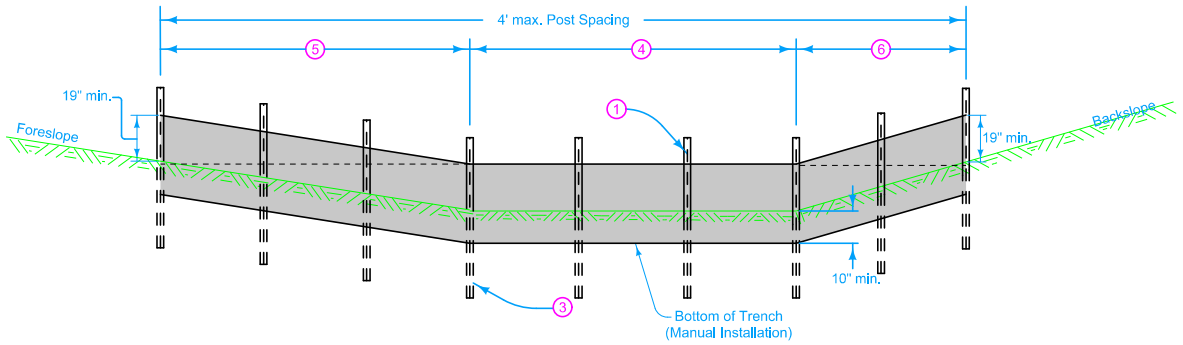


SECTION C-C

DITCH CHECK - MANUAL INSTALLATION



SECTION C-C



FRONT VIEW

IOWA DOT

STANDARD ROAD PLAN

REVISION	
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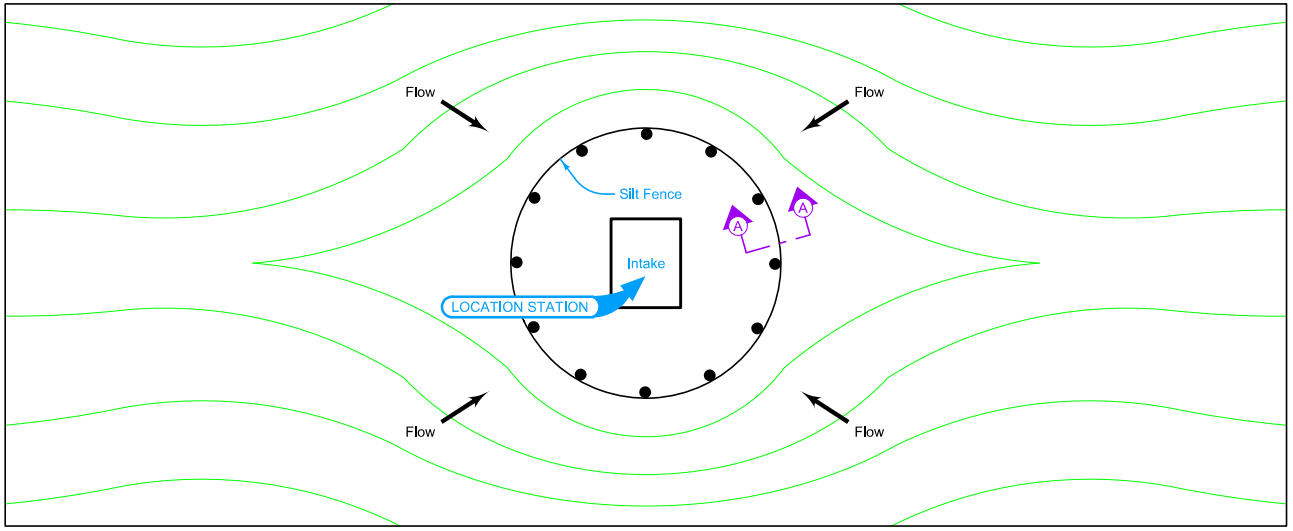
SHEET 2 of 6

REVISIONS: Modified trench to 10". Added circle notes 13 & 14.

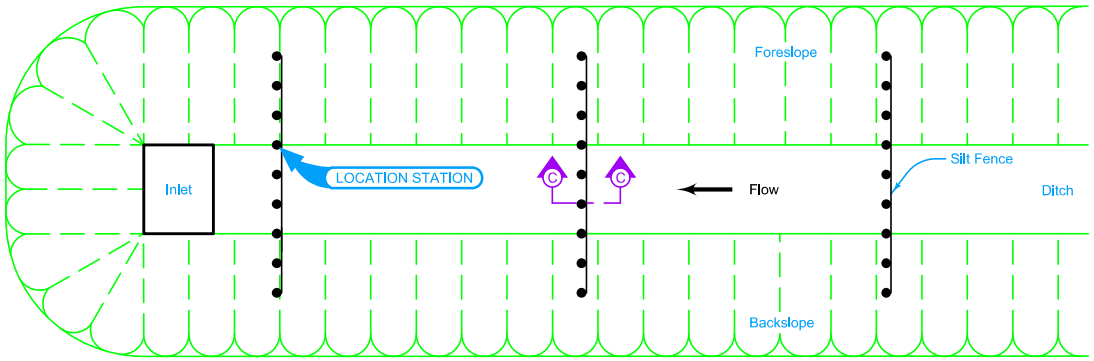
APPROVED BY DESIGN METHODS ENGINEER

SILT FENCE

(12) Refer to Tab. 100-18



PLAN FOR SILT FENCE AT INTAKE (TYPE 2) (12)



Contour Lines

PLAN FOR SILT FENCE DITCH CHECK AT INLET (TYPE 3) (12)

IOWA DOT

STANDARD ROAD PLAN

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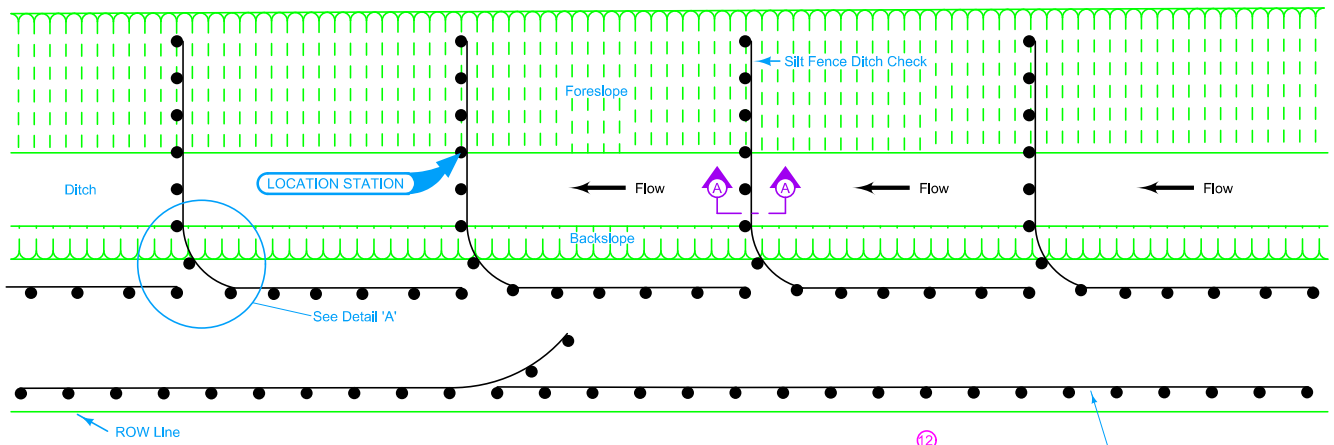
EC-201

SHEET 3 of 6

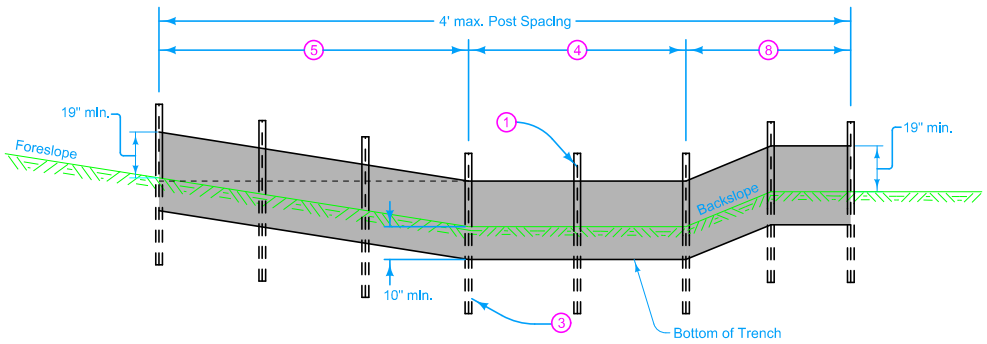
REVISIONS: Modified trench to 10". Added circle notes 13 & 14.

APPROVED BY DESIGN METHODS ENGINEER

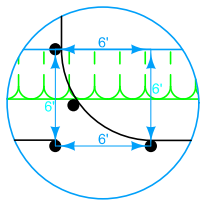
SILT FENCE



PLAN FOR SILT DITCH (SHALLOW DITCH SECTION-TYPE 4) (12)



FRONT VIEW



Detail 'A'

(1) Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire passing through or encompassing the belt. See attachment to post..

(3) Embed all posts 28 inches below the ground line.

(4) Locate posts at toe of foreslope and toe of backslope and space remaining posts equally.

(5) Minimum end span (in feet) = 2 X Foreslope (H:V).

(8) Place posts shown in Detail 'A' to transition from transverse to parallel installation. Place one post at the back slope intercept and the other beyone the intercept.

(12) Refer to Tab. 100-18

IOWA DOT

STANDARD ROAD PLAN

REVISION	
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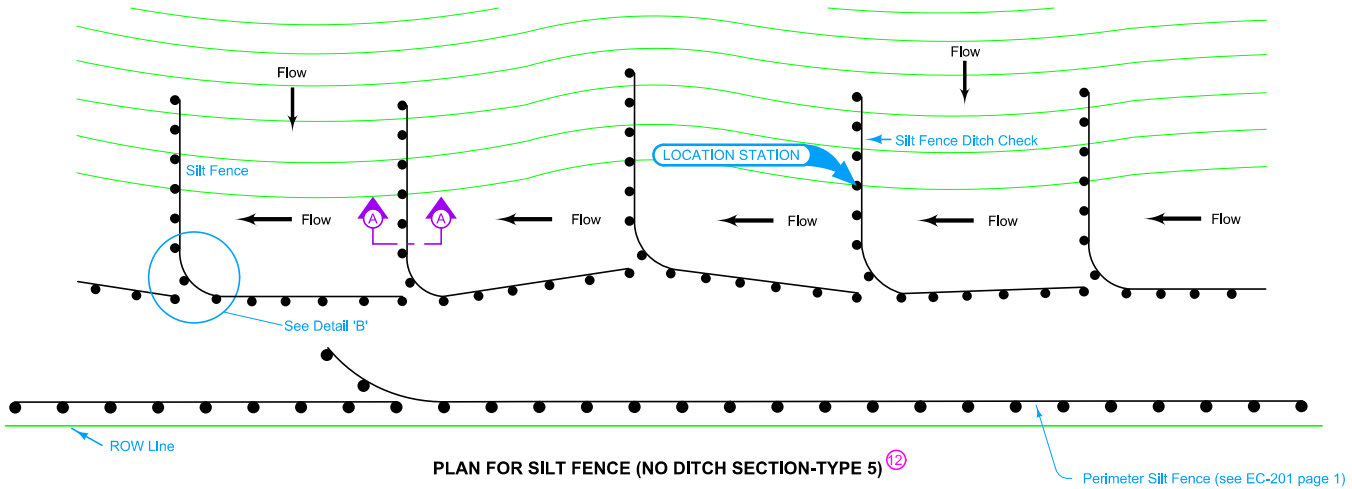
SHEET 4 of 6

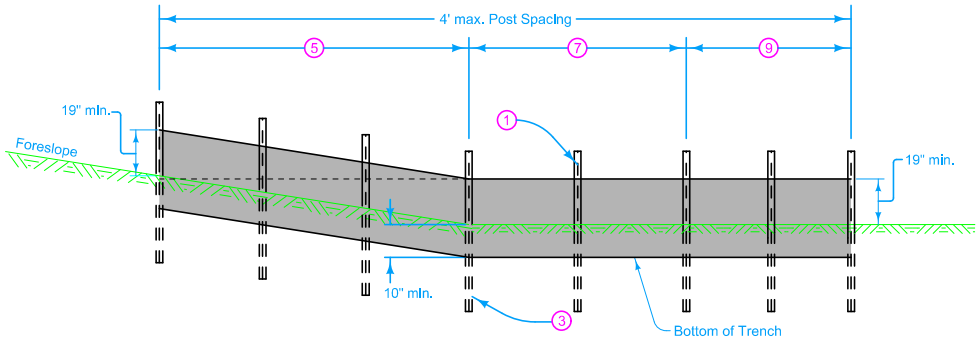
REVISIONS: Modified trench to 10". Added circle notes 13 & 14.

APPROVED BY DESIGN METHODS ENGINEER

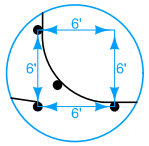
SILT FENCE



PLAN FOR SILT FENCE (NO DITCH SECTION-TYPE 5) (12)



FRONT VIEW



Detail 'B'

(1) Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire passing through or encompassing the belt. See attachment to post..

(3) Embed all posts 28 inches below the ground line.

(5) Minimum end span (in feet) = 2 X Foreslope (H:V).

(7) Locate posts at toe of foreslope. Locate posts at 4 foot spacing

(9) Place posts as shown in Detail 'B' to transition from transverse to parallel installation. The parallel portion of the installation should approximately parallel the intercept of the foreslope.

(12) Refer to Tab. 100-18

IOWA DOT

REVISION 6 04-20-21

STANDARD ROAD PLAN

EC-201

SHEET 5 of 6

REVISIONS: Modified trench to 10". Added circle notes 13 & 14.

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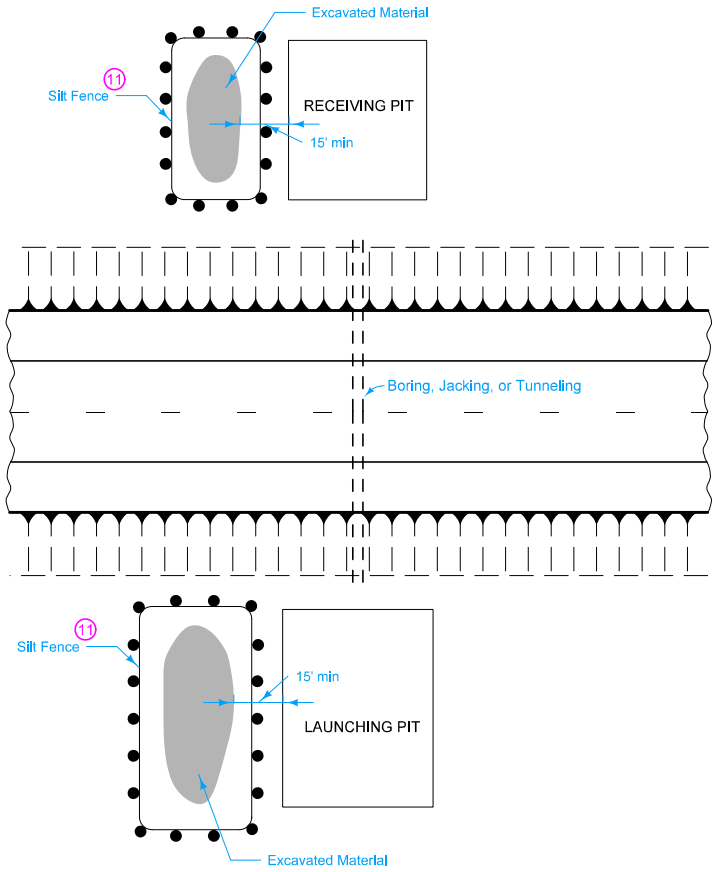
SILT FENCE

(11) Refer to Tab. 100-17



PLAN FOR SILT FENCE FOR TRENCHLESS CONSTRUCTION

IOWA DOT

REVISION 6 04-20-21

STANDARD ROAD PLAN

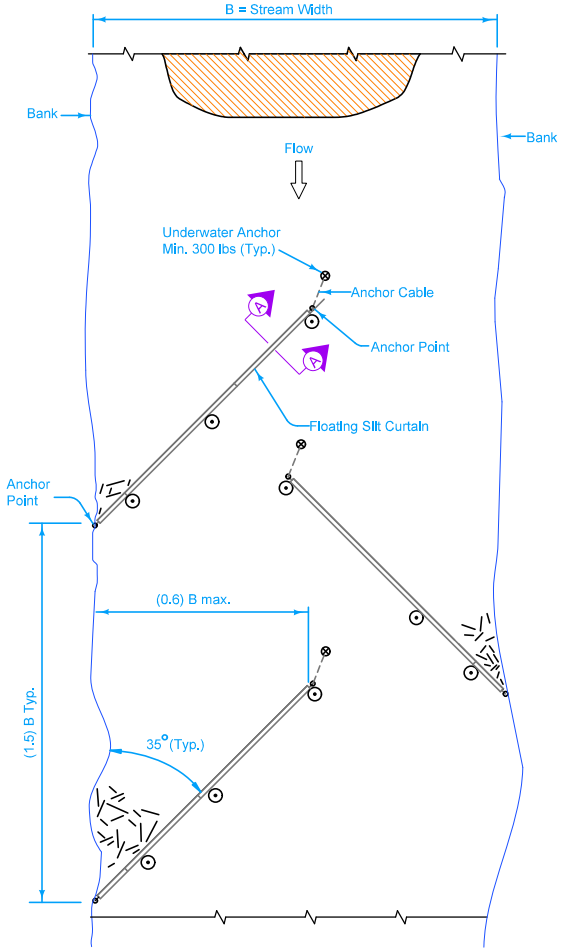
EC-201

SHEET 6 of 6

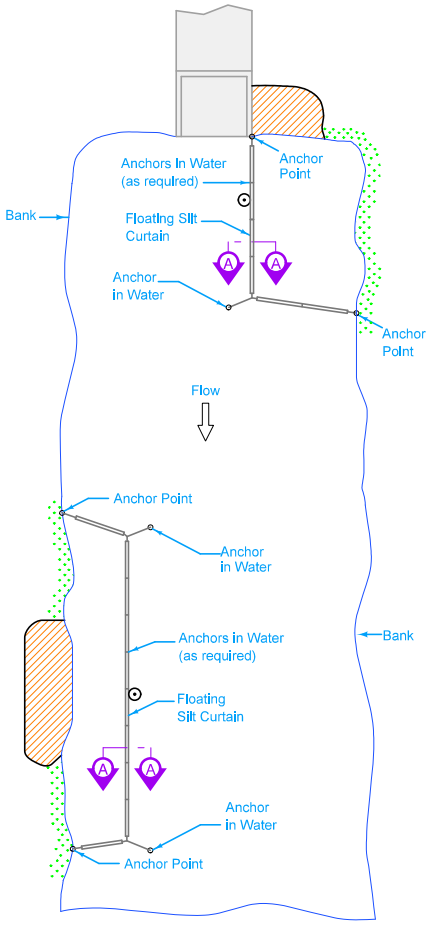
REVISIONS: Modified trench to 10'. Added circle notes 13 & 14.

APPROVED BY DESIGN METHODS ENGINEER

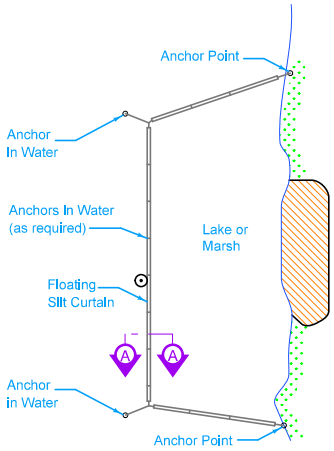
SILT FENCE



PLAN
Disturbed Area within Stream



PLAN
Disturbed Area Adjacent
to Stream



PLAN
Still Water Only

LEGEND
- Carrier Float
- Buoy
- Undisturbed Vegetation
- Disturbed Soil

Keep silt curtain as close to work area as possible.

Depth of curtain is the dimension of the curtain fabric extending below the flotation, i.e. hanging in the water.

Install according to Hanging Installation unless specified otherwise.

Possible Tabulation:
100-10

Possible Contract Items:
Clean-out of Floating Silt Curtain (Containment)
Floating Silt Curtain (Containment)
Floating Silt Curtain (Hanging)
Maintenance of Floating Silt Curtain

IOWA DOT

REVISION
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STANDARD ROAD PLAN

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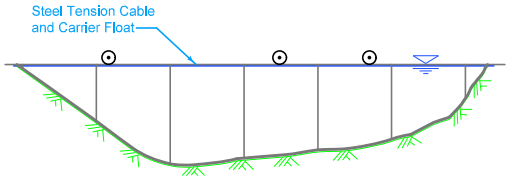
SHEET 1 of 2

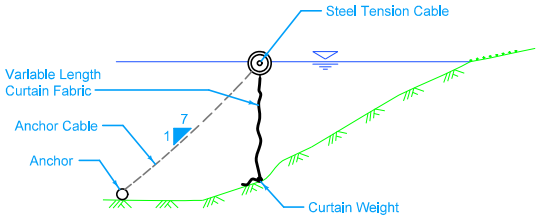
REVISIONS: Removed 100' typical spacing between anchors on page 2. Added possible contract item. Removed sections of standard notes and circle note 1.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

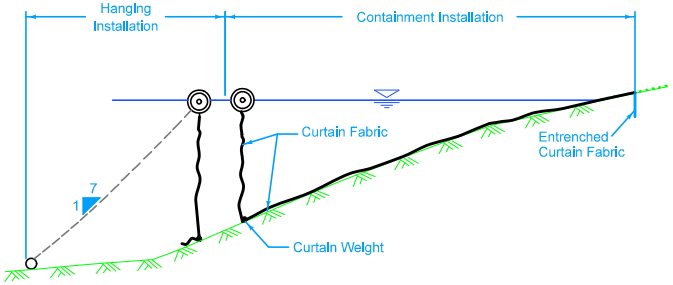
FLOATING SILT CURTAIN



PROFILE



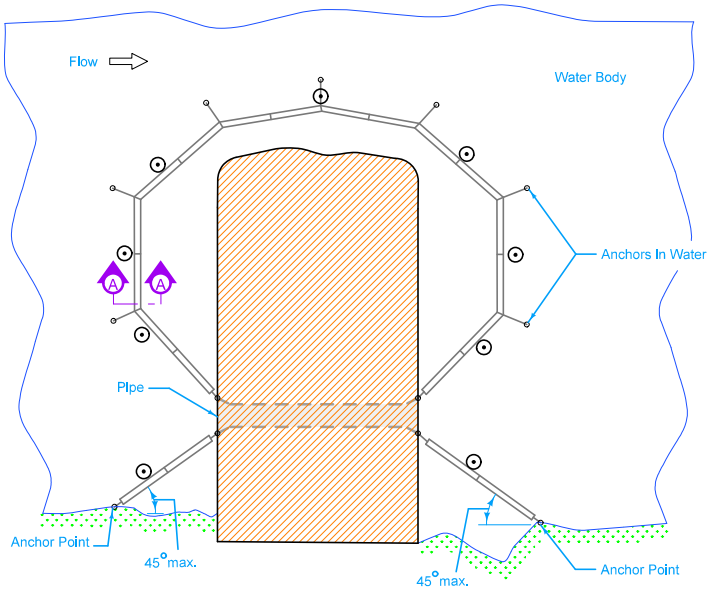
SECTION A-A
Hanging Installation



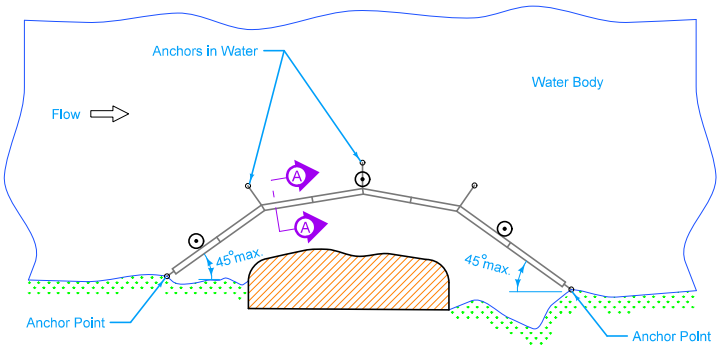
SECTION A-A
Containment Installation (1)

LEGEND

- Carrier Float
- Buoy
- Undisturbed Vegetation
- Disturbed Soil
- Water Surface



PLAN
Stream Crossing or Causeway
(with pipe)



PLAN
Causeway or Pad

(1) When Containment Installation is specified, it will be in combination with a Hanging Installation that is paid for separately.

IOWA DOT

REVISION	
6	10-21-14

STANDARD ROAD PLAN

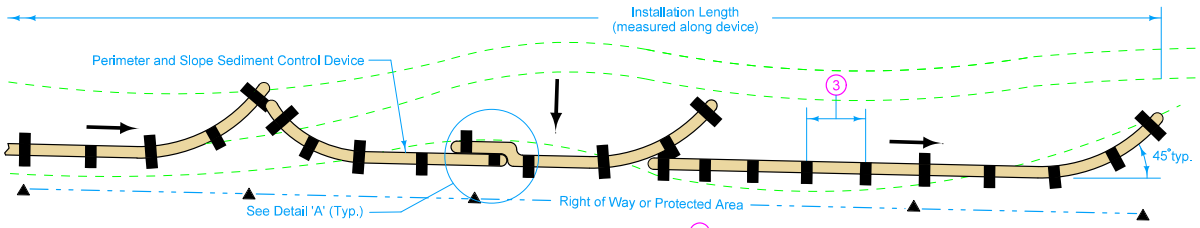
EC-202

SHEET 2 of 2

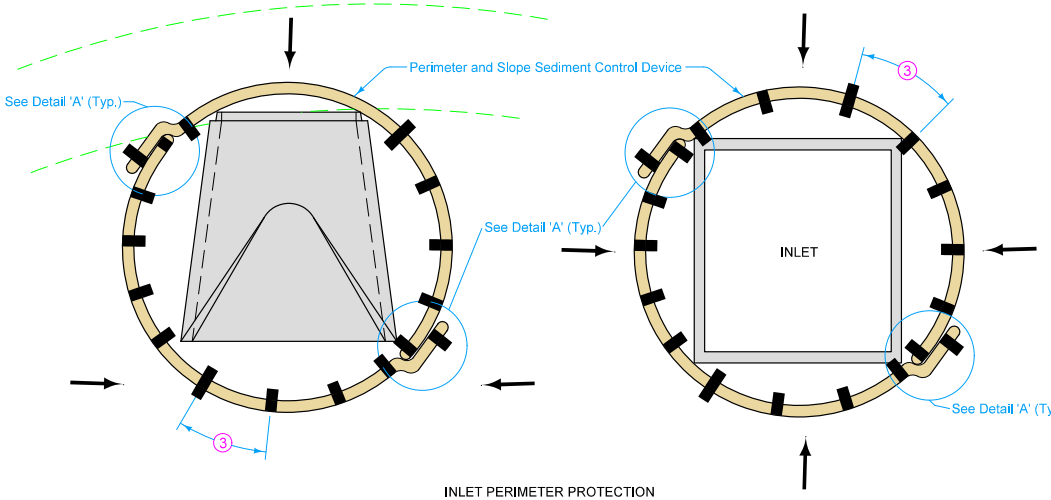
REVISIONS: Removed 100' typical spacing between anchors on page 2. Added possible contract item. Removed sections of standard notes and circle note 1.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

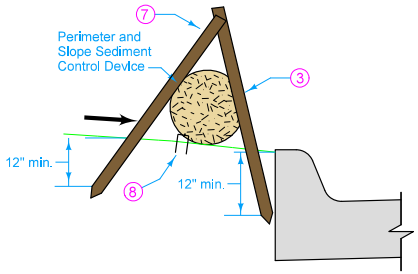
FLOATING SILT CURTAIN



PERIMETER CONTROL (1)



INLET PERIMETER PROTECTION



PERIMETER CONTROL ALONG CURB

Not intended for use in perennial or intermittent streams.

Fill and compact rills and gullies (see Detail 'B') prior to placing Perimeter and Slope Sediment Control Device. Ensure ground surface is smooth in order to provide continuous contact with Perimeter and Slope Sediment Control Device. Minor ground shaping may be required. Filling and compacting rills and gullies, and minor ground shaping, is incidental to Perimeter and Slope Sediment Control Device.

(1) Overlap joints per Detail 'A'. Turn the lower 10 feet of each run up the slope to help contain runoff. When placed such that runoff is conveyed along the device, additional run-ups and/or means may be required to reduce erosion along the device. Run-ups will be included in the installation length.

(2) Extra material required to install overlaps will not be included in the installation length.

(3) Install downslope stakes at 4 foot maximum spacing. Upslope stakes spaced at ends and middle of device. Use minimum actual stake size 3/4" x 3/4" wood stakes.

(7) All stakes to be placed at approximatly 45 degree angle to ground.

(8) Install staples every 2 feet on upslope side.

Possible Contract Item:
Perimeter and Slope Sediment Control Device
Ditch Check Sediment Control Device

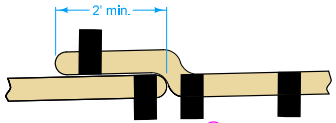
Possible Tabulation:
100-19

LEGEND

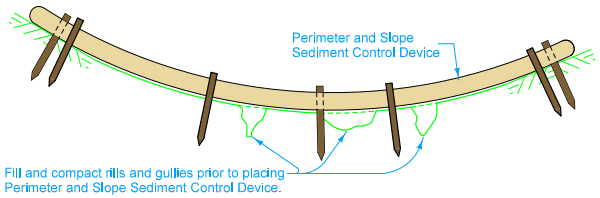
Contour Lines

Flow

(3) Wood Stake



DETAIL 'A' (2)
(Overlap Joint)



DETAIL 'B'

IOWADOT

STANDARD ROAD PLAN

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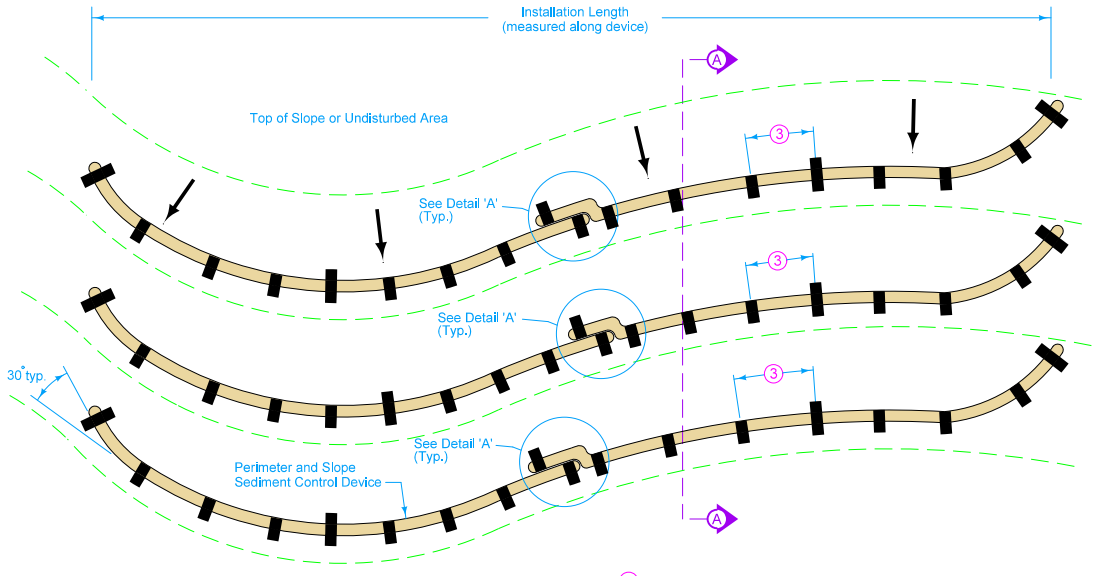
SHEET 1 of 3

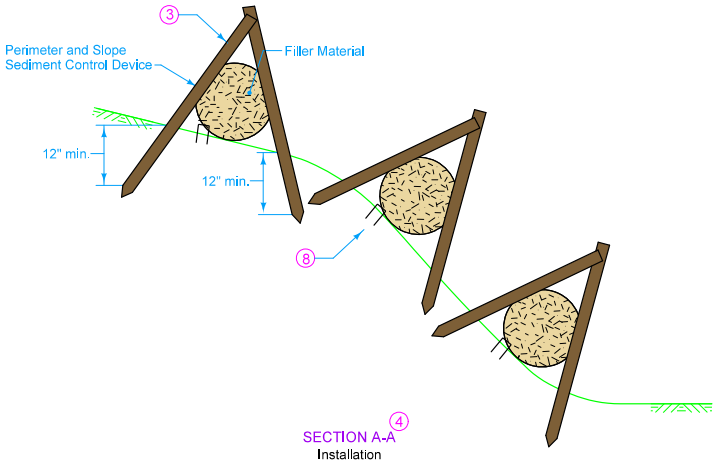
REVISIONS: Changed labelling on Sheet 3.

APPROVED BY DESIGN METHODS ENGINEER

PERIMETER, SLOPE AND DITCH CHECK SEDIMENT CONTROL DEVICES



SLOPE PROTECTION (4)



SECTION A-A (4)
Installation

LEGEND

- Contour Lines
- Flow
- Wood Stake (3)

(3) Install downslope stakes at 4 foot maximum spacing. Upslope stakes spaced at ends and middle of device. Use minimum actual stake size 3/4" x 3/4" wood stakes. Install staples every 2 feet on upslope side.

(4) Install Slope Protection perpendicular to slope (parallel to contours). Overlap joints per Detail 'A'. Run the last 10 feet of each device up the slope to prevent flow runaround. Run-ups will be included in the installation length.

(8) Install staples every 2 feet on upslope side.

IOWA DOT

STANDARD ROAD PLAN

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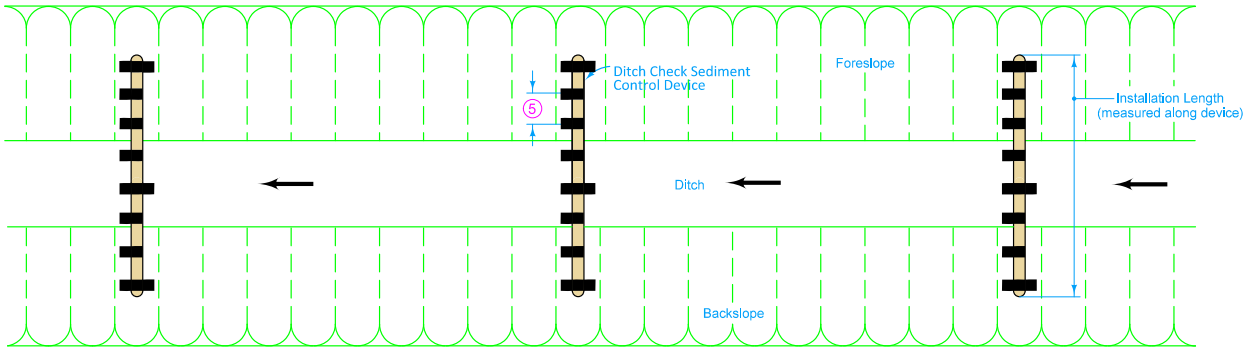
SHEET 2 of 3

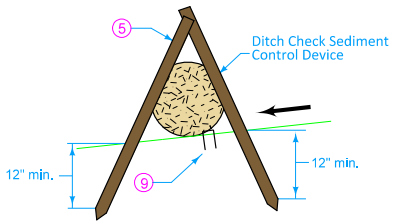
REVISIONS: Changed labeling on Sheet 3.

APPROVED BY DESIGN METHODS ENGINEER

PERIMETER, SLOPE AND DITCH CHECK SEDIMENT CONTROL DEVICES



DITCH PROTECTION (6)



INSTALLATION IN DITCH

LEGEND

- Contour Lines
- Flow
- (5) Wood Stake

(5) Install downslope stakes at 2 foot maximum spacing. Upslope stakes spaced at ends and middle of device. Use minimum actual stake size 3/4" x 3/4" wood stakes.

(6) Install Ditch Protection perpendicular to ditch. Overlap joints per Detail 'A'.

(9) Install staples every 1 foot on upslope side.

IOWA DOT

STANDARD ROAD PLAN

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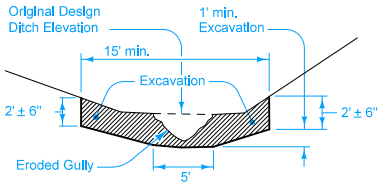
SHEET 3 of 3

REVISIONS: Changed labeling on Sheet 3.

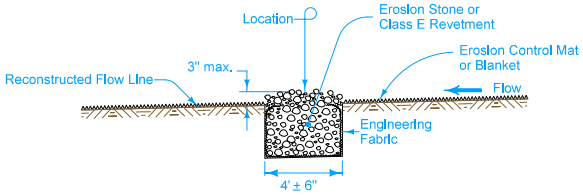
APPROVED BY DESIGN METHODS ENGINEER

PERIMETER, SLOPE AND DITCH CHECK SEDIMENT CONTROL DEVICES

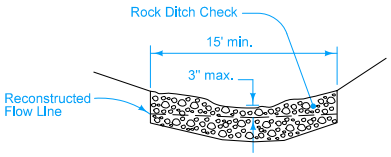
DESIGNER INFORMATION



EXCAVATION SECTION

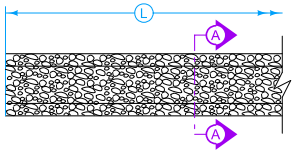


LONGITUDINAL SECTION AT CENTERLINE OF DITCH

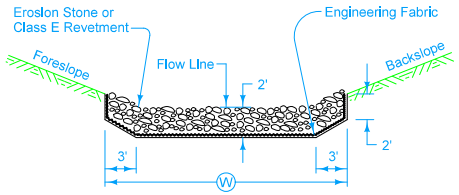


DITCH CHECK SECTION

TYPE 1
(Rock Ditch Check)

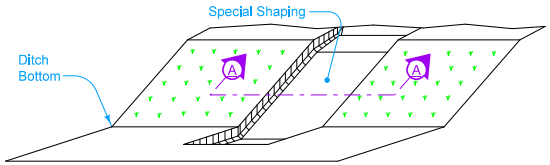


PLAN

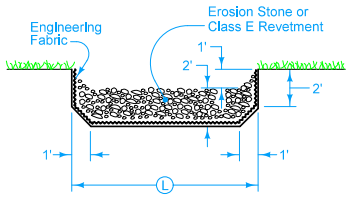


SECTION A-A

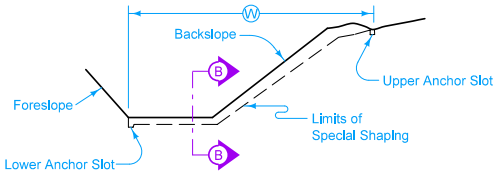
TYPE 2
(Rock Ditch)



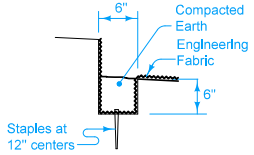
ISOMETRIC VIEW



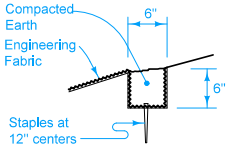
SECTION A-A



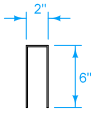
TYPICAL SECTION



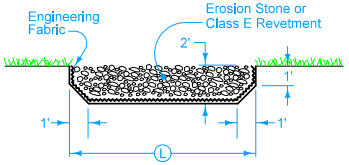
LOWER ANCHOR SLOT



UPPER ANCHOR SLOT



STAPLE
(No. 11 wire)



SECTION B-B

TYPE 3
(Rock Flume)

Class 10 excavation required to install Rock Erosion Control is incidental and will not be paid for separately.

Use fabric for Embankment Erosion Control complying with Section 4196 of the Standard Specifications.

Possible Contract Items:
- Erosion Stone
- Class E Revetment
- Engineering Fabric

Possible Tabulation:
100-23

IOWA DOT

REVISION	
2	10-18-22

STANDARD ROAD PLAN

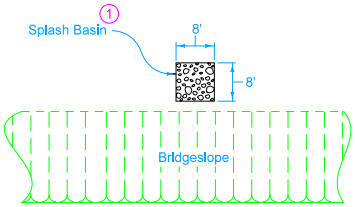
EC-301

SHEET 1 of 2

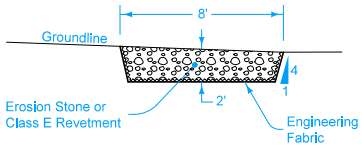
REVISIONS: Added note referencing 4196

APPROVED BY DESIGN METHODS ENGINEER

ROCK EROSION CONTROL (REC)

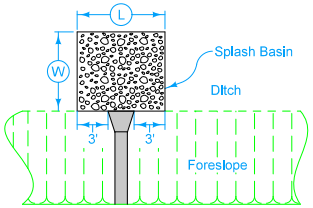


PLAN

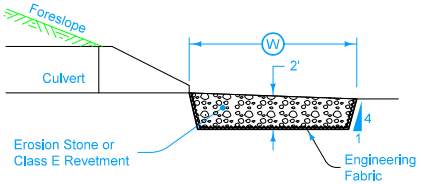


TYPICAL SECTION

SPLASH BASIN UNDER BRIDGE DRAIN



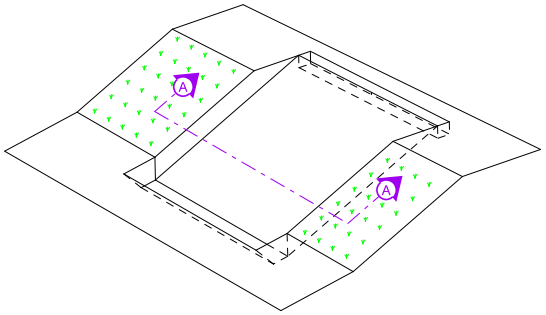
PLAN



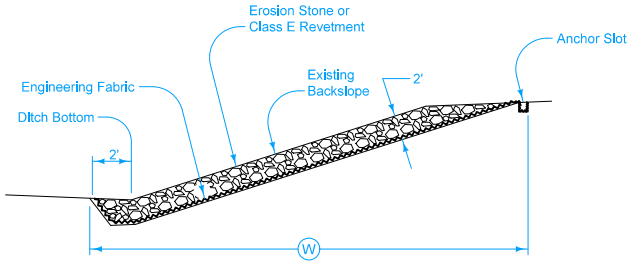
TYPICAL SECTION

SPLASH BASIN AT PIPE CULVERT OUTLET

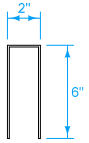
TYPE 4
(Rock Splash Basin)



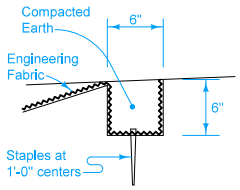
ISOMETRIC VIEW



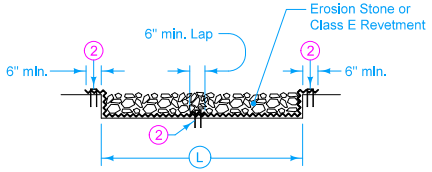
TYPICAL SECTION



STAPLE
(No. 11 wire)



ANCHOR SLOT



SECTION A-A

TYPE 5
(Rock Slope Protection)

1 Center splash basin directly under bridge drain.

2 Staples at 12 inch centers.

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-18-22

EC-301

SHEET 2 of 2

REVISIONS: Added note referencing 4196

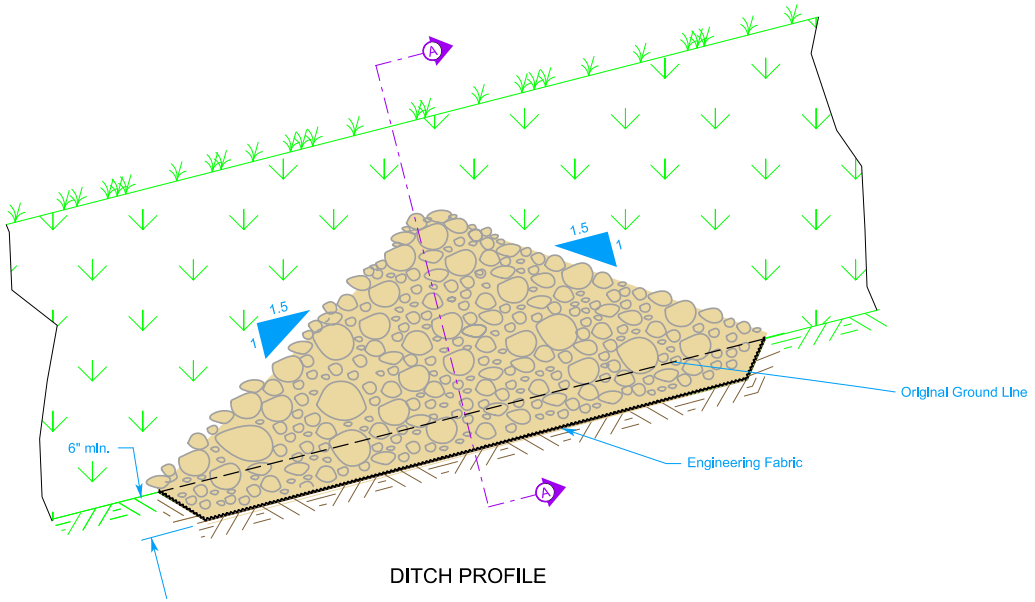
APPROVED BY DESIGN METHODS ENGINEER

ROCK EROSION CONTROL (REC)

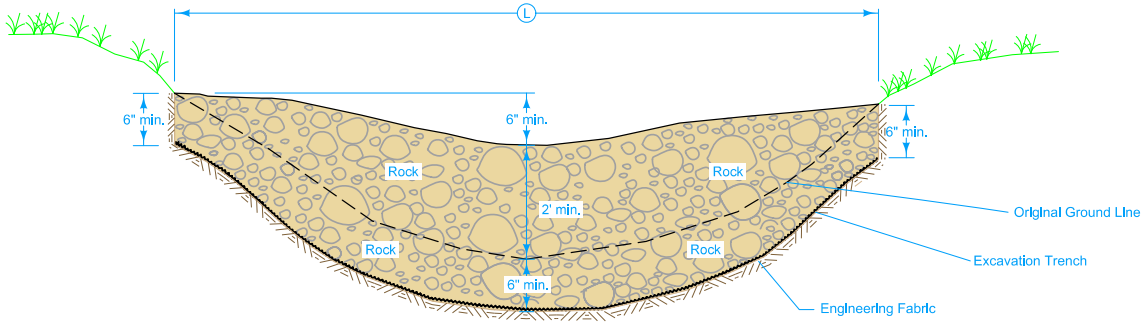
DESIGNER INFORMATION

Use Class D Revetment to construct Rock Check Dam.

Use fabric for Embankment Erosion Control complying with Section 4196 of the Standard Specifications.



DITCH PROFILE



SECTION A-A

Possible Contract Items:
- Rock Check Dam
- Maintenance of Rock Check Dam
- Removal of Rock Check Dam

Possible Tabulation:
- 100-32

IOWADOT

REVISION	
1	10-18-22

STANDARD ROAD PLAN — **EC-302** — SHEET 1 of 1

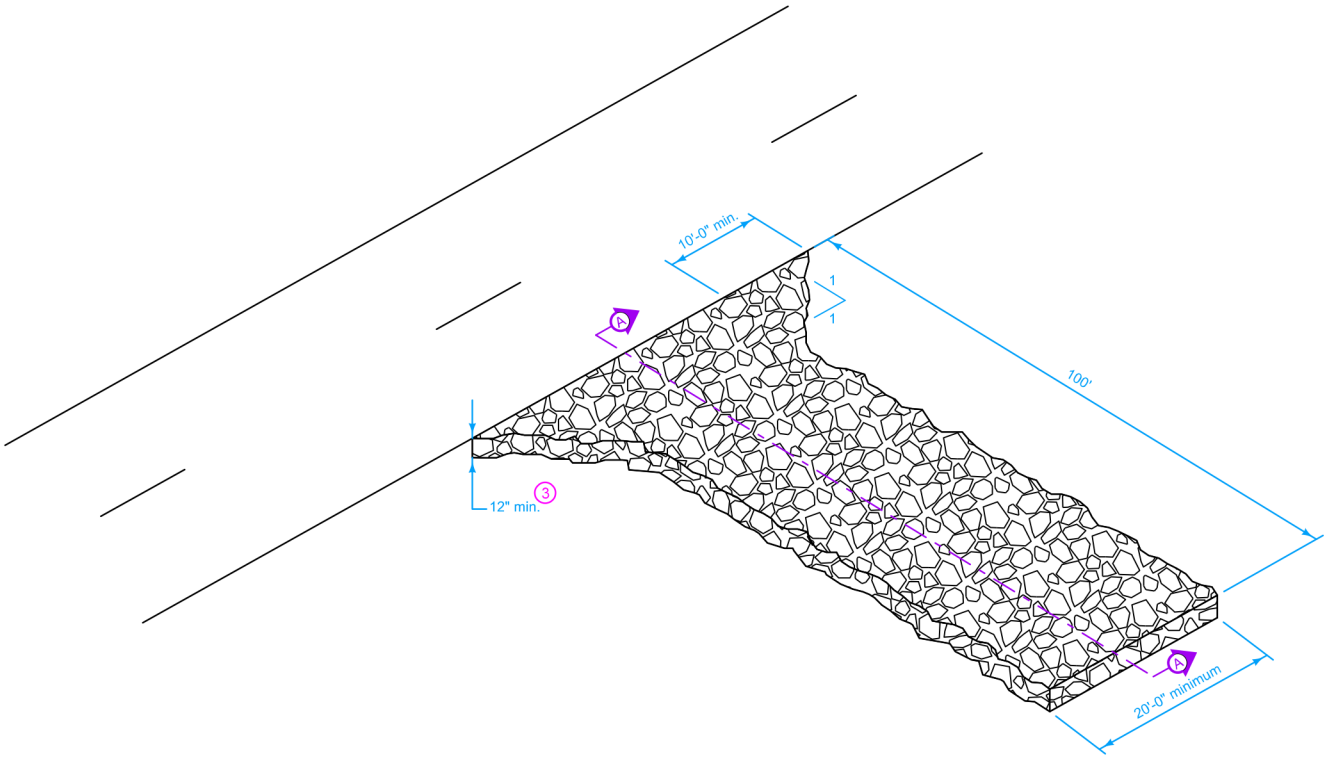
REVISIONS: Added note refering to 4196.

