Erosion Control

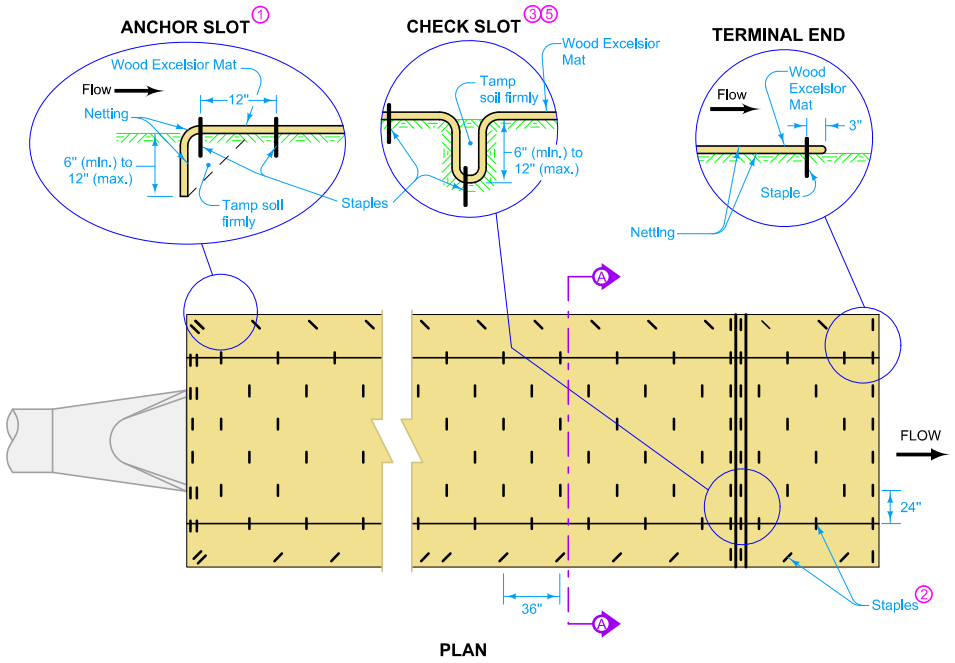
EC

SECTION

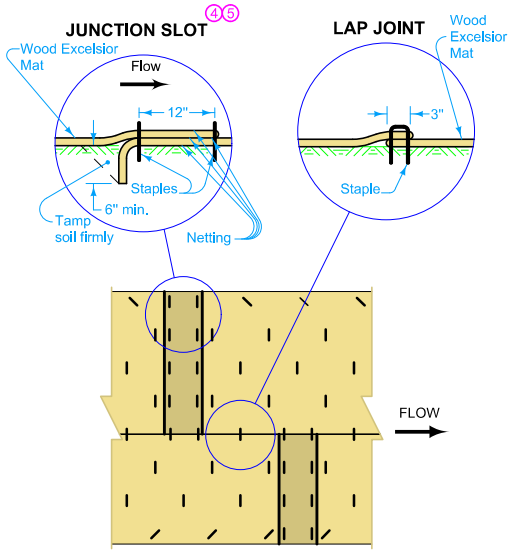
Erosion Control

EC

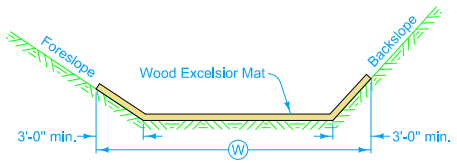
NO.	DATE	TITLE
EC-101	04-19-16	Wood Excelsior Mat for Ditch Protection
EC-102	04-21-15	Sod for Ditch Protection
EC-103	04-21-15	Wood Excelsior Mat for Slope Protection
EC-104	04-19-16	Turf Reinforced Mat (TRM)
EC-105	04-18-17	Transition Mat
EC-201	10-18-16	Silt Fence
EC-202	10-21-14	Floating Silt Curtain
EC-204	04-18-17	Perimeter and Slope Sediment Control Devices
EC-301	10-18-16	Rock Erosion Control (REC)
EC-501	04-21-15	Trees and Shrubs
EC-502	04-21-15	Seeding in Rural Areas