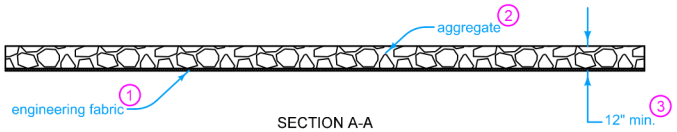
APPROVED BY DESIGN METHODS ENGINEER

ROCK CHECK DAM

Obtain the Engineer's approval for location of stabilized entrances prior to constructing.

1. Place engineering fabric prior to placing aggregate. Use fabric for Embankment Erosion Control complying with Section 4196 of the Standard Specifications.
2. Use aggregate meeting Gradation No. 13a of Section 4109 of the Standard Specificaitons.
3. Depth may need to be increased depending on the weight of contractor vehicles and equipment.





SECTION A-A

IOWADOT

STANDARD ROAD PLAN

REVISION 4 10-19-21

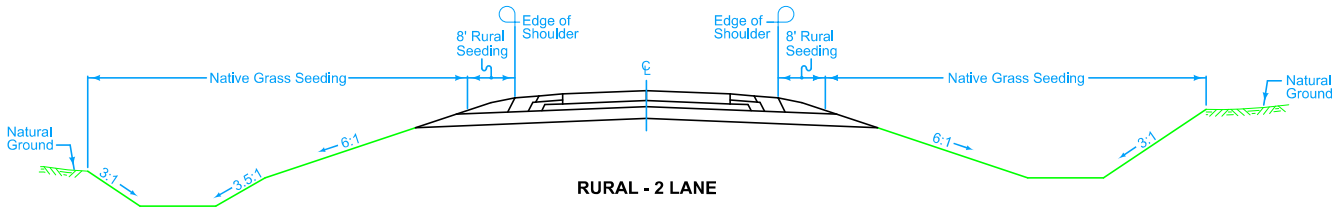
EC-303

SHEET 1 of 1

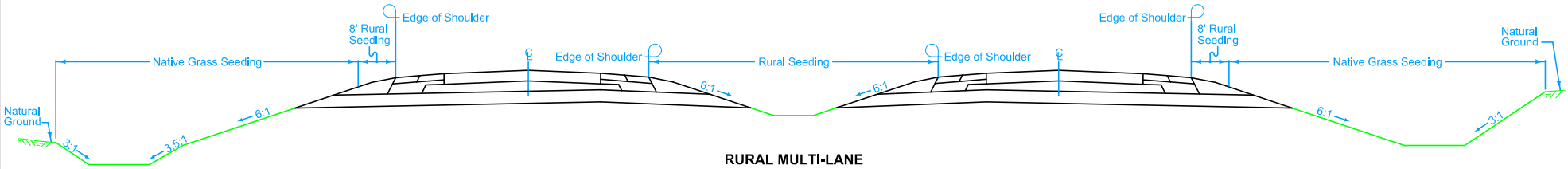
REVISIONS: Defined length to be 100', to be consistant with spec change.

APPROVED BY DESIGN METHODS ENGINEER

STABLIZED CONSTRUCTION ENTRANCE



RURAL - 2 LANE



RURAL MULTI-LANE

IOWA DOT

STANDARD ROAD PLAN

REVISION

New	04-21-15

EC-502

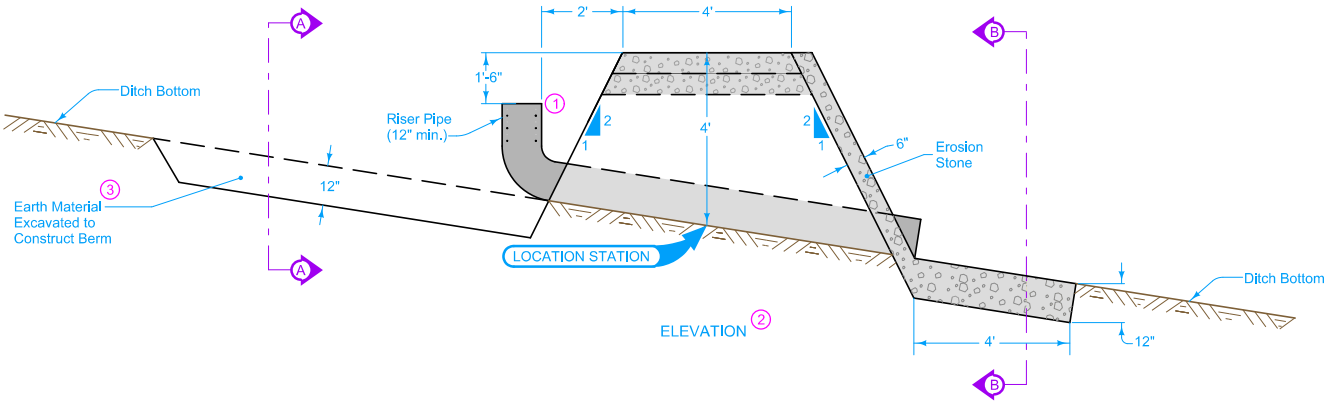
SHEET 1 of 1

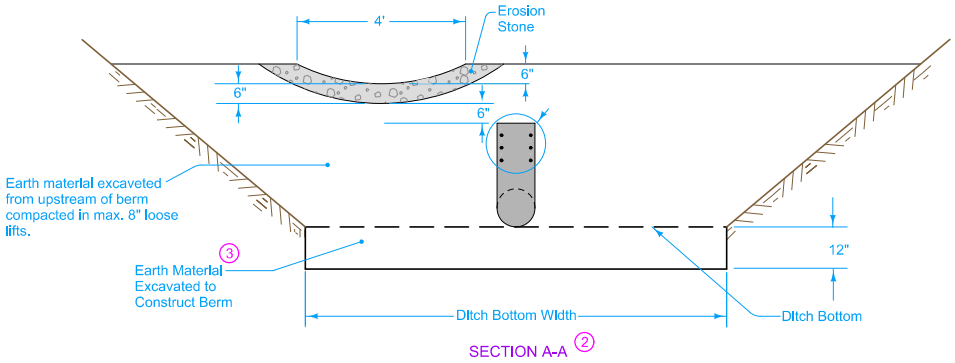
REVISIONS: New.

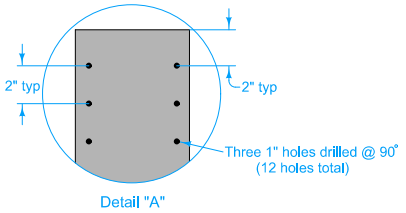
Brian Smith

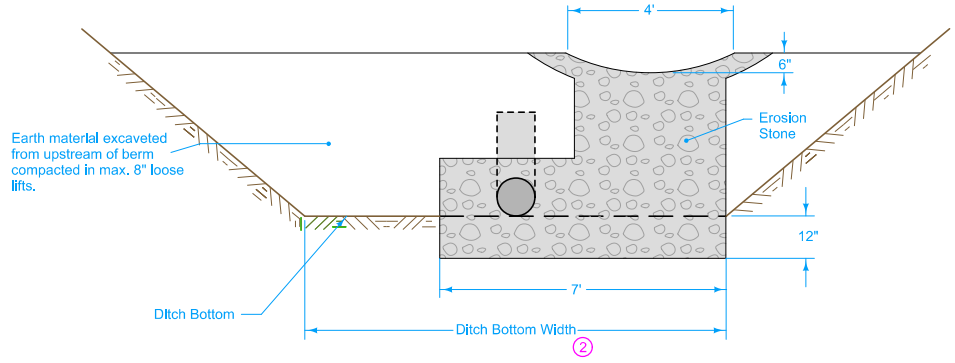
APPROVED BY DESIGN METHODS ENGINEER

SEEDING IN RURAL AREAS









1. Ensure Riser Pipe remains vertical.
2. Dimensions shown are minimums.
3. When Temporary Sediment Control Basin is removed, if basin has not silted in to designed ditch grade, use topsoil to bring up to designed ditch grade.

Possible Contract Items:
- Temporary Sediment Control Basin
- Maintenance of Temporary Sediment Control Basin
- Removal of Temporary Sediment Control Basin

Incidental to Temporary Sediment Control Basin:
- Erosion Stone
- Pipe
- Excavated Earth Material

Possible Tabulation:
- 100-33

IOWA DOT

STANDARD ROAD PLAN

REVISION	
New	10-16-18

EC-601

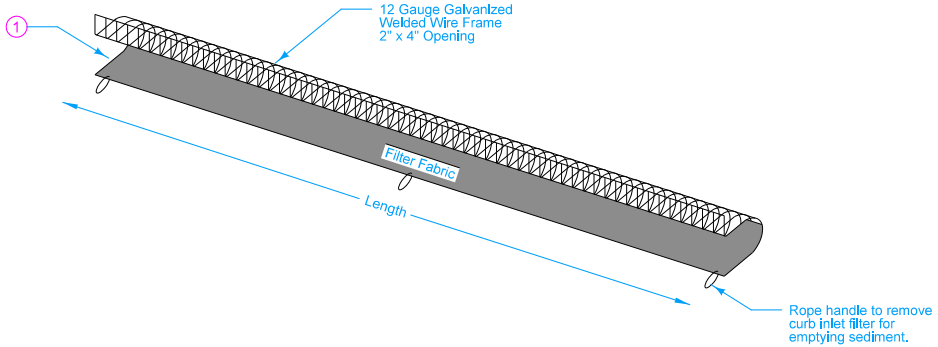
SHEET 1 of 1

REVISIONS: New. Replaces Design Detail 570-3

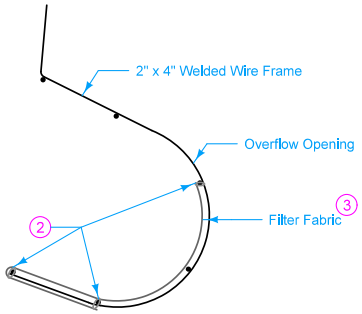
APPROVED BY DESIGN METHODS ENGINEER

TEMPORARY SEDIMENT CONTROL BASIN

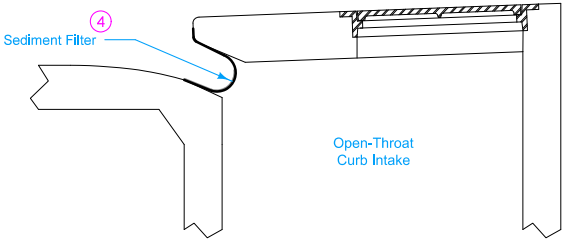
DESIGNER INFORMATION



OPEN-THROAT CURB INTAKE SEDIMENT FILTER



SEDIMENT FILTER CROSS SECTION



SEDIMENT FILTER PLACEMENT

Remove sediment filter upon stabilization of sediment sources.

1. Trim frame as needed to tightly fit in the intake throat. Overlap fabric a minimum of 3 inches and securely fasten.
2. Securely attach filter fabric to the wire frame leaving an overflow opening above the filter fabric.
3. Woven material meeting the requirements of Table 4196.01-1 of the Standard Specifications, except a maximum apparent opening size US Sieve No. 10 and a minimum flow rate of 145 gallons per minute per square foot.
4. Insert sediment filter to create a compression fit in the intake throat. If overflow opening is not present after inserting filter, trim filter fabric so opening is present.

Possible Contract Items:
Open-throat Curb Intake Sediment Filter
Maintenance of Open-throat Curb Intake Sediment Filter
Removal of Open-throat Curb Intake Sediment Filter

Possible Tabulation:
100-36

IOWA | DOT

STANDARD ROAD PLAN

REVISION	
1	10-15-24

EC-602

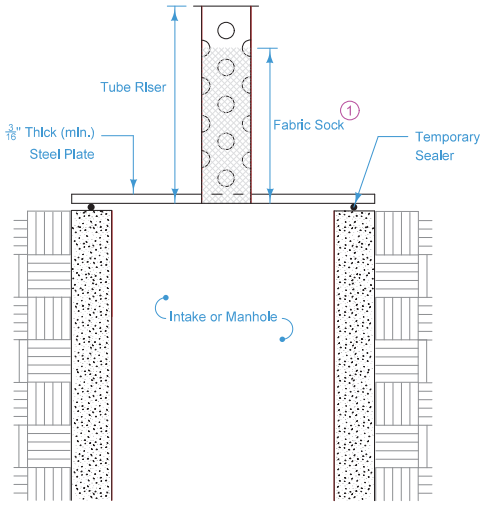
SHEET 1 of 1

REVISIONS: Update logo.

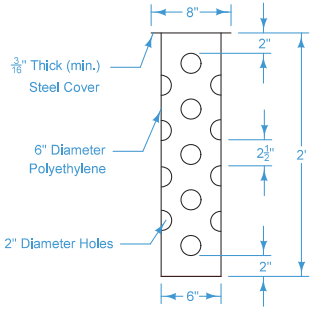
APPROVED BY DESIGN METHODS ENGINEER

OPEN-THROAT CURB INTAKE SEDIMENT FILTER

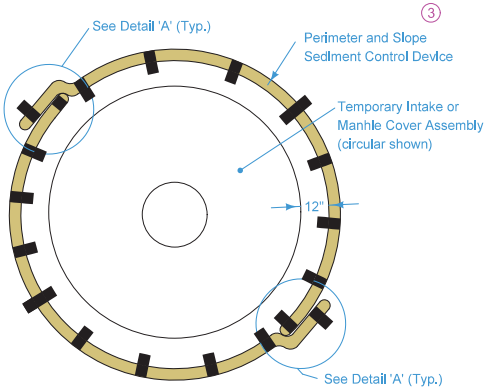
DESIGNER INFORMATION

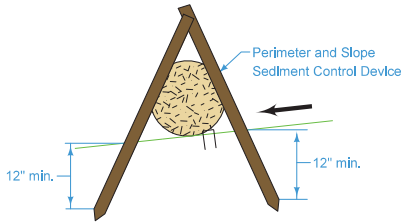


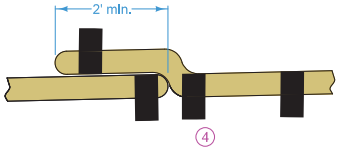
SECTION VIEW



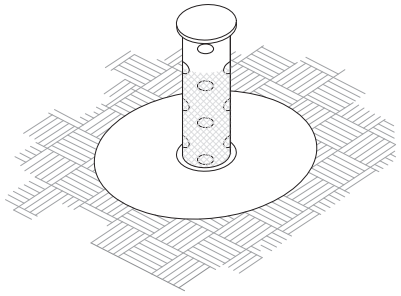
TUBE RISER 2



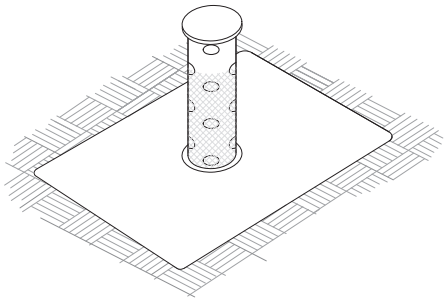




DETAIL 'A'
(Overlap Joint)



ISOMETRIC VIEW
(Circular)



ISOMETRIC VIEW
(Rectangular)

TEMPORARY INTAKE OR MANHOLE COVER ASSEMBLY

PERIMETER AND SLOPE SEDIMENT CONTROL

Method of Measurement for Temporary Intake or Manhole Cover Assembly will be by count.

Basis of Payment for Temporary Intake or Manhole Cover Assembly will be at the contract unit price for each device installed.

Method of Measurement for Maintenance of Temporary Intake or Manhole Cover Assembly will be by count.

Basis of Payment for Maintenance of Temporary Intake or Manhole Cover Assembly will be at the contract unit price for each occurance. Payment is full compensation for inspecting fabric sock and replacing when flow capicity has been reduced to 50%.

Method of Measurment for Removal of Temporary Intake or Manhole Cover Assembly will be by count.

Basis of Payment for Removal of Temporary Intake or Manhole Cover Assembly will be at the contract unit price for each device removed.

1. Wrap fabric sock around tube riser. Use fabric complying with Article 4196.01, B, 1 with a minimum flow rate of 90 gallons per minute per square foot. Ensure top of sock is below form grade elevation.
2. Tube riser may be such that it can be pushed down and pulled up.
3. Place Perimeter and Slope Sediment Control Devices around all intake or manhole wells. Use 20 inch diameter device.
4. Extra material required to install overlaps will not be included in the installation length.

Possible Contract Items:
Temporary Intake or Manhole Cover Assembly
Maintenance of Temporary Intake or Manhole Cover Assembly
Removal of Temporary Intake or Manhole Cover Assembly
Perimeter and Slope Sediment Control Device

Possible Tabulations:
100-11
100-19

IOWA DOT

REVISION	
New	10-17-23

STANDARD ROAD PLAN

EC-603

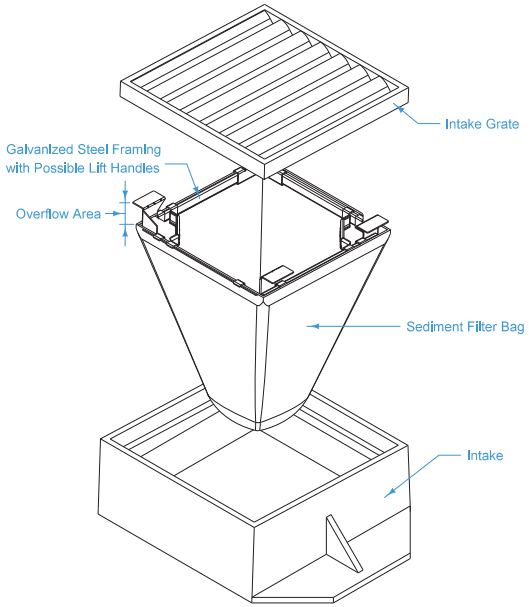
SHEET 1 of 1

REVISIONS: New. Replaces Detail 570-5.

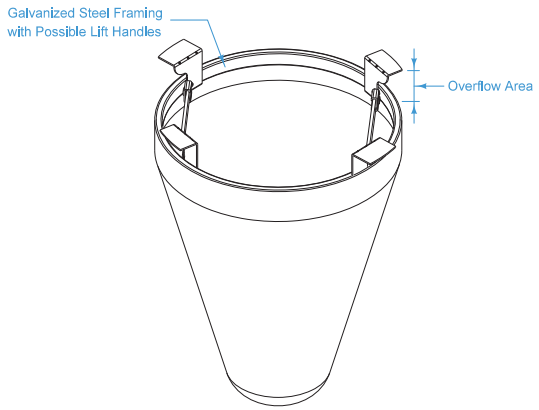
APPROVED BY DESIGN METHODS ENGINEER

EROSION CONTROL FOR INTAKE OR MANHOLE WELL

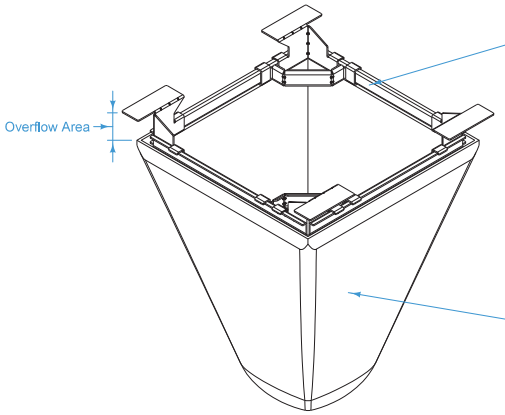
DESIGNER INFORMATION



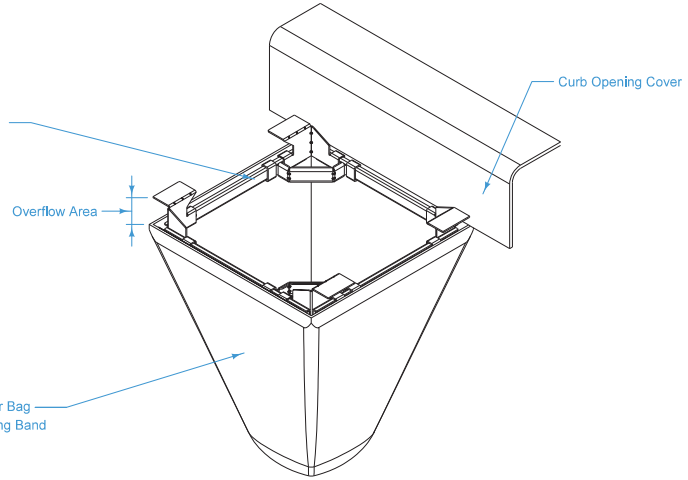
TYPICAL SEDIMENT FILTER BAG PLACEMENT



SEDIMENT FILTER BAG FOR CIRCULAR GRATE



SEDIMENT FILTER BAG FOR SQUARE
OR RECTANGULAR GRATE



SEDIMENT FILTER BAG FOR COMBINATION
GRATE WITH CURB OPENING

Use sediment filter bag consisting of woven material meeting the requirements of Table 4196.01-1 of the Standard Specifications, except a maximum apparent opening size of US Sieve No. 10 and a minimum flow rate of 145 gallons per minute per square foot. Sediment filter bags without steel grame and clampling bands will be allowed if overflow is provided.

Remove sediment filter bag upon stabilization of sediment sources.

Measurement for Grate Intake Sediment Filter Bag will be by count.

Basis of Payment for Grate Intake Sediment Filter Bag will be at the contract unit price for each device installed. Payment is full compensation for furnishing all equipment, labor, and materials required to install the Grate Intake Sediment Filter Bag as shown.

Method of Measurement for Maintenance of Grate Intake Sediment Filter Bag will be by count.

Basis of Payment for Maintenance of Grate Intake Sediment Filter Bag will be at the contract unit price for each occurence. Payment is full compensation for clean out and disposal of material when capacity reaches 50%, and for any other repair needed during the project.

Measurement for Removal of Grate Intake Sediment Filter Bag will be by count.

Basis of Payment for Removal of Grate Intake Sediment Filter Bag will be at the contract unit price for each device removed. Payment is full compensation for all labor and equipment required for removal.

Possible Contract Items:
- Grate Intake Sediment Filter Bag
- Maintenance of Grate Intake Sediment Filter Bag
- Removal of Grate Intake Sediment Filter Bag

Possible Tabulation:
100-37

IOWADOT

STANDARD ROAD PLAN

REVISION	
New	10-17-23

EC-604

SHEET 1 of 1

REVISIONS: New. Replaces Detail 570-7.

APPROVED BY DESIGN METHODS ENGINEER

GRATE INTAKE
SEDIMENT FILTER BAG

STD. ROAD PLANS - EW

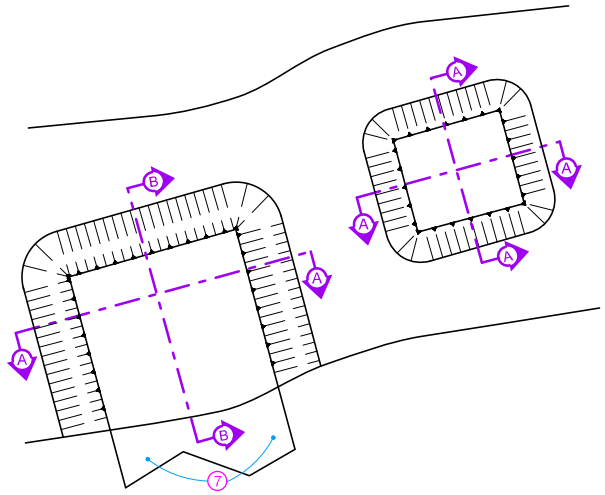
Standard Road Plans

EW Standards

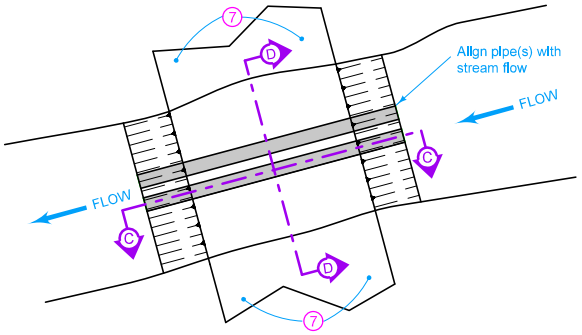
EW-401: Temporary Stream Crossing, Causeway, or Equipment Pad

EW-402: Temporary Stream Diversion

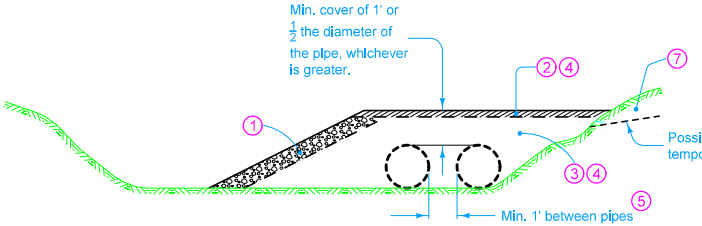
EW-403: Temporary Erosion Control Measures



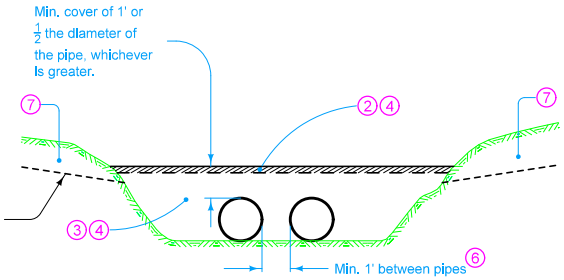
TYPICAL PLAN (CAUSEWAY OR EQUIPMENT PAD) (5)



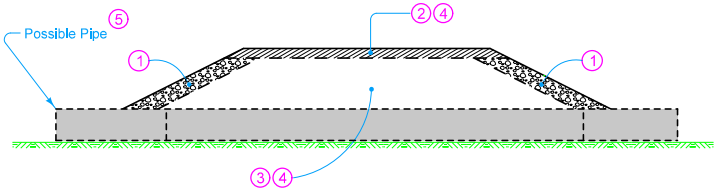
TYPICAL PLAN (STREAM CROSSING) (6)



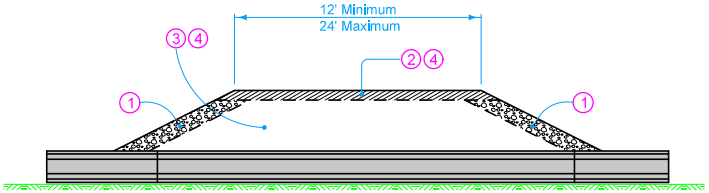
SECTION B-B (CAUSEWAY) (5)



SECTION D-D (STREAM CROSSING) (6)



SECTION A-A (5)



SECTION C-C (6)

1. Minimum 1 foot of Class D revetment, Class E revetment, or broken concrete meeting the requirements of Section 4130 of the Standard Specifications.
2. Possible choke layer for construction traffic. Use any combination of erosion stone, granular backfill, special backfill (except with reclaimed HMA), granular surfacing material, or granular soils of AASHTO classification A-1 or A-2 with less than 5% fines passing the #200 sieve.
3. Use clean material with less than 5% fines passing the #200 sieve. Acceptable materials include revetment and granular materials.
4. When dredging is allowed by a permit, use dredged material containing 10% or less passing the #200 sieve. Prior to beginning construction according to EW-401 , install erosion control measures according to EC-202. Leave these measures in place and maintain until temporary EW-401 materials have been completely removed. Installation, maintenance, and removal of these erosion control measures is incidental and will not be paid for separately.
5. Pipe required if structure spans more than half the distance between banks. Contractor determines size and number of pipe(s) unless specified otherwise in the contract documents.
6. Pipe required. Contractor determines size and number of pipe(s) unless specified otherwise in the contract documents.
7. When material needs to be cut from the bank to provide for access to construct and use a temporary stream structure, move this material to an upland location.

IOWA DOT

REVISION	
2	10-20-15

STANDARD ROAD PLAN

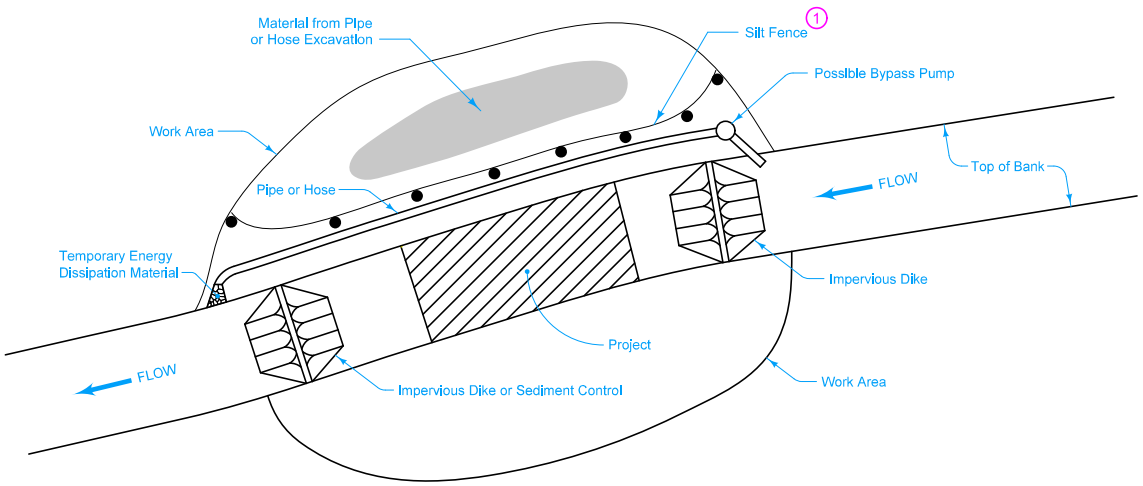
EW-401

SHEET 1 of 1

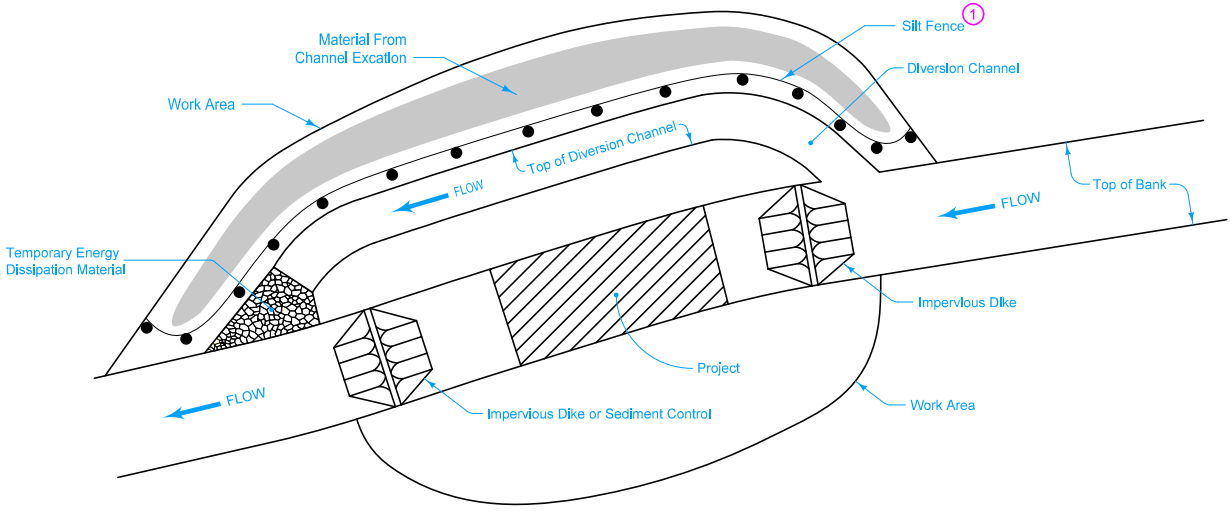
REVISIONS: Corrected typo in note 4. Updated the DOT logo.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TEMPORARY STREAM CROSSING, CAUSEWAY, OR EQUIPMENT PAD



PIPE OR HOSE



DIVERSION CHANNEL

1 Extend ends of silt fence to work area boundry.

Possible Contract Items:

Temporary Stream Diversion
Silt Fence
Removal of Silt Fence or Silt Fence for Ditch Check
Perimeter and Slope Sediment Control Device

Possible Tabulations:

100-26
100-17

IOWA DOT

REVISION	
2	04-18-17

STANDARD ROAD PLAN

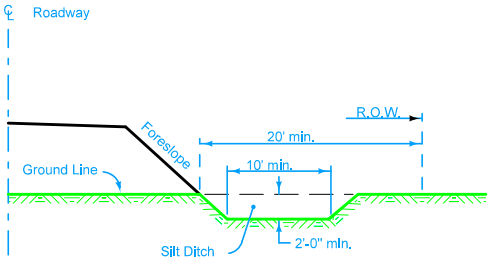
EW-402

SHEET 1 of 1

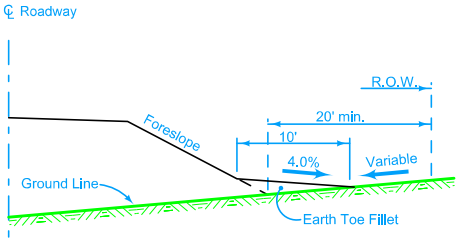
REVISIONS: Added silt fence in DIVERSION CHANNEL and PIPE OR HOSE views.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

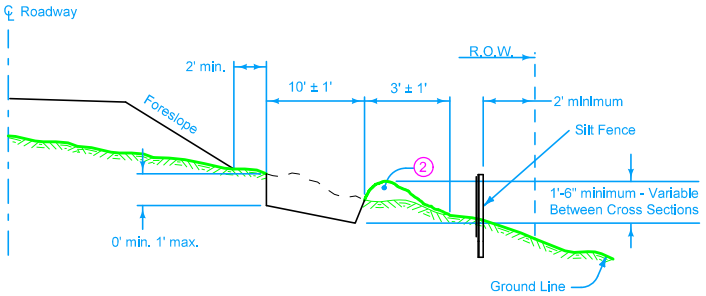
TEMPORARY STREAM DIVERSION



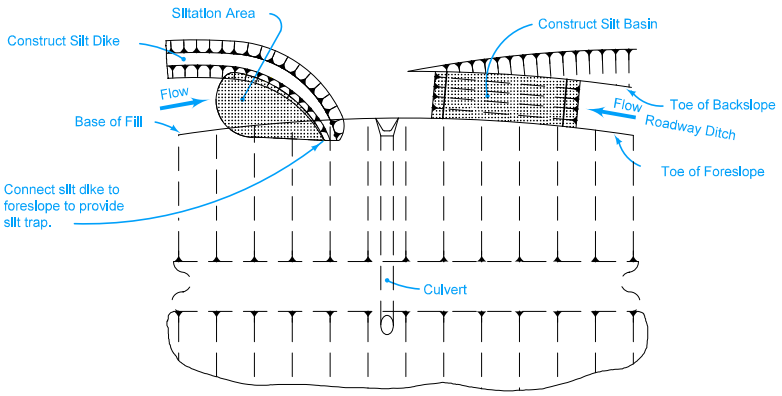
SILT DITCH



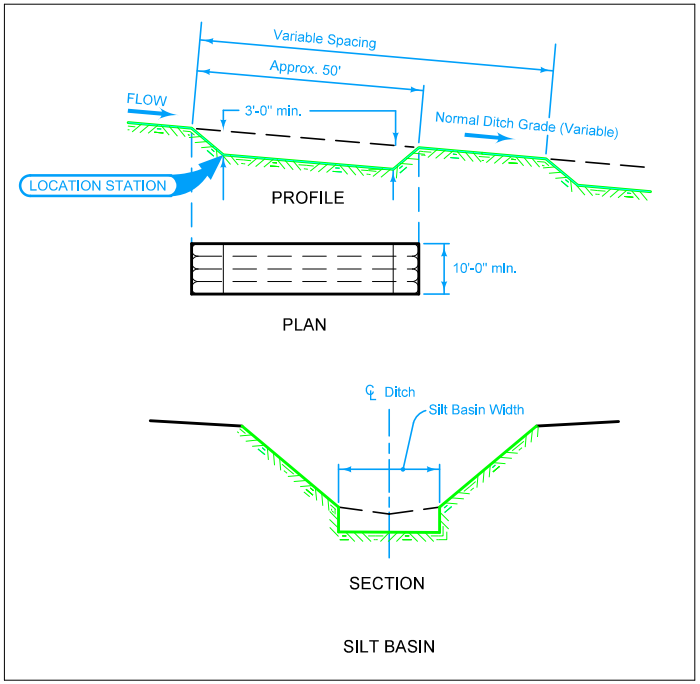
TOE FILLET ①



SILT DIKE



TYPICAL PLAN WITH
PERMANENT CULVERT INSTALLATION



SILT BASIN

Obtain the Engineer's approval for installation locations.

① Construct an earth fillet at the toe of the roadway foreslope for areas where a roadway ditch, silt ditch, or silt dike is not provided. This Toe Fillet is incidental to "Roadway and Borrow Excavation".

② Windrow of excavated and compacted silt material or deposited and compacted earth.

Possible Contract Items:

Silt Ditch
Silt Dike
Silt Basin

Possible Tabulations:

100-13
100-14
100-15

IOWADOT

REVISION	
3	04-18-17

STANDARD ROAD PLAN

EW-403

SHEET 1 of 1

REVISIONS: Added Location Station to Silt Basin view. Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TEMPORARY EROSION CONTROL MEASURES

STD. ROAD PLANS - DR

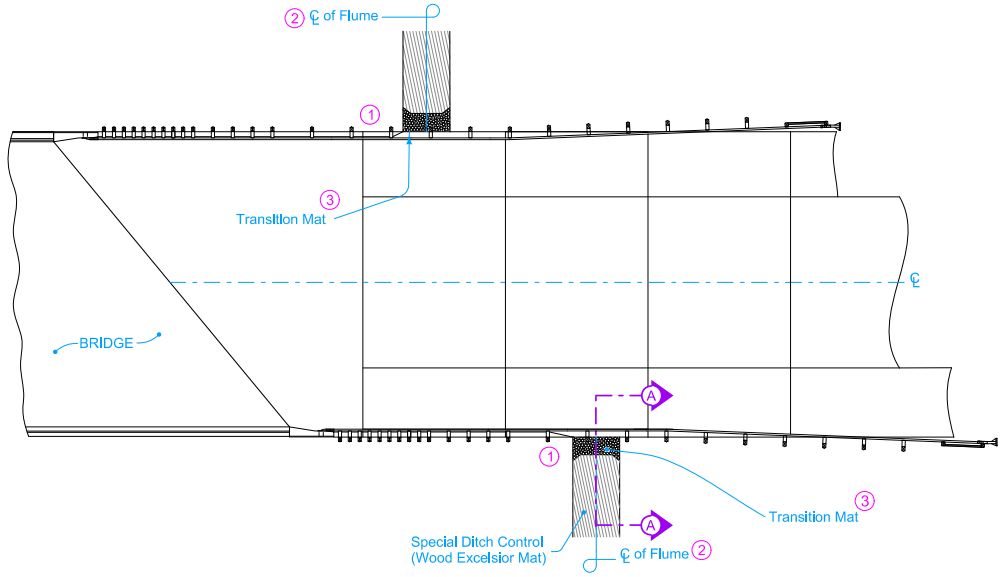
Standard Road Plans

DR Standards

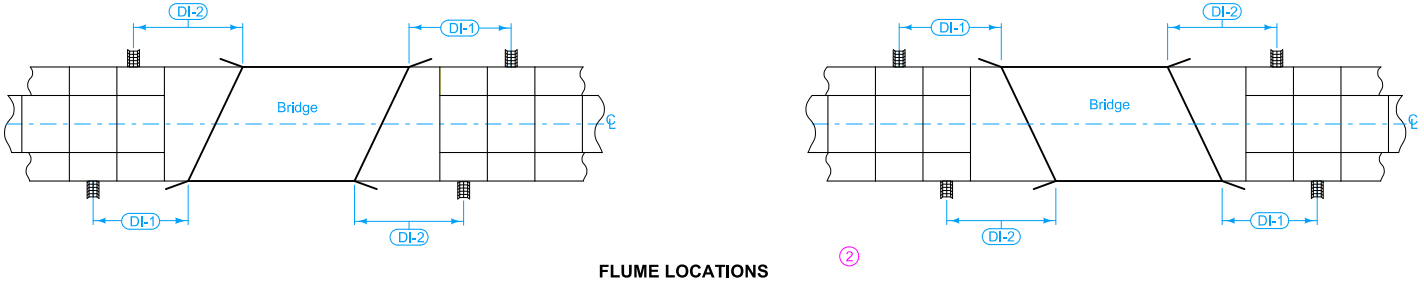
DR-401: Scour Protection for Bridge End Drain

DR-402: Rock Flume for Bridge End Drain

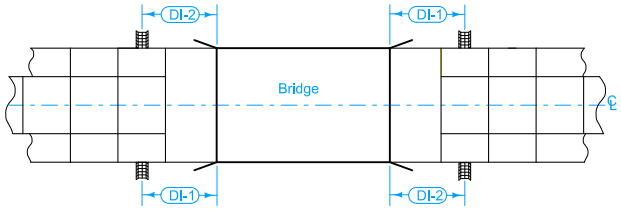
DESIGNER INFORMATION



PLAN



FLUME LOCATIONS
(Skewed Bridge)



FLUME LOCATIONS
(Non-Skewed Bridge)

Price bid for "Bridge End Drain, DR-401" is full compensation for furnishing, installing, and constructing the Bridge End Drain as shown.

① Continue 4 inch sloped curb to edge of flume per section B-B. Refer to BR-201, BR-202, BR-203, BR-204, or BR-205 for details of 4 inch curb.

② DI-1 and DI-2 distances measured from center of Bolt Pattern. Refer to BA-202.

③ Abut Transition Mat (see EC-105) panels to the edge of the pavement to prevent from being undercut by water. Cut panels to fit around guardrail posts to ensure pavement edge contract. No deduction will be made for area of Transition Mat removed for guardrail posts.

Possible Contract Items:
Bridge End Drain, DR-401

Incidental to Bridge End Drain:
Transition Mat
Seeding and Fertilizing
Soil Fill
Special Ditch Control (Wood Excelsior Mat)
Turf Reinforced Mat, Type 2
Watering for Sod, Special Ditch Control, or Slope Protection
Mobilization for Watering

Possible Tabulation:
104-8A

IOWADOT

REVISION	
7	04-16-24

STANDARD ROAD PLAN

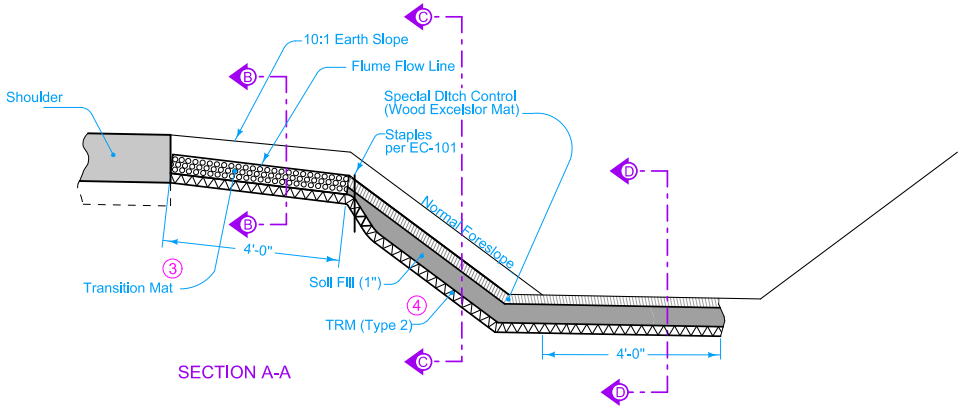
DR-401

SHEET 1 of 2

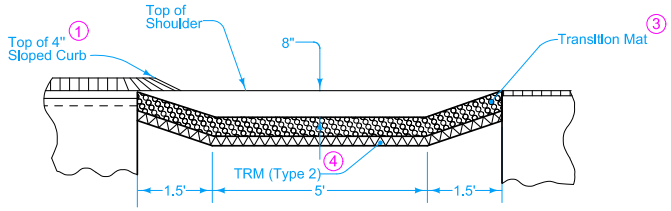
REVISIONS: Added reference to BR-202 in note 2.

APPROVED BY DESIGN METHODS ENGINEER

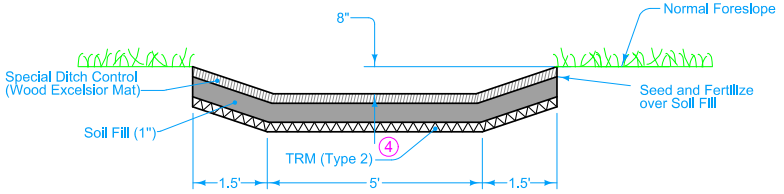
SCOUR PROTECTION
FOR BRIDGE END DRAIN



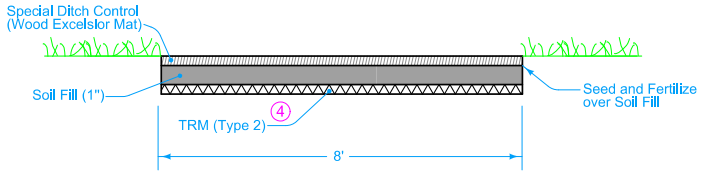
SECTION A-A



SECTION B-B



SECTION C-C (5)



SECTION D-D (6)

1. Continue 4 inch sloped curb to edge of flume per section B-B. Refer to BR-201, BR-202, BR-203, BR-204, or BR-205 for details of 4 inch curb.
3. Abut Transition Mat (see EC-105) panels to the edge of the pavement to prevent from being undercut by water. Cut panels to fit around guardrail posts to ensure pavement edge contact. No deduction will be made for area of Transiton Mat panel removed for guardrail posts.
4. Extend TRM (see EC-104) flume 4 feet beyond toe of slope.
5. Transition the flume flow line depth from 3 inches at the downstream edge of Transition Mat to 8 inches with an approximate transition rate of 1 inch vertical per 1 foot horizontal.
6. Transition the flume flow line depth from 8 inches at the toe of slope to 0 inches with an approximate transition rate of 2 inches vertical per 1 foot horizontal.

IOWADOT

REVISION

7	04-16-24

STANDARD ROAD PLAN

DR-401

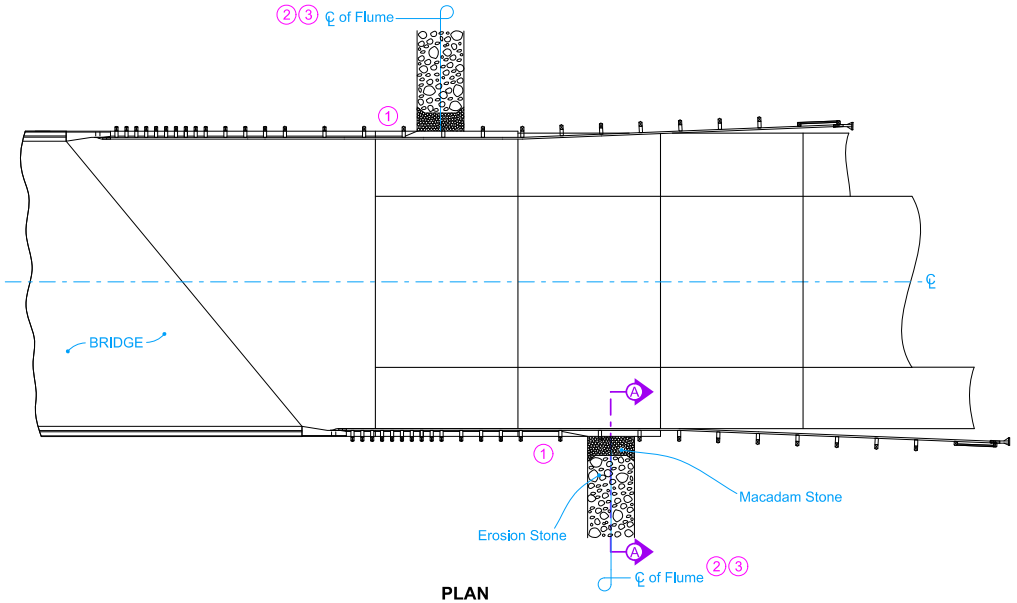
SHEET 2 of 2

REVISIONS: Added reference to BR-202 in note 2.