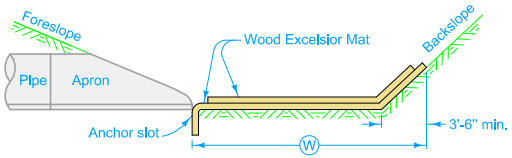
PLAN



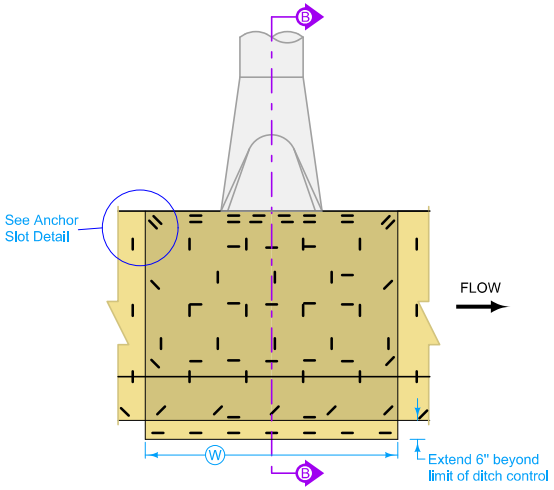
PLAN
(at Junction Slots and Lap Joints)



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

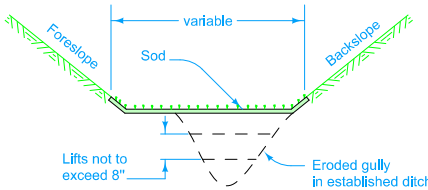
EC-101

SHEET 1 of 1

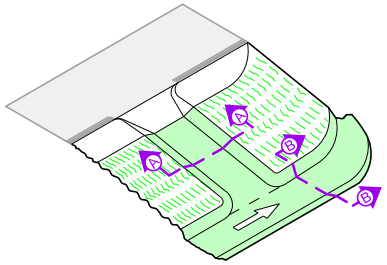
REVISIONS: Revised to show placement of erosion control beginning at the end of the apron.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

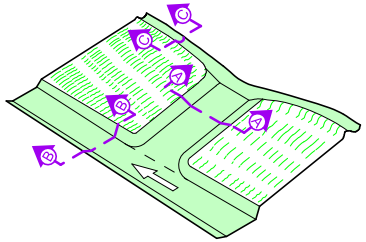
SPECIAL DITCH CONTROL



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.

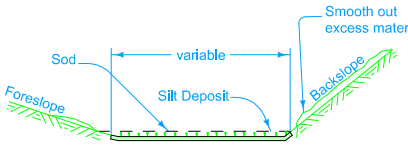
Provide necessary excavation at locations where silt conditions require shaping of a ditch to provide a proper type of area for installation of sod for special ditch control. Dispose excavated material in adjacent area as directed by the Engineer.

At locations where erosion has created gullies in ditches or backslopes, fill and compact gullies in lifts not more than 8-inches thick.

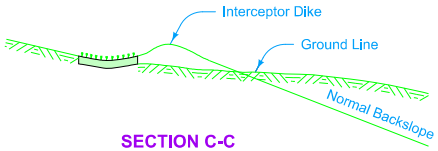
Unless specifically required otherwise by the Engineer, install wire stakes or wood stakes. Stagger wire stakes as shown. Minimum 33 stakes per square. Use wood stakes in sod flumes when designated by the Engineer. When directed by the Engineer, longer stakes may be required for certain soil conditions 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.

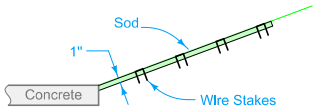
Shaping and grading work necessary to prepare the ground for sodding adjacent to concrete surfaces will not be paid for separately but is incidental to other work on the project. Such grading and shaping may include the removal and disposal of excess earth, as directed by the Engineer, in order to obtain satisfactory drainage and appearance for the finished work.



SECTION B-B
Sod placement for silted ditch in cut.

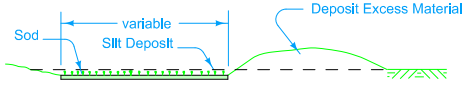


SECTION C-C
Sod placement on Interceptor Ditch

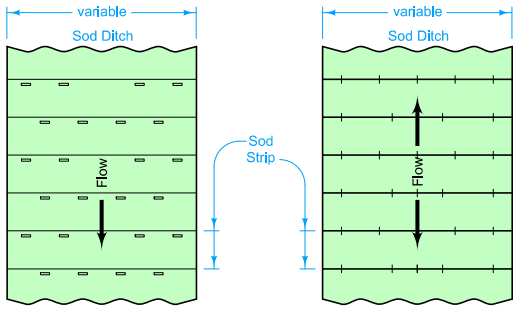


Ground surface shall be graded 1" below the edge of concrete before sod is placed.