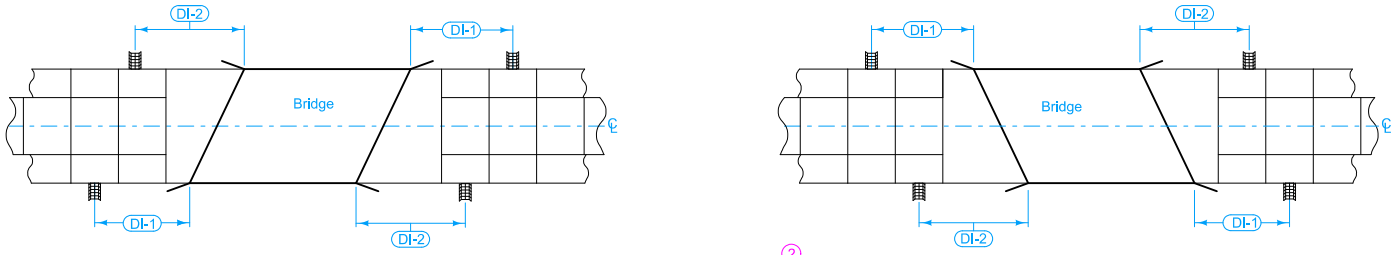
APPROVED BY DESIGN METHODS ENGINEER

SCOUR PROTECTION FOR BRIDGE END DRAIN

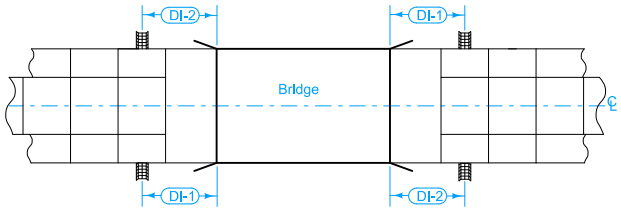
DESIGNER INFORMATION



PLAN



FLUME LOCATIONS (2)
(Skewed Bridge)



FLUME LOCATIONS (2)
(Non-Skewed Bridge)

Price bid for "Bridge End Drain, DR-402" is full compensation for furnishing, installing, and constructing the Bridge End Drain as shown.

(1) Continue 4 Inch sloped curb to edge of flume per section B-B. Refer to BR-201, BR-202, BR-203, BR-204, or BR-205 for details of 4 inch curb.

(2) DI-1 and DI-2 distances measured from center of Bolt Pattern. Refer to BA-202.

(3) Extend rock flume to toe of backslope. If no backslope exists, extend rock flume a minimum of 4 feet beyond the toe of foreslope.

Possible Contract Items:
Bridge End Drain, DR-402

Incidental to Bridge End Drain:
Macadam Stone Base Material
Erosion Stone
Engineering Fabric
Excavation, hauling, and disposing of material

Possible Tabulation:
104-8A

IOWADOT

REVISION	
7	04-16-24

STANDARD ROAD PLAN

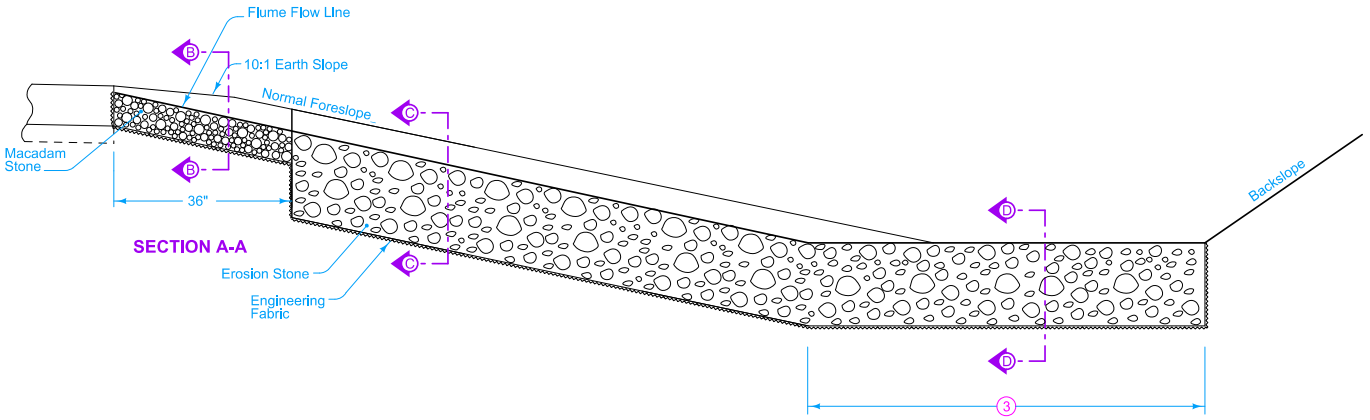
DR-402

SHEET 1 of 2

REVISIONS: Added reference to BA-202 In note 2.

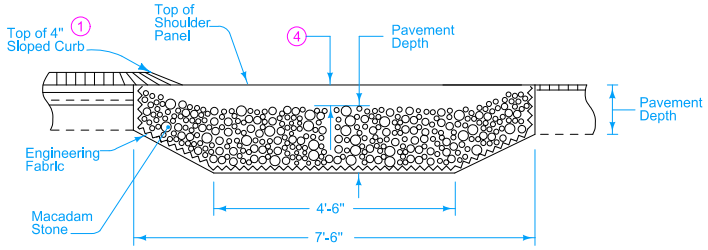
APPROVED BY DESIGN METHODS ENGINEER

ROCK FLUME FOR BRIDGE END DRAIN

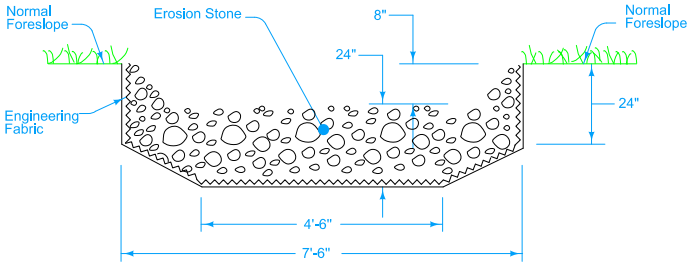


SECTION A-A

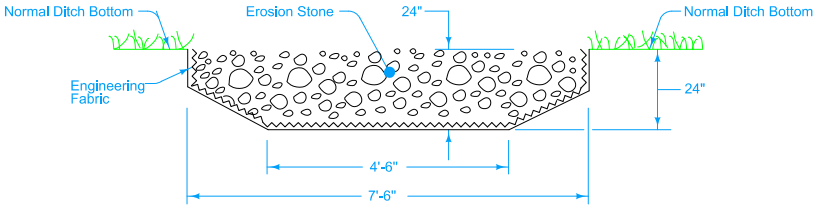
1. Continue 4 inch sloped curb to edge of flume per section B-B. Refer to BR-201, BR-202, BR-203, BR-204, or BR-205 for details of 4 inch curb.
3. Extend flume to toe of backlope. If no backslope exists, extend rock flume a minimum of 4 feet beyond the toe of foreslope.
4. Transitions from 2 inches at edge of pavement to 8 inches within 3 feet.
5. Transition the flume flow line depth from 8 inches at the toe of slope to 0 inches with an approximate transition rate of 2 inches per 1 foot horizontal.



SECTION B-B



SECTION C-C



SECTION D-D 5

IOWADOT

STANDARD ROAD PLAN

REVISION	
7	04-16-24

DR-402

SHEET 2 of 2

REVISIONS: Added reference to BA-202 In note 2.

APPROVED BY DESIGN METHODS ENGINEER

ROCK FLUME FOR BRIDGE END DRAIN

DESIGN & TAB. FORMS

Design and Tabulation Forms

100-09: Transition Mat

100-10: Floating Silt Curtains

100-11: Erosion Control for Intake or Manhole Well

100-13: Tabulation of Silt Ditches

100-14: Silt Basins

100-15: Tabulation of Silt Dikes

100-16: Tabulation of Intercepting Ditches

100-17: Tabulation of Silt Fences

100-18: Silt Fences for Ditch Checks

100-19: Perimeter and Slope Sediment Control Devices

100-22: Rolled Erosion Control

100-23: Rock Erosion Control

100-32: Rock Check Dam

100-33: Temporary Sediment Control Basin

100-34: Stormwater Drainage Basin

100-36: Open-Throat Curb Intake Sediment Filter

100-37: Grate Intake Sediment Filter Bag

100_09
8/15/22

TRANSITION MAT

Refer to EC-105

Line No.	Station	Side	Length (LF)	Width (LF)	Area (SF)	Remarks

100_10
8/15/22

FLOATING SILT CURTAINS

Refer to EC-202

Line No.	Station	Hanging (LF)	Containment (LF)	Clean-out (Containment) (LF)	of Floating Silt Curtain (LF)	Remarks

100_11
4/16/24

EROSION CONTROL FOR INTAKE OR MANHOLE WELL

Possible Standard Road Plan : EC-603

Line No.	Location Station	Side	Cover Assembly Type	Quantity (EA)	Remarks

100_13
8/15/22

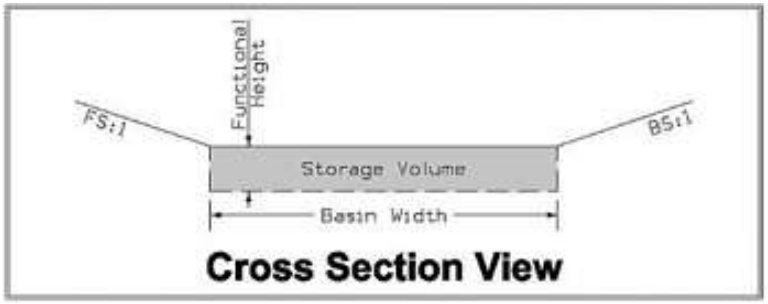
SILT DITCHES

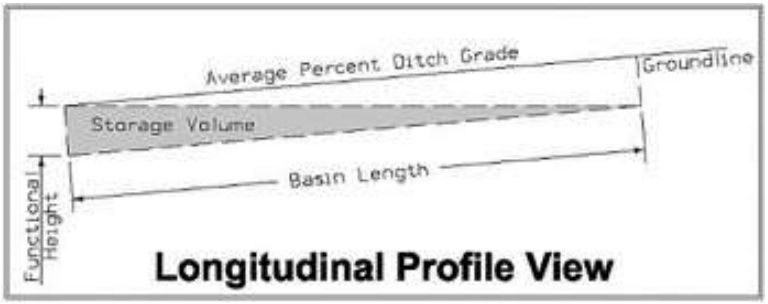
Refer to EW-403

Line No.	Station From	Station To	Side	LF	Remarks

SILT BASINS

Possible Standard: EW-403





* The functional height used in the volume equation is 95% of effective height. Effective height is 3 feet as shown in EW-403.
* Volume equation: (0.5*Length*(Width*Height+Width*(Height-Length*Avg%Slope))

Line No.	Basin No.	Station	Side	Installation (Each)	Removal (Each)	Basin Width (FT)	Basin Length (FT)	Height (FT)	Avg. % Slope	Volume (CF)	Remarks

100_15
8/15/22

SILT DIKES

Refer to EW-403

Line No.	Station From	Station To	Side	Length (LF)	Remarks

100_16
8/15/22

TABULATION OF INTERCEPTING DITCHES

Line No.	Station From	Station To	Side	Length (LF)	Remarks

100_17
8/15/22

TABULATION OF SILT FENCES

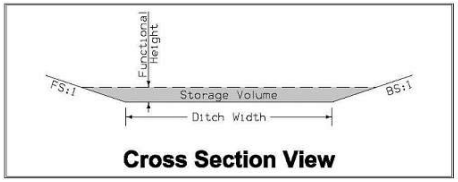
Refer to EC-201

Line No.	Station From	Station To	Side	Length (FT)	Remarks

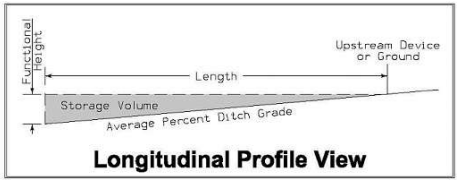
100_18
8/15/22

SILT FENCES FOR DITCH CHECKS

Possible Standard: EC-201



Cross Section View



Longitudinal Profile View

* The functional height used in the volume equation is 85% of effective height. Effective height is 1.58 feet as shown on EC-201.
* Volume equation: [0.5*Spacing*(0.5*H^2*FS+DW*H+0.5*H^2*BS)]

Line No.	Basin No.	Type	Station	Side	Installation (LF)	Maintenance (LF)	Removal (LF)	Foreslope (FS:1)	Backslope (BS:1)	Ditch Width (FT)	Avg. % Slope Ditch Grade	Volume (CF)	Remarks

100_19
10/15/24

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE

Possible Standards: EC-204

Line No.	Station From	Station To	Side	Sediment Control Device Type	Diameter Size	Length (LF)	Remarks

100_22
8/15/22

ROLLED EROSION CONTROL

Refer to EC-101, EC-103 and EC-104.

Line No.	Road Identification	Station From	Station To	Side	Length (FT)	Width (FT)	TRM Type (EC-104)	TRM Quantity (Squares)	Slope Protection (EC-103) (Squares)	Special Ditch Control (EC-101) (Squares)	Remarks

100_23
8/15/22

ROCK EROSION CONTROL

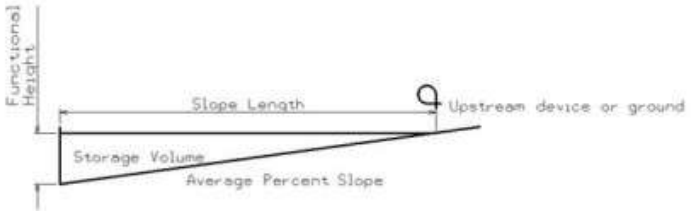
Refer to EC-301 and Detail 570-8

Road Identification	Station From	Station To	Side	Length (FT)	Width (FT)	Rock Erosion Control Type	Engineering Fabric (SY)	Class E Revetment (TON)	Erosion Stone (TON)	Remarks

100_32
8/15/22

ROCK CHECK DAM

Possible Standard: EC-302



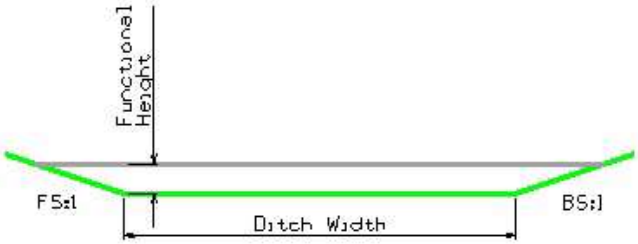
* The functional height used in the volume equation is 90% of effective height. Effective height is 2 feet as shown in EC-302.
* Volume equation: [0.5*Spacing*(0.5*H2*FS+DW*H+0.5*H2*BS)]

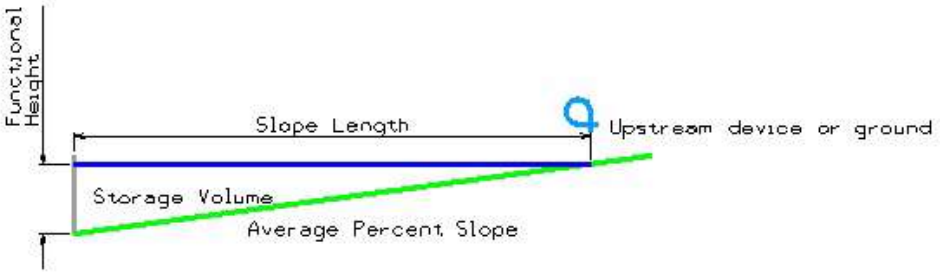
Line No.	Basin No.	Station	Side	Offset	Installation (LF)	Maintenance (Each)	Removal (Each)	Foreslope (FS:1)	Backslope (BS:1)	Ditch Width (FT)	Avg. % Slope	Volume (CF)	Remarks

100_33
8/15/22

TEMPORARY SEDIMENT CONTROL BASIN

Possible Standard: EC-601





* The functional height used in the volume equation is 95% of effective height. Effective height is 2.5 feet as shown in EC-601.
* Volume equation: [(1/4*(FS*H2))+(1/2*DW*H)+(1/4*(BS*H2))]*(H/Avg%Slope)

Line No.	Basin No.	Station	Side	Installation (Each)	Maintenance (Each)	Removal (Each)	Foreslope (FS:1)	Backslope (BS:1)	Ditch Width (FT)	Avgerage % Slope	Volume * (CF)	Remarks

100_34
8/15/22

STORMWATER DRAINAGE BASIN

Refer to EC Standards and 570s Details.

Line No.	Basin No.	Station From	Station To	Side	Discharge Station	Discharge Side	Total Disturbed Area (ACRES)	Disturbed Area with Storage Provided (ACRES)	Disturbed Area without Storage Provided (ACRES)	Best Management Practice	Total Storage Volume Provided (CF)	Total Storage Volume Required (CF)	Storage Volume Met	Remarks

100_36
8/15/22

OPEN-THROAT CURB INTAKE SEDIMENT FILTER

Possible Standard: EC-602

Line No.	Station	Side	Installation (LF)	Maintenance (Each)	Removal (Each)	Remarks

100_37
4/16/24

GRATE INTAKE SEDIMENT FILTER BAG

Possible Standard Road Plan : EC-604

Line No.	Location Station	Side	Installation (Each)	Maintenance (Each)	Removal (Each)	Remarks

STANDARD NOTES

Standard Notes

232-3A: Erosion Control (Rural Seeding)

232-3B: Erosion Control (Urban Seeding)

232-3C: Erosion Control (Native Grass Seeding)

232-11: Erosion Control (Stabilizing Crop Seeding)

281-1: Section 404 Permit and Conditions

281-2: Individual Storm Water Permit

232_03A
9/28/22

EROSION CONTROL (RURAL SEEDING)

Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are all incidental to mobilization and will not be paid for separately.

232_03B
9/28/22

EROSION CONTROL (URBAN SEEDING)

Area to be seeded is estimated to be less than 1 acre. If the Contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,4 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are incidental to mobilization and will not be paid for separately.

232_03C
9/28/22

EROSION CONTROL (NATIVE GRASS SEEDING)

Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are all incidental to mobilization and will not be paid for separately.

232_11
6/21/23

EROSION CONTROL (STABILIZING CROP SEEDING)

Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.

If outside of permanent seeding dates in Section 2601 of the Standard Specifications, or if required by a storm water permit, place stabilizing crop, fertilizer, and mulch on the disturbed area as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,1 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are incidental to mobilization and will will not be paid for separately.

281_01
9/28/22

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers <<_____>>, Permit No. <<_____>>. A copy of this permit is available from the Iowa DOT website (http://www.envpermits.iowadot.gov/). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

281_02
9/28/22

INDIVIDUAL STORM WATER PERMIT

This project is regulated by the requirements of Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) permit, Permit No. <<##-##-#-##>>. A copy of this permit is available from the Iowa DOT Office of Contracts upon request. Co-permittee certification statement requirements from Standard Specifications Section 2602 apply.

ROAD DESIGN DETAILS

Road Design Details

570-1: Slash Mulch Berm

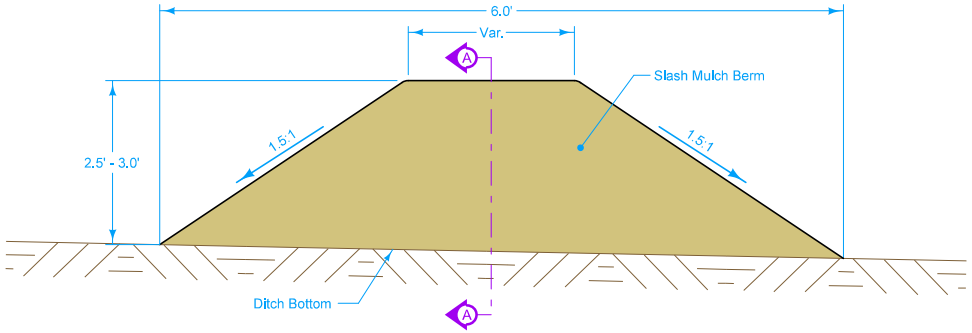
570-8: Temporary Rock Berm For Sediment Control

570-11: Temporary Sediment Control for Culvert Extension with Exposed Soil

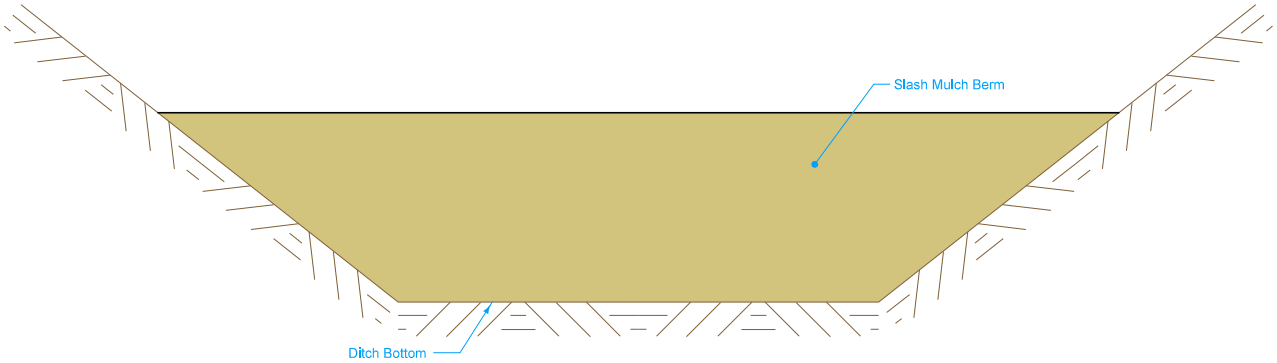
570-12: Temporary Sediment Control for Shoulder Widening with Exposed Soil

Slash mulch consists of waste material from clearing and grubbing. Use material with a maximum length of 20 inches and maximum width of 2 inches for individual pieces. Material will be accepted based on visual inspection.

Dispose of the slash mulch berm material off the project unless the Engineer approves a suitable site within the project limits.



DITCH PROFILE



SECTION A-A

IOWA DOT

REVISION

1	10-18-16

ROAD DESIGN DETAIL

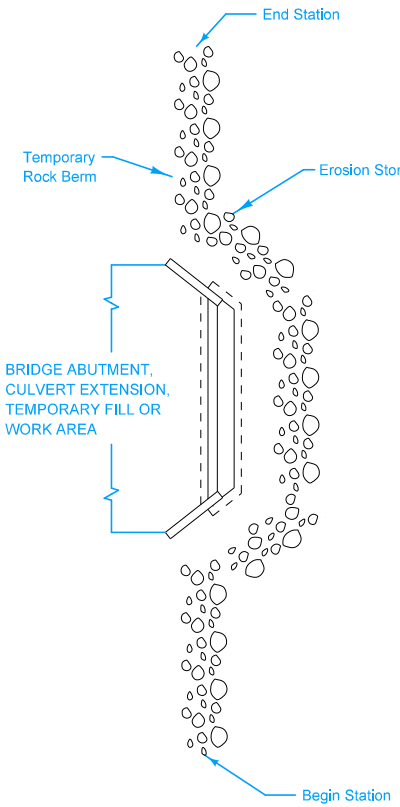
570-1

SHEET 1 of 1

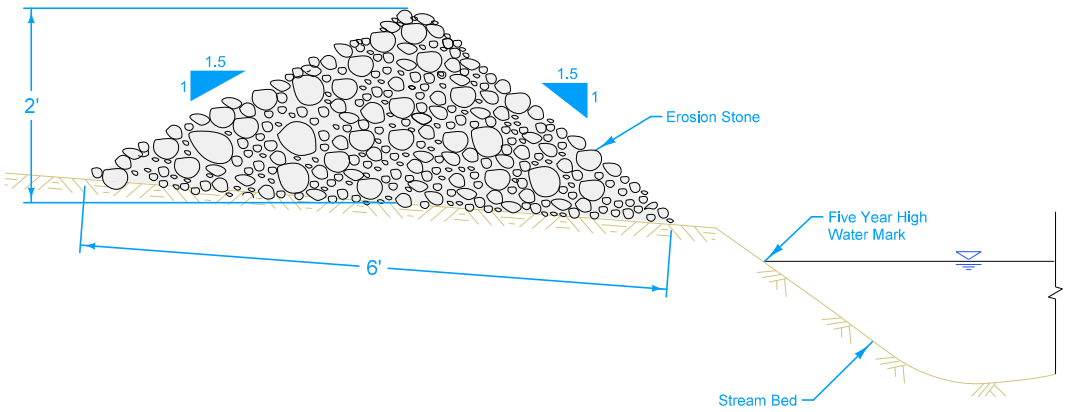
REVISIONS: Corrected typo from 'much' to 'mulch' in general notes.

SLASH MULCH BERM

Place Erosion Stone as near to the five year high water mark as possible while not allowing it to enter the stream bed. Remove Erosion Stone after project completion.



PLAN



PROFILE

Possible Contract Item:
Erosion Stone

Possible Tabulation:
100-23

IOWA DOT

REVISION	
NEW	10-17-17

ROAD DESIGN DETAIL

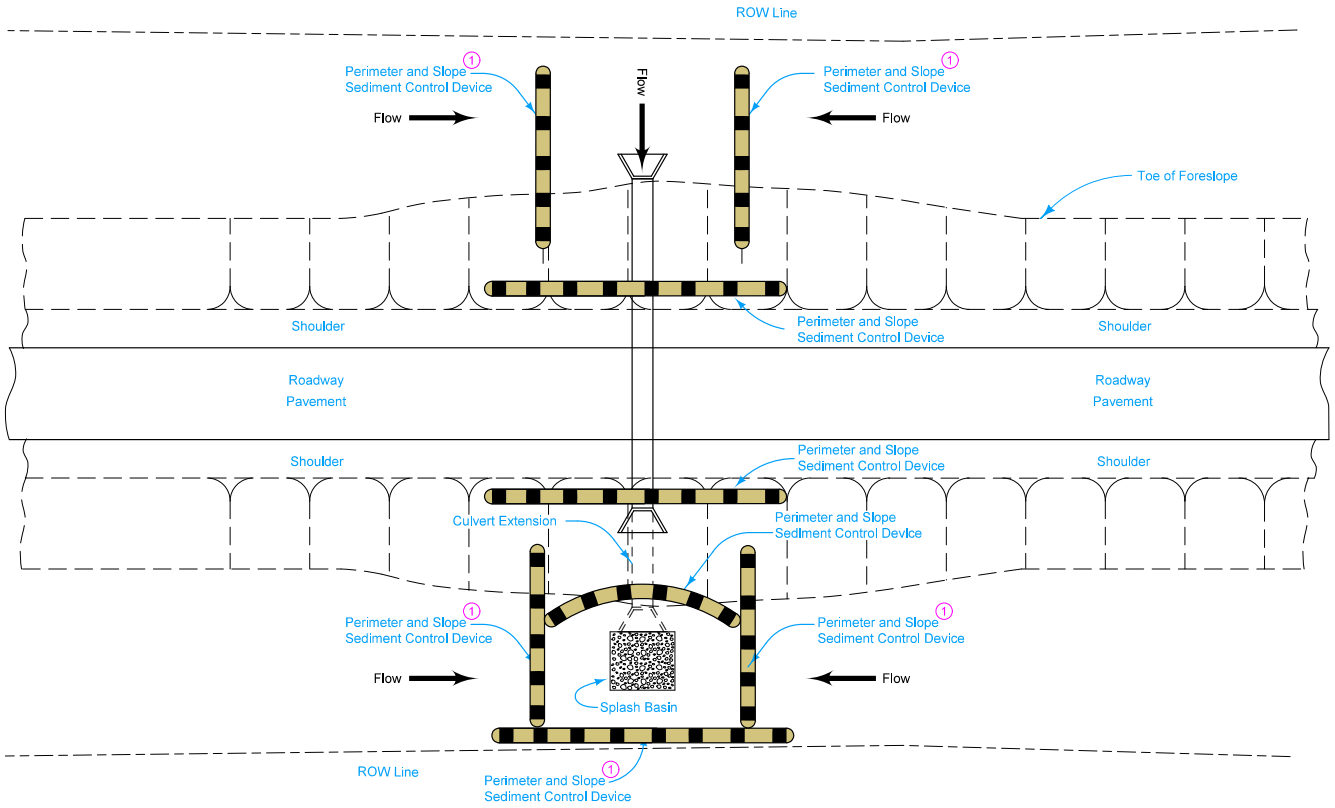
570-8

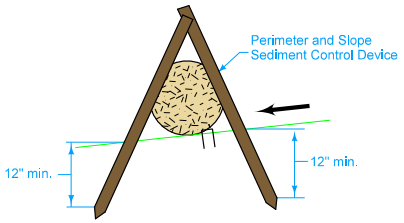
SHEET 1 of 1

REVISIONS: NEW

TEMPORARY ROCK BERM FOR SEDIMENT CONTROL

See Standard Road Plans EC-201, EC-204, and EC-301 for installation details.





① Silt Fence for Ditch Check may be substituted at no additional cost to the Contracting Authority.

Possible Contract Items:
- Perimeter and Slope Sediment Control Device
- Erosion Stone
- Class E Revetment
- Engineering Fabric

Possible Tabulations:
- 100-19
- 100-23
- 100-34

IOWA DOT

REVISION	
1	10-19-21

ROAD DESIGN DETAIL

570-11

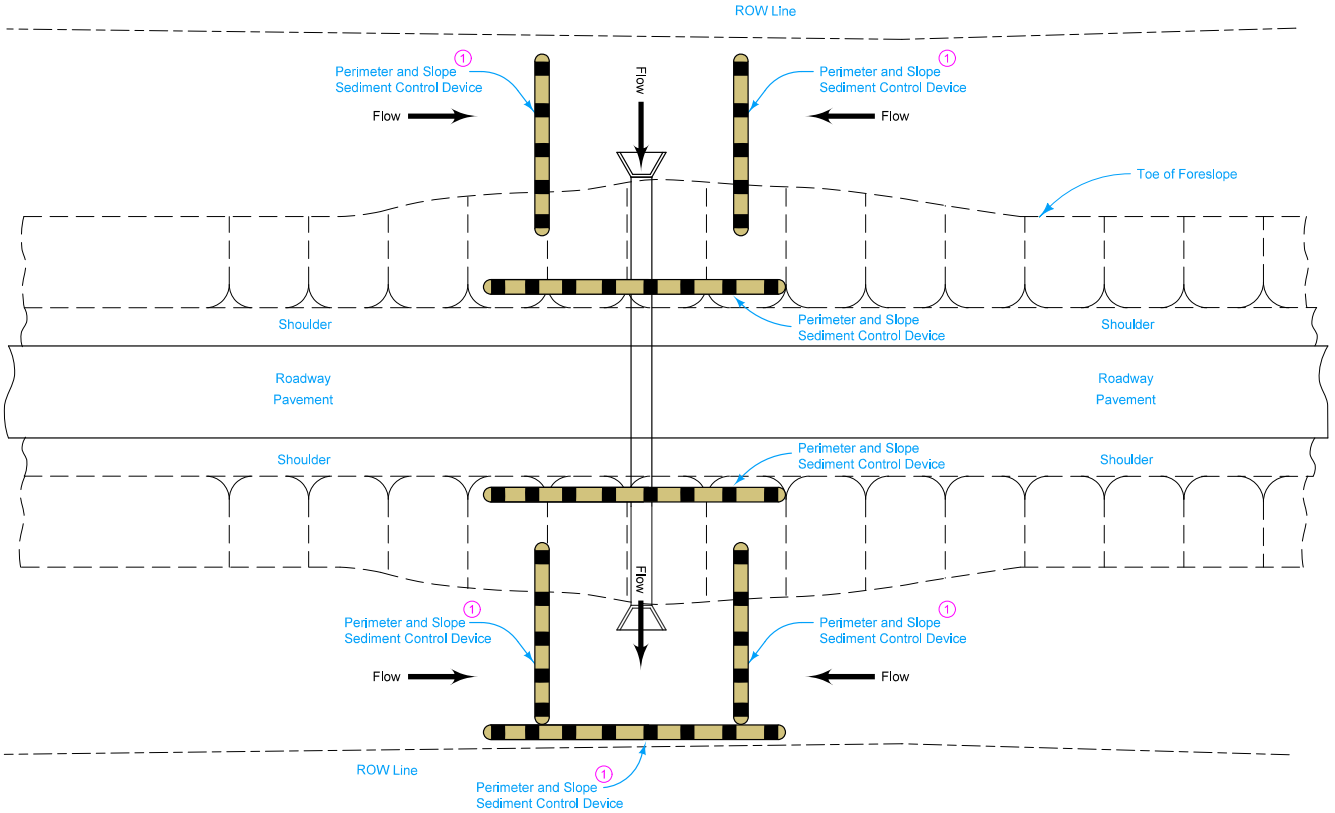
SHEET 1 of 1

REVISIONS: Added cross section for staking details.

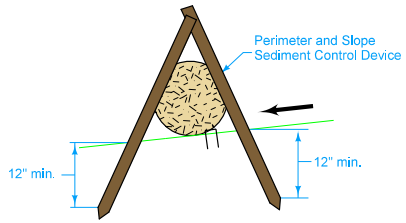
TEMPORARY SEDIMENT CONTROL FOR CULVERT EXTENSION WITH EXPOSED SOIL

See Standard Road Plans EC-201 and EC-204 for installation details.

① Silt Fence for Ditch Check may be substituted at no additional cost to the Contracting Authority.



NON-CONTINUOUS FLOW CULVERT



Possible Contract Items:
Perimeter and Slope Sediment Control Device

Possible Tabulations:
100-19
100-34

IOWADOT

REVISION	
1	10-19-21

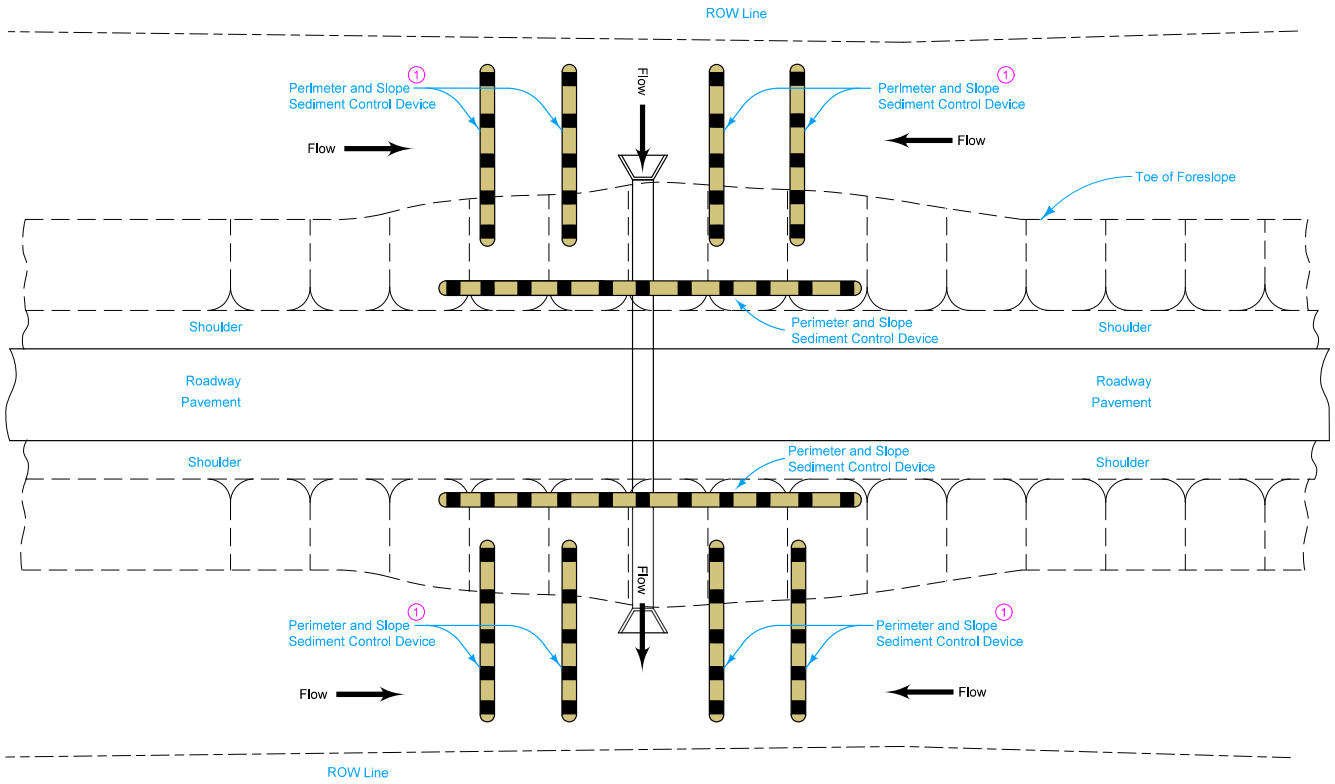
ROAD DESIGN DETAIL

570-12

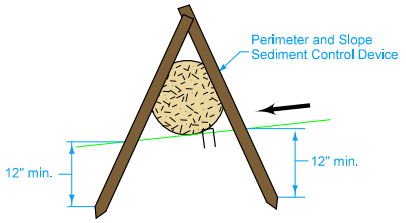
SHEET 1 of 2

REVISIONS: Added cross section for staking details.

TEMPORARY SEDIMENT CONTROL FOR SHOULDER WIDENING WITH EXPOSED SOIL



CONTINUOUS FLOW CULVERT



① Silt Fence for Ditch Check may be substituted at no additional cost to the Contracting Authority.

IOWA DOT

REVISION	
1	10-19-21

ROAD DESIGN DETAIL

570-12

SHEET 2 of 2

REVISIONS: Added cross section for staking details.

TEMPORARY SEDIMENT CONTROL FOR SHOULDER WIDENING WITH EXPOSED SOIL

DESIGN MANUAL
10C-1

Temporary Sediment Control Devices

Design Manual
Chapter 10
Roadside Development and Erosion Control
Originally Issued: 12-31-97
Revised: 3-4-21

General

Temporary sediment control devices should be considered on all projects involving earthwork. They are used to control sediment on new projects until permanent seeding is established. This section describes the following devices that are to be used and their bid quantities:

- Silt Basin
- Silt Basin Bid Quantities
- Silt Dike and Ditch
- Silt Fence
- Silt Fence Bid Quantities
- Silt Fence Ditch Checks
- Silt Fence Ditch Check Bid Quantities
- Rock Check Dam Quantities
- Rock Check Dam Bid Quantities
- Temporary Sediment Control Basins
- Temporary Sediment Control Basin Bid Quantities
- Perimeter and Slope Sediment Control Devices and Ditch Check Sediment Control Devices
- Perimeter and Slope Sediment Control Device and Ditch Check Sediment Control Device Bid Quantities
- Silt Curtains
- Stabilized Construction Entrance

The Erosion and Sediment Control Field Guide provides more information regarding erosion and sediment control.

Section 10C-2 provides more information regarding temporary sediment control devices used for storm water retention.

Silt Basin

A silt basin collects silt deposits from flowing water. Typically, designers decide when and where to use them. Silt basins should be strongly considered any time soil is disturbed which could result in silt flowing to a waterway. Silt basins are not required if a minimum 50 foot undisturbed vegetated buffer separates a soil disturbance from the waterway. Designers can

Quick Tips:

- Silt basins collect silt deposits from flowing water.
- Silt dikes and silt ditches trap silt in a depressed area to keep it from flowing onto private property.
- Silt fence is used to disrupt the flow of water so soil and debris will settle and collect behind the silt fence.
- Silt fence ditch checks are used to slow flow of water and to intercept soil and debris from water flowing through ditches.
- Rock check dams are typically used to replace silt fence ditch checks that fail.
- Temporary sediment control basins are used to capture sediment before it leaves the right of way.
- Perimeter and slope sediment control devices are used to capture sediment or to slow flow of water.
- Silt curtain is used for soil disturbing operations in or adjacent to a body of water.
- Stabilized construction entrances are used to reduce mud tracked on to roads.
- Include a Pollution Prevention Plan (PPP) in all projects involving a land disturbance of one acre or more.
- Summary of bid quantities for Silt Basin, Silt Fence, Silt Fence for Ditch Check, and Rock Check Dam.

contact Roadside Development in the Design Bureau and the Construction and Materials Bureau for assistance.

Silt basins may be used in roadway ditches preceding drainage structure inlets (typically at last roadway pipe prior to discharging offsite) and at ditch outlets that flow offsite. Figure 1 illustrates these locations.

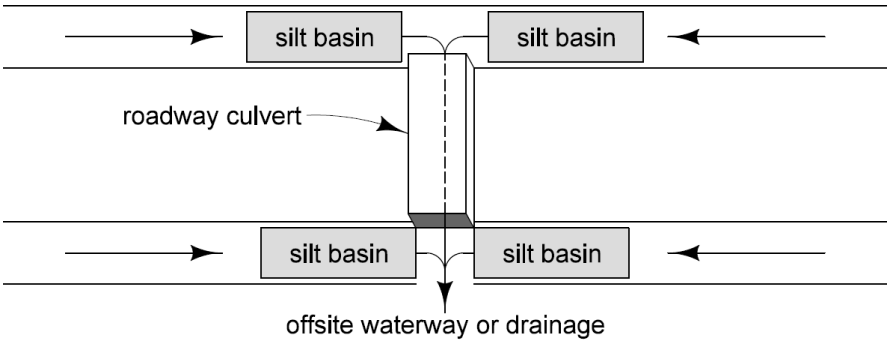


Figure 1: Typical location of silt basins.

Depending on the drainage areas, silt basins may also be placed in ditch grades of 1% to 2% at approximately 100 foot intervals. There is no maximum ditch slope for silt basins.

Standard Road Plan EW-403 shows an example of a silt basin used as a final device at the end of the ditch before water leaves the right-of-way.

Tab 100-14 is used to list silt basin locations.

Silt Basin Bid Quantities

Grading Projects

Bid quantity = tab quantity × 2. The bid quantity is at least twice the tab quantity to reflect possible excavation to clean out and maintain basins.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-14. The tabulation includes estimated locations for placement of Silt Basins to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 100% additional quantity for field adjustments and maintenance.

Paving Projects

Bid quantity = new locations × 2.5. The bid quantity is at least 2.5 times the paving tab quantity to reflect possible excavation to clean out and maintain the basins during paving project. Round the quantity up to a whole number.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-14. The tabulation includes estimated locations for placement of Silt Basins to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 150% additional quantity for the paving project for field adjustments and maintenance.

Grade and Pave Projects

One year and two year construction season projects should be treated like a grading project.

Bridge and RCB Projects

Whether a stand-alone project or as part of a grading project, treat like a grading project.

Removal of Silt Basins

Typically, Removal of Silt Basins will be included in a permanent erosion control project. Include the bid item for Removal of Silt Basins in a project only if it does not have a related permanent erosion control project.

Grading Projects

Bid quantity = tab quantity for grading project.

Paving Projects

Bid quantity = New locations for paving project.

Grade and Pave Projects

One year and two year construction season projects should be treated like a grading project.

Bridge and RCB Projects

Whether a stand-alone project or as part of a grading project, treat like a grading project.

Silt Dike and Silt Ditch

Silt dikes and silt ditches trap silt in a depressed area to keep it from flowing onto private property. A silt dike and/or a silt ditch may be used when the natural ground slopes away from the foreslope and roadway ditch is not provided. Examples of a silt dike and silt ditch are shown on Standard Road Plan EW-403.

A silt dike is constructed longitudinally along the foreslope. A silt ditch is constructed by excavating the earth to a uniform depth below natural ground at the toe of the foreslope. Silt dikes and silt ditches may be used together or separately, depending on the situation. A silt dike may be constructed by taking the excavated material from a silt ditch and placing it to the side to form a silt dike.

Use Tab. 100-13 to list locations of silt ditches and Tab. 100-15 to list locations of silt dikes.

Silt Fence

Silt fence is constructed out of engineering fabric. It is used to disrupt the flow of water. By doing this, the soil and debris will settle out of the water and collect behind the silt fence. Silt fence is placed along the contours of the slope. At a minimum, two rows of silt fence should be placed: one near the mid-slope and another near the toe of the slope. The number of rows, and spacing, depends on the length and grade of the slope. Table 1 shows recommended spacing of silt fence along a slope.

Table 1: Guidelines for silt fence spacing on slopes.

slope	approximate spacing (ft)*
up to 10:1 (10%)	100
up to 5:1 (20%)	60
up to 4:1 (25%)	50
up to 3:1 (33%)	40
up to 2.5:1 (40%)	30

*For Loess and other highly erodible soils, these spacings should be decreased.

Information Source: Based on information in Iowa Construction Site Erosion Control Manual, 2006.

Note: For slopes with lengths less than the approximate spacing listed in Table 1, contact the Agronomist to determine silt fence needs.

Silt fence typically is not required along the right-of-way line when an existing ditch will convey storm water and the existing ditch will not be disturbed during the course of the project. Silt fence should be placed around intakes when they are constructed.

Silt fence may be placed up to a maximum length of 200 feet. For every segment of silt fence that is placed, place a 20 foot J-hook segment at the lower end skewed towards the foreslope to intercept runoff (see Figure 2). This J-hook segment should be included in the tabulation and the bid items, as demonstrated in Figure 2.

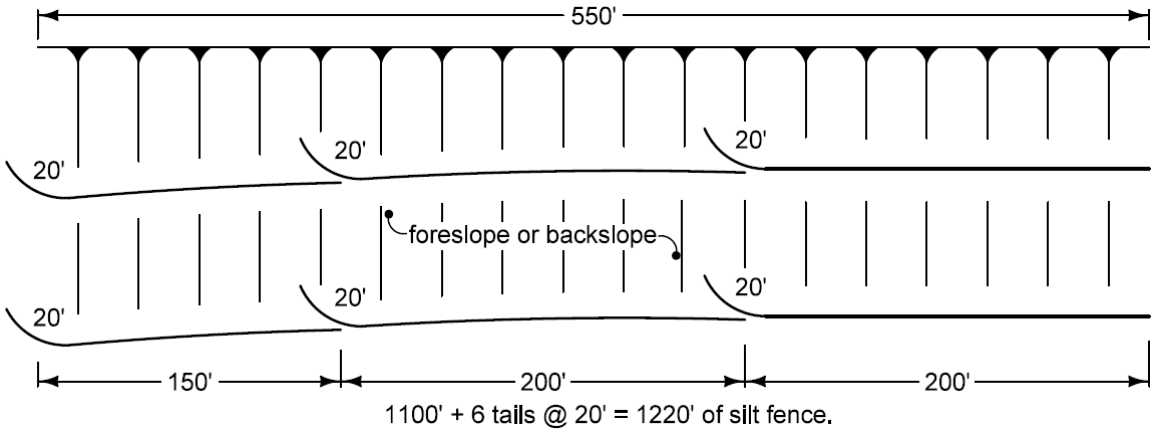


Figure 2: Silt fence placed on a slope.

Standard Road Plan EC-201 shows details for silt fences.

Use Tab. 100-17 to list silt fence locations.

Silt Fence Bid Quantities

Grading Projects

Silt Fence

Bid quantity = tab quantity × 1.25. The bid quantity should be 25% more than the tab quantity to reflect possible replacements during the grading.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-17. The tabulation includes estimated locations for placement of Silt Fence to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements.

Maintenance of Silt Fence or Silt Fence for Ditch Check

Bid quantity = (silt fence bid quantity + silt fence for ditch check bid quantity) × 0.10. The bid quantity is equal to 10% of the bid quantities for silt fence and silt fence for ditch checks.

Include the following bid item Estimate Reference Note:

> This item is included for cleanout and repair of the silt fence and silt fence for ditch checks during the project.

Removal of Silt Fence or Silt Fence for Ditch Check

Bid quantity = (silt fence bid quantity + silt fence for ditch check bid quantity) × 0.5. The bid quantity should be 50% of the bid quantities for silt fence and silt fence for ditch checks for staged projects.

Include the following bid item Estimate Reference Note:

> This item is included for silt fence and silt fence for ditch check removal required for staging reasons, for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth.

Paving Projects

Silt Fence

Bid quantity = new locations + grading tab quantity × 0.10. The bid quantity should include the new locations for the paving project plus 10% of the grading project tab quantity.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-17. The tabulation includes estimated locations for placement of Silt Fence to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes tab quantity for the paving project for new locations and 10% of the original tab quantity for the grading project (insert original tab quantity from the grading project) for field adjustments and replacements.

Maintenance of Silt Fence or Silt Fence for Ditch Check

Bid quantity = (new locations + grading bid quantities) × 0.10. The bid quantity should be 10% of the new locations for the paving project and the bid quantities for silt fence and silt fence for ditch checks installed on the grading project.

Include the following bid item Estimate Reference Note:

> This item is included for maintaining the new silt fence and silt fence ditch checks installed for the paving project and existing silt fence and silt fence for ditch checks installed as part of the grading project.

Removal of Silt Fence or Silt Fence for Ditch Check

Bid quantity = (new locations + grading bid quantities) × 0.10. The bid quantity should be 10% of the new locations for the paving project and the bid quantities for silt fence and silt fence for ditch checks installed on the grading project.

Include the following bid item Estimate Reference Note:

> This item is included for silt fence and silt fence for ditch check removal required for staging reasons, for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth.

Grade and Pave Projects

One year and two year construction season projects should be treated like a grading project (except as noted below).

Removal of Silt Fence or Silt Fence for Ditch Check

Include 100% of silt fence and silt fence for ditch check bid quantities for projects with permanent seeding. Include 50% of silt fence and silt fence for ditch check bid quantities for staged projects (projects that are broken into grading only, paving only, etc.).

Include the following bid item Estimate Reference Note:

> This item is included for silt fence and silt fence for ditch check removal required for staging reasons, for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth.

An additional mobilization will be needed for the paving portion of the project if one of the items listed in Section 1G-5 is included for the paving portion the project.

Bridge and RCB Projects

Whether a stand-alone project or as part of a grading project, treat like a grading project (except as noted below).

Removal of Silt Fence or Silt Fence for Ditch Check

The bid quantity should be 100% of silt fence and silt fence for ditch check bid quantities for projects with permanent seeding. For staged projects (projects that are broken into grading only, paving only,

etc.), bid quantity should be 50% of silt fence and silt fence for ditch check bid quantities for staged projects.

Include the following bid item Estimate Reference Note:

> This item is included for silt fence and silt fence for ditch check removal required for staging reasons, for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth.

Silt Fence for Ditch Checks

Silt fence ditch checks are used to slow flow of water and to intercept soil and debris from water flowing through ditches. They are installed at right angles to the flow of water.

When rolled erosion control products are used in ditches or medians, use perimeter and slope sediment control devices for ditch checks rather than silt fence.

Follow the spacing guidelines in Table 2 when placing silt fence ditch checks.

Table 2: Guidelines for silt fence ditch check spacing.

ditch grade	approximate spacing (ft)
≤ 0.5%	315
> 0.5% to ≤1%	155
> 1% to ≤1.5%	100
> 1.5% to ≤ 2%	75
> 2% to ≤ 2.5%	60
> 2.5% to ≤ 3%	50
> 3% to ≤ 3.5%	45
> 3.5% to ≤ 4%	40
> 4% to ≤ 5%	35
> 5% to ≤ 5.5%	30
> 5.5% to < 6%	25
≥ 6%	Special design required – contact the Agronomist

Standard Road Plan EC-201 shows details for silt fence ditch checks.

Use Tab. 100-18 for location and storage volume of silt fence ditch checks.

Silt Fence for Ditch Check Bid Quantities

Grading Projects

Silt Fence for Ditch Checks

Bid quantity = tab quantity × 1.50. The bid quantity should be 50% more than the tab quantity to reflect possible replacements during the grading project.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-18. The tabulation includes estimated locations for placement of Silt Fence for Ditch Checks to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for field adjustments and replacements.

Maintenance of Silt Fence or Silt Fence for Ditch Check

Refer to Silt Fence Bid Quantities above.

Removal of Silt Fence or Silt Fence for Ditch Check

Refer to Silt Fence Bid Quantities above.

Paving Projects

Silt Fence for Ditch Checks

Bid quantity = new locations + grading tab quantity × 0.10. The bid quantity should include the new locations for the paving project plus 10% of the grading project tab quantity.

Include the following bid item Estimate Reference Note:

> Refer to Tab. 100-18. The tabulation includes estimated locations for placement of Silt Fence for Ditch Checks to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes tab quantities for the paving project for new locations and 10% of the original tab quantity for the grading project (insert original tab quantity from the grading project) for field adjustments and replacements.

Maintenance of Silt Fence or Silt Fence for Ditch Check

Refer to Silt Fence Bid Quantities above.

Removal of Silt Fence or Silt Fence for Ditch Check

Refer to Silt Fence Bid Quantities above. An additional mobilization will be needed if one of the items listed in Section 1G-5 is included in the project.

Grade and Pave Projects

One year and two year construction season projects should be treated like a grading project.

Bridge and RCB Projects

Whether a stand-alone project or as part of a grading project, treat like a grading project.

Rock Check Dams

Similar to silt fence ditch checks, rock check dams are used to slow flow of water and to intercept soil and debris from water flowing through ditches. They are installed at right angles to the flow of water. Typically, they are installed in situations where silt fence ditch checks have failed to hold up. For this situation, the quantity bid is based on a percentage of Silt Fence for Ditch Check. Should the Roadside Development Section specifically request the use of rock check dams for storm water storage purposes, follow the spacing guidelines in Table 3.

> **Note:** Rock check dams cannot be used within the construction clear zone. Refer to the Clear Zone Distances for Temporary Traffic Control Zones section in Section 8A-2 for information related to construction clear zone.

Table 3: Guidelines for rock check dam spacing.

ditch grade	approximate spacing (ft)
≤ 0.5%	400
> 0.5% to ≤1%	200
> 1% to ≤ 1.5%	130
> 1.5% to ≤ 2%	100
> 2% to ≤ 2.5%	80
> 2.5% to ≤ 3%	65
> 3% to ≤ 3.5%	55
> 3.5% to ≤ 4%	50
> 4% to ≤ 4.5%	45
> 4.5% to ≤ 5%	40
> 5% to ≤ 5.5%	35
> 5.5% to ≤ 6.5%	30
> 6.5% to ≤ 8%	25
> 8% to ≤ 10%	20
> 10%	Special design – contact the Agronomist

Standard Road Plan EC-302 shows details for rock check dams.

Use Tab. 100-32 for location and storage volume of rock check dams.

Rock Check Dam Bid Quantities

Used to Replace Silt Fence Ditch Check

Grading Projects

Rock Check Dam

Bid quantity = bid quantity for Silt Fence for Ditch Checks × 0.1. The bid quantity should be 10% of the bid quantity of Silt Fence for Ditch Checks to reflect possible replacement for Silt Fence for Ditch Checks during the grading project.

Maintenance of Rock Check Dam

Assume 3 cleanouts for each rock check dam. Installation of rock check dam is paid in linear feet; however, maintenance is paid per occurrence. This requires converting linear feet of rock check dam bid to a number of rock check dams maintained. To make the conversion, assume each rock check dam is 16 linear feet. Divide the linear feet bid by 16 feet per rock check dam and round up to get the equivalent number of rock check dams.

As an example, suppose 9,000 feet of Silt Fence for Ditch Check is bid for a drainage basin. Then the bid quantity for Rock Check Dam is 0.1 x 9000 feet = 900 feet. This converts to 900/16 = 57 (after rounding up) rock check dams.

Removal of Rock Check Dam

Refer to Maintenance of Rock Check Dam Quantities above to estimate the number of rock check dams to be removed.

Paving Projects

Rock Check Dam

Bid quantity = bid quantity for Silt Fence for Ditch Checks × 0.1. The bid quantity should be 10% of the tab quantity of Silt Fence for Ditch Checks to reflect possible replacement for Silt Fence for Ditch Checks during the grading project.

Maintenance of Rock Check Dam

Assume 3 cleanouts for each rock check dam. Installation of rock check dam is paid in linear feet; however, maintenance is paid per occurrence. This requires converting linear feet of rock check dam installed to a number of rock check dams maintained. To make the conversion, assume each rock check dam is 16 linear feet. Divide the linear feet of installation by 16 feet per rock check dam and round up to get the equivalent number of rock check dams.

Removal of Rock Check Dam

Refer to Maintenance of Rock Check Dam Quantities above to determine the number of rock check dams to be removed.

Grade and Pave Projects

One year and two year construction season projects should be treated like a grading project.

Bridge and RCB Projects

Whether a stand-alone project or as part of a grading project, treat like a grading project.

Used for Storm Water Storage

Rock Check Dam

Rock check dams are bid by linear feet. The bid item includes the revetment, Class 10 excavation, and engineering fabric required to construct rock check dams.

Maintenance of Rock Check Dam

Assume 3 cleanouts for each rock check dam.

Removal of Rock Check Dam

Include 1 removal for each rock check dam installed.

Temporary Sediment Control Basins

Temporary sediment control basins are used to capture sediment before it leaves the right of way. At a minimum, they should be included for drainage basins which involve 10 or more acres of disturbed area. Disturbed areas are areas where vegetation, rocks, pavement and other protective ground covers are removed during construction resulting in the exposure of underlying soil. Temporary sediment control basin structures are larger than other temporary sediment control devices and are intended to detain more storm water. They include a pipe, the intent of which is to release water from the top of the pond first to allow sediment to settle out. They also include a rock spillway to reduce likelihood of the structure washing out.

Standard Road Plan EC-601 shows details for temporary sediment control basins.

Use Tab. 100-33 for location and storage volume of temporary sediment control basins.

Temporary Sediment Control Basin Bid Quantities

Temporary Sediment Control Basin

Temporary sediment control basins are bid by count. The bid item includes the materials and labor to construct them.

Maintenance of Temporary Sediment Control Basin

Assume 3 cleanouts for each temporary sediment control basin.

Removal of Temporary Sediment Control Basin

Include 1 removal for each temporary sediment control basin installed.

Perimeter and Slope Sediment Control Devices and Ditch Check Sediment Control Devices

Perimeter and Slope Sediment Control Devices and Ditch Check Sediment Control Devices are used for a purpose similar that of silt fence – to capture sediment or to slow flow of water. However, the use of these devices is much more flexible than silt fence. For example, this type of control may be installed when weather or site conditions do not permit installation of silt fence, or when it is preferred, as a result of the contractor's staging, to install a control that can be easily removed and replaced. Because of this flexibility, placement of these controls is difficult to determine during design.

Perimeter and Slope Sediment Control Device and Ditch Check Sediment Control Device Bid Quantities

Perimeter and Slope Sediment Control Device

Where Perimeter and Slope Sediment Control Devices are used in lieu of silt fence, and specific locations have been determined, use the guidelines in Table 4 for estimating purposes. On slopes, use 12 inch devices for slopes/grades less than 33% and use 20 inch devices for slopes/grades equal to or greater than 33%. Refer to Table 4 for spacing.

Table 4: Guidelines for Perimeter and Slope Sediment Control Device spacing on slopes.

slope	approximate spacing (ft)		
	9 inch device	12 inch device	20 inch device
4:1 and flatter	40	60	80
3:1	30	45	60
2:1	20	30	40
1:1	10	15	20

Note: Perimeter logs are sold in 10 foot increments, so estimates should be rounded up to the next 10 foot increment.

If specific locations for Perimeter and Slope Sediment Control Devices haven't been determined, then for estimating purposes include the greater of:

- A minimum of 200 feet each of 12 inch and 20 inch Perimeter and Slope Sediment Control Devices or
- 10% of the silt fence quantities up to a maximum of 1,000 feet each of 12 inch and 20 inch Perimeter and Slope Sediment Control Devices.

Some specific locations where use of Perimeter and Slope Sediment Control Devices is ideal include:

- Slopes which are pitched towards the roadway and end at the back of curb or along a sidewalk.
- Inlet protection, such as on guardrail projects to protect inlets of median pipes. Quantity should be based on the number of inlets to be protected.
- RCB or Bridge Projects. Estimated quantity for 12 inch or 20 inch devices would be the length of stream from ROW line to ROW line. If work is being done on both sides of the stream, the quantity would be doubled.

Removal of Perimeter and Slope Sediment Control Devices is bid in the same manner as installation.

Ditch Check Sediment Control Devices

When Ditch Check Sediment Control Devices are used in lieu of silt fence ditch checks, use the guidelines in Table 5 for estimating purposes. Only 12 inch and 20 inch devices are used. Typically, 12 inch devices are limited to use in medians; 20 inch logs are used elsewhere. In the estimate reference note, state 20 foot logs are to be used. Refer to Table 5 for spacing.

Table 5: Guidelines for Ditch Check Sediment Control Device spacing.

ditch grade	approximate spacing (ft)	
	12 inch device	20 inch device
≤ 1%	92	133
≤ 2%	46	67
≤ 3%	31	44
≤ 4%	23	33
≤ 5%	18	27
≤ 6%	15	22
≤ 7%	13	19
≤ 8%	11	17
≤ 9%	10	15
≤ 10%	9	13

If specific locations for Ditch Check Sediment Control Devices haven't been determined, then for estimating purposes include the greater of:

- A minimum of 200 feet each of 12 inch and 20 inch Ditch Check Sediment Control Devices, or
- 10% of the Silt Fence for Ditch Check quantities up to a maximum of 1000 feet each of 12 inch and 20 inch Ditch Check Sediment Control Devices.

Removal of Ditch Check Sediment Control Devices is bid in the same manner as installation.

Silt Curtains

Include the Developmental Specifications for Floating Silt Curtain as well as EC-202, which shows installation of hanging and containment silt curtains.

Floating Silt Curtain (Hanging)

Use for soil disturbing operations in or adjacent to a body of water and when requested by the ADE.

Estimate quantities based upon the width from need line to need line or width from need line to need line plus easements (whichever is greater) at the location. For bridges, use 2x the need line to need line (or need line to need line plus easement) width when both berms are impacted or 1x the width if only one berm is affected. The main point is to have a bid item and a reasonable quantity in the plans for the field to work with, so there is no need to be overly precise.

> **Note:** Floating silt curtain is supplied in 50 foot lengths, so estimates should be rounded up to the next 50 foot increment (though not all 50 feet needs to be installed in the water – some of the curtain may be placed on the bank).

Cleanout is not required and removal is incidental to installation.

For culvert projects, a temporary stream diversion (EW-402) is typically included instead of floating silt curtain.

Floating Silt Curtain (Containment)

Use when specified by the Location and Environment Bureau or when requested by the ADE. It is intended for sensitive areas, protected waters, and where endangered aquatic species are expected to exist. When this item is used, it is installed parallel to the Hanging curtain and both bid items will be used.

Estimated quantities for Floating Silt Curtain (Containment) are the same as used for Hanging. For example, if you have 200 LF of Hanging and OLE says to use Containment also, then you will also have 200 LF of Containment. Include the Clean-out of Floating Silt Curtain (Containment) bid item. The clean-out quantity will be 2x the Floating Silt Curtain (Containment) quantity, as it includes one

interim cleanout plus removal. The removal is paid for as one cleanout since the curtain has to be removed to clean it out.

Examples

1. **Bridge Project**
   Need line to need line is 150 feet. Work is on both sides of the stream. Containment is not specified by OLE. Bid as follows:
   - Floating Silt Curtain (Hanging) = 150 × 2 = 300 feet.
2. **ER Project**
   Need line to need line is 100 feet. Only one bank is disturbed. Not directed to use Containment. Bid as follows:
   - Floating Silt Curtain (Hanging) = 100 × 1 = 100 feet.

Maintenance of Floating Silt Curtain (Hanging or Containment)

Bid quantity = Floating Silt Curtain × 0.50. The bid quantity is equal to 50% of the tab quantities for Floating Silt Curtain.

Best Management Practices (BMPs) for erosion and sediment control measures are required throughout the site and immediately uphill of the curtains to minimize sediment migration to the curtains.

Other Criteria when Determining Controls or Bid Quantities

Soil conditions, such as erodibility, should be considered when choosing a sediment control device. For example, sands and silts erode quickly, but clays are more stable. Highly erodible soils may require more devices with a closer spacing than more stable soils. Design decisions should be made on the field exam. For assistance in design or for more information, contact Roadside Development.

On paving projects where sediment control devices have already been installed on the grading project, it is the intent that these be maintained in functional condition during the paving contract. A certain percentage of the original quantity of sediment control devices from the grading project is included on the paving project to account for the reconstruction of the existing devices that are no longer functional (see Bid Quantities of corresponding sediment control device). A tabulation of sediment control devices from the grading project should not be included in the paving project. Instead, include a note in the bid items to distinguish this quantity. The paving project may also have locations of new devices exclusive to the paving project to be included in the bid items. Once again the quantities depend on the existing conditions of the project.

Stabilized Construction Entrance

Stabilized construction entrances are temporary entrances consisting of a layer of aggregate placed on a mat of engineering fabric. The purpose of stabilized construction entrances is to reduce mud tracked on to the roadway, so they should be located at points where construction traffic leaves a construction site and enters on to a public road. Construction staging affects where contractors will enter a roadway. This makes determining the location and number of stabilized construction entrances difficult to determine, so for estimating purposes, assume the following:

- For grading or grade and pave projects: 1 entrance at the start of the project, 1 entrance at the end of the project, 2 for each leg of a side road used to access a project, and 1 per structure (bridge or box culvert), if included with grading or paving project.
- Each entrance will be 100 linear feet.
- For stand-alone structures project: 2 entrances.

As an example, for a grade and pave project with 3 side road legs used for access and 2 structures:

Number of entrances = 1 at the start + 1 at the end + 6 for the side road legs + 2 for the structures
= 10 entrances

Linear feet of Stabilized Construction Entrance = 10 entrances × 100 linear feet per entrance
= 1,000 linear feet

Pollution Prevention Plans – Stormwater Permit

Include a Pollution Prevention Plan (PPP) in all projects involving a disturbed area of one acre or more. A disturbed area is an area where vegetation, rocks, pavement and other protective ground covers are removed during construction resulting in the exposure of underlying soil. All projects requiring a PPP must show drainage patterns. For projects such as shoulder widening, shoulder strengthening, guardrail blisters, etc., as-builts can be included as U sheets to show drainage patterns.

The same PPP must appear in all plans that occur within a permit's limits. Therefore, when covered under a single permit, if a PPP is developed for a grading project, the same PPP must appear in all related plans for paving, culverts, bridges, lighting, erosion control, etc. This means even if a bridge or RCB project within the permit limits involves less than an acre of disturbance, it is covered under the permit and therefore must contain a PPP. See Section 10D-1 for more information regarding PPPs.

Chronology of Changes to Design Manual Section:

010C-001 Temporary Sediment Control Devices

3/4/2021	Revised Added information regarding Ditch Check Sediment Control devices and bid items.
8/9/2018	Revised Changed reference to Detail 570-2 to Standard Road Plan EC-302. Changed reference to Detail 570-3 to Standard Road Plan EC-601.
5/9/2017	Revised Added guidance to use perimeter and slope sediment control devices as ditch checks rather than silt fence when rolled erosion control devices are used in ditches and medians.
11/16/2016	Revised Provided additional information related to bidding Removal of Silt Basins. Added information stating if silt fence is installed on a slope, at least two rows should be installed, with one at the mid-slope. Added information to contact the Agronomist for silt fence needs on slopes less than those in Table 1. Added Tables 4 and 5 for Permeter and Slope Sediment Control Devices used on slopes and for ditch checks. Changed Floating Silt Curtain (Hanging) quantity estimate to be calculated from need line to need line instead of ROW to ROW. Added information stating all projects requiring a PPP must show drainage patterns. Revised Bid Item Summary Table to include Removal of Silt Basin.
1/7/2016	Revised Revised silt fence ditch check spacing in Table 2. Removed information on page 7 regarding use of floating silt curtain (hanging) for use with culverts. Changed silt fence maintenance and removal bid quantities to be based on installation bid quantities.
7/22/2014	Revised Added Quick Tips. Added link to Erosion and Sediment Control Field Guide. Added additional information regarding use of floating silt curtain (hanging) and bidding Maintenance of Floating Silt Curtain. Added information regarding silt basin use. Added information for Removal of Silt Basin, Removal of Slope and Sediment Control Devices, and Removal of Perimeter and Slope Control Devices. Created summary table for erosion control bid items.
2/10/2012	Revised Updated Standard Numbers

CONSTRUCTION MANUAL

CHAPTER 7

CHAPTER 7
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CHAPTER 7
EROSION & SEDIMENT CONTROL

7.00 GENERAL INSPECTION

Inspection personnel assigned to erosion control work should review project plans, specifications, special provisions, and road standards pertaining to erosion control. The right-of-way contracts should be reviewed for special treated areas not mentioned on the plans. For seeding, fertilizing, and mulching, a pre-measurement using slope distances of the project is needed before the contractor starts. Both the contractor and inspector should know the quantities of seed, fertilizer, and mulch required on the project.

Attention should be given to the erosion control plan and proposal notes for the special items and conditions involved with each individual project. This will include seed mixtures, seed variety, fertilizer type and rate, and required watering.

Material delivered to the project and damaged due to improper storage or handling should be rejected, even though it may have been previously accepted.

Specification 4169 should be referred to for material requirements.

The testing requirements for seed and fertilizer are outlined in *Materials I.M. 469.02 and 469.03*.

If possible, the inspector should observe the application of seed, fertilizer, and mulch. If the inspector is not present, the contractor should collect and provide tags/tickets for the seed, fertilizer, and mulch applied so the inspector can verify quantities placed.

Record the quantities of these materials used in the project records.

Witnessing the mixing of seed for Native Grass, Wildflower and Wetland Grass seeding mixtures is no longer required by the specifications. Instead, these mixes and urban and permanent rural seed mixes shall be mixed off-site by a seed conditioner approved by the Iowa Crop Improvement Association or other state's crop improvement association.

All revisions made to the seed mixtures, fertilizer, or rate of fertilizer should be approved by the Construction and Materials Bureau or the Design Bureau (Roadside Development Section).

Current seed supply issues and recommended substitutions are provided at:
https://iowadot.gov/construction_materials/Earthwork-and-erosion-control

7.01 EQUIPMENT

Proper equipment in good working condition and operated at a reasonable speed must be used to get the best results. Where possible, the equipment should be operated on the contour or parallel to the slope.

Equipment for preparation of the seedbed includes a disc, cultipacker, spike tooth harrow, spring tooth harrow, slope harrow, and a rotary tiller. Other equipment may be approved for use provided that it achieves the desired results.

A heavy disc, such as a Rome disc, may be required in areas of heavy vegetation. A slope harrow may be required in areas of light soil, where equipment tracks damage the

appearance of the seedbed.

Equipment for applying seed and fertilizer consists of a hydro-seeder, gravity seeder, end gate cyclone seeder, cyclone seeder, slit seeder, drop seeder, and a seed drill. The cyclone seeder (hand seeder) is usually used to spread seed and fertilizer in small areas or areas inaccessible to field equipment. If allowed by the contract documents, aerial equipment may be used for the application of seed and fertilizer. Contract documents may also specify where seeding must be done with a seed drill with a no-till attachment.

Equipment should be checked for proper rate of application of seed and fertilizer by measuring a representative area and weighing the required amount of seed to be applied. All seeders must be cleaned when changing seed mixtures, particularly when changing from rural seeding to urban seeding.

7.02 CONTRACT ADMINISTRATION

Both the project engineer and the inspector should review the construction period shown on the proposal form. On most projects, the contract will have a late start date with a specified number of work days.

For overseeding, the work is to be done during February and March when the soil is friable from frost action. Working days are not to be charged until April 1, unless winter work is required in the contract documents.

The placement of special ditch control for the spring planting period should be done as soon as weather and soil will allow. After April 1, working days should be charged whenever it is possible to perform the controlling operation.

7.10 PERMANENT EROSION CONTROL

The normal periods for permanent urban and rural seeding are from March 1 to May 31 and from August 10 to September 30. Native grass and wildflower seeding dates are between April 1 through May 31 and November 1 until ground conditions are unsuitable for seeding due to moisture or frost. Wetland seeding dates are between April 1 and June 30. Spring overseeding is typically performed after February 1 and before April 1. Refer to *Construction Manual Section 7.16* for more information on overseeding.

These dates may be modified by the Construction and Materials Bureau or the Design Bureau (Roadside Development Section). Changes in the dates will be based on temperature and moisture conditions and possibly specific project considerations.

Seeding date extension notices will be posted on the Construction and Materials Bureau website:
https://iowadot.gov/construction_materials/Earthwork-and-erosion-control

Any other extensions or dormant seeding are at the discretion of the Engineer on a project-by-project basis.

7.11 PREPARATION OF SEEDBED

Before seeding operations commence, care should be taken to properly prepare the area to be seeded. Areas around culvert headwalls and wingwalls, shoulders, flumes, signposts, and other structures require special attention. The seedbed shall be worked to a depth of at least 3 inches deep with field machinery and at least 2 inches deep in locations prepared by hand. The specifications require certain areas such as raised medians, islands, and rest areas to be prepared with a Rototiller.

All debris, including stones 3 inches in diameter and larger, logs, stumps, wire, and other objectionable material shall be picked up and disposed of off the project.

If there is enough vegetative growth (i.e., weeds or temporary seeding) to sufficiently interfere with proper seedbed preparation, the contractor is to mow before seeding at no additional cost to the Contracting Authority, unless indicated otherwise in the plans. Or in the case of installing permanent native grass seed using a drill with a no till attachment, no seedbed preparation is required. However, mowing of temporary seeding may be required.

7.12 PREPARATION OF SEED MIXTURE

Seed

Permanent rural, permanent urban, urban stabilizing, Native Grass, Wetland Grass, and Wildflower seeding mixtures are required to be mixed off-site by a seed conditioner approved by ICIA or other state's Crop Improvement Association. For more information on the seed conditioner program, refer to ICIA website:
http://www.iowacrop.org/Seed_Directory.htm. Additional links are provided at:
https://iowadot.gov/construction_materials/Earthwork-and-erosion-control

Mechanically printed seed tags and the seed mixture reports should be checked to verify that it complies with minimum purity and germination requirements, current test data, and variety. The date of the germination test should be checked also. The specifications, based on the Iowa Department of Agriculture regulations, require that the test date be within a 9-month period exclusive of the calendar month in which the test was completed. For example, seed tested 8/5/12 shall be applied by 5/31/13. If seed is

to be applied after 5/31/13, then seed requires a new test. Refer to *Materials IM 469.02* for more information on acceptance of seed.

If the test information indicates noncompliance for purity and germination requirements, the seed may be used on a pure live seed (PLS) basis providing:

- Seed meeting the requirements cannot be obtained, and
- The seed meets the approval of the project engineer.

For each seed variety or mix, remove and retain at least one seed tag per day of seeding that was inspected. If the inspector is not onsite, then the contractor should collect and provide tags/tickets for the seed, fertilizer, and mulch applied so the inspector can verify quantities placed.

When seed is used on a pure live seed basis (PLS), the quantity required must be calculated from test results. If the project requires 10 pounds of Switchgrass PLS per acre, and the tag rated the furnished seed at 98% purity and 95% germination, the pure live seed is computed as follows:

Purity	= 98% = 0.98
Germination	= 95% = 0.95

PLS (Pure Live Seed)	= Purity X Germination
	= 0.98 X 0.95
	= 0.93 = 93% PLS

To calculate the number of pounds of seed required to provide 10 pounds PLS:

10 pounds / 0.93 = 10.75 pounds of seed per acre

Sticking Agent

Seed to be inoculated shall be treated with a sticking agent prior to the application of the inoculant. A sticking agent is not required with liquid inoculant.

Inoculant

An inoculant is required for legume seed. An inoculant is a culture of bacteria specifically formulated to enhance the growth of the seed. The inoculant shall be a type recommended by the manufacturer and applied at the rate according to our specifications.

Red clover is an example of a legume that was previously specified in stabilizing crop seeding.

Seed Mixtures

Each bag shall have seed tags with information such as seed species, lot numbers, seed test date and seeding rate percentages (which is oftentimes shown as purity for the mixture).

For example:

Oat	47.5%
Grain Rye	46.5%
Canada wildrye	4.8%
Other	1.2%

A 50 pound bag of mixed seed would contain 23.75 pounds of Oat, 23.25 pounds of Grain rye, and 2.4 pounds of Canada wildrye.

The seed mixture reports should also include the project number, seed test information, and lot numbers.

The Department is not obligated to purchase remaining amounts of premixed seed as "unincorporated material."

7.13 RURAL SEEDING

The following suggested sequence of operations for temporary rural seeding (also called rural stabilizing crop seeding) is as follows:

1. Prepare seedbed (except for stockpiles where areas are not accessible to field equipment)
2. Apply fertilizer and roll prior to seeding
3. Apply seed with gravity, cyclone, hydraulic, native grass seed drill with split rate application (no less than two passes).
4. Cover seeding and fertilizing with a light disking or other tillage equipment such as a rigid harrow, spring tooth harrow, or field cultivator.
5. Follow tillage with a cultipacker.
6. Apply mulch.
7. Tuck mulch with mulch anchoring equipment

The following suggested sequence of operations for permanent rural seeding when seedbed preparation is required by the specifications is as follows:

1. Prepare seedbed
2. Disk in fertilizer and roll the area prior to application of permanent seed.
3. Apply seed using drop seeder (with pulverizer rollers and packer wheels) with split rate application (no less than two passes).
4. Apply mulch.
5. Tuck mulch with mulch anchoring equipment

The following suggested sequence of operations for permanent rural seeding when seedbed preparation is not required by the specifications is as follows:

1. Seedbed preparation is not required.
2. Apply fertilizer (but no disking).
3. Apply seed with slit seeder or with native grass seed drill with a no till attachment with split rate application (no less than two passes).
4. Roll after application of seed.

7.14 HYDRO-SEEDING (HYDRAULIC SEEDING)

The suggested sequence of operations using a hydro-seeder is:

1. Prepare seedbed
2. Apply fertilizer, seed, inoculant, and water with hydro-seeder
3. Roll with cultipacker
4. Place mulch where specified
5. Tuck mulch with mulch anchoring equipment (step not required if hydro-mulch is used)

The following items should be noted when inspecting hydro-seeding:

A fanning motion or horizontal motion of the seeding nozzle insures uniform application of the seed. Do not use an "up and down" motion; it results in seed application too heavy near the seeder and too thin at the far reach of the spray.

The seeder tank must be cleaned when changing seed mixtures.

The agitator in the seeder tank must be in operation for a period of time prior to starting the seeding to insure mixing of the material in the tank. After mixing and during application of material, a continuous operation with a constant pressure must be maintained during the seeding.

The contractor should apply the mixture of water, seed, and fertilizer with the wind, if possible. The contractor should try to prevent mist from blowing across the roadway if open to traffic.

The seed may be in the fertilizer solution for no more than one hour.

If hydraulic mulching is used with hydraulic seeding, they must be performed as separate operations. To keep seed from floating to the top in the equipment during hydraulic seeding, a bag of hydraulic mulch may be added to the seed. However, this bag will not be included as part of the required mulching rate (minimum 3,000 pounds per acre).

7.15 URBAN SEEDING

The suggested sequence for temporary seeding in urban areas is:

1. Seedbed prep with a rotary tiller
2. Apply fertilizer and roll prior to seeding. For rolling, use either open grid type equipment or cultipacker type equipment modified by covering with expanded metal mesh.
3. Apply seed with gravity, cyclone, hydraulic, native grass seed drill with split rate application (no less than two passes).
4. Roll after application of seed.
5. Apply mulch (typically hydraulic mulch is used in urban situations).

The suggested sequence for permanent seeding in urban areas is:

- In areas with urban crop stabilizing 50% or more,
    5. Seedbed preparation is not required.
    6. Apply fertilizer (but no disking).
    7. Apply seed with slit seeder with split rate application (no less than two passes).
    8. Roll after application of seed.
- Other areas:
    1. Prepare seedbed with a rotary tiller
    2. Apply fertilizer and roll prior to seeding. For rolling, use either open grid type equipment or cultipacker type equipment modified by covering with expanded metal mesh.

3. Apply seed with gravity, cyclone, hydraulic, native grass seed drill with split rate application (no less than two passes).
4. Roll after application of seed.
5. Apply mulch (typically hydraulic mulch is used in urban situations).

7.16 NATIVE GRASS SEEDING

The suggested sequence for native grass seeding is:

1. Seedbed preparation and cultipacking will not be required. However, mowing may be required.
2. No fertilizer.
3. Apply seed with native grass seed drill with a no till attachment. Perform two passes with drill, with second pass being offset from first pass.
4. Place and tuck mulch – unless area contains rural stabilizing crop residue.

7.17 OVERSEEDING AND FERTILIZING

Spring overseeding or "frost overseeding" is the application of permanent seed without preparing a seedbed. Spring overseeding is performed normally in February or March, but may be modified depending on the weather conditions.

The following guidelines should be used to determine when spring overseeding is allowed:

- Ground is relatively free of packed snow and ice.
- Light snow cover of not more than 1 inch.
- The project may be free of snow and ice with the exception of a few ditches or slope areas. It would be permissible to allow the overseeding with the stipulation that the contractor would reapply the seed on those designated ditches or slopes as soon as the snow and ice have melted.

The application of seed when the ground is loose and friable from frost action provides a favorable condition for the earliest possible seed establishment. The application of seed prior to this ideal condition is more favored than after the ground is free of frost and dry. Seed applied when the ground is frozen is not generally detrimental. The loss of seed due to runoff, in the event of heavy spring rains or snow melt, should be minor.

7.18 AERIAL SEEDING

Aerial seeding is only allowed when specified in the contract documents. The distribution of seed on the ground should be checked during the aerial seeding operation. If a significant quantity of seed falls onto the roadway shoulders or off of the right-of-way, the seeding operation should be halted, and corrective action taken. For aerial application, the wind velocity should be less than 10 mph.

As a guide, the following is a part of the Beaufort Scale for wind velocity:

Type	Observations	Speed (mph)
Calm	Calm. Smoke rises vertically.	(0-1)
Light air	Direction of wind shown by smoke drift but not by wind vanes.	(1-3)

Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.	(4-7)
Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flags.	(8-12)
Moderate breeze	Raises dust and loose paper. Small branches are moved.	(13-18)
Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters.	(18-24)

A subcontract request form is not required for the aerial applicator (airplane or helicopter), which is usually owner-operated.

Guidelines to allow/disallow use of local roads for takeoff and landing of planes which seed areas on primary projects are:

- Primary roads or local roads designated as detours shall not be used for takeoff/landing
- Takeoff/landing should be with written permission of the county engineer or local agency and with traffic control and signing as required by the owner of the road
- The owner of the road may, at their discretion, ask the applicator for:
  -- A “waive and hold harmless” agreement to reduce liability
  -- Proof of insurance
- Federal Aviation Regulations (FAR) are listed in Title 14 of the U.S. Code of Federal Regulations. They are available to view at Web address: https://www.faa.gov/regulations_policies/faa_regulations/

Applicable regulations are “FAR Part 91 – General Operating and Flight Rules” and “FAR Part 137 – Agricultural Aircraft Operations”.

7.20 FERTILIZER

Fertilizer shall include the following information on the bag ticket or manufacturer's invoice:

- net weight
- name of the manufacturer and/or distributor
- guaranteed analysis of the fertilizer

These should be checked by the inspector in order to insure correct fertilizer grade and amount. "Fertilizer Grade" refers to the percentages of nitrogen (N), phosphoric acid (P_2O_5) and potassium (K_2O) present. The contractor must furnish a list of the number of containers and a corresponding weight ticket from an approved scale for fertilizer used in the work.

Fertilizer spilled on the ground shall be promptly cleaned up in accordance with *Iowa Administrative Rule 21-44.57(4).*

7.21 EXAMPLE CALCULATIONS -

A. CHEMICALLY COMBINED FERTILIZER

Example No. 1

X-X-X fertilizer is specified, and contractor provides Y-Y-Y fertilizer. Determine equivalent rate of Y-Y-Y fertilizer.

Specified: 500 pounds of 12-12-12 chemically combined commercial fertilizer per acre. The contractor may furnish an equivalent grade such as 10-10-10, 13-13-13, 14-14-14, 15-15-15, 16-16-16, etc., chemically combined fertilizer. The nutrients in the above grades of fertilizer are of the same ratio (1-1-1).

To calculate the pounds of 13-13-13 fertilizer needed to provide the plant nutrients specified for 500 lbs. of 12-12-12, divide the percent of the required analysis by the percent of the furnished analysis for the same nutrient.

$$\frac{\text{500 lbs. per acre x 12\% required}}{\text{13\% furnished}} = \frac{500\ (12)}{13} = 462 \text{ lbs. per acre}$$

Therefore, 462 lbs. of 13-13-13 is equivalent to 500 lbs. of 12-12-12.

If hydro-seeder is used, the contractor may furnish each nutrient as a separate material or use two or more chemically combined nutrients.

Example No. 2

X-X-X fertilizer is specified, and contractor provides three other types of fertilizer. Contractor has also provided their proposed application rates. Determine if the provided application rates are equivalent.

400 lbs. of 14-14-14 per acre is specified. The contractor has furnished the following fertilizer grades and amounts: 140 lbs. of 30-10-0, 88 lbs. of 16-48-0, and 94 lbs. 0-0-60. Determine if what the contractor has provided is equivalent.

1) Compute the lbs. of each nutrient required per acre:

   400 lbs. x 14% (N) = 56 lbs. N
   400 lbs. x 14% (P_2O_5) = 56 lbs. P_2O_5
   400 lbs. x 14% (K_2O) = 56 lbs. K_2O

2) Compute the lbs. of each nutrient provided per acre:

   N: 140 lbs. x 30% + 88 lbs. x 16% = 42 + 14.1 = 56.1 lbs.
   P_2O_5: 140 lbs. x 10% + 88 lbs. x 48% = 14 + 42.2 = 56.2 lbs.
   K_2O: 94 lbs. x 60% = 56.4 lbs.

3) Compare amounts provided in (2) to amounts required in (1)

   N: 56.1 lbs. is greater than or equal to 56 lbs.
   P_2O_5: 56.2 lbs. is greater than or equal to 56 lbs.
   K_2O: 56.4 lbs. is greater than or equal to 56 lbs.

So, the contractor has provided fertilizers that meet the required rates and they are equivalent.

Example No. 3

X-X-X fertilizer is specified, and contractor provides three other types of fertilizer. Determine equivalent rates for the three other types.

Specified: 500 lbs. of 12-12-12 per acre. The contractor may furnish the following fertilizer grades to meet the nutrient requirements: 30-10-0, 16-48-0, and 0-0-60.

1) Compute the lbs. of each nutrient required per acre:
   500 lbs. x 12% (N) = 60 lbs. N
   500 lbs. x 12% (P_2O_5) = 60 lbs. P_2O_5
   500 lbs. x 12% (K_2O) = 60 lbs. K_2O

2) Compute the lbs. of 0-0-60 needed to furnish 60 lbs. of K_2O:
   $\frac{\text{60 lbs. } K_2O \text{ required}}{\text{60\% furnished}} = \frac{60}{0.60}$ = 100 lbs. of 0-0-60

   OR

   $\frac{\text{500 lbs. per acre x 12\% required}}{\text{60\% furnished}} = \frac{500\ (12)}{60}$ = 100 lbs. of 0-0-60

3) Compute the lbs. of 30-10-0 and the lbs. of 16-48-0 needed to furnish 60 lbs. of N and 60 lbs. of P_2O_5:
   X = 30-10-0 component Y = 16-48-0 component

   a) N = 0.30X + 0.16Y = 60
      P_2O_5 = 0.10X + 0.48Y = 60

   b) Solve equations in (a) simultaneously
      30 (0.30X) + 30 (0.16Y) = (30) (60)

9X + 4.8Y = 1800

c) 10 (0.10X) + 10 (0.48Y) = (10) (60)
1X + 4.8Y = 600

d) Subtract equation (c) from equation (b) and solve for X.
(9X + 4.8Y) = 1800
- (1X + 4.8Y) = 600
8X = 1200
X = 150 lbs.

e) Substitute X into 1st equation in (a) and solve for Y.
0.30X + 0.16Y = 60
(0.30) (150) + 0.16Y = 60
45 + 0.16Y = 60
0.16Y = 60 - 45
0.16Y = 15
Y = 93.7 (or 94 lbs.)

4) 150 lbs. of 30-10-0 per acre
94 lbs. of 16-48-0 per acre
100 lbs. of 0-0-60 per acre

The above quantities supply the nutrient requirements per acre that are provided by 500 lbs. of 12-12-12.

B. COLD BLENDED FERTILIZER

Cold blended fertilizer is also allowed and can be a combination of different ingredients, such as:

- Diammonium Phosphate (DAP) 18-46-0,
- Monoammonium Phosphate (MAP) 11-52-0,
- Muriate of Potash 0-0-60, and/or
- Urea 46-0-0.

Thus, one needs to understand: (1) what is required; (2) what is in these ingredients; and (3) how much of each ingredient is needed to meet the overall requirements. The following example problems will take you through calculations to help illustrate these concepts.

Additionally, a spreadsheet to determine or verify equivalent fertilizer rates is found on the Construction and Materials Bureau page:
https://iowadot.gov/Construction_Materials/earthwork_erosion/EquivalentWorksheet.xlsm

Example No. 1

The plan requires 100 pounds of 6-24-24 fertilizer per acre, but the fertilizer brought to the site is a cold mix with DAP (18-46-00) and Potash (0-0-60). The ticket indicates that there are 52.2 pounds of DAP and 40 pounds of Potash for this cold blend. Is this an equivalent amount of fertilizer for 1 acre?

1) Check if there is an equivalent amount of nitrogen and phosphoric acid (P_2O_5) provided by the DAP (18-46-00):

   Nitrogen: $\frac{\text{100 lbs. x 6\% required}}{\text{18\% furnished}} = \frac{100\ (6)}{18} = 33.3$ lbs.

   Phosphoric acid (P_2O_5): $\frac{\text{100 lbs. x 24\% required}}{\text{46\% furnished}} = \frac{100\ (24)}{46} = 52.2$ lbs.

   Since both nitrogen and phosphoric acid are provided by DAP, the larger of the two amounts (which is 52.2 lbs.) must be used to provide at least an equivalent fertilizer amount.

   The ticket indicated there is 52.2 pounds of DAP, so this provides an equivalent amount of nitrogen and phosphoric acid (P_2O_5).

2) Check if there is an equivalent amount of potassium provided by the Potash (0-0-60):

   Potassium (K_2O): $\frac{\text{100 lbs. x 24\% required}}{\text{60\% furnished}} = \frac{100\ (24)}{60} = 40$ lbs.

   The ticket indicated there is 40 pounds of Potash, so this provides an equivalent amount of potassium.

   Therefore, 52.2 pounds of DAP and 40 pounds of Potash is an equivalent amount of fertilizer for 1 acre of 100 pounds of 6-24-24.

Example No. 2

Let's change Example 1 so that the plan actually requires 500 pounds of 6-24-24 fertilizer per acre instead of 100 pounds per acre. Since the required amount is now 500 pounds, the amounts of DAP and Potash, in this case, will have to be multiplied by a factor of 5 (500/100 = 5). Thus:

For the required 100 pounds of 6-24-24 fertilizer per acre from Example 1, it is acceptable to have 52.2 pounds of DAP (18-46-0) and 40 pounds of Potash (0-0-60) cold-blend or total weight of 92.2 pounds.

For the required 500 pounds of 6-24-24 fertilizer per acre, the cold blend must have at least 261 pounds (52.2 x 5) of DAP and 200 pounds (40.0 x 5) of Potash or total weight of 461 pounds.

Or you could perform the calculations from Example 1, substituting 500 lbs. for 100 lbs.

Example No. 3

Example No. 2 shows the amounts of different ingredients for the cold blend fertilizer with DAP and Potash when the plan requires 500 pounds of 6-24-24 fertilizer per acre (261 pounds of DAP and 200 pounds of Potash). The inspector should recognize that number of acres which are being seeded and calculate the total amount of fertilizer that should be spread.

For example: The plan requires 500 pounds of 6-24-24 fertilizer per acre and there are 35 acres that will be seeded. The contractor brings in the cold blend fertilizer with DAP and Potash. From Example No. 2, the following calculations should be done:

DAP amount: (261 pounds/acre) x 35 acres = 9,135 pounds of DAP
Potash amount: (200 pounds/acre) x 35 acres = 7,000 pounds of Potash

The inspector can use the same calculation procedure to figure the amounts of different ingredients for the project(s). The followings are some quick guidelines to check the amounts ***per acre***.

For 500 pounds of 6-24-24 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 231 pounds of 11-52-0 MAP
- 10 pounds of 46-0-0 Urea
- 200 pounds of 0-0-60 Potash

For 500 pounds of 6-24-24 fertilizer per acre with a cold blend with DAP and Potash, the individual amounts are:

- 261 pounds of 18-46-0 DAP
- 200 pounds of 0-0-60 Potash

For 400 pounds of 6-24-24 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 185 pounds of 11-52-0 MAP
- 8 pounds of 46-0-0 Urea
- 160 pounds of 0-0-60 Potash

For 400 pounds of 6-24-24 fertilizer per acre with a cold blend with DAP and Potash, the individual amounts are:

- 209 pounds of 18-46-0 DAP
- 160 pounds of 0-0-60 Potash

For 300 pounds of 6-24-24 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 139 pounds of 11-52-0 MAP
- 6 pounds of 46-0-0 Urea
- 120 pounds of 0-0-60 Potash

For 300 pounds of 6-24-24 fertilizer per acre with a cold blend with DAP and Potash, the individual amounts are:

- 157 pounds of 18-46-0 DAP
- 120 pounds of 0-0-60 Potash

For 750 pounds of 13-13-13 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 188 pounds of 11-52-0 MAP
- 167 pounds of 46-0-0 Urea
- 163 pounds of 0-0-60 Potash

For 750 pounds of 13-13-13 fertilizer per acre with a cold blend with DAP, Urea and Potash, the individual amounts are:

- 212 pounds of 18-46-00 DAP
- 129 pounds of 46-0-0 Urea
- 163 pounds of 0-0-60 Potash

For 450 pounds of 13-13-13 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 113 pounds of 11-52-0 MAP
- 101 pounds of 46-0-0 Urea
- 98 pounds of 0-0-60 Potash

For 450 pounds of 13-13-13 fertilizer per acre with a cold blend with DAP, Urea and Potash, the individual amounts are:

- 128 pounds of 18-46-00 DAP
- 77 pounds of 46-0-0 Urea
- 98 pounds of 0-0-60 Potash

For 250 pounds of 13-13-13 fertilizer per acre with a cold blend with MAP, Urea and Potash, the individual amounts are:

- 63 pounds of 11-52-0 MAP
- 56 pounds of 46-0-0 Urea
- 55 pounds of 0-0-60 Potash

For 250 pounds of 13-13-13 fertilizer per acre with a cold blend with DAP, Urea and Potash, the individual amounts are:

- 71 pounds of 18-46-00 DAP
- 43 pounds of 46-0-0 Urea
- 55 pounds of 0-0-60 Potash

Again, the separate amounts are for one acre. The inspector should multiply these amounts by the number of acres being seeded.

7.22 APPLICATION OF FERTILIZER

The fertilized area shall be disked and rolled with a cultipacker prior to seeding. The project engineer may approve the substitution of a harrow if a cultipacker cannot be operated satisfactorily.

7.30 MULCH

All permanent seeding with prepared seedbeds are required to be mulched. The mulch shall be "blown" and "tucked in" as soon after seeding as possible. Machine printed weight tickets are required for all mulch used. The inspector should receive the weight ticket and obtain a count of the bales at the time the material is delivered to the job site. The average bale weight can then be calculated.

Following the last rolling with the cultipacker, mulch should be applied to the specified areas at the required rate. A straw mulching machine capable of spreading mulch uniformly is used for applying mulch. Areas inaccessible to a straw mulching machine should be mulched by hand.

Immediately after mulch material has been applied, it should be anchored with a mulch stabilizer operated on the contour.

Mulch shall be Certified Noxious Weed Seed Free Mulch as certified by the Iowa Crop Improvement Association (ICIA) or an adjacent state's Crop Improvement Associations. To meet the requirements of the ICIA, bales should have a white certification label securely attached to the bale.

The specifications require straw to be bailed the same growing season as the grain was harvested from the plant. Mulch may consist of native grass straw, which is typically harvested beginning in August. If you encounter native grass straw on your project that is shown as harvested earlier than August of that same calendar year, contact the Office of Roadside or the Earthwork Field Engineer.

Refer to http://www.iowacrop.org/Weed_Free.htm for more information on the ICIA Noxious Weed Seed Free Mulch Program.

7.31 EXAMPLE CALCULATION

Example of area to be mulched at the rate of 1 1/2 tons/acre:

Measured area is 2.6 acres, the average weight per bale is 48 pounds. Compute as follows: 1 1/2 tons/acre X 2.6 acres = 7,800 lbs. of mulch required for the area.

Number of bales required: $\frac{7{,}800 \text{ lbs.}}{48 \text{ lbs./bale}}$ = 162 bales

7.32 HYDRO-MULCH

Hydro-mulch (or hydraulic mulch) is typically applied following the application of seed, but it may be used as a stand-alone practice just like straw mulch.

If seeding is performed in conjunction with hydro-mulching, the specifications require hydro-mulch to be applied as a separate operation.

There are different types of hydro-mulch, and each has different material properties and typical uses:

- Wood Cellulose Fiber:
  - Produced from whole wood chips or a combination of whole wood chips and recycled fiber from sawdust, recycled paper, chipboard, or corrugated cardboard
  - Use is typically limited to slopes 6:1 or flatter.

- Typically requires 24 hours to dry before rainfall occurs in order to be effective against erosion.
- Expected longevity is up to 3 months.

- Bonded Fiber Matrix (BFM):
  - Produced from long-strand wood fibers held together by organic tackifier and bonding agent
  - May be used on slopes up to and including 2:1.
  - Typically requires 24 hours to dry before rainfall occurs in order to be effective against erosion.
  - Expected longevity is 3 to 12 months.
  - Provides superior erosion protection than straw mulch or wood cellulose hydro-mulch.

- Mechanically Bonded Fiber Matrix (MBFM):
  - Produced from long-strand wood fibers and crimped, interlocking synthetic fibers.
  - May be used on slopes up to and including 2:1.
  - Requires 2-hour cure time, thus provides fast protection against erosion.
  - Expected longevity is 12 months or greater.
  - Provides superior erosion protection than straw mulch or wood cellulose hydro-mulch.