CASE 1
NATURAL GROUND SLOPES TOWARD CONCRETE

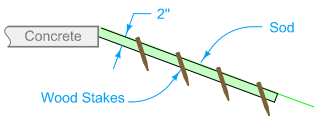


SECTION B-B
Sod placement for silted area in no-ditch section.



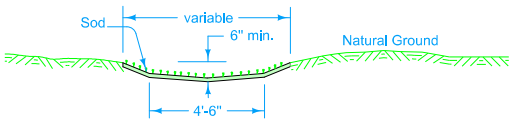
4 Wood Stakes per row, staggered in rows

5 Wire Stakes per row, staggered in rows



Grade ground surface 2" below the edge of concrete before sod Is placed.

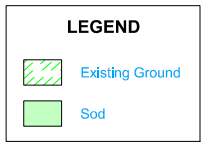
CASE 2
NATURAL GROUND SLOPES AWAY FROM CONCRETE



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

REVISION	
1	04-21-15

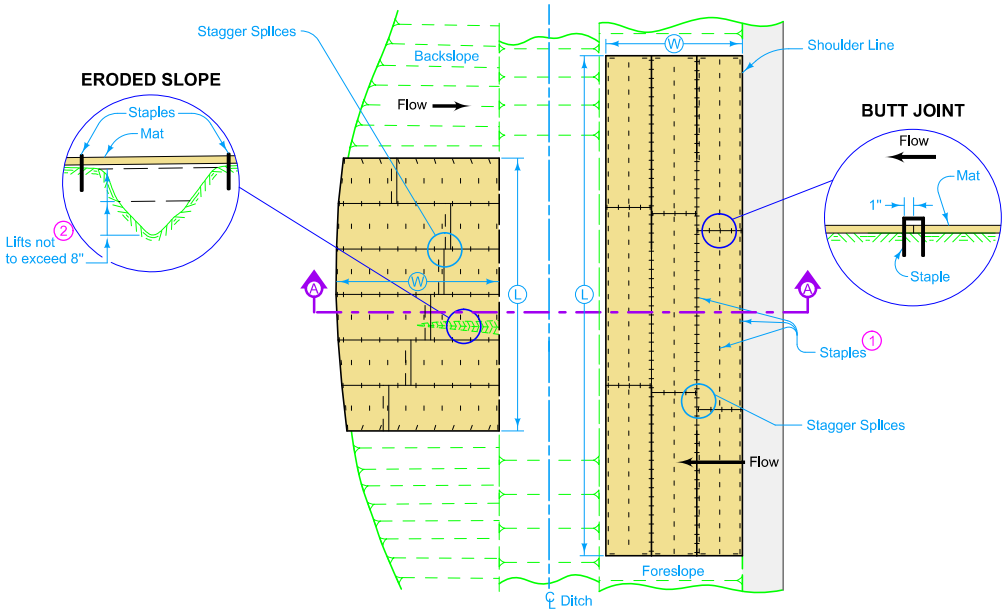
STANDARD ROAD PLAN EC-102

SHEET 1 of 1

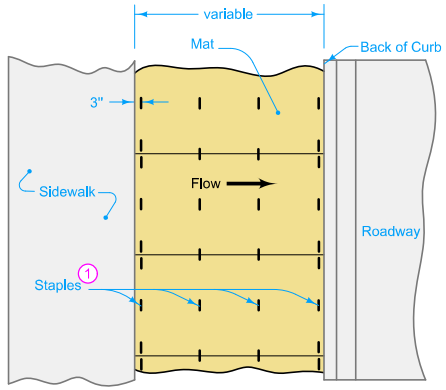
REVISIONS: Replaced DOT logo with new version. Revised Section A-A and B-B drawings to show ditch bottoms being flat.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