The most commonly used type of hydro-mulch used on DOT projects is BFM.

All types of hydro-mulch are dyed to facilitate visual metering during application.

The minimum rate of application is 3,000 lb./acre. The mixing chart below is based on 3,000 lb./acre:

# of 50 lb. Bales	BFM (lb.)	Water * (gallons)	Application Rate of 3,000 lb./acre	
			Sq. Ft.	Acre
1	50	67-125	726	0.017
2	100	134-250	1,452	0.033
4	200	268-500	2,904	0.067
8	400	536-1,000	5,808	0.133
16	800	1072-2,000	11,616	0.267
32	1,600	2144-4,000	23,232	0.533
64	3,200	4288-8,000	46,464	1.067
128	6,400	8576-16,000	92,928	2.133
30	1,500	2010-3,750	21,780	0.500
60	3,000	4020-7,500	43,560	1.000

*Range is provided as guidance. Water amount varies depending on manufacturer and product.

Approved sources and products of hydraulic mulch are listed in the Materials Approved Products Listing Enterprise (MAPLE).

7.40 WATER POLLUTION CONTROL (SOIL EROSION)

While this section addresses soil erosion on all projects, *Construction Manual 10.30* addresses the additional requirements of a storm water discharge permit. Coverage under the Iowa Department of Natural Resources permit is required for all construction activities which disturb more than 1 acre. The Construction & Materials Bureau obtains coverage for projects where the Iowa DOT is the Contracting Authority.

The primary objective is to control soil erosion and sedimentation caused by soil erosion during construction with reasonable and economical construction practices.

While the contract documents indicate locations of sediment control devices (silt fence, ditch checks, and silt basins), their actual location should be verified in the field by the contractor and project engineer in order to fit existing conditions and the contractor's sequencing and schedule.

The erosion and sediment control devices should not be limited to those which are included in the contract documents. The project engineer should authorize adding any device that will be most effective in controlling erosion.

The primary method for temporary erosion control is stabilizing crop seeding, fertilizing, and mulching.

Stabilizing crop seeding requires seedbed preparation as described in *Specification 2601.03, B, 4, a* and covering and compacting as described in *Specification 2601.03, C, 3*.

Where possible, the installation of silt fence or other sediment controls as perimeter control and for ditch checks should be installed prior to any soil disturbing activities occurring on the project.

7.41 CONTRACTOR REQUIREMENTS

The contractor's responsibility is to ensure that soil erosion is minimized and to prevent eroded soil from leaving the construction project onto adjacent property or entering a waterbody. Timely installation of sediment control devices, such as silt fence and ditch checks, will help to prevent this damage from occurring. The most effective erosion control practice is stabilized crop seeding which shall be done as the grading progresses. This may require the erosion control contractor to mobilize and seed more than once.

The contractor's Erosion Control Implementation Plan (ECIP) is the contractor's schedule (sequence and timing of operations) and proposed method for accomplishing the required erosion control. For projects regulated by a NPDES storm water permit, the ECIP must be submitted to the project engineer prior to the Preconstruction Conference and be accepted before commencing work.

The contractor's ECIP should include information such as that shown in the ECIP Worksheet (Appendix 7-1). Updates to the ECIP may be included on the ECIP Worksheet or the ECIP Update Checklist (Appendix 7-2). Copies of both documents are available at https://iowadot.gov/construction_materials/Earthwork-and-erosion-control

If the temporary erosion control is to be performed by a subcontractor, the subcontractor should be involved in developing the work plan, but the plan should be submitted by the Prime contractor.

On projects regulated by a NPDES storm water permit, the contractor is required to submit an amended Pollution Prevention Plan site map. This marked-up map is required to show the erosion and sediment control work performed. The contractor is required to submit this prior to payment for corresponding work items from *Specifications Sections 2601 and 2602*. Additionally, it shall be submitted no later than one week after completion of such work items. This time requirement is to comply with the storm water permit. The marked-up map shall be legible and show status of onsite controls (such as control type, installation/maintenance/removal activities, date of work, etc.). They may be completed by the prime contractor or erosion control subcontractor. Depending on the project and amount of work completed over time, the marked-up map might show all work since the start of the project, or if it becomes too cluttered with removal and maintenance mark-ups, the map may have to be restarted. However, it should show the current status of controls onsite for the contract and not just the controls that were installed over the last week. Plan views from the D/E/K sheets or the R-sheets may be used as a basis for the amended site map. Examples of marked-up plan sheets are provided in Appendix 7-3. For DOT projects, amended site maps should be uploaded to DocExpress in the Pay Items drawer (Amended PPP site map document type). For local agency projects, amended site maps should be uploaded to DocExpress in the Environmental drawer.

The prime contractor is required to designate a Water Pollution Control Manager (WPCM) for projects that are regulated by a NPDES storm water permit. *Specifications Section 2602* provides a list of the WPCM's responsibilities. One of the responsibilities is that the WPCM visit the project on a frequent basis and in no instance less than once per week during construction activities. The WPCM must be an Erosion Control Technician (ECT) or be current with Erosion & Sediment Control (ESC) Basics training. Information on the training and certification program is provided in *Construction Manual 7.43*.

Damage due to siltation on private property shall be corrected by the contractor with no expense to the contracting authority.

7.42 MOBILIZATION FOR EROSION CONTROL

Mobilization for Erosion Control is applied to projects according to *Standard Specifications 2602.03, L*. For additional clarification, a flowchart showing when Mobilization for Erosion Control applies to a project is provided in Appendix 7-4. Payment for mobilization would apply to any contract items from *Standard Specification Sections 2601 or 2602* (excluding mowing, debris pick-up, monitoring well, or removal items). Payment for Mobilization for Erosion Control also does not apply to watering since Section 2601 already provides for payment for Mobilization for Watering.

When erosion control items are incidental, there is no payment for erosion control mobilizations.

Correcting deficient work, fixing damage caused by carelessness or adding work that should have or could have been installed during an earlier mobilization wouldn't warrant payment for mobilization.

If a contractor will have separate mobilizations for different crews performing different items of work, this should be indicated in the ECIP or the ECIP updates.

The specifications provide a deduction if the contractor does not mobilize within 72 hours

of written order or if the work is not completed within 7 calendar days of written order. There is another deduct referenced in *Article 2602.03, E* when the contractor does not initiate stabilization measures as required by the NPDES storm water permit. These two different deducts should not be applied for the same days for the same work area and items.

Mobilizations for emergency erosion control should be ordered when there is a serious and urgent nature which is beyond normal maintenance of controls.

To determine if a situation warrants an emergency versus regular mobilization, review the location and the weather forecast. For example, the Engineer should order an emergency erosion control mobilization if a site has experienced a major rain event that has shown installed controls at a box culvert outlet are not adequate or have failed and there is another rain event in the immediate forecast.

7.43 EROSION AND SEDIMENT CONTROL TRAINING AND CERTIFICATION PROGRAM

On projects where there is a National Pollutant Discharge Elimination System (NPDES) storm water permit, the Contractor is required to have an Erosion Control Technician (ECT) and an Erosion & Sediment Control (ESC) Basics trained individual. Projects that require NPDES storm water permit will have a Pollution Prevention Plan in the contract documents. The ESC Basics training requirements begin for contracts let on or after October 15, 2013, and ECT requirements begin for contracts let on or after April 15, 2014.

The contractor's WPCM may fulfill the responsibilities of the ESC Basics trained individual or the ECT (if certified).

Additional information on the program requirements and FAQs is located at:
https://iowadot.gov/construction_materials/earthwork_erosion/ESControl_training

List of ECTs is provided at:
https://iowadot.gov/training/CertTechBook.pdf
This list is updated annually. It may also be updated periodically during the training season.

List of ESC Basics trained individuals is provided at:
https://iowadot.gov/training/ttcp/Erosion-Control-Basic.pdf
This list is updated approximately monthly.

During the course of a project, presence of ESC Basics trained individual should be documented periodically in the inspector's IDR.

7.50 SODDING

The suggested sequence for placement of sod is:

Shape Sodbed

Ditch channels should be shaped in order to obtain a relatively level, flat-bottom ditch which will drain without water ponding. The depth should be a minimum of 6 inches below adjacent ground. Many ditch failures result because the ditch bottom is not level, causing a concentration of flow on one side of the ditch.

Apply Fertilizer

The first application of fertilizer shall be applied prior to laying of sod. Fertilizer must be spread with a mechanical spreader at a uniform rate of application. A cyclone seeder may be used.

Place Sod

Note the quality of sod, making sure it is free of objectionable material (tree roots, brush, stones, etc.) also that it is free of noxious weeds and relatively free of all other weeds and grasses other than bluegrass. The sod is to be mowed to a height of 1 1/2 to 2 inches prior to cutting. On the sides and bottoms of ditches and channels, strips must be laid at right angles to the centerline of the channel.

The project engineer may order areas staked to prevent loss of sod before the root system becomes established. Staking of sod channels ordered by the project engineer is paid for at 25 percent of the contract price for sodding.

Sod can be placed until the ground freezes at the construction site or at the sod farm.

Finish Sod

Smooth disturbed areas along the edges of the sod. Be sure that no ridge of dirt remains alongside the sod ditch, and that the disturbed area is properly shaped and sloped to allow water to run onto the sod.

Seed

Reseed disturbed areas, using the seed mixture specified.

Mulch

Mulch disturbed areas, using the mulch rate specified.

Water

Water the sod within one hour after laying. Five additional waterings will be required with the second, third, and fourth waterings performed at 4 calendar day intervals, and the fifth and sixth waterings performed at weekly intervals. The amount of water required for sodding varies depending upon soil type, soil moisture, and local weather conditions at the time of sodding. Watering is to saturate the soil to a depth of 4 inches or a maximum of 100 gallons of water per 100 square feet. This is roughly equivalent to a 1 ½ inch rainfall but depends on soils conditions, rate of rainfall, and topography of land. Sod should be watered with a spray, and not much pressure. Too much pressure disturbs the sod and has a tendency to wash the dirt away from its edges. All areas disturbed in preparation of sod ditches must be watered with the sod after seeding, fertilizing, and mulching. The scheduled waterings may be deleted if precipitation has moistened the soil to a depth of 4 inches.

The specifications provide for a price adjustment per calendar day if the Contractor does not complete the watering.

Tamp
Tamp or roll sod as specified if necessary to secure bonding.

Special Ditch Control
Place special ditch control over the sod when specified. This material is normally specified on steep ditch grades, and at the outlet end of roadway pipes where large volumes of runoff water may occur.

7.51 PAYMENT

Payment for the sod item will not be made until the watering has been completed. If the quantity of sod to be placed is large, the sod may be paid as a stockpiled material at the time all of the sod is installed according to specifications.

If the contractor fails to maintain the sod as specified above, washed out sod must be replaced at the contractor's expense.

Payment for watering will be based on the predetermined contract unit price per 1000 gallons.

Typically, projects that have a contract item for Watering should also include a contract item for Mobilization for Watering, unless they are identified as erosion control or landscaping projects. Initial watering required at installation will not be counted for payment of Mobilization for Watering.

7.60 SPECIAL DITCH CONTROL

Special ditch control is to be placed in conjunction with seedbed as specified in *Specification 2601.03, B*.

The limits of ditches should be staked with flats or flags, and markers should be placed to one side of the ditch to remain visible during construction. The centerline of the ditch is determined by the low point of the ditch. It may be necessary to shift the ditch in order to maintain the best possible alignment and to avoid sharp turns in sod ditches.

7.61 PLACEMENT

The suggested sequence of work for special ditch control is as follows:

Shape

Shape the ditch and prepare the seedbed to a depth of no less than 3 inches. If ditches are unstable and equipment leaves them in a rough condition, the seedbed must be prepared by hand. The ditches should be shaped so that the ditch drains without water ponding and has a minimum depth of 6 inches. Minor irregularities in ditch alignment must be corrected so the completed ditch will follow the ditch line constructed during the grading operation. This may not be possible in cases of severe washing of the ditch bottom. All rocks and clods 1 1/2 inches in diameter, and all sticks and other materials, which prevent contact of the special ditch control materials with the seedbed, shall be removed.

Check Slots

Install check slots as required. Take care that all check slots are carefully and properly installed. The success of the ditch may be dependent on proper installation of the check slots.

Finish

Smooth disturbed areas adjacent to ditch control. Make sure that no ridge of dirt remains alongside the ditch, and that material excavated from the ditch channel is properly shaped and sloped to allow water to run onto the special ditch control material. This area should be raked.

Fertilize

Fertilizer should be applied at the proper rate with a mechanical spreader. A cyclone seeder may be used to secure a uniform rate of application.

Seed

Seed mixture and rate of application are specified in addition to acceptable methods of application.

Special Ditch Control Material

Special ditch control materials must be applied without tension and in the direction of the flow of water since there may be some settling of low or filled portions of the ditch and some shrinkage of the material. Do not stretch the material. Install staples as specified in the Design Standards.

7.62 WATERING

Special ditch control should be watered initially by the end of the day following installation. Water should saturate the soil to a depth of approximately 2 inches with the maximum of 50 gallons of water per 100 square feet. This is roughly equivalent to a 3/4

inch rainfall but depends on soils conditions, rate of rainfall, and topography of land. Three additional waterings are required at one week intervals, depending on weather conditions. The scheduled waterings may be deleted if precipitation has moistened the soil to a depth of 2 inches.

The specifications provide for a price adjustment per calendar day if the Contractor does not complete the watering.

7.63 PAYMENT

Payment for watering will be based on the predetermined contract unit price per 1000 gallons.

Typically, projects that have a contract item for Watering should also include a contract item for Mobilization for Watering, unless they are identified as erosion control or landscaping. Initial watering required at installation will not be counted for payment of Mobilization for Watering.

7.70 SUGGESTED EROSION AND SEDIMENT CONTROL DEVICES FOR SPECIFIC SITUATIONS

The best way to control erosion is to minimize the disturbed areas and to get the disturbed areas stabilized as soon as possible. Stabilizing seeding should be the first option. This requires planning and coordination to get "things" finished and seeded. When seeding is done late in the season, the growth may not be enough to provide adequate protection to the soils. Thus, mulching should be applied along with the seeding. Also, there are many cases during the construction projects that special care or devices need to be utilized. Following are some situations/information and solutions that should be used as guidelines during construction:

Types of Soils

Typically, soils high in silt, low in clay, and low in organic material are the most erodible. Sediment control devices must be appropriate for the types of soil throughout the project. The inspector/engineer needs to review the soil sheets and soil report for the project.

Ditch Grade (% Slope) and Length

The steeper and longer the ditch, the faster and stronger the flow would be. Again, the ditches should be seeded. They may also require Special Ditch Control, Turf Reinforced Mat (TRM), or rock. A Permanent Erosion Control Matrix used by designers is available as guidance to help determining the type of material appropriate for different ditch grades and lengths. It is available at https://iowadot.gov/design/dmanual/01E-06/EC-104.pdf.

Nevertheless, silt fence ditch checks or another type of ditch check are still needed. The frequency and the distance between the checks must be determined.

The following guidelines are recommended for silt fence ditch checks:

Ditch Grade	Approximate Spacing (ft.)
≤ 0.5%	315
> 0.5% to ≤1%	155
> 1% to ≤1.5%	100
> 1.5% to ≤ 2%	75
> 2% to ≤ 2.5%	60
> 2.5% to ≤ 3%	50
> 3% to ≤ 3.5%	45
> 3.5% to ≤ 4%	40
> 4% to ≤ 5%	35
> 5% to ≤ 5.5%	30
> 5.5% to < 6%	25

If a silt fence ditch check has been overwhelmed and blown out twice, rock check dams should be installed. Rock check dams should be installed 15 feet beyond the edge of travel way and not installed in the median.

The following guidelines are recommended for rock check dams:

Ditch Grade	Approximate Spacing (ft.)
≤ 0.5%	400
> 0.5% to ≤1%	200
> 1% to ≤1.5%	130
> 1.5% to ≤ 2%	100
> 2% to ≤ 2.5%	80
> 2.5% to ≤ 3%	65
> 3% to ≤ 3.5%	55
> 3.5% to ≤ 4%	50
> 4% to ≤ 4.5%	45
> 4.5% to ≤ 5%	40
> 5% to ≤ 5.5%	35
> 5.5% to ≤ 6.5%	30
> 6.5% to ≤ 8%	25
> 8% to ≤ 10%	20

In addition to these guidelines, the length of the ditch must be considered, especially when the ditch grade is 3% or more.

For ditches with grades steeper than 4.0% and longer than 1,000 feet, a rock flume is more appropriate than a rock ditch check. The rock flume, 30 to 40 feet in length, is constructed by placing erosion stone or Class E revetment at the lower end of the ditch. Additional rock flumes should be placed as needed for steeper ditch grades.

Drainage Ways/Ponds/Lakes/Wetlands, etc.
Silt needs to be prevented from leaving our project! Silt basins, riprap dams, silt fences, seeding, and available ROW should be looked at, especially when the construction work is close to drainage ways/ponds/lakes/wetlands.

ROW or at least temporary easement must be available to install the necessary erosion control devices near these “sensitive” areas. Depending on the situation, a silt basin or even a temporary sediment control basin should be created to allow the silt to settle. The overflow location of the basin should be armored with riprap to make sure that the water energy is minimal before leaving the ROW. Finally, a silt fence or multiple rows of silt fence or rock checks should be placed to catch the silt from escaping the project.

Height of the Fills for Bridge Berms
As the fills and/or the bridge berms get higher, the potential for erosion increases significantly. Without some seeding or mulching, there will be gullies on the slopes. Seeding or some sort of stabilization must be done as the fill is going up.

Height of the Backslope
When the backslope is not too high (less than 10 feet) and the drainage area above the backslope is small, the potential for erosion on the backslope is low. However, when the

backslope is high and the drainage area onto the backslope is large, something must be done. For example, a small intercepting ditch next to the top of the backslope could be utilized to carry the water along the top of the backslope down to the ditch to avoid the erosion on the backslope. Sometimes the runoff will be concentrated at one location. If this is the case, a letdown flume should be placed to minimize or prevent erosion.

When a sandy backslope is encountered, topsoil ~~or cohesive soil~~ should be used to dress the slope. A wood excelsior mat or straw mat would be the next choice for slope protection.

Culvert Ends

Since culverts are at the lowest spots, this is where the water will drain off. Most of the time, the water will be drained into a creek or drainage way. Silt fences or logs must be placed on both sides of the box culvert wing from the end of the wing at least around the toe and along the top of the box to catch the silt from the area right next to and above the culvert~~s~~. Seeding has to be done as soon as possible. This is also a good location for slope protection.

In case of water discharging strongly from the pipe onto an adjoining property/farm/pond, etc., especially in the no-ditch situation, many things may be needed. First, the ROW has to be available. Second, one or two riprap dams or a splash basin may be needed to slow down the water. Finally, one or two silt fences adjacent to the ROW line to catch silt would be beneficial.

End of Ditches

At the end of the ditch, water is going to drain off the highway project. Depending on the situation, temporary sediment control basins, riprap dams, rock checks, rock flumes, silt basins, and silt fences should be looked at. For example, the slope of the ditch may be steep and carrying a large volume of water. The soil for the project is very sandy. In this case, a riprap dam may be needed near the end of the ditch. Also, where a steeper slope occurs, a rock flume may be added. In contrast, if the project is in a flat area with mainly cohesive soil, maybe a silt fence ditch check is all that is required.

Letdown Pipes

The slope of letdown pipes is very steep. Thus, the velocity of the water at the outlet of the pipe is very high. This water will cause severe erosion. In this case, a silt retention basin at the top allowing water into the pipe slowly should be considered. Also, a layer of riprap with engineering fabric underneath or even a flume of riprap will need to be installed to dissipate the water velocity or energy.

Sometimes the outlet of the letdown pipe is right next to a creek. Because the water flow rate in the creek can be very high in the spring, the pipe must be protected. This means that riprap must be installed on both sides of the pipe and maybe even on the top to prevent scouring around the culvert and uplifting of the pipe.

Berm Face

Drainage from the median and ditches can cause erosion on the berm face. Rock flumes sometimes are needed to minimize the erosion on the berm face.

Drop Inlet or Intake
The flow rate at this location may be high. Turbulent flow may cause erosion. Silt may enter the storm sewers or farm tiles. In order to minimize erosion, preventive actions should have been taken at other places so that the water flow rate and siltation are minimal. Silt fences or another type of perimeter control should be placed around the drop inlets or intakes.

Bridge Deck Drain
When the deck is wide and high above the ground, the water dropping on the ground from the deck drain can cause erosion. Erosion stone or riprap may have to be placed under the deck drain to absorb the energy from the water impact.

Borrow Area
Sometimes the borrow is located on a hill. After the topsoil is stripped and excavation begins, water runoff from the borrow could be high. Silt fences may not be able to hold the water. A small dike along the low side of the borrow would minimize the potential of the silt leaving the borrow.

Terraces would also be helpful.

V-Ditch
A V-Ditch is not the most desirable shape for a ditch; but, due to site conditions, they exist. Some seeding and mulching along with special ditch control should be done. In addition, ditch checks should be placed in the ditch to slow down the water velocity.

Area of Super Elevated Curve
Due to the increased slope of super-elevated curves, surface water in the curve will flow to a concentrated area. During the grading project, erosion problems may be minimal. However, after the pavement is completed, the velocity of the water draining off the pavement will increase significantly. A letdown flume may be needed to be constructed on the “low” side of the super-elevated curve.

Silt Curtains
Silt curtains are included as bid items with projects when there will be bridge or streambank construction activities in or beside a water body (such as a river, lake, creek, or stream). Typically, only Floating Silt Curtain (Hanging) will be included as a bid item. However, there are rare times when the Location and Environment Bureau will specify the use of Floating Silt Curtain (Containment) bid item.

The main purpose of the silt curtain is to isolate the work area from the water body, thus allowing sediment to settle out of suspension. A silt curtain alone should not be considered as adequate perimeter control. Other sediment controls, such as silt fence or perimeter and slope sediment control devices, should be installed upland.

Silt curtains should not be installed across a river or stream. Refer to *EC-202* for installation configurations.

For creeks, streams or rivers, the Design Bureau typically estimates the silt curtain bid quantity as the length of the water body from ROW to ROW plus any easements. This quantity is doubled if working on both sides of the creek, stream or river. The contractor and inspector/engineer should review the contractor’s plan for disturbed areas prior to

installing a silt curtain in order to determine the needed length to contain the disturbed zone.

The inclusion of a Floating Silt Curtain (Hanging) bid item does not mean the silt curtain has to be installed. Rather, the use of the silt curtain is at the discretion of the inspector/engineer.

Additionally, it may also be determined that installing a rock berm along the water's edge will be a more effective form of sediment control.

Temporary Stream Diversions

A temporary stream diversion is to be included as a bid item for projects involving installation or extension of box culverts or precast box culverts 6 feet by 6 feet or larger and arch pipe culverts 102 inches by 62 inches or larger. For smaller box culverts and arch pipe culverts, the contractor is to determine the means and methods of managing the water, complying with *Specification 1107.18*, and this work will be incidental to the project.

Temporary stream diversions were developed as a best management practice when working in areas where flows are low enough and/or the watershed is small enough to allow normal base flows to be handled practically in a small diversion channel or pipe.

This practice allows the contractor several methods of diverting the flow around the work area – through use of a diversion channel or pipe or hose.

Even if the creek or stream may be dry or there is a minimal flow, the temporary stream diversion dikes and energy dissipation material should be in place in the event of rain.

The energy dissipation material (i.e. revetment) is included in the bid price of the temporary stream diversion. However, upland sediment control measures are not included in the bid price and should be paid for separately.

Refer to *Standard Specifications Section 2418* and *Standard Road Plan EW-402* for more information.

CHAPTER 7 APPENDIX

Appendix 7-1	Erosion Control Implementation Plan (ECIP) Worksheet
Appendix 7-2	ECIP Update Checklist
Appendix 7-3	Examples of marked-up Pollution Prevention Plan site maps
Appendix 7-4	“Should Mobilizations for Erosion Control apply to the project?” Flowchart

Erosion Control Implementation Plan (ECIP) Worksheet

Project No.: _____

County: _____

Type of Work: _____

Prime Contractor: _____

Water Pollution Control Manager (WPCM): _____

☐ **ECT** ☐ **ESC Basics**

Phone: _____

Erosion Control Technician (ECT) and Certification Number (unless satisfied by WPCM):

_____

_____

Additional ESC Basics Trained Individual(s) and Company:

_____

_____

_____

_____

_____

Subcontractor responsible for installation & maintenance of erosion/sediment controls:

Name: _____

Company: _____

Address: _____

Phone: _____

<u>Project specific</u> description of intended schedule and sequence of major land disturbing and erosion/sediment control activities, including number of mobilizations. Additional items to consider:

- **Initial controls required prior to disturbing land,**
- **Construction staging to limit disturbed areas,**
- **Sensitive areas (such as waterbodies) requiring special consideration,**
- **Anticipated suspension of work and stabilization of disturbed areas, including compliance with the 0/14 day rule**

Include staging and maintenance, method for winter shutdown and removal of temporary measures (if required for the project). Describe any additional measures that are needed due to late season work.

Describe measures necessary to control erosion based on your schedule or sequence of operations. Explain how you plan to implement erosion control plan in stages. Indicate measures that must be in place before grading begins.

Based on your staging, are there areas where additional erosion control beyond that shown in the plans is anticipated? If so, provide information.

Include proactive measures and sequencing to protect critical areas.

Consider if there will be different crews performing different items.

Other pollution prevention measures, such as measures for 1) construction entrances and other methods to minimize tracking, 2) dewatering, 3) concrete washout, 4) stockpiles, 5) fuel tanks or other SPCC items, 6) proper waste disposal, etc.:

Describe dewatering methods and locations. What controls will be used to manage discharge?

Provide information regarding location and protection of stockpiles.

Plan to prevent discharge of concrete washout and minimize off-site tracking.

Other pollution prevention measures, such as Spill, Prevention, Control, and Countermeasures (SPCC) for fuel tanks?

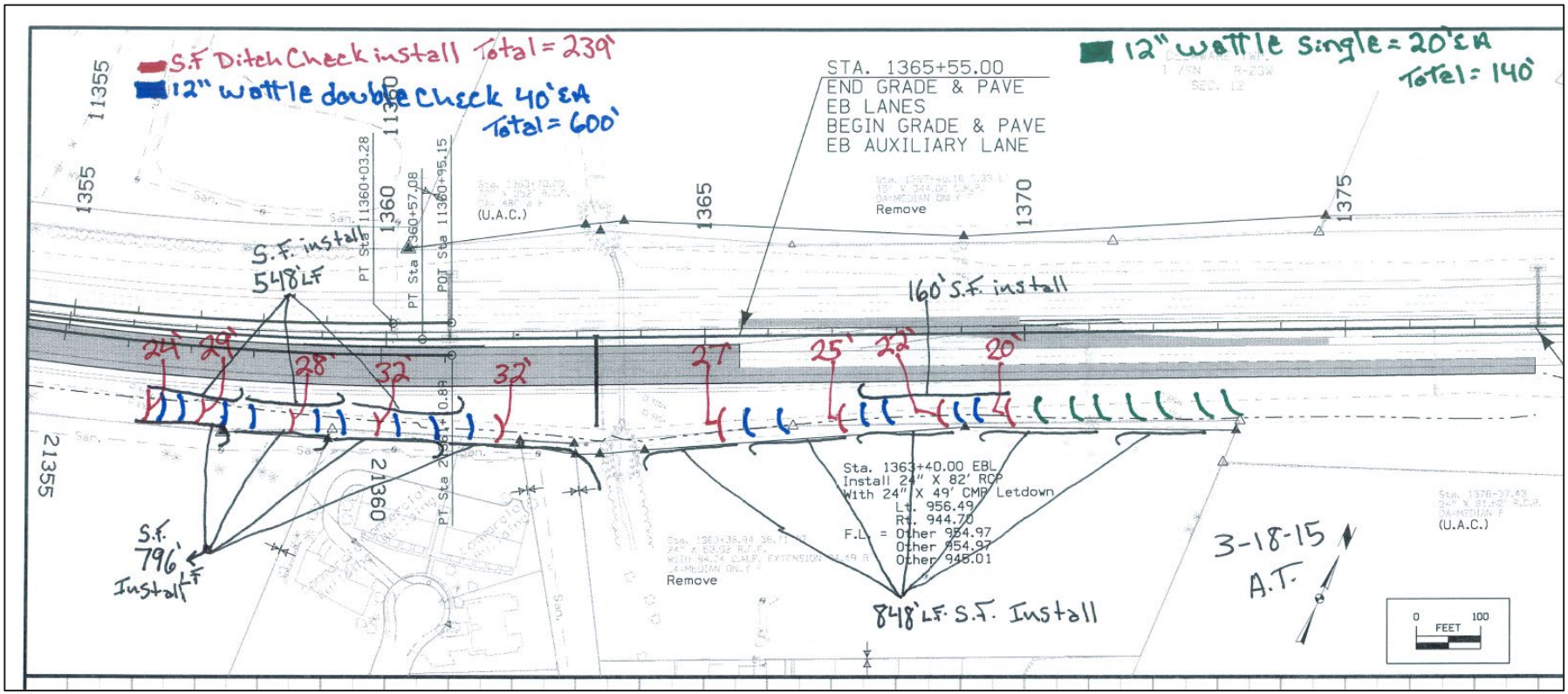
Updates:

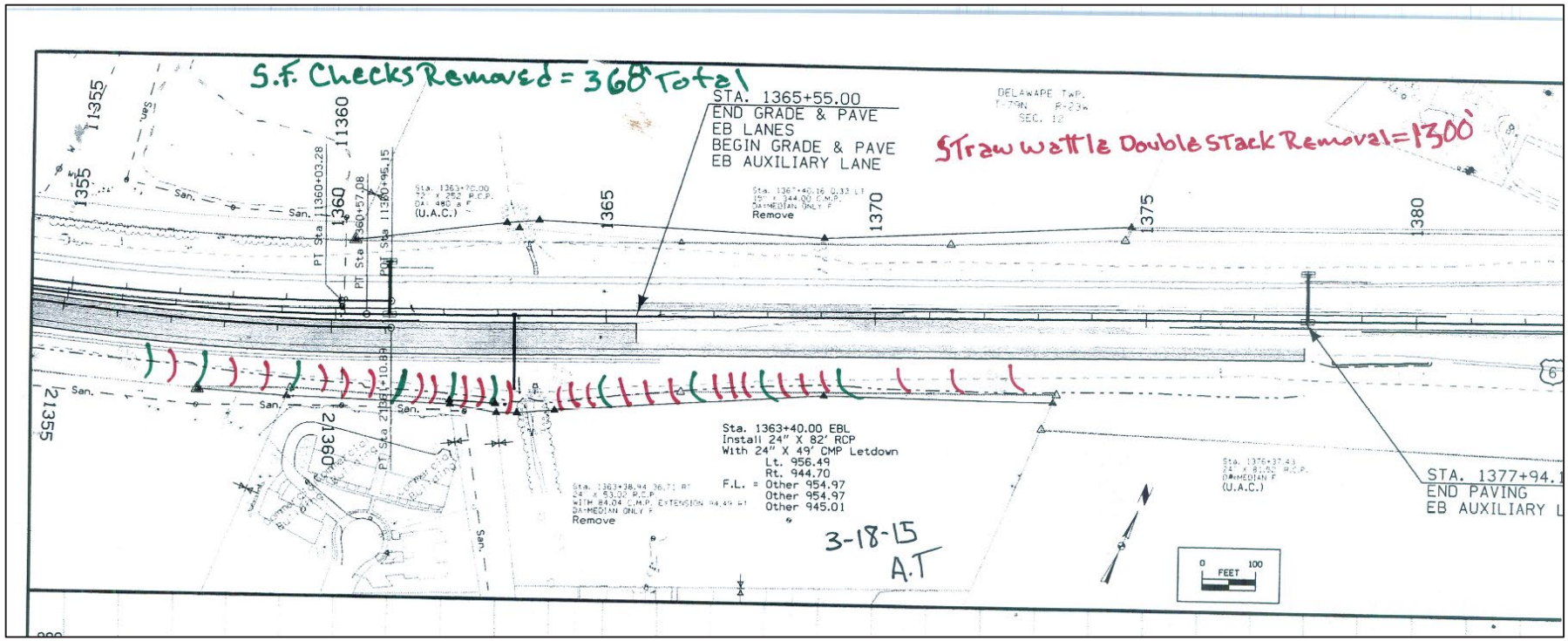
Update ECIP to address changes in the order of operations or staging, weather changes, or any other changes required to comply with permit requirements.

Update ECIP to address changes in the number of mobilizations.

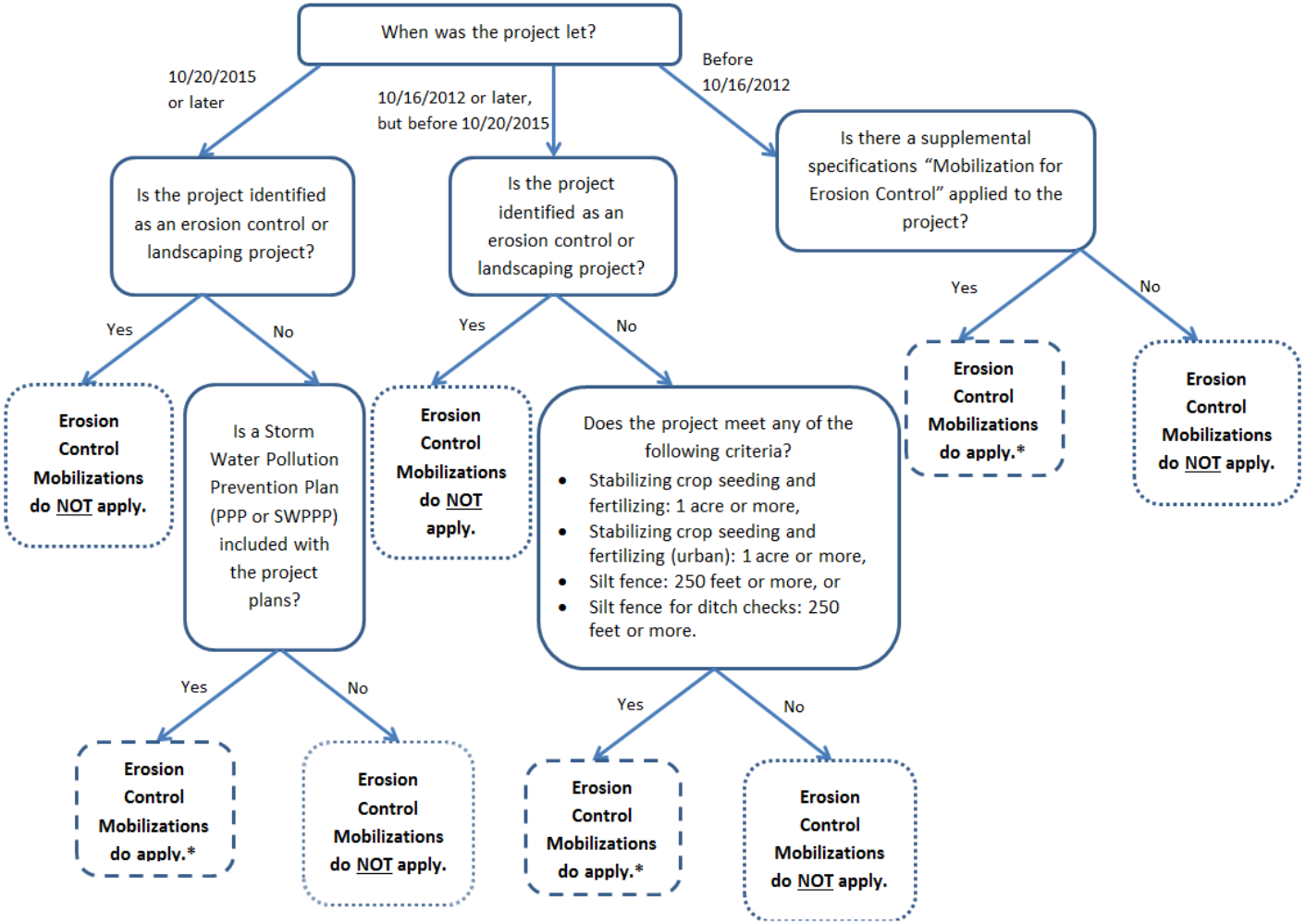
ECIP UPDATE CHECKLIST

	Install	Maintain	Remove	Location(s) and Schedule
Silt Fence	☐	☐	☐	
Silt Fence Ditch Check	☐	☐	☐	
Perimeter & Slope Sediment Control Device	☐	☐	☐	
Rock	☐	☐	☐	
Silt Basin	☐	☐	☐	
Stabilizing Seeding & Mulching	☐	☐	☐	
Permanent Seeding & Mulching	☐	☐	☐	
Other: _____	☐	☐	☐	
Other: _____	☐	☐	☐	


S.F Ditch Check install Total = 239'
12" wattle double Check 40'EA
Total = 600'
12" wattle Single = 20'EA
Total = 140'
STA. 1365+55.00
END GRADE & PAVE
EB LANES
BEGIN GRADE & PAVE
EB AUXILIARY LANE
11355
1355
11360
1360
1365
1370
1375
21355
21360
PT Sta 11360+03.28
PT Sta 11360+57.08
POT Sta 11360+95.15
(U.A.C.)
Remove
S.F. install
548'LF
160' S.F. install
24'
29'
28'
32'
32'
27'
25'
22'
20'
Sta. 1363+40.00 EBL
Install 24" X 82' RCP
With 24" X 49' CMP Letdown
Lt. 956.49
Rt. 944.70
F.L. = Other 954.97
Other 954.97
Other 945.01
S.F.
796'
Install LF
848'LF. S.F. Install
3-18-15
A.T.
0
100
FEET


S.F. Checks Removed = 368 Total
STA. 1365+55.00
END GRADE & PAVE
EB LANES
BEGIN GRADE & PAVE
EB AUXILIARY LANE
Straw wattle Double Stack Removal = 1300'
DELAWARE TWP.
T. 19N. R. 23W.
SEC. 12
Sta. 1363+70.00
72" x 252' R.C.P.
DA-MEDIAN ONLY F
(U.A.C.)
Sta. 1367+40.16 0.33 LT
Remove
Sta. 1360+03.28
Sta. 1360+57.08
Sta. 1360+96.15
Sta. 1361+10.88
1355
1360
1365
1370
1375
1380
21355
21360
San.
PT Sta.
POT Sta.
Sta. 1363+40.00 EBL
Install 24" X 82' RCP
With 24" X 49' CMP Letdown
Lt. 956.49
Rt. 944.70
F.L. = Other 954.97
Other 954.97
Other 945.01
Sta. 1363+38.44 36.71 RT
24" x 83.00' R.C.P.
WITH 84.04 C.M.P. EXTENSION 94.49 RT
DA-MEDIAN ONLY F
Remove
3-18-15
A.T
Sta. 1376+37.43
24" x 81.00' R.C.P.
DA-MEDIAN F
(U.A.C.)
STA. 1377+94.
END PAVING
EB AUXILIARY L
0
100
FEET

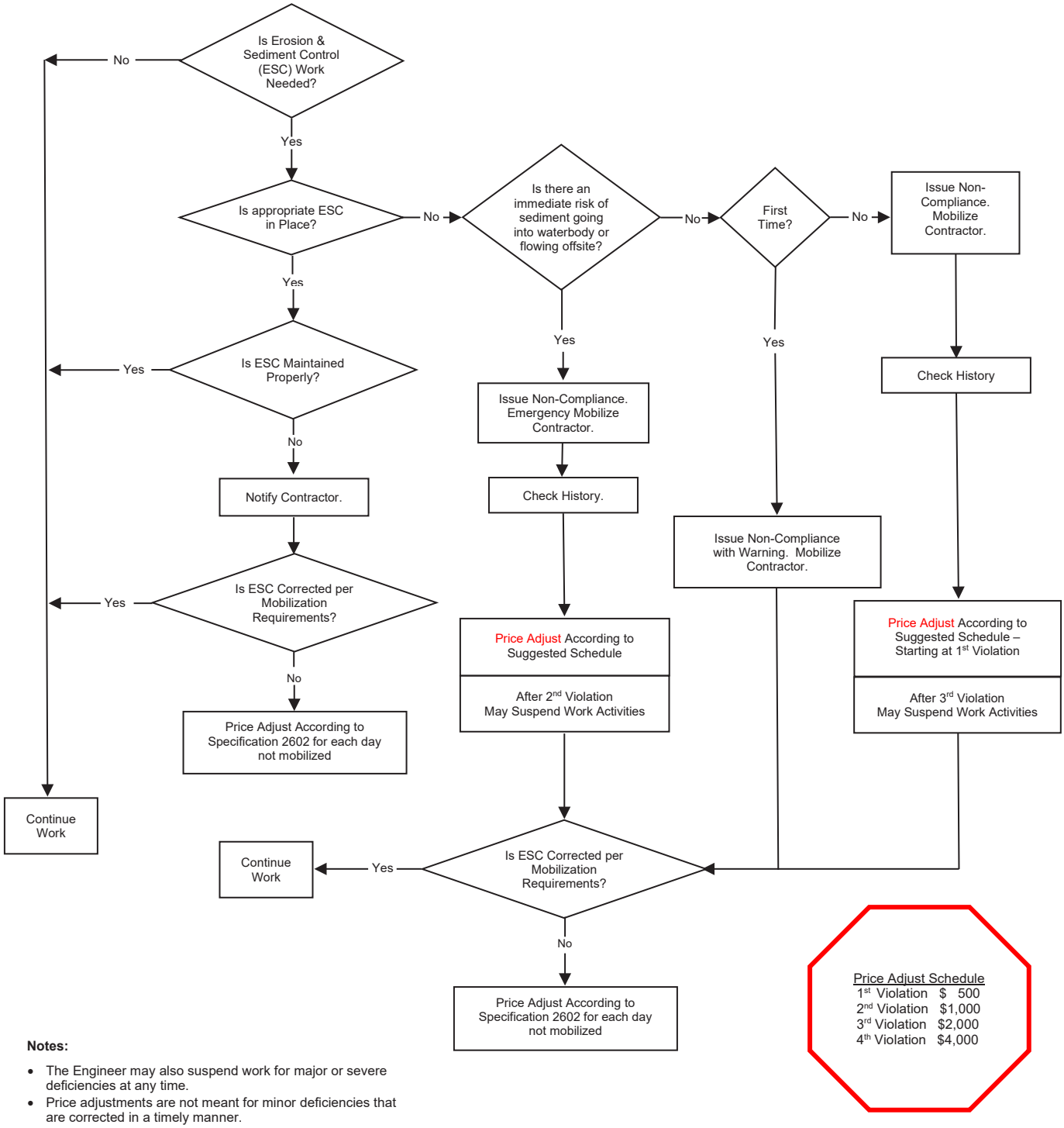
Should Mobilizations for Erosion Control apply to the project?



*Payment for mobilization applies to contract items from Section 2601 and 2602 excluding watering, mowing, debris pickup, monitoring well, or removal items.

APPENDIX 2-34(O)

Erosion & Sediment Control Non-Compliance Flow Chart



Notes:

- The Engineer may also suspend work for major or severe deficiencies at any time.
- Price adjustments are not meant for minor deficiencies that are corrected in a timely manner.
- ESC work may include housekeeping items, such as construction entrances/tracking issues, concrete washout, garbage, etc.

POWERPOINT

NPDES PERMIT & PPP

IOWA DOT EROSION CONTROL TECHNICIAN CERTIFICATION

NPDES Permit and PPP

Melissa Serio/Nathan Pohlen
Construction and Materials Bureau & Roadside Development

1

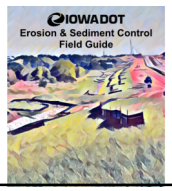
Housekeeping

- Zoom (if online) or Building Info (if in-person)
- Schedule
- Test
- Iowa DOT function code - 145
- Participation and experiences encouraged, but please omit project specifics if negative

2

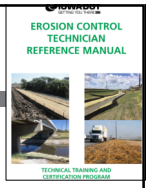
Housekeeping

- Materials
  - Reference manual
    - Next slide has list of tabs
  - Field guide
  - 11x17 handout



3

Housekeeping



- Reference manual tabs (color coded)
  - IM 213
  - NPDES Permit
  - PPP
  - Iowa DOT Forms
  - Std. Spec. 2601
  - Std. Spec. 2602
  - Std. Spec 4169
  - IM 469.02/469.04
  - IM 469.10/496.01
  - Std. Road Plans
  - Design & Tab. Forms
  - Standard Notes
  - Road Design Details
  - Design Manual 10C-1
  - Construction Manual
  - PowerPoint
  - Review
  - BMP Reference Table & Abbrev.

4

Housekeeping

- Introductions
  - Instructors
  - Students (poll question next slide)

5

If you have a phone

Use below QR code

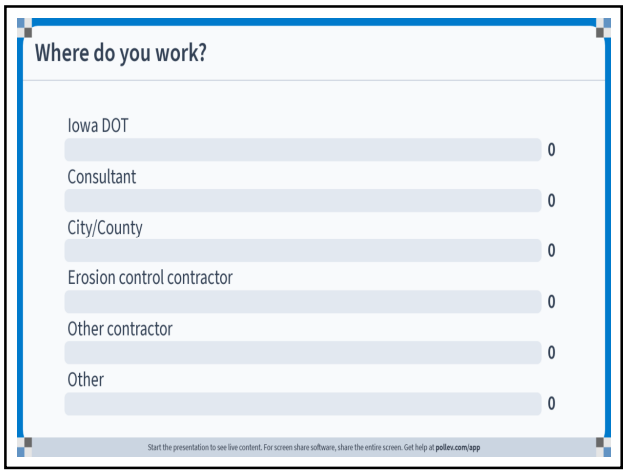
Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can "Skip for now"

You can also "Skip" if it asks for your name.

6



7

Housekeeping

- Iowa DOT Electronic Reference Library (ERL)
  - For use on projects
  - https://ia.iowadot.gov/erl/

8

Objectives

- Recognize erosion causes, processes, influences, and impacts
- Distinguish between erosion and sediment control
- Be familiar with the erosion control certification program and duties
- Understand the importance and requirements of:
  - NPDES General Permit No. 2
  - Iowa DOT specifications and PPP

9

Objectives

- Recognize the roles that the Contractor, Inspector, and Iowa DOT have in permitting and compliance
- Be knowledgeable of BMPs and be able to properly incorporate them
- Know when and how to conduct site inspections

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Erosion Control Certification/Training Program

- Under DOT spec, required for projects with a NPDES General Permit No. 2
- Two levels
  - ESC Basics
  - ECT
- ECT can perform ESC Basics duties
- Standard specification 2602.01D (p. 1-2) identifies requirements

Summary Table
Field Guide p. 15

11

Erosion and Sediment Control Basics

- 1-2 hours online training
- No fee or exam
- Retake every 2 years
- Prime Contractor required to have one per project
- DOT required to have one per project

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Erosion Control Technician

- 2 1/2 day certification class
- Fee and 2 hour certification exam
- Recertify or retake every 5 years
- Updates
  - Provided yearly and online
  - Encouraged but not mandated
- Prime Contractor required to have one on staff
- DOT required to have one per RCE

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Duties of the Erosion Control Technician

- IM 213 App. D
  - Review details of contract documents with respect to erosion and sediment control
  - Assign monitoring responsibilities to ESC Basics trained staff
  - Review inspection reports
  - Provide input on initial ECIP and updates
  - Provide onsite reviews as requested

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Definitions

Erosion

- Detachment and movement of soil or rock fragments by water, wind, ice, or gravity

Sediment

- Soil particles that have become dislodged due to the erosion process and remain mostly suspended in flowing water

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Erosion Process

- Vegetation is removed and soil becomes susceptible to erosion
- Wind or water dislodges soil particles
- Soil particles are transported
- Process ends when particles are deposited
- Water generated erosion is most severe type

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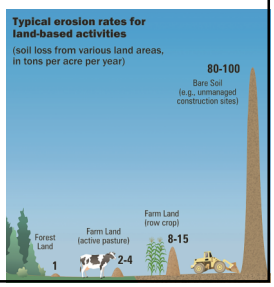
Causes of Erosion and Loss of Sediment

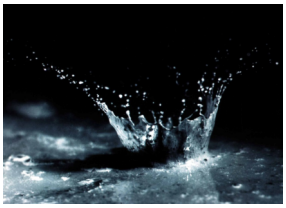
- Construction activities
  - Vegetation and topsoil are removed
  - Grading and compacting subgrade
  - Increases amount of runoff (volume) and speed (rate)
- Sediment travels from unprotected surfaces to waterways



17

Types of Water Erosion

- Raindrop – initial rain impact dislodges soil particles
- Sheet – raindrops consolidate into shallow flow transporting dislodged particles



18

Types of Water Erosion

- Rill – sheet flow concentrates in irregularities in the surface gaining speed resulting in shallow channels
- Gully – rills combine and continue to increase into deeper channels
  - Major difference between gully and rill erosion is magnitude

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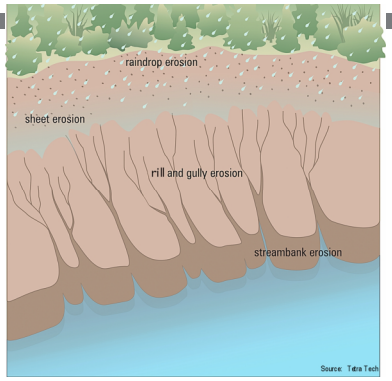
Types of Water Erosion

- Stream bank or channel – volume and velocity of flow causes movement in stream bed and bank materials

20

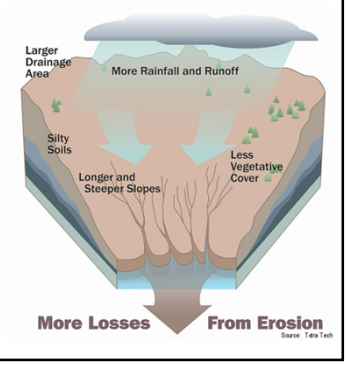
Types of Water Erosion



21

Influences on Erosion

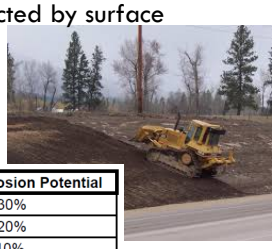
- Soils
- Precipitation
- Vegetation
- Surface area
- Slope length
- Slope gradient
- Surface condition



22

Influences of Erosion

- Erosion potential is impacted by surface conditions



Soil Surface Condition	Effect on Erosion Potential
Compacted & Smooth	+30%
Track walked along contour	+20%
Track walked up & down slope	-10%
Punch or crimped straw	-10%
Rough, irregular cut	-10%
Loose to 12 in. depth	-20%
	Source: Goldman, 1986

Field Guide
p. 25

23

Objectives of Erosion and Sediment Control

- First (erosion control) - use best practices and controls to manage the amount of erosion that occurs
- Second (sediment control) – understand that some erosion will occur, implement best practices to collect or allow soil to settle to prevent it from traveling offsite
- Phasing/limiting disturbance with a combined approach is best

p. 24 Field Guide – Definitions
p. 25 Field Guide – Effectiveness chart

24

Storm Water Permits Importance and Requirements

- EPA identifies which activities or facilities require storm water permits
- Intent of regulations/permits is to improve water quality by minimizing contaminants in storm water
- NPDES regulates discharge of storm water from sites
- Iowa DNR has been granted authority to issue NPDES permits

25

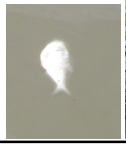
National Pollutant Discharge Elimination System Program

- March 10, 2003 federal regulations require certain construction activities be covered under a NPDES permit
- Construction activities causing land disturbance of one or more acres
- Noncompliance constitutes a violation
  - Code of Iowa
  - Clean Water Act

26

Noncompliance Environmental Impacts

- Suspended sediments
  - Absorbs sunlight, inhibiting aquatic plant growth
  - Reduces fish feeding success and reproduction
- Deposited sediments
  - Impacts recreational activities
  - Destroys habitat
  - Flooding
- Loss of soil



27

Noncompliance Financial Impacts

- Penalties
  - Iowa DNR and EPA may issue
  - Iowa DNR - $ per day for each violation
  - EPA - $ per day for each violation
  - Cost and time of litigation

Sample Headlines of Penalties

Idaho Transportation Department and Contractor to Pay Total of $895,000 to Settle Federal Storm Water Discharge Claims

Hawaii DOT Agrees to Pay $1 Million to Resolve Stormwater Violations

Iowa Department of Transportation and Three Contractors to Pay $60,000 Civil Penalty for Construction Stormwater Violations

28

Noncompliance Financial Impacts

- Repairs to damaged systems
- Expenditure of resources
  - Equipment and labor hours
  - Gravel road needed extensive maintenance to repair silt runoff

29

Types of NPDES Permits

- Nine General NPDES Permits issued for specific activities
- NPDES General Permit No. 2
  - "Storm Water Discharge Associated with Construction Activities"
  - Land-disturbing activities of one or more acres
  - Effective March 1, 2023 to February 29, 2028
  - Focus of this class

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Types of NPDES Permits

- NPDES General Permit No. 3
  - "For Asphalt Plants, Concrete Batch Plants, Rock Crushing Plants and Construction Sand and Gravel Facilities"
  - Mixing or producing, portable or permanent
- Municipal Separate Storm Sewer Systems (MS-4)
  - Part is similar to General Permit No. 2 but issued to and applied to cities and universities with separate storm sewer systems
  - https://www.iowadnr.gov/environmental-protection/water-quality/stormwater-program/ms4-required-permitees

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Individual S.W. Permits and Other

- Individual Storm Water Permits – Outstanding Iowa Waters
  - https://www.iowadnr.gov/media/7149/download?inline
- 404 permit
  - Issued by Army Corp of Engineers for placement of fill material within wetlands, streams, ponds, etc.

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EPA and Iowa DNR Roles

- EPA grants Iowa DNR authority to write and issue NPDES General Permit No. 2
- Determine compliance with permit
- Assess adequacy of BMPs
- Conduct on-site inspections
  - BMPs in place
  - Documentation review

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If you have a phone

Use below QR code

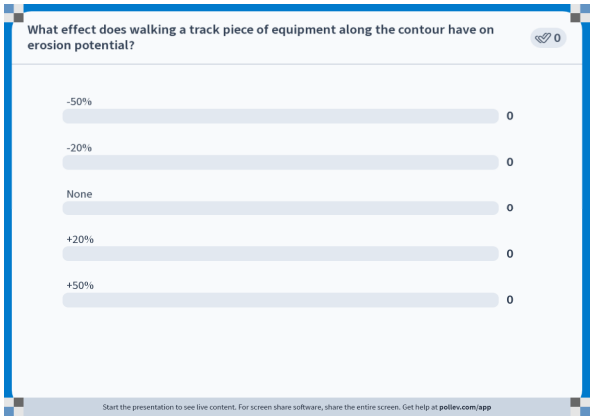
Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can "Skip for now"

You can also "Skip" if it asks for your name.

34



Field Guide p. 25

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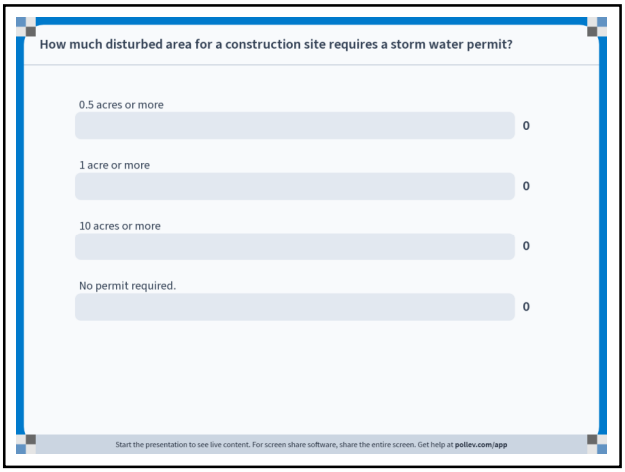

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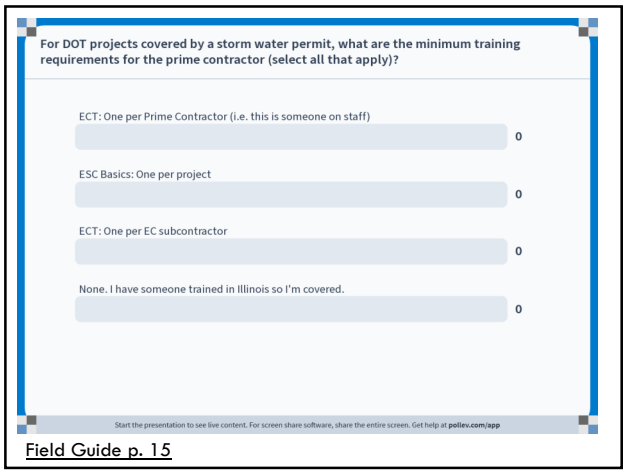

Field Guide p. 15

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QUESTIONS?
BREAK
NPDES AND PPP REQUIREMENTS

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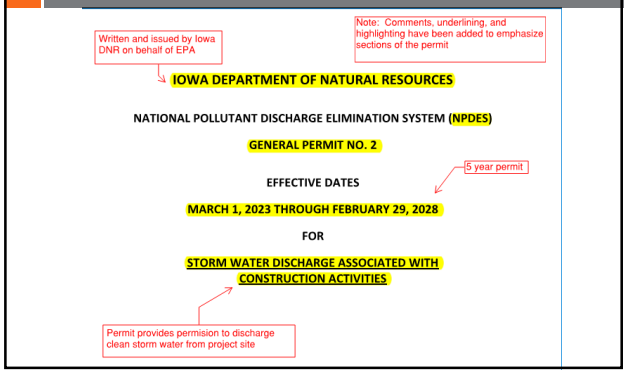
NPDES Cover Page



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NPDES Page 1-Coverage Under This Permit

PART I. COVERAGE UNDER THIS PERMIT

A. PERMIT AREA
This permit covers all areas of the State of Iowa.

Permit coverage must be obtained for construction sites disturbing 1 acre or more

B. ELIGIBILITY

1. **Authorizations.**
   a. Except for discharges identified under Parts I.B.2. and I.B.3., this permit may authorize the discharge of storm water associated with industrial activity from construction sites, (those sites or common plans of development or sale that will result in the disturbance of one or more acres total land area, including the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more), (hereafter referred to as storm water discharge associated with industrial activity for construction activities), occurring after the effective date of this permit (including discharges occurring after the effective date of this permit where the

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NPDES Page 1-Coverage Under This Permit

Concrete washout and waste slurry is not approved to be discharged

To discharge to these waters requires an individual permit

Part III.A.2. of this permit;
...scharges associated with industrial activity for construction activities which are covered by an ...ual NPDES permit or which are issued a permit in accordance with Part I.C. of this permit.
...scharges authorized by an existing individual NPDES permit ... this general permit as the existing individual permit expires;

c. storm water discharges associated with industrial activity for construction activities that the Iowa Department of Natural Resources has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard;
d. new or expanded storm water discharge associated with industrial activity that discharges to Outstanding Iowa Waters or to Outstanding National Resource Waters; and
e. discharges from concrete washout activities and from wet sawing of concrete. Waste from concrete washout and wet sawing of concrete is not allowed to be discharged to surface waters and is not allowed to adversely affect a water of the state.

3. **Exclusions.** The following storm water discharges associated with industrial activity from construction activities

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NPDES Page 1-Coverage Under This Permit

washout and wet sawing of concrete is not allowed to be discharged to surface waters and is not allowed to adversely affect a water of the state.

3. **Exclusions.** The following storm water discharges associated with industrial activity from construction activities do not require a NPDES permit: discharges from soil disturbing activities from sites where less than 5 acres is disturbed and the soil disturbing activities are due to routine maintenance that is performed to maintain the original line and grade, hydraulic capacity or original purpose of the site and discharges from agricultural and silvicultural activities including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands, but not discharges from concentrated animal feeding operations as defined in 40 CFR Section 122.23, concentrated aquatic production facilities as defined in 40 CFR Section 122.24, discharges to aquaculture projects as defined in 40 CFR Section 122.25, and discharges from silvicultural point sources as defined in 40 CFR Section 122.27.

These activities do not require a permit

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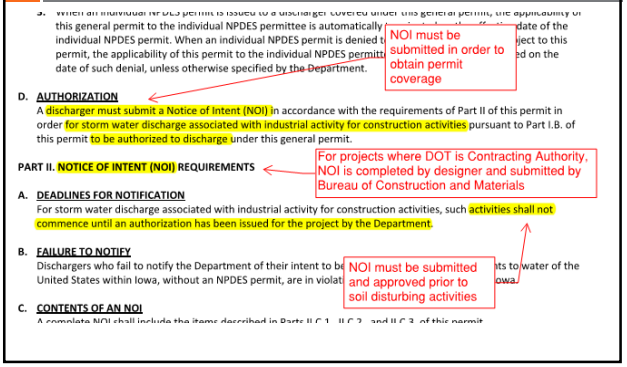
NPDES Page 2-Coverage Under This Permit



this general permit to the individual NPDES permittee is automatically … date of the individual NPDES permit. When an individual NPDES permit is denied … ject to this permit, the applicability of this permit to the individual NPDES permitt… …ed on the date of such denial, unless otherwise specified by the Department.

NOI must be submitted in order to obtain permit coverage

D. AUTHORIZATION

A discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part II of this permit in order for storm water discharge associated with industrial activity for construction activities pursuant to Part I.B. of this permit to be authorized to discharge under this general permit.

PART II. NOTICE OF INTENT (NOI) REQUIREMENTS

For projects where DOT is Contracting Authority, NOI is completed by designer and submitted by Bureau of Construction and Materials

A. DEADLINES FOR NOTIFICATION

For storm water discharge associated with industrial activity for construction activities, such activities shall not commence until an authorization has been issued for the project by the Department.

B. FAILURE TO NOTIFY

Dischargers who fail to notify the Department of their intent to be… …nts to water of the United States within Iowa, without an NPDES permit, are in violat… …owa.

NOI must be submitted and approved prior to soil disturbing activities

C. CONTENTS OF AN NOI

A complete NOI shall include the items described in Parts II.C.1, II.C.2, and II.C.3 of this permit.

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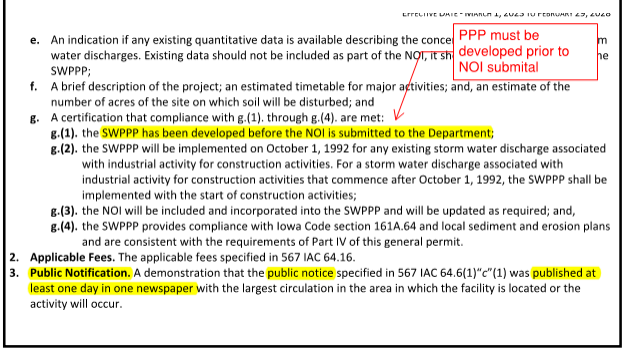
NPDES Page 3-Notice of Intent Requirements



EFFECTIVE DATE - MARCH 1, 2023 TO FEBRUARY 29, 2028

PPP must be developed prior to NOI submital

e. An indication if any existing quantitative data is available describing the concel… …m water discharges. Existing data should not be included as part of the NOI, it sh… …he SWPPP;

f. A brief description of the project; an estimated timetable for major activities; and, an estimate of the number of acres of the site on which soil will be disturbed; and

g. A certification that compliance with g.(1). through g.(4). are met:

g.(1). the SWPPP has been developed before the NOI is submitted to the Department;

g.(2). the SWPPP will be implemented on October 1, 1992 for any existing storm water discharge associated with industrial activity for construction activities. For a storm water discharge associated with industrial activity for construction activities that commence after October 1, 1992, the SWPPP shall be implemented with the start of construction activities;

g.(3). the NOI will be included and incorporated into the SWPPP and will be updated as required; and,

g.(4). the SWPPP provides compliance with Iowa Code section 161A.64 and local sediment and erosion plans and are consistent with the requirements of Part IV of this general permit.

2. **Applicable Fees.** The applicable fees specified in 567 IAC 64.16.

3. **Public Notification.** A demonstration that the public notice specified in 567 IAC 64.6(1)"c"(1) was published at least one day in one newspaper with the largest circulation in the area in which the facility is located or the activity will occur.

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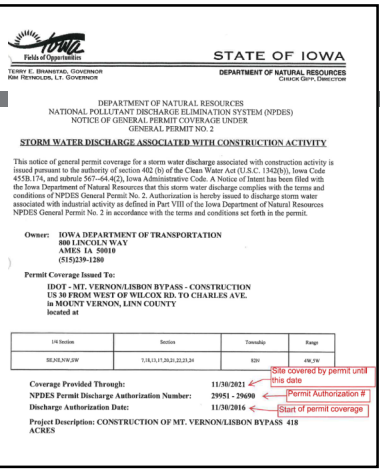
Permit Approval

- Becomes part of PPP
- Contains NPDES authorization number
- Provides dates of coverage
- DOT administered projects:

Copy uploaded to DocExpress (Contract Documents or Environmental drawer)



Fields of Opportunities

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

DEPARTMENT OF NATURAL RESOURCES
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
NOTICE OF GENERAL PERMIT COVERAGE UNDER
GENERAL PERMIT NO. 2

STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITY

This notice of general permit coverage for a storm water discharge associated with construction activity is issued pursuant to the authority of section 402 (b) of the Clean Water Act (U.S.C. 1342(b)), Iowa Code 455B.174, and subrule 567--64.4(2), Iowa Administrative Code. A Notice of Intent has been filed with the Iowa Department of Natural Resources that this storm water discharge complies with the terms and conditions of NPDES General Permit No. 2. Authorization is hereby issued to discharge storm water associated with industrial activity as defined in Part VIII of the Iowa Department of Natural Resources NPDES General Permit No. 2 in accordance with the terms and conditions set forth in the permit.

Owner: IOWA DEPARTMENT OF TRANSPORTATION
800 LINCOLN WAY
AMES IA 50010
(515)239-1280

Permit Coverage Issued To:
IDOT - MT. VERNON/LISBON BYPASS - CONSTRUCTION
US 30 FROM WEST OF WILCOX RD. TO CHARLES AVE.
in MOUNT VERNON, LINN COUNTY
located at

1/4 Section	Section	Township	Range
SE,SE,NW,SW	7,18,13,17,20,21,22,24	82N	6W,7W

Site covered by permit until this date

Coverage Provided Through: 11/30/2021
Permit Authorization #

NPDES Permit Discharge Authorization Number: 29951 - 29690

Discharge Authorization Date: 11/30/2016
Start of permit coverage

Project Description: CONSTRUCTION OF MT. VERNON/LISBON BYPASS 418 ACRES

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NPDES Page 4-Notice of Intent Requirements

G. NOTICE OF DISCONTINUATION (NOD)

1. Within 30 days after final stabilization at a construction site (as defined in Part VIII of this permit), the operator or owner of the facility shall submit a Notice of Discontinuation (NOD) to the Department.
2. A NOD shall include the following information:
   a. the name of the owner/operator to which the permit was issued;
   b. the general permit number and permit authorization number;
   c. the date the construction site reached final stabilization; and,
   d. the following certification signed in accordance with Part VI.H. of this permit:

"I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized and ent control measures have been removed or will be removed at an appropriate bmitting this Notice of Discontinuation, that I am no longer authorized to ated with industrial activity for construction activities by Iowa Department of PDES Permit No. 2. and that discharging pollutants from storm water associated ers of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit.

Definition is on p. 13-14 of permit

RCE sends NOD to Bureau of Construction and Materials after final stabilization has been achieved, who submits to DNR

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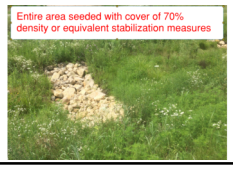
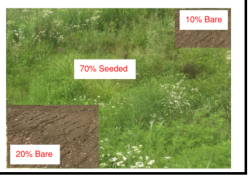
NPDES Page 13-14 - Final Stabilization

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70%, sufficient to preclude erosion, for the entire disturbed area of the permitted project has been established or equivalent stabilization measures have been employed, or which is covered by a permanent structure that ensures the ground surface will not be eroded or otherwise impacted by precipitation or runoff, or which has been returned to agricultural production.

Means this:



Not this:



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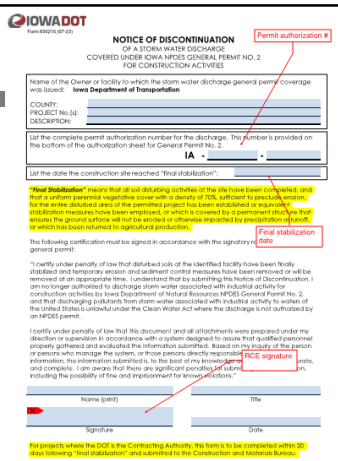
Notice of Discontinuation

- Becomes part of PPP
- Contains NPDES authorization number
- Provides date of final stabilization



IOWA DOT

NOTICE OF DISCONTINUATION
OF A STORM WATER DISCHARGE
COVERED UNDER IOWA NPDES GENERAL PERMIT NO. 2
FOR CONSTRUCTION ACTIVITIES

Permit authorization #

Name of the Owner or facility to which the storm water discharge general permit coverage was issued: **Iowa Department of Transportation**

COUNTY:
PROJECT No.(s):
DESCRIPTION:

List the complete permit authorization number for the discharge. This number is provided on the bottom of the authorization sheet for General Permit No. 2.
IA - _____ - _____

List the date the construction site reached "final stabilization":

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70%, sufficient to preclude erosion, for the entire disturbed area of the permitted project has been established or equivalent stabilization measures have been employed, or which is covered by a permanent structure that ensures the ground surface will not be eroded or otherwise impacted by precipitation or runoff, or which has been returned to agricultural production.

Final stabilization date

The following certification must be signed in accordance with the signatory requirements of the general permit:

"I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time. I understand that by submitting this Notice of Discontinuation, I am no longer authorized to discharge storm water associated with industrial activity for construction activities by Iowa Department of Natural Resources NPDES General Permit No. 2, and that discharging pollutants from storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by an NPDES permit.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

RCE signature

Name (print) | Title
Signature | Date

For projects where the DOT is the Contracting Authority, this form is to be completed within 30 days following "final stabilization" and submitted to the Construction and Materials Bureau.

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NPDES Page 4 - Special Conditions, Management Practices and Other….

PART III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. PROHIBITION ON NON-STORM WATER DISCHARGES

1. All discharges authorized by this permit shall be composed entirely of storm water except for non-storm discharges listed in Part III.A.2 of this permit.
2. Discharges from firefighting activities; fire hydrant flushings; waters used to wash vehicles in accordance with Part III.C. and Part IV.D.2.c.(2). of this permit; potable water sources including waterline flushings; irrigation drainage; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated groundwater; and foundation or footing drains where flows are not contaminated with process materials such as solvents; may be authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5. of this permit.

Must be uncontaminated and noted in PPP

B. RELEASES IN EXCESS OF REPORTABLE QUANTITIES

Any owner or operator identified in the SWPPP is subject to the spill notification [illegible] Iowa Code 455B.386. Iowa law requires that as soon as possible but not more than six hours after the onset of a

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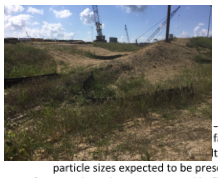
NPDES Page 5 - Special Conditions, Management Practices and Other….



factors such as the amount, frequency, intensity and duration of [illegible] ting storm water runoff and soil characteristics in [illegible] soil particle sizes expected to be present on the site; and

0-14 day rule for stabilization

f. Provide and maintain natural buffers around waters of the United States, direct storm water to vegetated areas and maximize storm water infiltration to reduce pollutant discharges, unless infeasible.

2. **Soil Compaction and Topsoil Preservation.** Practices to minimize soil compaction and preserve topsoil shall be implemented as described in Part IV.D.2.a.(2).iii. of this permit.
3. **Soil Stabilization.** Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. In drought-stricken areas and areas that have recently received such high amounts of rain that seeding with field equipment is impossible and initiating vegetative stabilization immediately is infeasible, alternative stabilization measures must be employed as specified by the Department. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed.
4. **Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and [illegible]

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NPDES Page 5 - Special Conditions, Management Practices and Other….

4. **Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.
5. **Pollution Prevention Measures.** Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measur[illegible] and maintained to:
   a. Minimize the discharge of pollutants from equipment and vehic[illegible] wash waters. Wash waters must be treated in a sediment basin [illegible] equivalent or better treatment prior to discharge;
   b. Minimize the exposure of building materials, building products, [illegible] materials, fertilizers, pesticides, herbicides, detergents, sanitary [illegible] site to precipitation and storm water. Minimization of exposure [illegible] to precipitation and to storm water will not result in a discharge [illegible] specific material or product poses little risk of storm water cont[illegible] materials intended for outdoor use); and
   c. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

Spill Prevention, Control, & Countermeasure (SPCC)

6. **Prohibited Discharges.** The following discharges are prohibited:
   a. Wastewater from washout and cleanc[illegible], form release oils, curing compounds and other

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NPDES Page 10 - Retention of Records

B. If there is a construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP required by this permit at the construction site from the date of project initiation to the date of final stabilization. If there is no construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP from the date of project initiation to the date of final stabilization at a readily available alternative site approved by the Department and provide it for inspection upon request. If the SWPPP is maintained at an off-site location such as a corporate office, it shall be provided for inspection no later than three hours after being requested.

Where records are to be kept

C. ADDRESSES

Doc Express™ Paperless Contracting

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NPDES Page 11 & 12/13 - Standard Permit Conditions

F. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Department, within three hours, any information which the Department may request to determine compliance with this permit. The permittee shall also furnish to the Department upon request copies of records required to be kept by this permit.

O. INSPECTION AND ENTRY

The permittee shall allow the Department or an authorized representative of EPA, the State, or, in the case of a facility which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Provide access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), and
4. Sample or monitor, at reasonable times, to assure compliance or as otherwise authorized by the CWA.

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NPDES Page 6 - Storm Water Pollution Prevention Plan

- Many names
  - SWPPP – Storm Water Pollution Prevention Plan
  - PPP – Pollution Prevention Plan
  - Site map
  - Tabulation 110-12 and 110-12L
- Required for projects with NPDES General Permit No. 2
- Establishes roles and responsibilities of personnel
- Describes site characteristics and list pollutants
- Identifies controls to minimize the discharge of contaminated storm water
- Provides procedures for maintaining controls and inspecting disturbed areas

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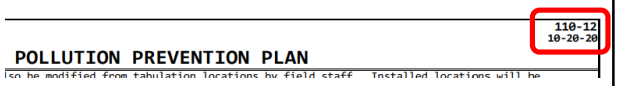
Iowa DOT PPP Tabulation

- Tabulation 110-12
  - Used when plan set includes R sheets
- Tabulation 110-12L
  - Used on local projects where Iowa DOT is not the contracting authority
- This class will focus on 110-12



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PPP I. Roles and Responsibilities - Designer

- Prepares Base PPP
- Prepares NOI
- Signature authority on Base PPP and NOI

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PPP I. Roles and Responsibilities - Contractor

- Signs Co-permittee certification statement
- Designates Water Pollution Control Manager (WPCM)
  - Standard Specification 2602.01 D. 1. a. (p. 1)
- Submit a detailed Erosion Control Implementation Plan (ECIP)
  - Standard Specification 2602.03 A. (p. 2)
- Installs and maintains controls
  - May be subcontracted
- Supervises and implements good housekeeping practices

57

PPP I. Roles and Responsibilities - Contractor

- Conduct joint inspections with inspection staff
  - When not mobilized may delegate
  - Contracting authority may waive during winter shutdown
  - Review and signature not waived
- Complies with training and certification requirements
  - Standard Specification 2602.01 D. 1. b. and c. (p. 1-2)
- Amend Site Map as needed
  - Standard Specification 2602.01 D. 3. (p. 2)
  - We will show examples tomorrow

58

PPP I. Roles and Responsibilities - Subcontractor

- Signs Co-permittee certification statement
  - NPDES General Permit No. 2 page 11 co-permittee certification statement
- Legally required to adhere to NPDES GP No. 2
- Implement good housekeeping practices

59

PPP I. Roles and Responsibilities - RCE/Project Engineer

- Storm Water Manager
- Maintains current training and certification requirements
- Takes necessary actions to ensure compliance with storm water requirements
- Supervises work necessary to meet storm water requirements
- Requires employees, contractors, and subcontractors to take action to comply with permit

60

PPP I. Roles and Responsibilities - RCE/Project Engineer

- Familiar with PPP and storm water site map
- Responsible for monitoring inspection reports, to determine whether deficiencies identified were adequately and timely addressed
- Point of contact for the project for regulatory agent, inspector, contractors, and subcontractors regarding storm water requirements
- Signature authority on NOD

61

PPP I. Roles and Responsibilities - Inspector

- Updates the PPP when there is a change in design, construction, operation, or maintenance
- Makes plans available to DNR and/or EPA
- Conducts joint required inspections with contractor/subcontractor
- Completes an inspection report after each inspection
- Signature authority on inspection reports

62

PPP II. Project Site Description

- Description of site conditions
- Estimate of total area disturbed
- Soil associations and estimated SCS runoff curve number
  - SCS number is an estimate of the percent of water runoff related land and hydrological factors
  - Larger value for greater runoff and erosion potential
- R sheets are used to detail site map

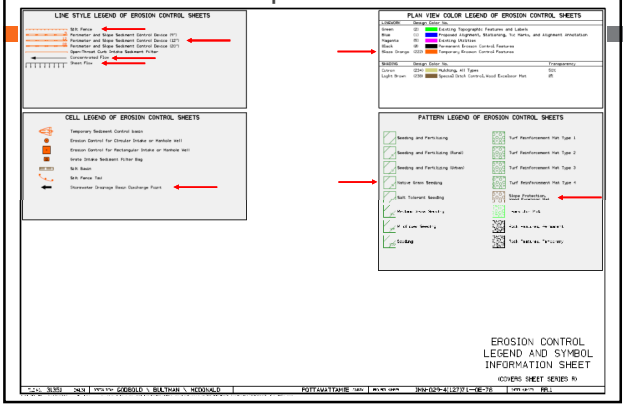
63

PPP II. Project Site Description

- Supplemental information in tabulations in C or CE sheets
- Site map is amended by contract modifications, Fieldbook entries of completed work, and by amended PPP site map
- Outlet locations for the project

64

R Sheets - Site Map



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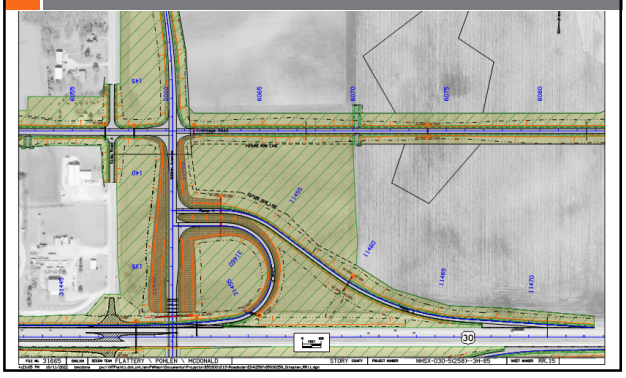
R Sheets - Site Map



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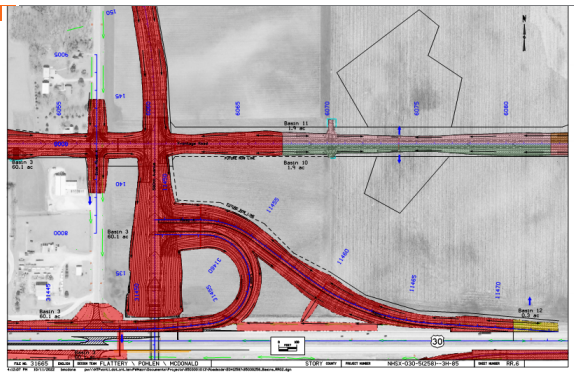
R Sheets - Site Map



67

PPP III. Controls

- Contractor ECIP should identify sequence of major activities and define controls
- Standard Specification 2601 and 2602 provide control requirements
- Actual quantities may vary from base PPP
  - Amendments documented through Fieldbook entries, contract modifications, and amended PPP site map
  - Additional measures may be required by inspector and/or contractor

68

PPP III. Controls – Stabilization Practices

- Existing vegetation and natural buffers are preserved when possible
- Initiate stabilization of disturbed areas immediately:
  - Where construction activities have permanently ceased
  - Temporarily ceased and will not resume for 14 days
- "0-14 day rule" : Snow/frozen ground are NOT stabilization

69

PPP III. Controls – Stabilization Practices

- Permanent and temporary stabilizing practices to be used are found:
  - Storm water site map
  - C/R sheets – project quantities & estimate reference notes

ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Roadside : Roadside Items

Item No.	Item Code	Item	Unit	Quantities Estimated Roadside	Estimate Reference Notes
1	2507-5250005	ENGINEERING FABRIC	SY	492.2	Refer to Tab. 100-20. Use material specified for embankment erosion control according to Article 4196.01, D, 3. of the Standard Specifications. Material will be measured in sq. yds. of actual area covered. Refer to details. The tabulation includes estimated locations for placement of "Engineering Fabric" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for other locations of erosion.
2	2507-6800061	REVETMENT, CLASS E	TON	464.4	Refer to Tab. 100-20. The tabulation includes estimated locations for placement of "Revetment, Class E" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for other locations of erosion. Estimated at 1.4 ton/cu yd. Class E revetment shall meet requirements of Article 4130 of the Standard Specifications.
3	2601-2634100	MULCHING	ACRE	145.2	Perform mulching according to Article 2601.03, E, 2, of the Standard Specifications. Anchor mulch into the soil using mulch anchoring equipment with a minimum of two passes. Item is included for areas requiring reshaping and seedbed preparation except where slope protection has been applied. Use mulch

70

PPP III. Controls – Stabilization Practices

- Topsoil should be preserved according to:
  - Standard Specification 2105
  - C sheets – project quantities & ERI

71

PPP III. Controls – Structural Practices

- Structural practices are implemented to:
  - Divert flows from exposed soils to vegetated areas
  - Detain runoff to allow sediment to settle
  - Limit run-off and the discharge of pollutants
  - Draw water from the surface to outlet

72

PPP III. Controls – Structural Practices

p. 7 of NPDES Permit

- Structural practices also include:
  - Silt basins providing 3600 ft.^{3} of storage per disturbed acre drained or equivalent sediment controls

these devices may be subject to Section 404 of the CWA.

a.(2).i For common drainage locations that serve an area with more than 10 disturbed acres at one time, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained shall be provided where attainable until final stabilization of the site has been achieved. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. For drainage locations which serve more than 10 disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained is not attainable, sediment traps, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

Storage capacity required

a.(2).ii For drainage locations serving 10 or fewer acres, sediment traps, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area or a sediment basin providing for 3,600 cubic feet of storage per acre drained.

73

PPP III. Controls – Structural Practices

- Structural practices to be used are found:
  - Storm water site map
  - C or R sheets – project quantities & ERN
  - Item specific tabulations
  - Standard Road Plans

9	2602-0000020	SILT FENCE	LF	68,647	Refer to Tab. 100-17. The tabulation includes estimated locations for placement of "Silt Fence" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements.
10	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF	11,123	Refer to Tab 100-18. The tabulation includes estimated locations for placement of "Silt Fence for Ditch Checks" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for field adjustments and replacements.
11	2602-0000050	SILT BASINS	EACH	112	Refer to Tab. 100-14. The tabulation includes estimated locations for placement of "Silt Basins" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 100% additional quantity for field adjustment and maintenance.

74

PPP III. Controls – Storm Water Management

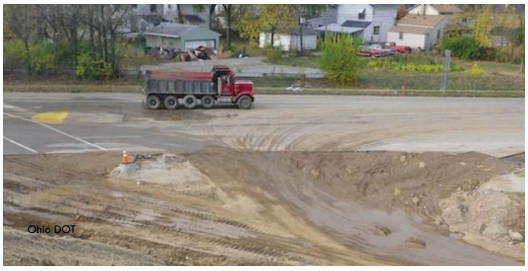
- Measures installed during construction to stay in place and control pollutants post construction
- Include velocity dissipation devices to provide non-erosive flow from structure to water body
- Storm water management to be used are found:
  - C or R sheets – project quantities & ERI
  - Storm water site map
  - Item specific tabulations
  - Standard Road Plans

Example: Rock pad and flume under bridge drain

75

PPP - III. Controls – Other Controls

- Construct vehicle entrance/exit to prevent tracking sediment onto roadways



76

PPP - III. Controls – Other Controls

- Implement practices to prevent discharge of materials during delivery, storage, and use
- Install controls to reduce or eliminate pollution from stockpiles of soil and paving
- Dispose of unused materials and wastes legally and do not discharge into waters of state

77

PPP - III. Controls – Other Controls

- Implement spill and leak prevention and contain and cleanup any spills

Examples of secondary containment

78

PPP III. Controls – Other Controls

- Control concrete washout and residuals by using temporary washout facilities
  - At least 50' from storm drains, streams, or other water bodies
  - Protected from overflowing
  - Provide directions to drivers

79

PPP III. Controls – Other Controls

- Do not discharge concrete grooving/grinding slurry into water body or storm drain

80

DOT PPP - III. Controls – Other Controls

- Perform fueling and maintenance in accordance with all environmental laws
  - Proper storage and disposal of waste fluids
  - Proper treatment of wash water
- Dispose of litter properly

81

DOT PPP - III. Controls – Other Controls

- When dewatering, remove sediment and prevent scour at discharge point

82

PPP IV. – Maintenance Procedures

- Maintain all temporary erosion and sediment control measures
- Ensure proper working order
  - Cleaning – begin at 50% lost capacity
  - Repairing
  - Replacing

83

PPP V. – Inspections Requirements

- More tomorrow…

84

PPP VI. Non-Storm Water Discharges

- Includes subsurface and slope drains as well as uncontaminated groundwater from dewatering
- Control outlet velocities with blocks, and/or erosion stone

Example: Longitudinal subdrains

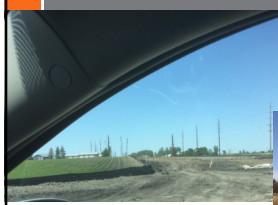
85

PPP VII. Potential Sources of Off Right-of-Way Pollution

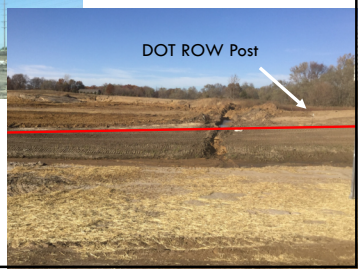
- Silt, sediment, other forms of pollution may be transported onto ROW
- Potential sources outside of ROW are beyond the control of this PPP
- Pollution within the ROW will be conveyed and controlled per this PPP

86

PPP VII. Potential Sources of Off Right-of-Way Pollution



Examples: Adjacent farm fields or new development



87

PPP – VIII. Definitions

- Base PPP is initial plan at start of construction
- Amended PPP is base PPP amended during construction
  - Plan revisions
  - Contract modifications
  - Site inspections reports
  - Fieldbook entries by Inspector
  - Amended PPP site map by Contractor
  - ECIP
  - NOI
  - Co-permittee certifications
  - Subcontractor request forms
- IDR's (now called DWR's)
  - Inspector's Daily Report (Daily Work Report)

Items stored electronically

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If you have a phone

Use below QR code

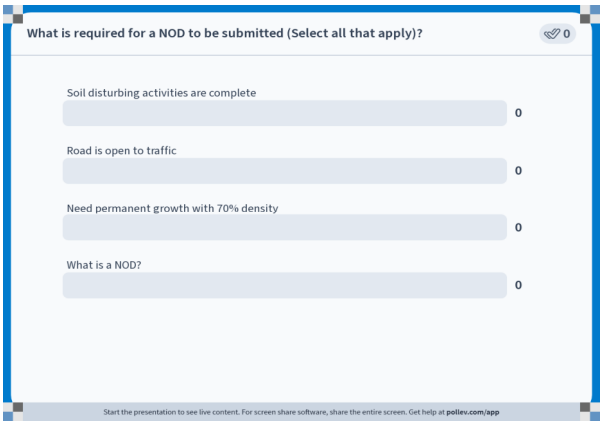
Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can "Skip for now"

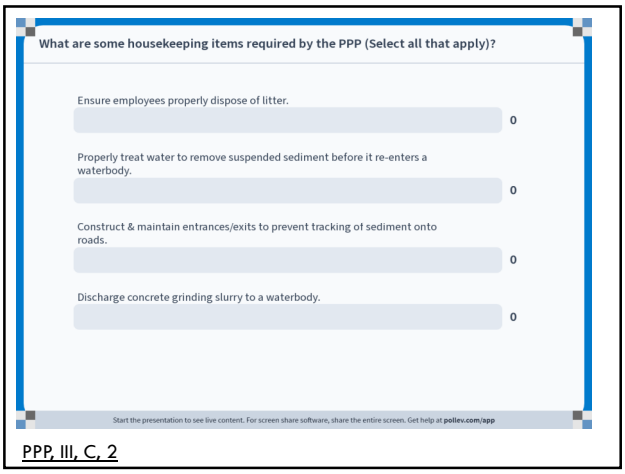
You can also "Skip" if it asks for your name.

89



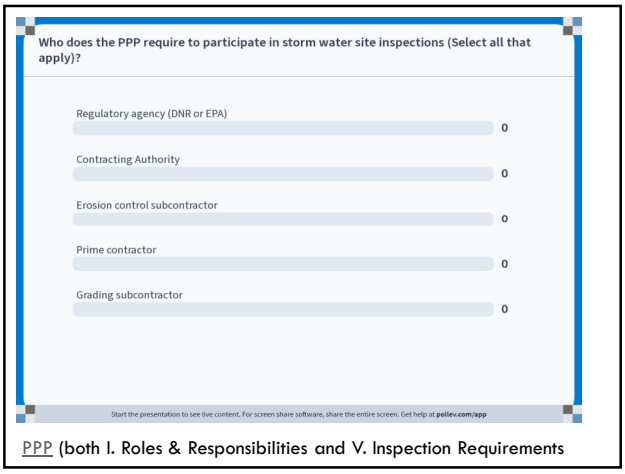
Notice of Discontinuation

90



PPP, III, C, 2

91



PPP (both I. Roles & Responsibilities and V. Inspection Requirements

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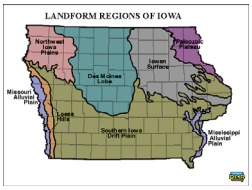
EROSION & SEDIMENT CONTROL BMP'S: CONTRACT DOCUMENTS

Erosion & Sediment Control Best Management Practices (BMP's): Contract Documents

1

Iowa Soil's

- Vary greatly across the state with over 450 different soil types!!
- Development was heavily influenced by glaciation, wind, and the tallgrass prairie
- 67% of the state soil is Mollisol (Fertile Black Soil)



- 1 teaspoon of healthy Iowa soil contains over a billion microbes. All the microbes in 1 acre would weigh as much as 2 adult African Elephants
- Iowa's #1 Natural Resource
  - ✓ #1 Corn Production
  - ✓ #2 Soybean Production
  - ✓ #5 Oat Production
  - ✓ #8 Alfalfa Production

2

"That's great, but we're not working in agriculture so why does this have anything to do with me."

50% of the publicly owned land in the state of Iowa is in road rights-of-way.

919,405 Acres

3

Why Is Erosion and Sediment Control Important?

Soil Loss

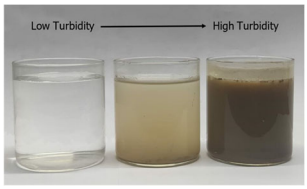
- 1" of topsoil takes several hundred years to form
- There was 14" to 16" of topsoil when the state was settled (1833)
- In the last 100 to 150 years, this has been reduced to 6" to 8" according to a 2015 soil survey
- We are currently losing topsoil at a rate 10 times faster than we can replace it

4

Why Is Erosion and Sediment Control Important?

Water Quality

- Sediment increases the turbidity of water, making it cloudy.
- Cloudy water reduces sunlight penetration, which lowers aquatic plant photosynthesis, which in turn reduces water oxygen.
- Cloudy water warms up at a much faster rate than clear water.



5

Why Is Erosion and Sediment Control Important?

Civility/Public Perception

- People may be using water downstream as a drinking source or for recreation.
- Dirty water can leave a "bad taste" in the public's mouth and can be very bad publicity for the IA DOT and contractors.

6

Why Is Erosion and Sediment Control Important?

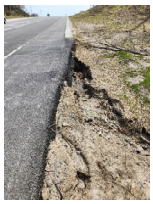
Regulatory Reasons

- Fines

- We want to keep a good working relationship with the EPA and DNR

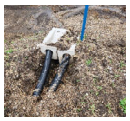
7

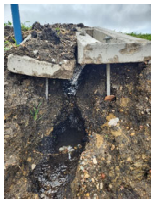
Why Is Erosion and Sediment Control Important?



Damage to Infrastructure

- Undercutting
- Drainage issues from sediment building up in ditches and culverts





8

Erosion & Sediment Control BMP's

Erosion Control

Controls or devices used to prevent the detachment and movement of soil or rock fragments by water, wind, ice or gravity. Helps keep soil in place.

Sediment Control

Controls or devices to trap sediment suspended in storm water by settling or filtration. Collects or allows soil to settle to prevent it from traveling offsite.

P. 24, 220, and 222 in Field Guide

9

Erosion & Sediment Control BMP's

- **Erosion Control**
  - Seeding
  - Mulching
  - Sodding
  - Slope Protection and Special Ditch Control
  - Stone and Revetment
- **Sediment Control**
  - Silt Fence
  - Perimeter, Slope & Ditch Check Sediment Control Devices
  - Silt Curtains
  - Silt Basins

10

Erosion Control BMP's

Prioritization of erosion and sediment controls for construction sites

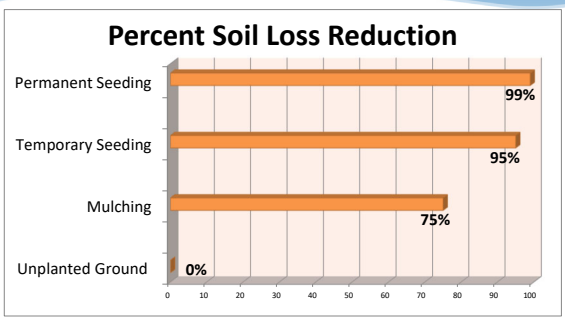
Practice	Cost	Effectiveness
Limiting disturbed areas through **phasing**	$	
Protecting disturbed areas through **mulching and revegetation**	$ $	
Installing diversion around disturbed areas.	$ $ $	
Sediment removal through **detention** of all site drainage	$ $ $ $	
Other **structural controls** to treat sediment-laden flow	$ $ $ $	

Source: Tetra Tech

P. 25 in Field Guide

11

Erosion Control BMP's



12

Seeding

- One of the most cost-effective practices we have to prevent erosion
- Two types of seeding:
  - Temporary
    - Short-term soil stabilization
    - The intent is to eventually reseed these areas with permanent seed mixtures
  - Permanent
    - Long-term soil stabilization

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Permanent Seed Mixes

- **Rural Seed Mix**
  - Medians and the first 8 feet adjacent to the shoulder
- **Urban Seed Mix**
  - Lawn-like
  - Regularly mowed
- **Native Seed Mix**
  - Low maintenance and excellent erosion control upon establishment
- **Wetland Mix**
- **Wildflower Mix**
- **Salt Tolerant**
  - Rural replacement in areas of high salt exposure
- **Custom Mixes** (check plan notes)

Specification 2601, p. 6 to 11

14

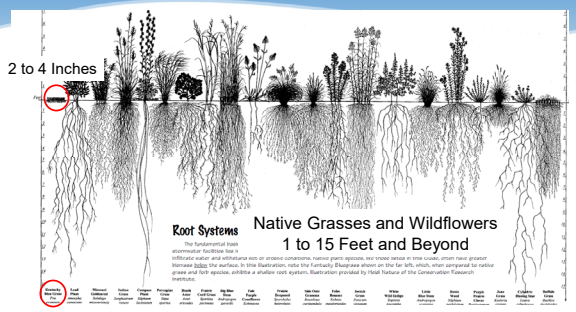
Temporary Seed Mixes

- **Rural Stabilizing Mix**
- **Urban Stabilizing Mix**
- **Rural Mix**
  - Sometimes used where long term cover is needed on projects
- **Custom Mixes**
  - Instances where current DOT seed mixes may not meet needs

Specification 2601, p. 6 to 11

15

Why Different Seed Mixes?



Field Guide p. 198

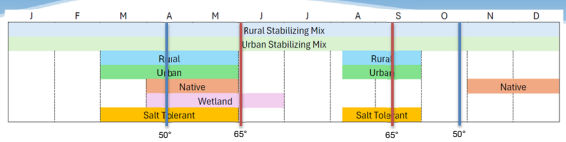
16

17

This is why you don't have to water native plants. And those roots act like sponges to control flooding.

18

Why do we have different seeding dates?



Rural Stabilizing Seed Mix	
Oats	35° and above
Canada Wildrye	50-70°
Grain Rye	34° and above

Optimum Soil Temperatures for Germination

Rural Seed Mix	
Tall Fescue	50-60°
Perennial Ryegrass	50-65°
Kentucky Bluegrass	50-65°

Wetland Seed Mix	
Boneset	70-85°
New England Aster	65-75°
Sneezeweed	65-70°
Arrowhead	65-75°

Native Seed Mix	
Big Bluestem	60-70°
Indiangrass	60-70°
Black-eyed Susan	70-75°
Partridge Pea	68-72°

19

Two ways to look at Germination and Purity

Standard Way

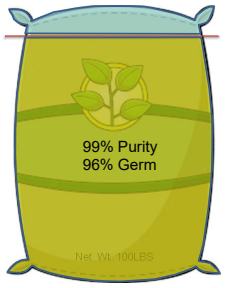
(Most Non-Native Seed)

Lot #	226-15
Date Tested:	1/1/2023
Origin:	IA
Net Weight (lbs):	100
Germ:	96%

Certified Seed Oats Cultivar: Badger	
Purity:	99.00%
Inert:	0.75%
Other Crop:	0.00%
Weed Seed:	0.25%
Noxious Weed Seed	0.00%

1% Non-Crop Seed

99% Seed Oats



20

Pure Live Seed (PLS)

(Native Seed)

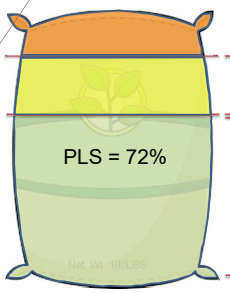
Lot #	N1000
Date Tested:	1/1/2023
Weight (lbs):	100

Big Bluestem (Andropogon gerardii) Cultivar or Selection: OZ-70	
Purity:	90.00%
Inert:	8.00%
Other Crop:	1.50%
Weed Seed:	0.50%

Total Germ: 80.00%

PLS%: 72.00%

10% of the total bag is Non-Crop Seed (10 lbs)



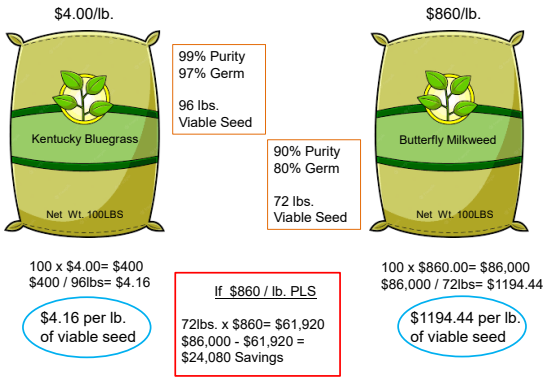
20% of the Big Bluestem seed is not viable. (90lbs x 20%= 18 lbs)

The remaining seed is all Big Bluestem and Viable. This is the **Pure Live Seed**. (100 lbs x 90% x 80% = 90lbs x 80%= 72 lbs or 72% of a 100 lb bag)

90% of the total bag is Big Bluestem Seed (90 lbs)

21

Why We Use PLS: Some Real-World Math



22

Pure Live Seed (PLS)

- **PLS example - Seed**

Contractor is installing native grass mix. Mix includes Indiangrass. Indiangrass was tested. Germination was 51% and purity was 93%. How many bulk lbs. per acre are required?

Look up PLS lbs. per acre req'd for Indiangrass (go to **Spec. 2601, p. 9**).

$$\frac{PLS\ application\ rate}{(Germination\ x\ Purity)} = \frac{6\ lbs.per\ acre}{0.51\ x\ 0.93} = \frac{6\ lbs.per\ acre}{0.4743}$$

$$= 12.65\ lbs.per\ acre$$

23

Seeding

- **Inspection and Acceptance of Seed**
  - **Materials IM 469.02 and Spec. 2601, p. 5**
  - Germination test date shall be completed within 9 month period prior to seed application, exclusive of calendar month of test
  - Onsite mixing allowed for rural stabilizing crop
  - Onsite mixing not allowed for all other seed types
  - No unsealed open bags of seed will be accepted
  - Seed germination requirements: **Spec. 4169, p. 1**

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Seeding

Seed Mixture Report - no PLS Factor - Seed Mixture to be Entered 11-13

Project No.:
County:
Contractor:

Date: 8/21/2019
Seed Mix Type: IDOT RURAL PERMANENT
# of Acres: 5
Lot #: IDR-ST2-19_5

Species (Scientific name)	Origin	Lot #	Test Date	Purity (%)	Germination (%)
FAWN TALL FESCUE	OR	M63-18-39ST	3/29/2019	99.57	97
PERENNIAL RYEGRASS	OR	M100-17-167	2/6/2019	98.84	95
KENTUCKY BLUEGRASS	WA	83.148.16	1/15/2019	98.23	88

Species (Scientific name)	Lbs. /Acre	# of Acre	Total Lbs.
FAWN TALL FESCUE	100	5	500.00
PERENNIAL RYEGRASS	75	5	375.00
KENTUCKY BLUEGRASS	20	5	100.00
		Total:	975.00

Lbs/Bag: 48.75 Acres/Bag: 0.25 # of Bags: 20

IM 469.02: Mix report and signed certification sheet from certified seed conditioner (for all seed mixes other than rural stabilizing) to be uploaded to **DocExpress**

25

Seeding

- **Inspection and Acceptance of Seed**
  - **Where to find certified seed conditioners?**

Go to Construction & Materials – Earthwork & Erosion Control page:

https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control

Go to "Approved Seed Conditioners"

26

Seeding

- **Inspection and Acceptance of Seed**
  - **Materials IM 469.02**

- Seed types (Spec. 2601)

IDOT Rural Stabilization - Winter

LOT# IRSST5-W-17_2

Variety and Kind	Purity	Germ	Origin	Origin	Lot Number	Test Date
Seed Oats	47.26%	99%	SD	SD	2717	8/172017
Winter Grain Rye	46.99%	92%	SD	SD	917	9/8/2017
Canada Wildrye	5.09%	94%	MN	MN	F9002	9/28/2017

Total Purity: 99.34% Crop: 0.03% Inert: 0.62% Weeds: 0.00% AMS: 127
Net Weight: 43.94 LBS_19.93Kgs Tested: Excess Noxious Weeds :None

- Germination (Spec. 4169.02)
- Test date (IM 469.02)

27

Seed Bed Preparation

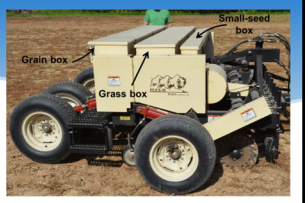
- Both Temporary and Permanent Mixes
  - Not required for all mixes (Native, etc.)
- Soil must be worked to a depth of 3 inches
- Smooth of all rills and gullies
- Any gullies 6 inches or deeper should be compacted
- Remove & pick-up debris, such as 3" or larger rocks, logs, etc.

Spec 2601
p. 4

28

Seeding

- Native Grass Seed Drill
  - Three different seed boxes
  - Forb/Small Seeds, Native Grass/Fluffy, Cover Crop



29

Seeding

Native Grass Seed Drill

30

Fertilizer

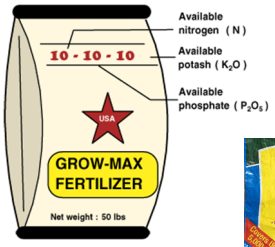
- **Temporary and Permanent Seeding**
  - How much and what type?
    - For rural stabilizing?
    - For rural permanent?
    - For native?

Spec. 2601
p. 6-11

31

Fertilizer

- **Fertilizer** – Equivalent calculations
  - **Construction Manual Section 7.21**



32

Fertilizer

- **Scenario 1**

  Contractor is applying rural stabilizing mix. Required fertilizer is 250 lb./acre of 13-13-13.

  If contractor brings out 19-19-19, how many lbs. per acre do they need to apply?

$$\frac{250\ lb.\ x\ \%\ required}{\%\ furnished} = \frac{250\ lb\ x\ 13}{19} = 171\ \text{lb.}$$

33

Fertilizer

- **Scenario 2**

  Contractor is applying rural permanent seed mix. Required fertilizer is 300 lb./acre of 6-24-24.

  If contractor brings out 157 lbs. per acre of 18-46-0 and 110 lbs. per acre of 0-0-60, does this meet requirements?

34

Fertilizer

Step 1:

Determine how much N, P_2O_5, and K_2O per acre the specifications provide.

Req'd amt. of N = 300 lbs. x 6% = 18 lbs.

Req'd amt. of P_2O_5, and K_2O = 300 lbs. x 24% = 72 lbs.

35

Fertilizer

Step 2:

Determine how much N, P_2O_5, and K_2O per acre the contractor is providing with:

157 lbs. per ac. of 18-46-0 and 110 lbs. per ac. of 0-0-60 .

N = 157 lbs. x 18% = 28 lbs.

P_2O_5 = 157 lbs. x 46% = 72 lbs.

K_2O = 110 lbs. x 60% = 66 lbs.

< ≥ ≥

Step 3: Compare back to amt. req'd by specs:

N	18 lbs.	✓
P_2O_5	72 lbs.	✓
K_2O	72 lbs.	✗

36

Fertilizer

- **Scenario 3**

  Contractor is applying rural permanent seed mix. Required fertilizer is 300 lb./acre of 6-24-24.

  If contractor brings out 139 lbs. per acre of 11-52-0, 120 lbs. per acre of 0-0-60 and 6 lbs. per acre of 46-0-0, does this meet requirements?

37

Fertilizer

Step 1: (Same as in Scenario 2)

Determine how much N, P_2O_5, and K_2O per acre the specifications provide.

Req'd amt. of N = 300 lbs. x 6% = 18 lbs.

Req'd amt. of P_2O_5, and K_2O = 300 lbs. x 24% = 72 lbs.

38

Fertilizer

Step 2:

Determine how much N, P_2O_5, and K_2O per acre the contractor is providing with:

139 lbs. per ac. of 11-52-0

120 lbs. per ac. of 0-0-60

6 lbs. per ac. of 46-0-0.

N = 139 lbs. x 11% + 6 lbs. x 46% = 18 lbs. ≥

P_2O_5 = 139 lbs. x 52% = 72 lbs. ≥

K_2O = 120 lbs. x 60% = 72 lbs. ≥

Step 3:
Compare back to amt. req'd by specs:

N 18 lbs. ✓

P_2O_5 72 lbs. ✓

K_2O 72 lbs. ✓

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Fertilizer

- Additional fertilizer examples in **C.M. Section 7.21** and in **Review Worksheet** (in Review tab)
- Fertilizer spreadsheet available for use on your project on Iowa DOT – Construction & Materials – Earthwork & Erosion Control page:

https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control

Please note this spreadsheet **cannot** be used on the exam.

40

Mulching

- Can be completed with or without seeding
- Depends on dates and contractor's schedule
- Application Rate is 1 ½ tons per acre
- Should be applied evenly
  - Piles will not allow seed to germinate
  - Bare areas will still erode

Spec 2601 p. 12
Spec 4169 p. 4-5

41

Mulching

42

Mulching

Certified Noxious Weed Seed Free - Iowa Crop Improvement Association requirements

- White certification label or transit cert

Certification Tag

Materials IM 469.04

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Mulching

- Certified Noxious Weed Seed Free
  - Iowa Crop Improvement Association http://www.iowacrop.org/Weed_Free.htm
  - Upload documentation to DocExpress

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Mulching

- Use mulch anchoring equipment to 'tuck' straw
  - Minimum of two passes, minimum 2 inches into ground

45

46

Erosion Control BMP's

- Be aware you may have bid items for seeding (which includes fertilizing) and mulching
- Or you may have incidental seeding notes, which include seeding, fertilizing, and mulching

ESTIMATED PROJECT QUAN
(1 DIVISION PROJEC

Item Code	Item
2507-3250005	ENGINEERING FABRIC
2507-6800061	REVETMENT, CLASS E
2507-8029000	EROSION STONE
2601-2633100	MOWING
2601-2634100	MULCHING
2601-2635045	MULCHING, BONDED FIBER MATRIX
2601-2636043	SEEDING AND FERTILIZING (RURAL)
2601-2640350	SPECIAL DITCH CONTROL, WOOD EXCELSIOR MAT
2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING
2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING (NATIVE STABI
2601-2643110	WATERING FOR SOD, SPECIAL DITCH CONTROL, OR SLOPE PROTEC
2601-2643300	MOBILIZATION FOR WATERING

232-3
10-19-2

EROSION CONTROL
(RURAL SEEDING)

Area to be seeded is estimated to be less than 1 acre. If the contractor determines the area exceeds 2 acres, notify the Engineer. Approved quantity in excess of 2 acres will be paid for as extra work according to Article 1109.03,B of the Standard Specifications.

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

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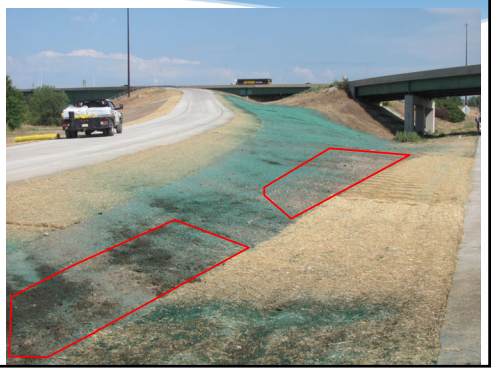
Hydraulic Mulching

- **Spec 2601, p. 12 and 4169, p. 4-5**
- May be wood cellulose, Bonded Fiber Matrix (BFM) or Mechanically-Bonded Fiber Matrix (MBFM)
- Typically lasts 3-12 months depending on conditions
- Application rate of 3,000 lb/acre

48

Hydraulic Mulching



49

Hydraulic Mulching

- Hydraulic mulch and seeding must be **two separate** operations
- **Construction Manual Section**

  7.32 HYDRO-MULCH

  Table/mixing chart on how much water is needed

  How many bales of hydro-mulch and how much water is needed for ½ acre?

50

Hydraulic Mulching

The minimum rate of application is 3,000 lb./acre. The mixing chart below is based on 3,000 lb./acre:

# of 50 lb. Bales	BFM (lb.)	Water * (gallons)	Application Rate of 3,000 lb./acre	
			Sq. Ft.	Acre
1	50	67-125	726	0.017
2	100	134-250	1,452	0.033
4	200	268-500	2,904	0.067
8	400	536-1,000	5,808	0.133
16	800	1072-2,000	11,616	0.267
32	1,600	2144-4,000	23,232	0.533
64	3,200	4288-8,000	46,464	1.067
128	6,400	8576-16,000	92,928	2.133
30	1,500	2010-3,750	21,780	0.500
60	3,000	4020-7,500	43,560	1.000

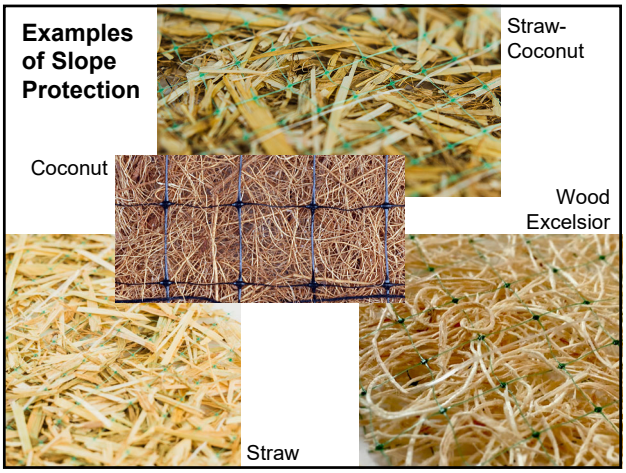
51

Slope Protection

- **Spec 2601, p. 16 and 4169, p. 7 to 8**
- Used on long foreslopes, backslopes, bridge berms and super elevated curves
- Seedbed preparation required prior to placement
- Bid Item Description 'Slope Protection, Wood Excelsior Mat'
  - May also use straw mat, straw-coconut mat or coconut fiber mat for slope protection
- See **EC-103** for additional details

52

Examples of Slope Protection



53

Special Ditch Control

- **Spec 2601, p. 14-15 and 4169, p. 7**
- Used on ditch grades greater than 1-2% where vegetation alone will not work
- Seedbed preparation required prior to placement
- May also use coconut fiber for ditch control
- No straw mat in ditches
- See **EC-101** for additional details

54

Examples of Special Ditch Control

Wood Excelsior

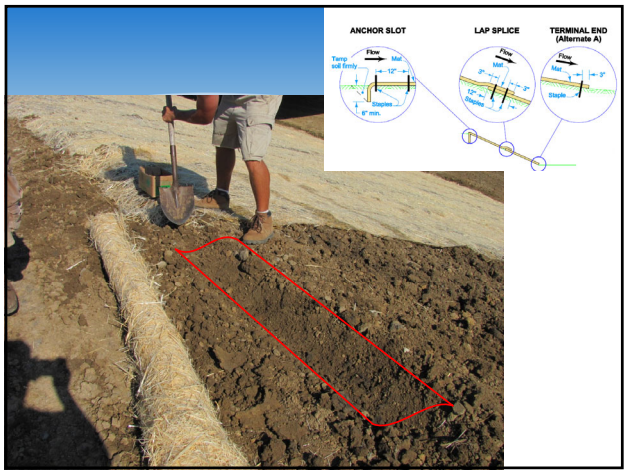
Coconut

55

Slope Protection & Special Ditch Control

- Tab 100-22
- Installation
  - Soil to mat contact required to perform properly
  - Remove all material greater than 1 ½ inches
  - Lap joints, anchor slots, terminal ends
  - Staples

56



57

Slope Protection & Special Ditch Control

58

Turf Reinforcement Mat (TRM)

- Provides stronger vegetation root structure to resist larger run-off velocities
- Used as an alternative to rock in certain cases
- Four different types of TRM – **Spec 4169, p. 8**

Table 4169.10-1: Minimum Material Property and Performance Requirements

Property	Property	Test Method	Type 1	Type 2 [d]	Type 3 [d]	Type 4 [d]
Material	Thickness	ASTM D 6525	0.25 in	0.25 in	0.25 in	0.25 in
Material	Tensile Strength[a, b]	ASTM D 6818	125 lb/ft	240 lb/ft	750 lb/ft	3000 lb/ft
Material	UV Resistance	ASTM D 4355	80% @ 500 hrs	80% @ 1000 hrs	80% @ 1000 hrs	90% @ 3000 hrs
Performance	Maximum Shear Stress (Channel Applications)[c]	ASTM D 6460	7-9 lb/ft^2	10-11 lb/ft^2	12-14 lb/ft^2	15-16 lb/ft^2

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Examples of TRMs (Note: appearances vary depending on brand/product)

Type 1

Type 2

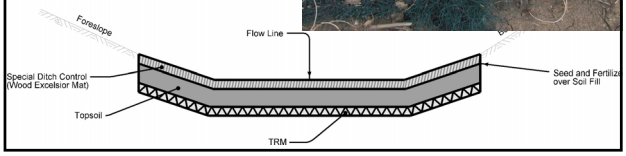
Type 3

Type 4

60

Turf Reinforcement Mat (TRM)

- See Standard Road Plan **EC-104** for installation and **Spec 2601, p. 14**



61

Proper Installation Is Key To Product Performance

62

Proper Installation Is Key To Product Performance

63

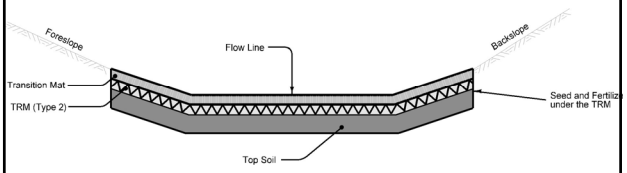
Proper Installation Is Key To Product Performance



64

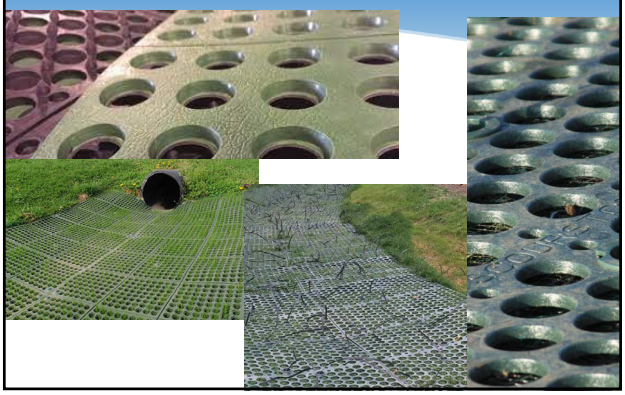
Transition Mat (TM)

- **Spec 2601, p. 16-17 and 4169, p. 9**
- See Standard Road Plan **EC-105** for installation
- Seed is applied under TRM



65

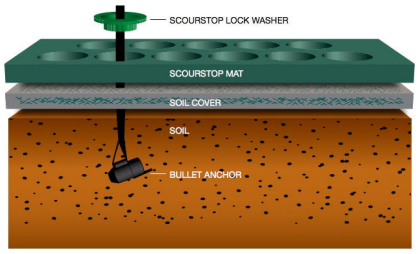
Transition Mat (TM)



66

Transition Mat (TM)

- Example of Anchor



67

Transition Mat (TM)

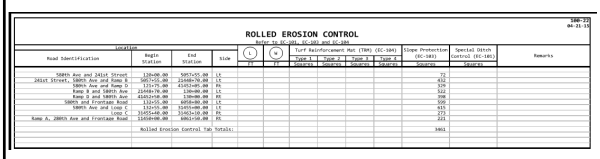
- Specialty products used at outlets and bridge end drains where rock is undesirable
- Correct installation is key to product working properly
- See **DR-401** for additional details

68

Erosion Control BMP's

- **Slope Protection, Special Ditch Control, TRM**

  Tab 100-22 (Sheet RC.11 of handout)



ROLLED EROSION CONTROL

69

Watering

- Used with slope protection, ditch control, TRM, and TM to help ensure vegetative growth as soon as possible
- **Spec. 2601, p. 17**
- Area must be watered no later than one day following placement of mat and TRM
- Other waterings follow at intervals of 5-8 calendar days

70

Watering

- Applied at a rate of 50 gallons per square
- Mobilization for *Watering* is paid for 2nd, 3rd and 4th waterings
- There is no payment for Mobilizations for *Erosion Control*
- In case of stand alone Erosion Control Contract, no mobilization paid specifically for watering
- Sod has a different watering rate and schedule **Spec. 2601, p. 17**

71

Rock Erosion Control

Rock Erosion Control (EC-301)

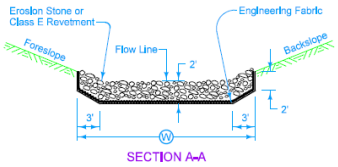
- Tab 100-23 Rock Ditch Check/Ditches/Flumes/Splash Basins/Slope Protection

72

Rock Erosion Control

Rock Ditch (EC-301)

- Installed when velocities are high enough to prevent the establishment of permanent vegetation



TYPE 2
(Rock Ditch)

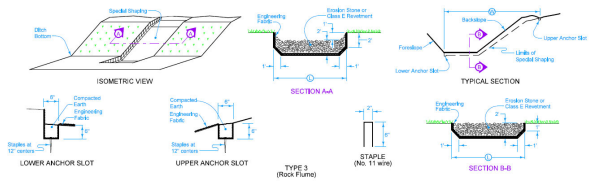
73

74

Rock Erosion Control

Rock Flume (EC-301)

- Installed to prevent gullies in areas of concentrated flow down a slope



75

Rock Erosion Control

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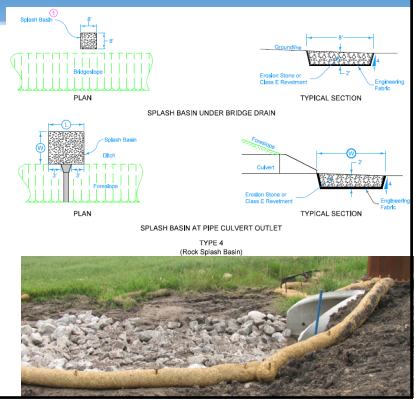
Rock Erosion Control

Splash Basin (EC-301)

- Installed to reduce velocity of water when entering or exiting a structure such as a culvert.



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If you have a phone

Use below QR code

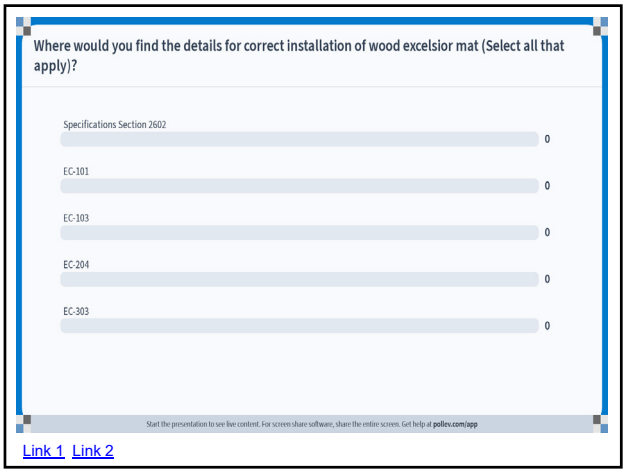
Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can “Skip for now”

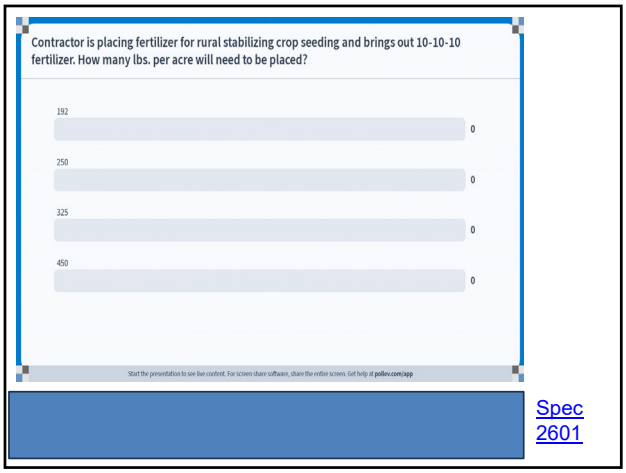
You can also “Skip” if it asks for your name.

78



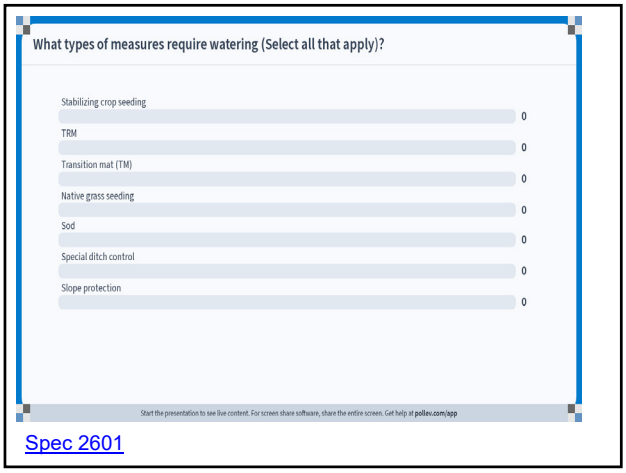
Link 1 Link 2

79



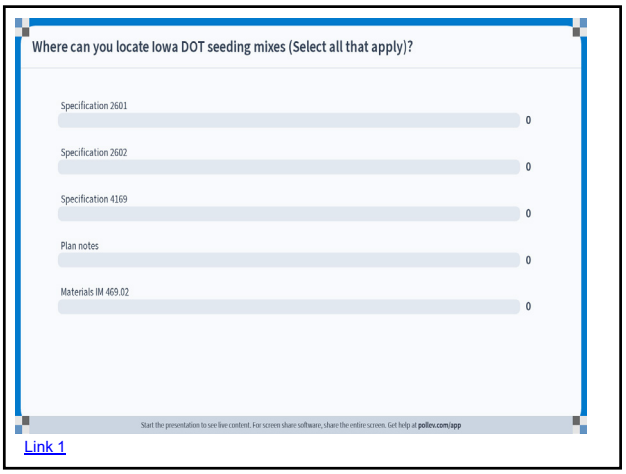
Spec 2601

80



Spec 2601

81



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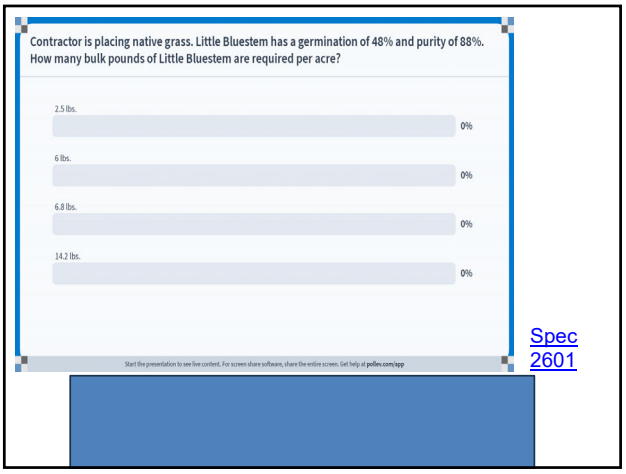
82



Spec 2601

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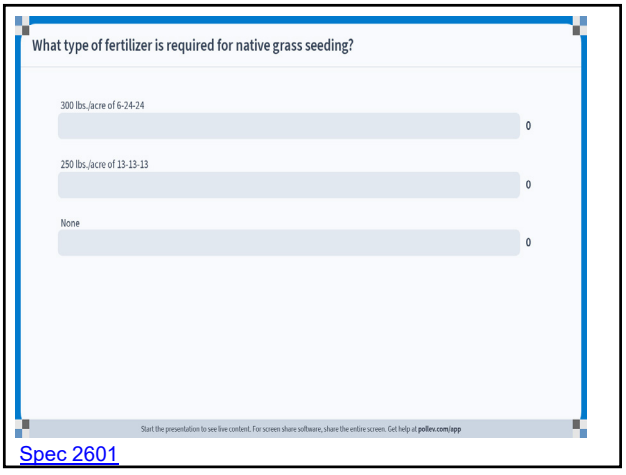

Spec 2601

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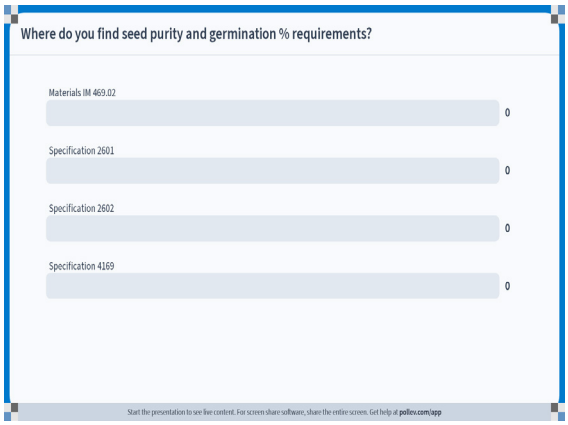

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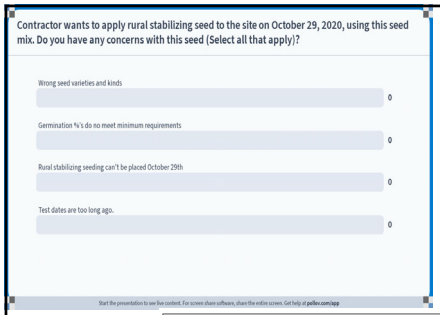
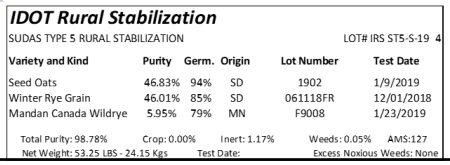


Spec 2601
Spec 4169
IM 469.02



IDOT Rural Stabilization

SUDAS TYPE 5 RURAL STABILIZATION LOT# IRS ST5-S-19 4

Variety and Kind	Purity	Germ.	Origin	Lot Number	Test Date
Seed Oats	46.83%	94%	SD	1902	1/9/2019
Winter Rye Grain	46.01%	85%	SD	061118FR	12/01/2018
Mandan Canada Wildrye	5.95%	79%	MN	F9008	1/23/2019

Total Purity: 98.78% Crop: 0.00% Inert: 1.17% Weeds: 0.05% AMS:127
Net Weight: 53.25 LBS - 24.15 Kgs Test Date: Excess Noxious Weeds: None

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Sediment Control BMP's

- **Silt Fence**
  - Maximum run length - go to **EC-201**
  - Installed on contours
  - Last 20 feet should be flared upslope in direction of flow
    - Call J-hooks (creates add'l areas to contain stormwater)
  - Should be fully entrenched into ground – go to **EC-201**
  - Both sides of silt fence should be compacted after installation

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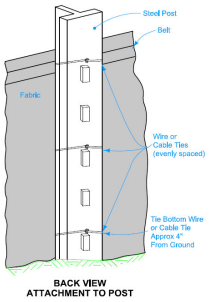
Silt Fence

89

Silt Fence

- EC-201
  - Steel Posts
    - Minimum length of 48 inches
    - Maximum spacing of 8 feet apart
    - At least three ties and one of these going through (encompassing) the reinforced belt



90

Silt Fence

- Tab 100-17 (Sheet RC.5 of handout)

100-17
04-20-10

TABULATION OF SILT FENCES

Refer to EC-201

Location			Length	Remarks
Begin Station	End Station	Side	LF	
113+25.00	115+25.00	Lt	200.0	580th Ave.
115+20.00	117+20.00	Lt	200.0	580th Ave.
117+20.00	117+95.00	Lt	80.0	580th Ave.
118+55.00	120+00.00	Lt	145.0	580th Ave.
122+25.00	124+25.00	Lt	200.0	580th Ave.
122+25.00	124+25.00	Lt	200.0	580th Ave. 50' offset
124+20.00	125+45.00	Lt	155.0	580th Ave.
143+00.00	145+00.00	Lt	200.0	580th Ave.
144+97.00	146+97.00	Lt	200.0	580th Ave.
146+95.00	148+95.00	Lt	200.0	580th Ave.
148+90.00	150+90.00	Lt	200.0	580th Ave.
150+85.00	152+85.00	Lt	200.0	580th Ave.
152+80.00	154+80.00	Lt	200.0	580th Ave.
154+75.00	156+75.00	Lt	200.0	580th Ave.
157+10.00	158+50.00	Lt	140.0	580th Ave.
158+50.00	160+50.00	Lt	200.0	580th Ave.
160+45.00	162+45.00	Lt	200.0	580th Ave.
162+40.00	164+40.00	Lt	200.0	580th Ave.
164+35.00	166+35.00	Lt	200.0	580th Ave.
Silt Fence Tab Totals:			54917.0	
Silt Fence Bid Totals:			68646.3	125% of Tab Total
Fence Maintenance Totals:			6864.6	10% of Bid Total
Silt Fence Removal Totals:			68646.3	100% of Bid Total

91

Silt Fence

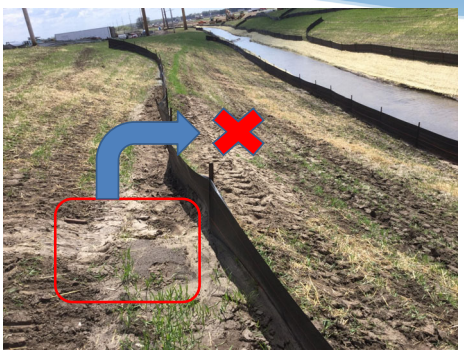
92

Silt Fence

- Silt fence should be cleaned out when capacity reaches 50% or more
  - If clean out is not possible, replace with another row of silt fence adjacent

93

Silt Fence



94

Silt Fence

Spacing on slopes

- p. 73 of Field Guide

slope	approximate spacing (ft)*
up to 10:1 (10%)	100
up to 5:1 (20%)	60
up to 4:1 (25%)	50
up to 3:1 (33%)	40
up to 2.5:1 (40%)	30

*For Loess and other highly erodible soils, these spacings should be decreased.

95

Silt Fence

96

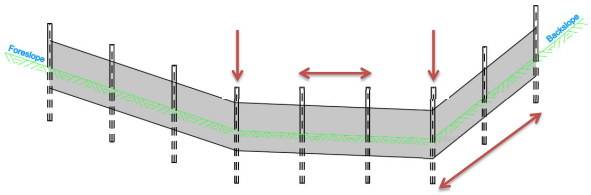
Sediment Control BMP's

- **Ditch Checks**
  - Can be constructed of silt fence, rock and other sediment control devices
  - Slows the velocity of the water so sediment can settle out
  - The steeper the ditch, the closer the ditch checks

97

Silt Fence Ditch Checks

- EC-201
- Post spacing maximum of 4 feet
- Post required at toe of foreslope and backslope
- Silt fence needs to be tied into the slope



98

Silt Fence Ditch Checks

Design Manual 10c-1 and p. 93 Field Guide: Recommended maximum spacing

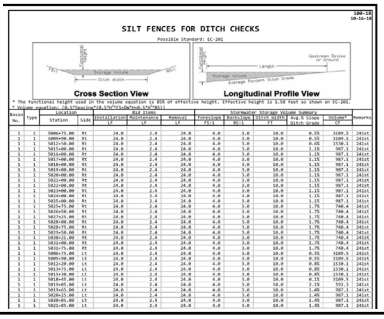
ditch grade	approximate spacing (ft)
≤ 0.5%	315
> 0.5% to ≤1%	155
> 1% to ≤1.5%	100
> 1.5% to ≤ 2%	75
> 2% to ≤ 2.5%	60
> 2.5% to ≤ 3%	50
> 3% to ≤ 3.5%	45
> 3.5% to ≤ 4%	40
> 4% to ≤ 5%	35
> 5% to ≤ 5.5%	30
> 5.5% to < 6%	25
≥ 6%	Special design required – contact the Agronomist

99

Silt Fence Ditch Checks

- Tab 100-18 Silt Fence for Ditch Checks

Sheet RC.5 of 11x17 handout


SILT FENCES FOR DITCH CHECKS

Cross Section View

Longitudinal Profile View

100

101

102

Silt Fence Ditch Checks

103

Perimeter & Slope Sediment Control Devices (PSSCD)

- Different diameters: 9, 12, 20 inches
- 3 different types
  - Straw wattles, filter socks, and sediment logs
  - All three types are allowed

104

Filter sock

Wood excelsior sediment logs

Straw wattles

105

Perimeter & Slope Sediment Control Devices (PSSCD)

- Great, flexible tool to have onsite at all times
- **Spec 4169, p. 10**
- Tab 100-19 Perimeter and Slope Sediment Control Devices

106

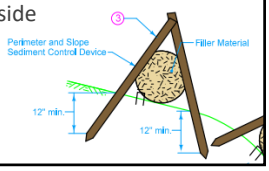
Perimeter & Slope Sediment Control Devices (PSSCD)

- Provide slope interruption, inlet protection and perimeter control
- Install along contours similar to silt fence
- Required to have an identification tag on each device
- See **EC-204** for details

107

Perimeter & Slope Sediment Control Devices (PSSCD)

- **Slopes & Perimeter Control (EC-204)**
  - Min. actual ¾" x ¾" wood stake min. 12 inches in ground
  - Stake layout and staples:
    - 4' max. spacing for downslope stakes
    - Upslope stakes at ends and middle of device
    - Staples every 2' on upslope side
  - Min. 2' overlap

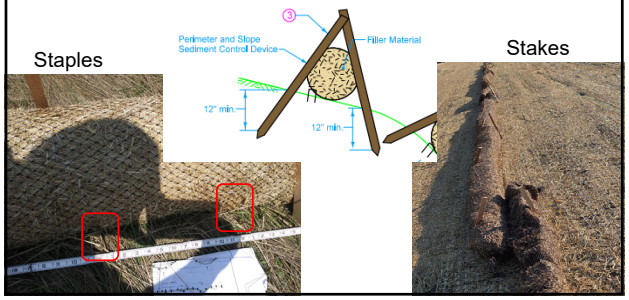


108

Perimeter & Slope Sediment Control Devices (PSSCD)

- Slopes & Perimeter Control (EC-204)

Staples



Stakes

109

Perimeter & Slope Sediment Control Devices (PSSCD)

- Slopes – Design Manual 10c-1, p. 84 Field Guide

Recommended maximum spacing

slope	approximate spacing (ft)		
	9 inch device	12 inch device	20 inch device
4:1 and flatter	40	60	80
3:1	30	45	60
2:1	20	30	40
1:1	10	15	20

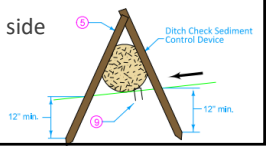
110

Perimeter & Slope Sediment Control Devices (PSSCD)

111

Ditch Check Sediment Control Device

- **Ditches (EC-204)**
  - All 3 types allowed
  - Min. actual ¾" x ¾" wood stakes
  - Stake layout and staples:
    - 2' max. spacing for downslope stakes
    - Upslope stakes at ends and middle of device
    - Staples every 1' on upslope side



112

Ditch Check Sediment Control Device

- **Ditches – Design Manual 10c-1, p. 84**
  Recommended maximum spacing

ditch grade	approximate spacing (ft)	
	12 inch device	20 inch device
≤ 1%	92	133
≤ 2%	46	67
≤ 3%	31	44
≤ 4%	23	33
≤ 5%	18	27
≤ 6%	15	22
≤ 7%	13	19
≤ 8%	11	17
≤ 9%	10	15
≤ 10%	9	13

113

Ditch Check Sediment Control Device

114

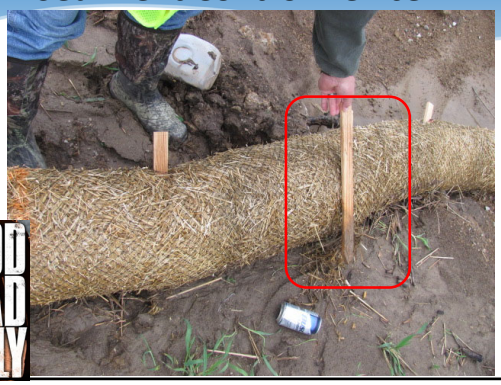
Ditch Check
Sediment Control Device

115

Ditch Check
Sediment Control Device

116

Ditch Check
Sediment Control Device



117

Performance Is Key

What is the proper way to address these situations?

118

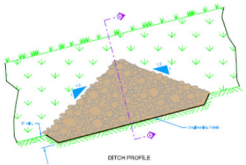
Performance Is Key

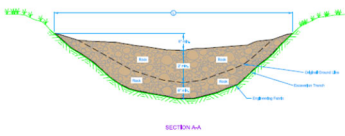
What is the proper way to address these situations?

119

Rock Check Dam

- Similar purpose as silt fence ditch checks
- Need to be tied into slopes
- **EC-302**
- Tab 100-32 Rock Check Dam





120

Rock Check Dam

121

Rock Check Dam

Design Manual 10c-1 and p. 97 Field Guide, Recommended maximum spacing

ditch grade	approximate spacing (ft)
≤ 0.5%	400
> 0.5% to ≤1%	200
> 1% to ≤ 1.5%	130
> 1.5% to ≤ 2%	100
> 2% to ≤ 2.5%	80
> 2.5% to ≤ 3%	65
> 3% to ≤ 3.5%	55
> 3.5% to ≤ 4%	50
> 4% to ≤ 4.5%	45
> 4.5% to ≤ 5%	40
> 5% to ≤ 5.5%	35
> 5.5% to ≤ 6.5%	30
> 6.5% to ≤ 8%	25
> 8% to ≤ 10%	20
> 10%	Special design – contact the Agronomist

122

Silt Dikes and Ditches

- **EW-403**
- Used on or near property boundaries to prevent damage to private property
- Used in 'No Ditch' areas
- Tab 100-13 Silt Ditches and Tab 100-15 Silt Dikes

123

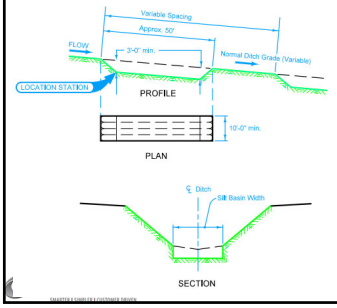
Silt Basins/Traps

- Allow water velocity to decrease and sediment to settle out
- Size of drainage and length to width ratio influence effectiveness
- Used in ditches and at culvert inlets and outlets
- Maintenance - clean out required when capacity is 50% or less
  - Payment is 100% of contract unit price for construction
- Tab 100-14 Silt Basins

124

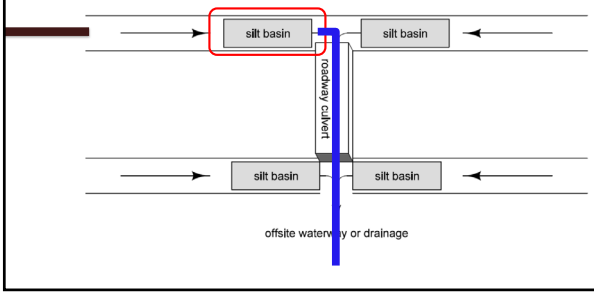
Silt Basins/Traps

- EW-403



125

Silt Basins/Traps



126

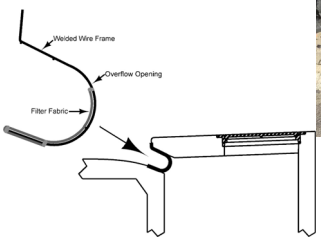
Inlet Protection

- If inlet is present - place sediment control device prior to disturbing any areas within the drainage area of that inlet
- Many ways to protect inlets:
  - Silt Fence
  - Perimeter and Slope Sediment Control Devices
  - Other:
    SRP EC-602 to 604

127

Inlet Protection

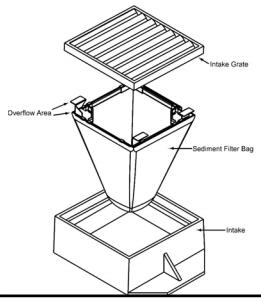
- **SRP EC-602**
- Tabs 100-36



128

Inlet Protection

- **SRP EC-604**
- Tabs 100-37



129

Floating Silt Curtain

- EC-202 & DS-15019
- Used to protect and isolate work area from lakes, streams and wetlands
- Not considered adequate perimeter control
  - Need upland controls (like silt fence, etc.)
- Two applications
  - Hanging-Creates static (calm) area for sediment to settle
  - Containment-Captures all sediment entering the water so the sediment can be removed after construction is complete
- **Tab 100-10 Floating Silt Curtains**

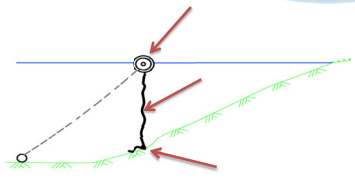
130

Floating Silt Curtain

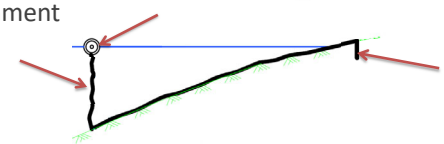
131

Floating Silt Curtain

- Hanging



- Containment



132

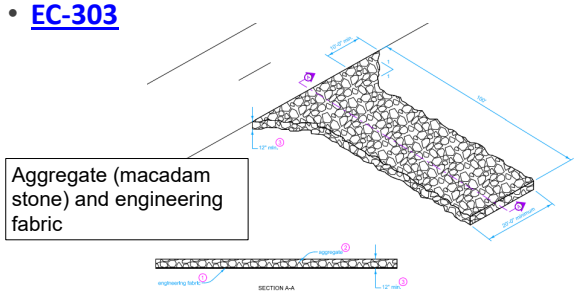
133

Sediment Control BMP's

134

Stabilized Construction Entrance

- EC-303



135

Stabilized Construction Entrance

136

Slash Mulch Berm

- Road Design Detail 570-1

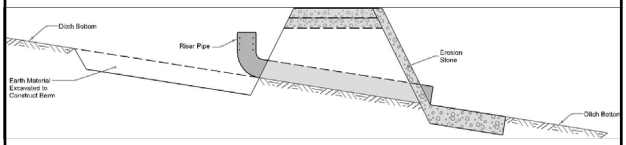
137

Slash Mulch Berm

138

Temporary Sediment Control Basin

- EC-601
- Tab 100-33 Temporary Sediment Control Basin



139

Temporary Sediment Control Basin

140

Temporary Sediment Control Basin

141

If you have a phone

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Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

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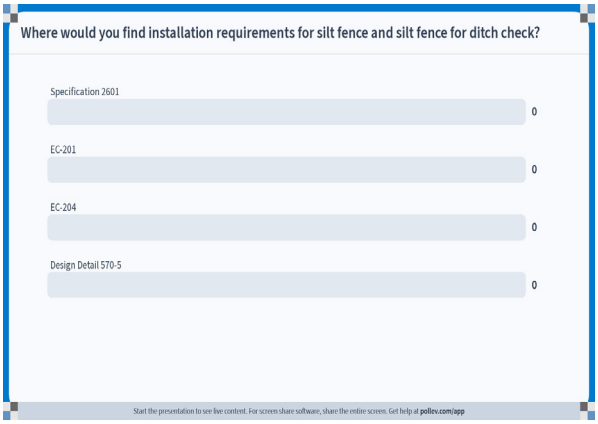
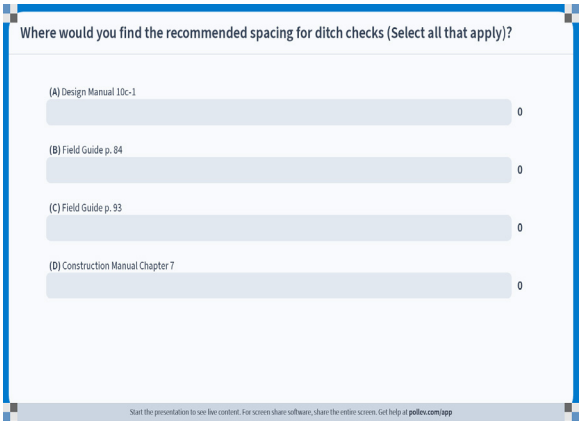
You can also “Skip” if it asks for your name.

142



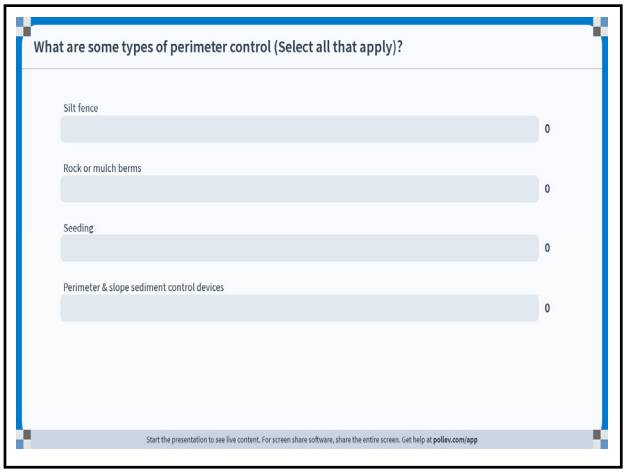
Link

143



Link 1 Link 2 Link 3 Link 4

144



145

Materials Approved Products List Enterprise (MAPLE)

- **Erosion Controls:**
  - Slope Protection, Special Ditch Control, TRM, TM, and Hydraulic Mulch
- **Sediment Controls:**
  - Silt Fence, Silt Curtains, and PSSCD
- For class, use MAPLE print-outs in binder
  (Look at IM 469.10 and 496.01 TOC)
- On a project, https://maple.iowadot.gov/

146

MAPLE – Erosion Controls

Example: Is "AEC Premier Straw-Double Net" approved for use as Special Ditch Control?

Go to **IM 469.10, Appendix A**.

147

MAPLE – Sediment Controls

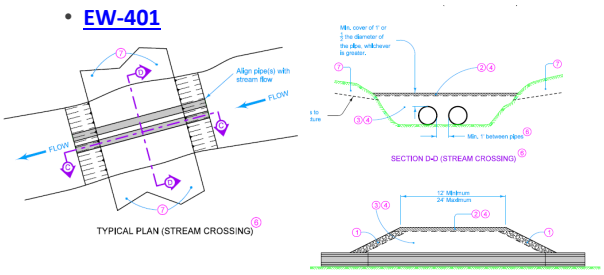
Example: Is GEOTEX 801 approved for use as silt fence?

Look at **IM 496.01, Appendix A**

148

Other BMP's

- **Temporary Stream Crossing, Causeway, or Equipment Pad**
  - **EW-401**



149

150

Other BMP's

151

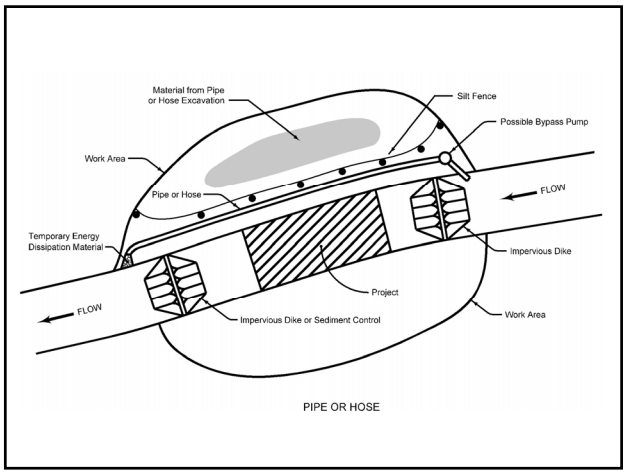
Other BMP's

152

Other BMP's

- **Temporary Stream Diversion**
  - **EW-402**
  - Projects involving installation or extensions of reinforced box culverts 6 feet by 6 feet or larger, precast box culverts 6 feet by 6 feet or larger, or arch pipes culverts 102 inches by 62 inches or larger.

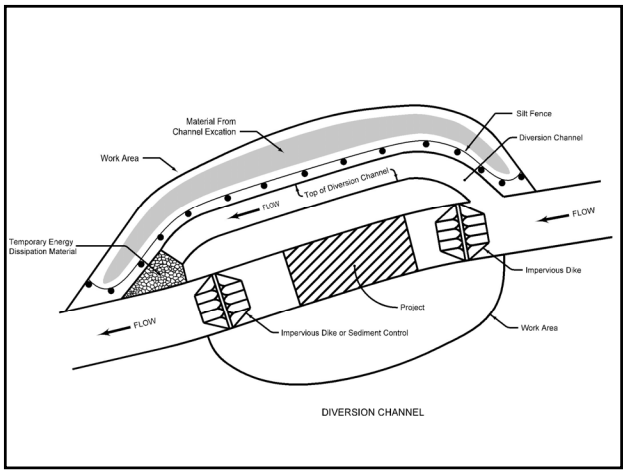
153



PIPE OR HOSE

154

155



DIVERSION CHANNEL

156

157

158

Other BMP's

- **Dewatering - PPP**
  - Sediment laden water should be prevented from directly entering water bodies
  - Be sure to utilize some type of sediment control. Examples:
    - Outlet diffused water onto a vegetated buffer or rock
    - Use silt fence
    - Utilize dewatering bags
  - Watch for scour at discharge

159

Other BMP's

- **Dewatering - PPP**

160

Other BMP's

- **Topsoil Preservation**
  - Requirement of General Permit #2
  - Check for bid items
  - Per Specification 2105, default is 12" strip and minimum 4" placement, but check your project for specific requirements.

161

162

163

Erosion & Sediment Control BMP's

- **Mobilization for Erosion Control**
  - Spec 2602.03 L (p. 3-4)
  - Applies to non-landscaping or non-erosion control projects with SWPPP
  - Applies to 2601 and 2602 contract items, excluding watering, mowing, removal items, etc.
  - Mobilize within 72 hours of written order
  - Complete work within 7 calendar days
  - Failure to mobilize and complete work = $750 deduct per calendar day

164

Erosion & Sediment Control BMP's

- Emergency Mobilization for Erosion Control
  - Spec 2602.03 M (p. 4)
  - Applies to non-landscaping or non-erosion control projects with SWPPP
  - For sudden occurrence of a serious and urgent nature which is beyond normal maintenance of erosion control items
  - Mobilize within 8 hours of written order
  - Failure to mobilize = $1500 deduct per calendar day

165

Erosion & Sediment Control BMP's

- Summary
  - Limiting disturbance through staging is most effective practice.
  - After an area has been disturbed, vegetation is the most cost effective means.
  - A combination of BMP's should be used together.
  - BMP's need to be installed properly to function correctly.
  - Erosion & sediment control measures are inexpensive compared to the alternative.

Next slides

166

BMP's: The Good, Bad & Ugly

167

BMP's: The Good, Bad & Ugly

168

BMP's: The Good, Bad & Ugly

169

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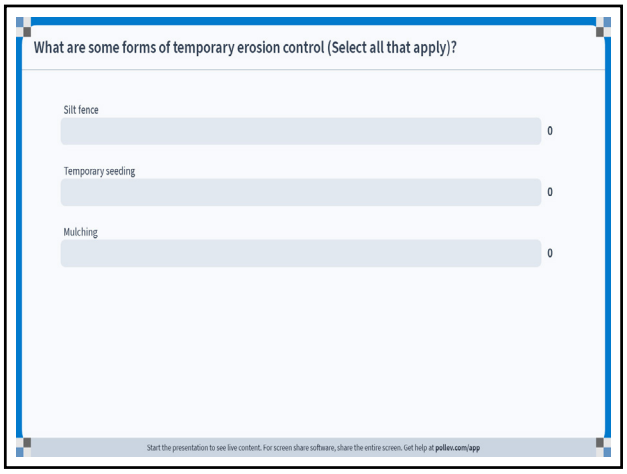
170

IM 469.10, Appendix E

171


What are some forms of permanent erosion control (Select all that apply)?
Rock
0
Temporary seeding
0
Permanent seeding
0
Sod
0
Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

172


What are some forms of temporary erosion control (Select all that apply)?
Silt fence
0
Temporary seeding
0
Mulching
0
Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

173

INSPECTIONS, INSPECTION REPORTS & AMENDED PPP

IOWA DOT EROSION CONTROL TECHNICIAN CERTIFICATION

Inspections, Inspection Reports, and Amended PPP

Melissa Serio/Nathan Pohlen
Construction and Materials Bureau & Roadside Development

1

NPDES Page 9 - Inspections

erosion and sediment control measures and other protective measures identified in the site plan.

4. **Inspections.** Qualified personnel (provided by the discharger) shall inspect disturbed areas of the construction site that have not been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion at least once every seven calendar days. Unless erosion is evident or other conditions warrant them, regular inspections are not required on areas that have been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion.

What to inspect

2

NPDES Page 9 - Inspections

density to preclude erosion.

What to inspect

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. When discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

3

NPDES Page 9 - Inspections

b. Based on the results of the inspection, the storm water pollution prevention measures identified in the SWPPP shall be revised at the construction site as appropriate as soon as practicable after the inspection and added to the SWPPP within 7 calendar days of the inspection. If the permittee determines that making these changes at the construction site within 72 hours of the inspection is impracticable, the permittee shall document in the SWPPP why it is impracticable and indicate an estimated date by which the changes will be made.

c. A report shall be made and retained as part of the SWPPP for at least [illegible] ation has been achieved and a NOD has been submitted to the Department. The report shall be signed in accordance

Completion of items after inspection

4

NPDES Page 9 - Inspections

c. A report shall be made and retained as part of the SWPPP for at least [illegible] ation has been achieved and a NOD has been submitted to the Department. The report shall be signed in accordance with Part VI.H. of this permit. The report shall contain the following: a summary of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP and actions taken in accordance with Part IV.D.4.b. of this permit.

5. **Non-Storm Water Discharges.** Sources of non-storm water listed in Part III.A.2 [illegible] combined with storm water discharges associated with industrial activity from construct[illegible] ntified in

Completion of items after inspection

Inspection report requirements

5

PPP V. - Inspection Requirements

- Joint inspection by Contractor and Contracting Authority at least once every 7 calendar days
- Reports contain:
  - Date of inspection
  - Summary of the scope
  - Name/qualifications of personnel
  - Major observations
  - Identify corrective actions
  - Rainfall amount since last inspection

  Helpful resource for precipitation - https://mesonet.agron.iastate.edu/request/coop/obs-fe.phtml

6

PPP V. - Inspection Requirements

- Inspection reports are part of amended PPP
- Incorporate additional or modified controls noted during inspection
- Begin corrective actions on deficiencies within 3 calendar days of inspection and complete within 7 calendar days
- If impractical to begin corrective actions within 72 hours, document why and provide an estimated time of completion

7

Conducting an Inspection

(Weekly Inspection Procedures)

- Who
  - Jointly by Contractor and Contracting Authority
  - ESC Basics or an ECT
- When
  - Once ground is disturbed every 7 days
  - Rainfall inspections are no longer required but should be considered for significant events

8

Conducting an Inspection

- How
  - Proper inspection includes observing all controls
  - Recommended plan
    - Day and time
    - Route
  - Adequate time for detailed review and not "drive-by"

9

Conducting an Inspection - **What**

- Discharge points
  - Inspect discharge point(s) and off-site areas
  - Walk downstream
  - Walk down street
  - Key indicator if problems exist up system

10

Discharge Point

11

Discharge Point

12

Discharge Point

13

Conducting an Inspection - **What**

- Stabilization (seeding, mulching)
  - Is the 0 - 14 day rule met?
  - Do new areas need to be stabilized?
  - Do previously stabilized areas require corrective action?
    - Poor growth/coverage
    - Evidence of erosion
  - Document location and corrective action needed

14

Stabilization

15

Stabilization

16

Stabilization

17

Conducting an Inspection - **What**

- Sediment controls (silt fence, ditch checks, perimeter and slope sediment control, rock check dams, etc.)
  - Installed properly per standard and plan?
  - Condition?
    - Damaged and in need of repair
    - Filled to 50% capacity needing maintenance
  - Effective quantity and placement?
  - New controls needed due to progress?
  - Document location and corrective action needed

18

Sediment Control

19

Sediment Control

20

Sediment Control

21

Conducting an Inspection - **What**

- Erosion control (slope protection, special ditch control, TRM, TM, rock ditch, rock flume, splash basin)
- Repeating same items as for sediment controls:
  - Installed properly per standard and plan
  - Damaged and in need of repair
  - Effective quantity and placement
  - New controls needed due to progress
  - Document location and corrective action needed

22

Erosion Control

23

Erosion Control

24

Erosion Control

25

Conducting an Inspection - **What**

- Streams (crossings, diversions)
  - Installed properly per standard and plan?
  - Condition?
    - Damaged and in need of repair
    - Maintenance of surfaces
  - Incorporation of proper controls (such as silt fence, rock or perimeter & slope sediment control devices)?
  - Document location and corrective action needed

26

Stream Crossing

27

Stream Diversion & Crossing

28

Conducting an Inspection - **What**

- Housekeeping
  - Document location and corrective action needed
  - Entrances
    - Installed properly per standard and plan
    - Evidence of tracking from site
    - Maintenance of surfaces
    - Sweep street as needed
  - Deliveries and stockpiles
    - Properly controlled
  - Spill prevention
    - Proper full capacity containment
    - Leak cleanup materials/process

29

Entrances/Tracking

30

Stockpiles

31

Spill Prevention

32

Conducting an Inspection - **What**

- Housekeeping
  - Vehicle storage and maintenance
    - Proper collection and disposal of fluids
    - Proper containment
  - Concrete washouts and residuals
    - Proper containment
    - Properly sized
    - 50 feet from bodies of water and drains
  - Litter
    - Properly collected and disposed of
  - Dewatering
    - Clean or properly controlled
    - Prevention of erosion at discharge

33

Concrete Washout

34

Concrete Washout

35

Do you see any housekeeping concerns?

36

Conducting an Inspection - **What**

- Miscellaneous
  - Water entering project site, run-on
    - Pictures
    - Grab a sample in water bottle and take a photo

37

What do you see as deficiencies?

38

What do you see as deficiencies?

39

What do you see as deficiencies?

40

What do you see as deficiencies?

41

What do you see as deficiencies?

42

Winter Shutdown

- Construction activity may shutdown over winter
- Erosion can still occur
- Ensure BMPs are in place before shutdown
- Weekly inspections are still required
  - Document state of frost in ground and snow coverage. Snow/frost is NOT temp stabilization. 0-14 rule still applies!!!
  - If snow cover prevents inspection, document that an attempt was made
  - Contractor attendance waived
    - Still responsible to correct deficiencies
    - Sign report

43

Suspension of Inspections

- Areas that have been stabilized with a perennial vegetative cover of sufficient density to preclude erosion
- Noted in inspection report:
  - Reason for suspension
  - Location/area
  - Date

44

Inspection Report

- Required for each inspection
- Inspector completes and is signature authority
- Contractor reviews and signs
- Fillable PDF form 830214 (copy in Iowa DOT Forms)
- Part of amended PPP
- For DOT projects, should be filed in DocExpress Signature or Environmental drawer
- Current and readily available for review

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Inspection Report - References

- https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control
- All items below are in "Iowa DOT Forms" tab in manual and available at website above (click on "Storm water inspection information")
  - Weekly storm water inspection procedures (FAQs)
  - Weekly inspection form 830214

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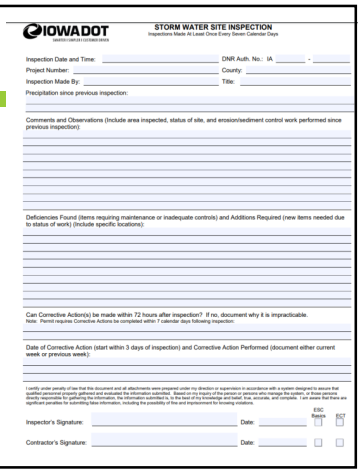
Inspection Report

Weekly Inspection Form 830214



IOWA DOT

STORM WATER SITE INSPECTION

Inspections Made At Least Once Every Seven Calendar Days

Inspection Date and Time: _____ DNR Auth. No.: IA _____ - _____

Project Number: _____ County: _____

Inspection Made By: _____ Title: _____

Precipitation since previous inspection:

Comments and Observations (Include area inspected, status of site, and erosion/sediment control work performed since previous inspection):

Deficiencies Found (Items requiring maintenance or inadequate controls) and Additions Required (new items needed due to status of work) (Include specific locations):

Can Corrective Action(s) be made within 72 hours after inspection? If no, document why it is impracticable.
Note: Permit requires Corrective Actions be completed within 7 calendar days following inspection.

Date of Corrective Action (start within 3 days of inspection) and Corrective Action Performed (document either current week or previous week):

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

ESC Basics ECT

Inspector's Signature: _____ Date: _____ ☐ ☐

Contractor's Signature: _____ Date: _____ ☐ ☐

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Inspection Report

- Poor examples

48

Regulatory Inspection - Example

- Sample in Iowa DOT Forms & Inspection Info tab

NPDES GENERAL PERMIT #2 INSPECTION REPORT

Facility Name: **NPDES No.:** **Permit Issued:** **Valid Through:**	**Owner:** Iowa Dept. of Transportation 800 Lincoln Way Ames, IA 50010 **Primary Contact:** **Phone Number:**	**Persons Interviewed:**
Type of Inspection: ☐ Routine Compliance Inspection ☐ Follow-Up Compliance Inspection ☒ Complaint Investigation ☐ Site Visit	**Inspection Date:** **Inspection Time:** **Previous Inspection:** NA	**Inspection Weather:** Mostly sunny, 80° **Recent Rainfall:** ☐ Yes ☒ No **Comments:**
Site Location: **Township:** **Range:** **Section**	**Total Site Size (acres):** **Number of Acres Disturbed:**	**Is this site part of a common plan of development?** ☐ Yes ☒ No **If yes, list other site(s):**

Compliance Status: "C" = compliance, "NC" = requirement is "not in compliance," "UC" = requirement is "unknown compliance."	C	NC	UC
1. Was pertinent & "in compliance," "NC" = requirement is "not in compliance," "UC" = requirement is "unknown compliance." information furnished to the Department within the required time?	☒	☐	☐
2. Plan is in accordance with Part VI.H and is retained at the construction site throughout the project?	☒	☐	☐
3. The plan has been updated based on changes in design, construction, operation or maintenance or if SWPPP proved to be ineffective?	☐	☐	☐
4. Pollution Prevention Plan Content:			
1. Does SWPPP describe size of site and acres to be disturbed?	☒	☐	☐
2. Does SWPPP clearly describe the intended sequence of major activities and control measures to be utilized during each activity?	☒	☐	☐
3. Does SWPPP describe and identify the erosion & sediment control measures to be employed?	☒	☐	☐
4. Does SWPPP contain topsoil preservation information?	☐	☐	☐
5. Does SWPPP contain site map?	☐	☐	☐
6. Does SWPPP contain all necessary signed contractor certification statements?	☐	☐	☒
5. Recordkeeping:			
1. Are weekly site inspections being performed as required by permit	☒	☐	☐
2. Has plan been updated based on changes in design, construction, operation, or maintenance, or if SWPPP proved to be ineffective?	☒	☐	☐
3. If deficiencies are noted in site inspection, are they corrected and SWPPP updated within 7 days of discovery?	☒	☐	☐
6.Visual Observations:			
1. Are all necessary erosion and sediment control measures installed/constructed?	☐	☒	☐
2. Erosion and sediment control measures are being maintained properly?	☐	☒	☐
3. Has off-site tracking been controlled?	☐	☒	☐
4. Storm sewer and/or tile intakes have been protected?	☐	☒	☐
5. Control measures have prevented the discharge of sediment off the construction site?	☐	☒	☐
7. Control/Stabilization Measures Utilized:			
☐ Earthen Dike ☒ Mulch ☐ Sod ☐ Sediment Basin ☒ Check Dam ☒ Compost Sock			

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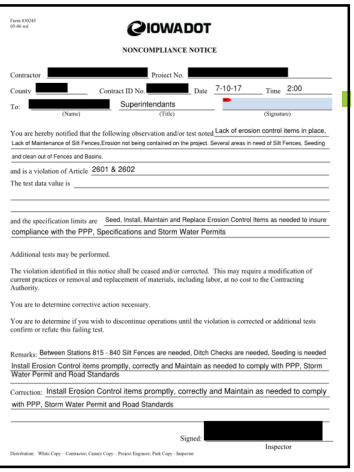
Noncompliance

- A noncompliance can be issued if a Contractor:
  - Fails to maintain controls
  - Fails to mobilize within
    - 72 hours of written order
    - 8 hours of emergency order
  - Performs poor quality work
  - Does not complete work in timely manner
- CM Appendix 2-34 (O)
- Other options
  - Restrict opening ground
  - Disincentives for not mobilizing
  - Shut down site

50

Noncompliance



Form 830243
05-06 wd

IOWA DOT

NONCOMPLIANCE NOTICE

Contractor [redacted] Project No. [redacted]

County [redacted] Contract ID No. [redacted] Date 7-10-17 Time 2:00

To: [redacted] (Name) Superintendants (Title) (Signature)

You are hereby notified that the following observation and/or test noted Lack of erosion control items in place, Lack of Maintenance of Silt Fences,Erosion not being contained on the project. Several areas in need of Silt Fences, Seeding and clean out of Fences and Basins.

and is a violation of Article 2601 & 2602

The test data value is

and the specification limits are Seed, Install, Maintain and Replace Erosion Control Items as needed to insure compliance with the PPP, Specifications and Storm Water Permits

Additional tests may be performed.

The violation identified in this notice shall be ceased and/or corrected. This may require a modification of current practices or removal and replacement of materials, including labor, at no cost to the Contracting Authority.

You are to determine corrective action necessary.

You are to determine if you wish to discontinue operations until the violation is corrected or additional tests confirm or refute this failing test.

Remarks: Between Stations 815 - 840 Silt Fences are needed, Ditch Checks are needed, Seeding is needed

Install Erosion Control items promptly, correctly and Maintain as needed to comply with PPP, Storm Water Permit and Road Standards

Correction: Install Erosion Control items promptly, correctly and Maintain as needed to comply with PPP, Storm Water Permit and Road Standards

Signed: [redacted] Inspector

Distribution: White Copy - Contractor; Canary Copy - Project Engineer; Pink Copy - Inspector

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Noncompliance

Form 830245
08-14

IOWA DOT

NONCOMPLIANCE NOTICE

Contractor [redacted] Project No. [redacted]

County [redacted] Accountine ID No. [redacted] Date 11-29-17 Time 10:00

To: [redacted] (Name) Superintendent (Title) [redacted] (Signature)

You are hereby notified that the following observation and/or test on 11-3-17 there were several items of Erosion Control that were not current with the grading activities. i.e. Silt fence, ditch checks and stabilizing crop were lacking.

And is a violation of Article 2601 & 2602

The test data value is

And the specification limits are Erosion control items shall be current with grading activities, including Temp. Seeding, Mulch, Silt Fences and Ditch Checks

Additional tests may be performed.

The violation identified in this notice shall be ceased and/or corrected. This may require a modification of current practices or removal and replacement of materials, including labor, at no cost to the Contracting Authority.

You are to determine corrective action necessary.

You are to determine if you wish to discontinue operations until the violation is corrected or additional tests confirm or refute this failing test.

Remarks: Notified on 11-3-17 via Storm Water Inspection Report for a Emergency mobilization. Erosion Control Contractor was already on-site and the notice was given to inform them of the lack of progress.

Correction: Install Erosion control items until current with the grading.
$1500 penalty.

Signed: [redacted] RCE Signed: [redacted] Inspector

Distribution: White Copy - Contractor; Canary Copy - Project Engineer; Pink Copy - Inspector

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Permix

- Web-based iPad application for site inspections
- Available on Iowa DOT projects only
- RCE determines if used
- Benefits of tracking deficiencies, automating notifications and linking pictures to deficiencies
- Described in standard specification 2602.01 D 2
- Contact Melissa Serio if interested
- https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control/permix-information

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Storm Water Oversight (Quality Assurance)

- DOT Projects that disturb more than 5 acres
- Conducted by ECT certified DOT staff or consultant
- Project inspection staff can be present but are not required to be
- At least once every 120 days during active construction
- Intent is to provide assistance with permit compliance
- Review for:
  - Deficiencies
  - Needed controls
  - Proper documentation (inspection reports, training records, ECIP, co-permittee statements, amended PPP, etc…)

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Storm Water Oversight (Quality Assurance)

- QA inspector post inspection responsibilities
  - Review findings with project inspection staff
  - Complete QA inspection report and upload to DocExpress
  - Do not instruct contractor or undertake corrective actions directly
  - https://docexpress.com/documents/834042
- Inspection staff post inspection responsibilities
  - Review findings with the QA inspector
  - Document issues and corrections on next inspection report
  - Explain if issues were not accepted and corrected
- https://iowadot.gov/consultants-contractors/construction-materials/earthwork-erosion-control/stormwater-inspections
- QA inspection form and inspection procedures (also in Iowa DOT Forms in manual)

55

Amending the PPP and Site Map

- Living documents that must be kept current as project progresses
- Amendments include:
  - Plan revisions
  - Contract modifications
  - Site inspections reports
  - Fieldbook entries by Inspector
  - Amended PPP site map by Contractor
  - ECIP
  - NOI
  - Co-permittee certifications
  - Subcontractor request forms

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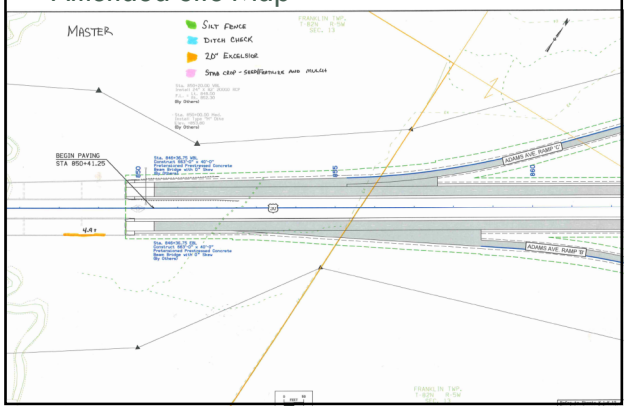
Amended PPP site map

- Document work performed:
  - What was installed, maintained, removed
  - Where
  - Date accomplished
- Organized and readily available for viewing
- Electronic in DocExpress (in Pay Items or Environmental drawer for DOT projects) but hardcopy is acceptable if DocExpress is unavailable

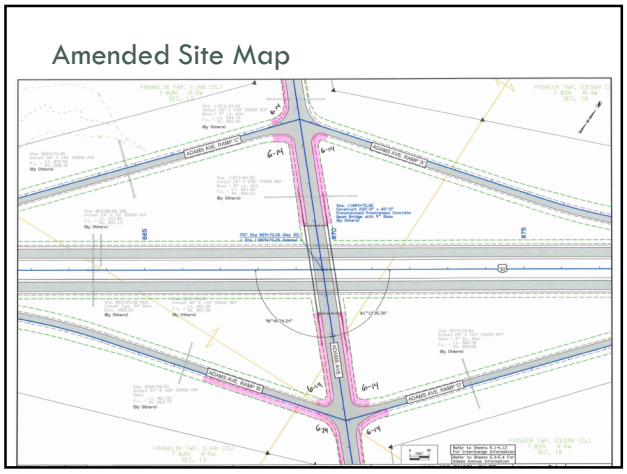
57

Amended Site Map



58

Amended Site Map

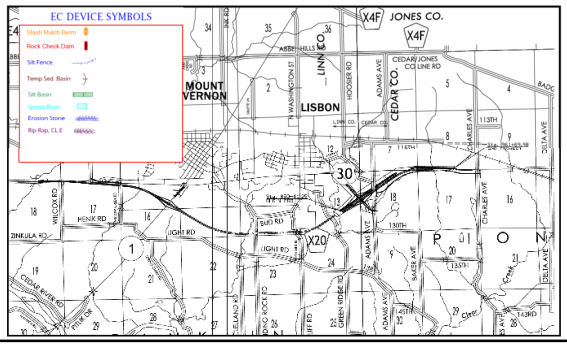


59

Amended Site Map

NHSX-030-7(192)--3H-57
EC MARK-UP

DATE UPDATED: 10/01/19



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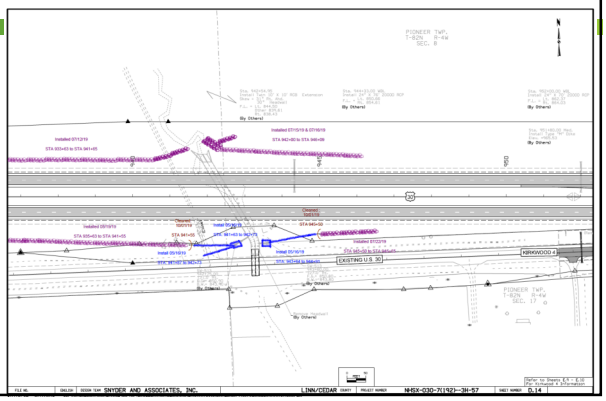
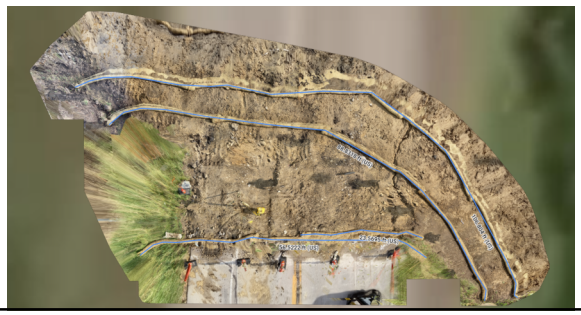
Amended Site Map



61

Amended Site Map

- Could use drone imagery to help complete



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Amended Site Map

- https://docexpress.com/drawers/36993
  - For all amended PPP site maps submitted for this project, search document type for "Amended PPP Site Map"

63

If you have a phone

Use below QR code

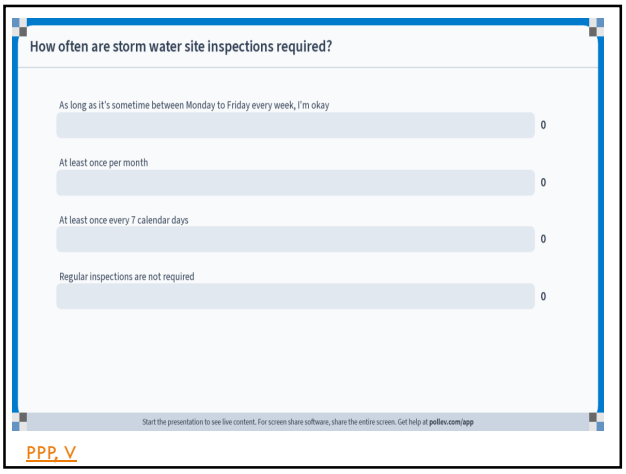
Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can "Skip for now"

You can also "Skip" if it asks for your name.

64



PPP, V

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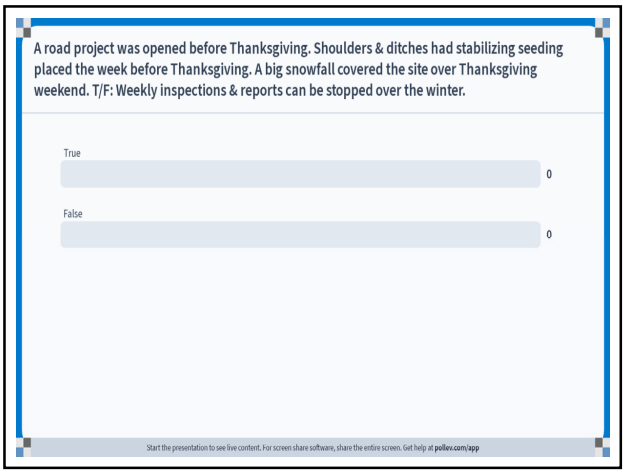

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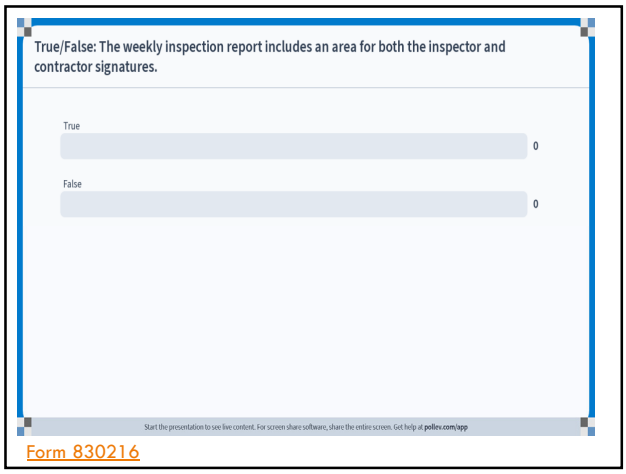

Form 830216

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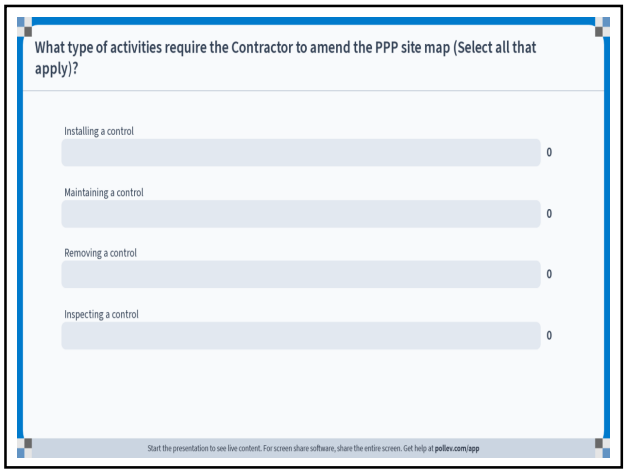

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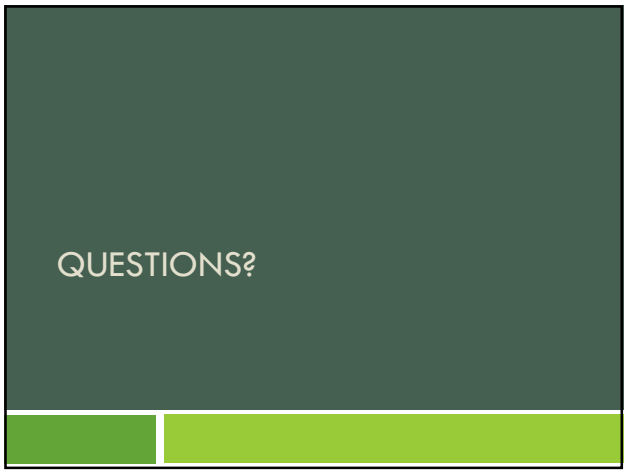

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REVIEW

ECT Review

1

If you have a phone

Use below QR code

Or go to pollev.com/gdurbin270

Or send a text to 37607 with message gdurbin270

If it asks you to register, you can "Skip for now"

You can also "Skip" if it asks for your name.

2

Installation of Transition Mat (TM) requires seed to be placed above the TRM (Type 2).

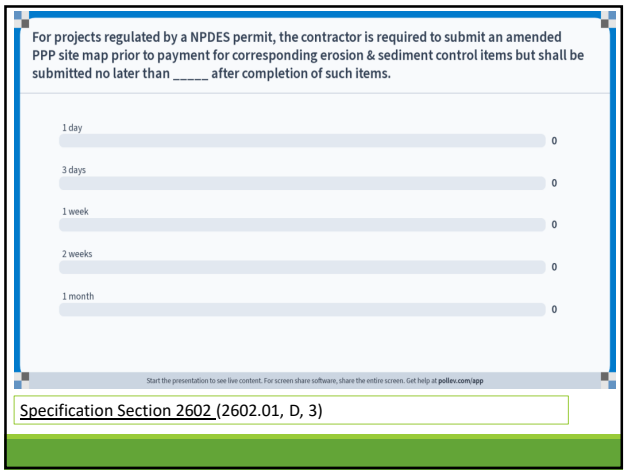
True 0

False 0

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

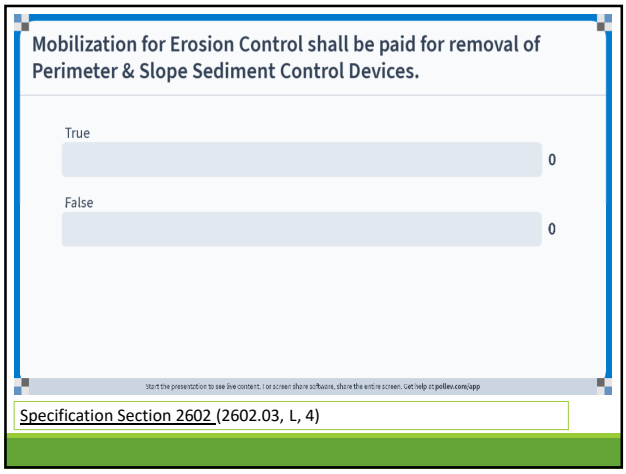
EC-105

3



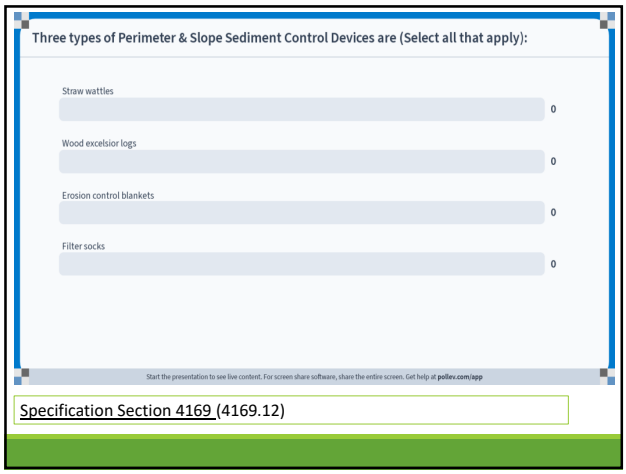
Specification Section 2602 (2602.01, D, 3)

4



Specification Section 2602 (2602.03, L, 4)

5



Specification Section 4169 (4169.12)

6

Field Guide p. 15

7

Table of Contents for Design & Tab Forms

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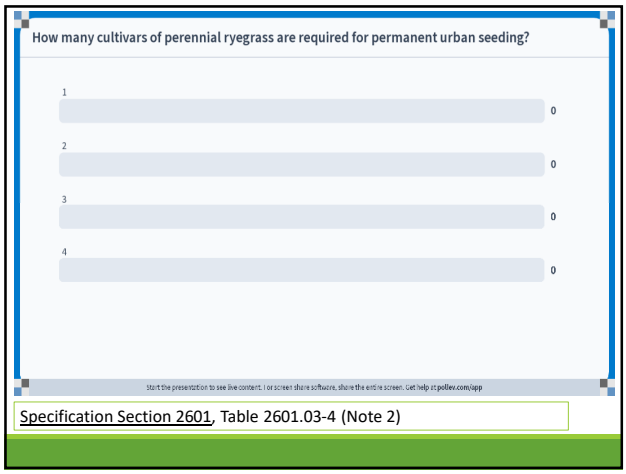
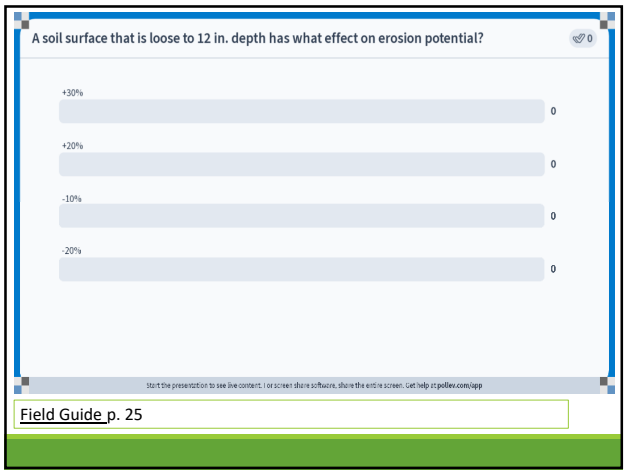


Specification Section 2601, Table 2601.03-4 (Note 2)

9



Field Guide p. 25

10

Erosion Control Technician – Review

Answers for review questions are found in your course manual (last pages of the Review section).

Fertilizer question:

A contractor is applying fertilizer for 1 acre of rural permanent seeding. They do not have 6-24-24 and are looking for fertilizer that would meet the nutrient requirements. Check if each of the different application rates would meet the requirements.

A) 600 lbs. per acre of 12-12-12

B) 157 lbs. per acre of 18-46-0 and 110 lbs. per acre of 0-0-60

C) 139 lbs. per acre of 11-52-00, 120 lbs. per acre of 0-0-60, and 6 lbs. per acre of 46-0-0

Answer:

Pure Live Seed (PLS) question:

A contractor is installing native grass seed per specifications. The mix includes Partridge Pea. Partridge Pea was tested and had a germination percentage of 36% and purity percentage of 86%.

How many bulk pounds of Partridge Pea per acre are required?

Answer:

Seed tag question:

A project is going to be seeded with a permanent urban mix on September 21, 2022. Review the below tag for compliance.

Remember to check 1) variety/kind of seed in seed mix, 2) germination requirements, and 3) seed testing and application dates!

Iowa DOT Urban Permanent Seed Mix
Lot LC-29-4190

Variety and Kind	Purity	Germination	Origin
Rock Star KY Bluegrass	24.83%	83%	WA
Ark KY Bluegrass	24.89%	85%	WA
Gateway KY Bluegrass	24.78%	88%	WA
Royal Green Perennial Ryegrass	7.38%	90%	MN
Double Time Perennial Ryegrass	7.42%	85%	OR
Boreal Creeping Red Fescue	9.34%	87%	CAN

		Seed Test	
Total Purity	98.64%	Date	1/12/2022
Crop	0.01%		
Inert	1.34%		
Weeds	0.01%		

Net weight: 50 lb

Supplied by Seed Company XYZ

Answer:

Erosion Control Technician – Review

Fertilizer question:

A contractor is applying fertilizer for 1 acre of rural permanent seeding. They do not have 6-24-24 and are looking for fertilizer that would meet the nutrient requirements. Check if each of the different application rates would meet the requirements.

A) 600 lbs. per acre of 12-12-12

B) 157 lbs. per acre of 18-46-0 and 110 lbs. per acre of 0-0-60

C) 139 lbs. per acre of 11-52-00, 120 lbs. per acre of 0-0-60, and 6 lbs. per acre of 46-0-0

Answer:

First, let's determine how much of each component is required:

Specification Section 2601 requires 300 lbs. of 6-24-24 for rural permanent seeding. Remember that 6 is 6% of Nitrogen (N) available or 24 is 24% of $P_2 0_5$ and K_2O available.

Required amount of N = 300 lbs. per acre x 6% = 18 lbs.
Required amount of $P_2 0_5$ and K_2O (each) = 300 lbs. per acre x 24% = 72 lbs.

A) N, $P_2 0_5$, K_2O: 600 lbs. per acre x 12% = 72 lbs. $\geq$ 72 lbs. req'd → This meets requirement

B) N: 157 lbs. per acre x 18% = 28 lbs. $\geq$ 18 lbs. req'd
$P_2 0_5$: 157 lbs per acre x 46% = 72 lbs. $\geq$ 72 lbs. req'd
K_2O: 110 lbs. per acre x 60% = 66 lbs. < 72 lbs. req'd →This does **not** meet requirement

C) N: 139 lbs. per acre x 11% + 6 lbs. per acre x 46% = 18 lbs. $\geq$ 18 lbs. req'd
$P_2 0_5$: 139 lbs per acre x 52% = 72 lbs. $\geq$ 72 lbs. req'd
K_2O: 120 lbs. per acre x 60% = 72 lbs. $\geq$ 72 lbs. req'd → This meets requirement

---

Pure Live Seed (PLS) question:

A contractor is installing native grass seed per specifications. The mix includes Partridge Pea. Partridge Pea was tested and had a germination percentage of 36% and purity percentage of 86%.

How many bulk pounds of Partridge Pea per acre are required?

Answer:

Specifications Section 2601 includes a required PLS application rate for Partridge Pea of 4 lbs. per acre.

Bulks pounds required per acre = PLS application rate / (purity x germination)

Bulk pounds required per acre = 4 / (0.36 x 0.86) = 4 / 0.3096 = 12.9 lbs.

Seed tag question:

A project is going to be seeded with a permanent urban mix on September 21, 2022. Review the below tag for compliance.

Remember to check 1) variety/kind of seed in seed mix, 2) germination requirements, and 3) seed testing and application dates!

Iowa DOT Urban Permanent Seed Mix
Lot LC-29-4190

Variety and Kind	Purity	Germination	Origin
Rock Star KY Bluegrass	24.83%	83%	WA
Ark KY Bluegrass	24.89%	85%	WA
Gateway KY Bluegrass	24.78%	88%	WA
Royal Green Perennial Ryegrass	7.38%	90%	MN
Double Time Perennial Ryegrass	7.42%	85%	OR
Boreal Creeping Red Fescue	9.34%	87%	CAN

Seed Test
Date 1/12/2022

Total Purity	98.64%
Crop	0.01%
Inert	1.34%
Weeds	0.01%

Net weight: 50 lb

Supplied by Seed Company XYZ

Answer:

1) Variety/Kind of seeds: Refer to Specification Section 2601

   Mix contains three different cultivars of Kentucky Bluegrass and two different cultivars of perennial ryegrass. Mix also contains Creeping Red Fescue.

   This item complies with the requirements.

2) Germination requirements: Refer to Specification Section 4169

If a specific cultivar is not listed in Section 4169 table (example: Rock Star KY Bluegrass), then use general type (example: Bluegrass, Kentucky) germination requirements.

All varieties meet germination requirements, except Double Time Perennial Ryegrass. Germination is required to be a minimum of 90%.

This item does **not** comply the requirements.

3) Seed testing date: Refer to Materials IM 469.02 for test date requirements and Specifications Section 2601 for application dates.

   Seed was tested January 12, 2022. Based on seed testing date, it is required to be placed by October 31, 2022.

   Specifications Section 2601 states normal permanent urban seeding are March 1 through May 31, and August 10 through September 30.

   This item complies with the requirements, and the contractor is applying the seed during the normal seed dates.

BMP REFERENCE TABLE & ABBREV.

Abbreviations

- BFM – Bonded Fiber Matrix
- BMPs - Best Management Practices
- DNR - Department of Natural Resources
- ECIP - Erosion Control Implementation Plan
- EPA - Environmental Protection Agency
- ESC Basics - Erosion and Sediment Control Basics
- ECT - Erosion Control Technician
- IDRs – Inspector's Daily Reports
- IMs - Instructional Memorandums
- NOD - Notice of Discontinuation
- NOI - Notice of Intent
- NPDES - National Pollutant Discharge Elimination System
- PPP - Pollution Prevention Plan (same as SWPPP)
- RCE - Resident Construction Engineer
- SRPs - Standard Road Plans – could be Erosion Control (EC), Earthwork (EW), Drainage (DR) for this class
- SWPPP - Storm Water Pollution Prevention Plan (same as PPP)
- TRM – Turf Reinforcement Mat
- TM – Transition Mat
- WPCM – Water Pollution Control Manager

Sediment Control	Specification	Standard Road Plan	Road Design Detail
Silt Fence	2602, 4196	EC-201	
Silt Fence Ditch Checks	2602, 4196	EC-201	
Perimeter, Slope and Ditch Check Sediment Control Device	2602, 4169	EC-204	
Rock Check Dam	2602	EC-302	
Silt Dike and Ditches	2602	EW-403	
Silt Basins	2602	EW-403	
Temporary Sediment Control Basin	2602	EC-601	
Inlet/Intake Protection	2602	EC-602	570-5, 570-7
Slash Mulch Berms			570-1
Floating Silt Curtain	DS-15019	EC-202	
Stabilized Construction Entrance	2602	EC-303	

Sediment Control	Tabulation	Materials IM	Design Manual	Construction Manual
Silt Fence	100-17	496.10	10c-1	
Silt Fence Ditch Checks	100-18	496.10	10c-1	7.70
Perimeter, Slope and Ditch Check Sediment Control Device	100-19	469.10	10c-1	
Rock Check Dam	100-32		10c-1	7.70
Silt Dike and Ditches	100-13, 100-15		10c-1	
Silt Basins	100-14		10c-1	
Temporary Sediment Control Basin	100-33		10c-1	
Inlet/Intake Protection	100-36, 100-37	469.10	10c-4	
Slash Mulch Berms				
Floating Silt Curtain	100-10	469.10	10c-1	7.70
Stabilized Construction Entrance			10c-1	

Erosion Control	Specification	Standard Road Plan	Road Design Detail
Seeding	2601, 4169	EC-502	
Fertilizing	2601, 4169		
Mulching	2601, 4169		
Sod	2601, 4169		
Slope Protection	2601, 4169	EC-103	
Special Ditch Control	2601, 4169	EC-101	
Turf Reinforcement Mat (TRM)	2601, 4169	EC-104	
Transition Mat	2601, 4169	EC-105	
Rock Erosion Control (e.g. Rock Flume, Splash Basin, Ditches)	2507	EC-301	
Temporary Stream Diversion	2418	EW-402	
Temporary Stream Access/Crossing	2547	EW-401	

Erosion Control	Tabulation	Materials IM	Design Manual	Construction Manual
Seeding		469.02	10b-1	7.10 to 7.18
Fertilizing		469.03	10b-1	7.20 to 7.22
Mulching			10b-1	7.30 to 7.32
Sod				7.50
Slope Protection	100-22	469.10		
Special Ditch Control	100-22	469.10		7.60
Turf Reinforcement Mat (TRM)	100-22	469.10		
Transition Mat	100-09	469.10		
Rock Erosion Control (e.g. Rock Flume, Splash Basin, Ditches)	100-23			
Temporary Stream Diversion				7.70
Temporary Stream Access/Crossing				