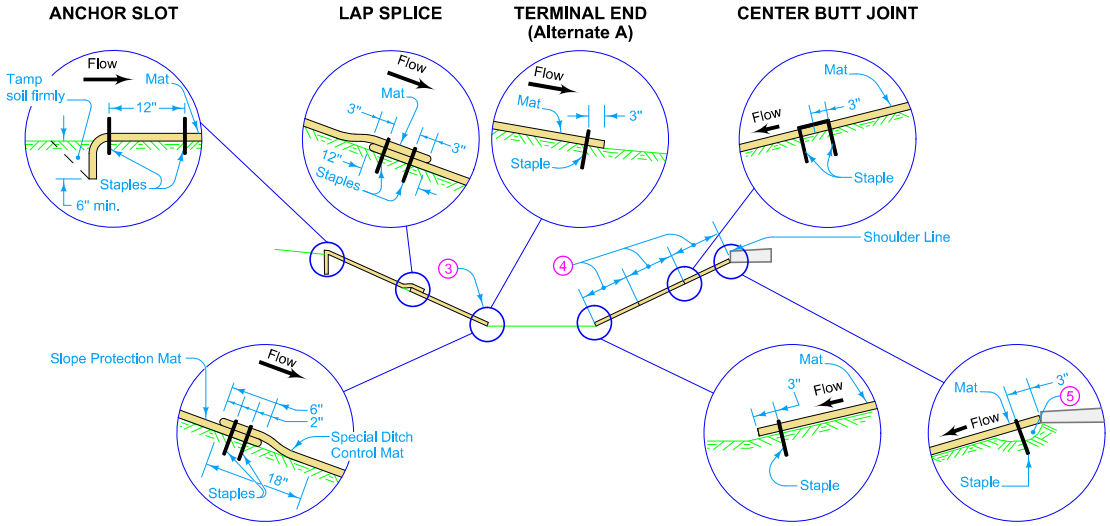
SOD FOR DITCH PROTECTION



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

STANDARD ROAD PLAN

REVISION	
1	04-21-15

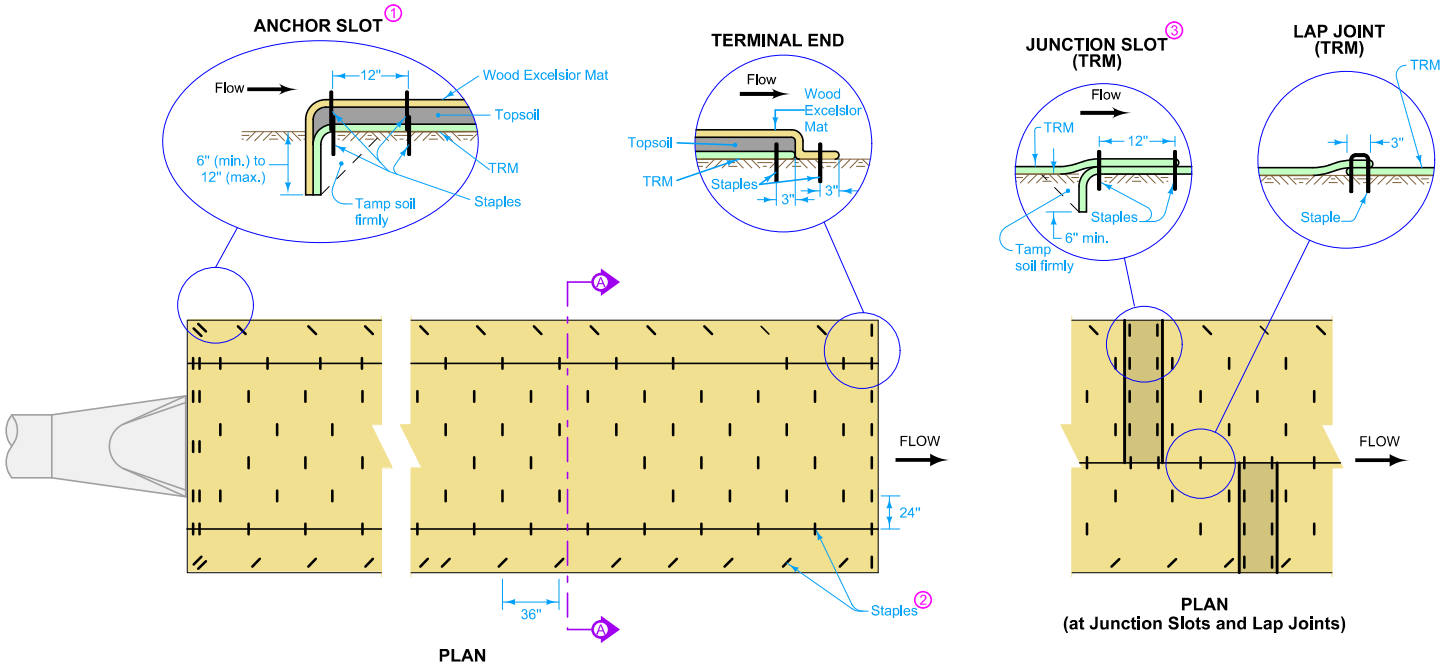
EC-103

SHEET 1 of 1

REVISIONS: Removed language from general notes already in the Specifications. Modified drawings. Added Possible Contract Item and Possible Tabulation.

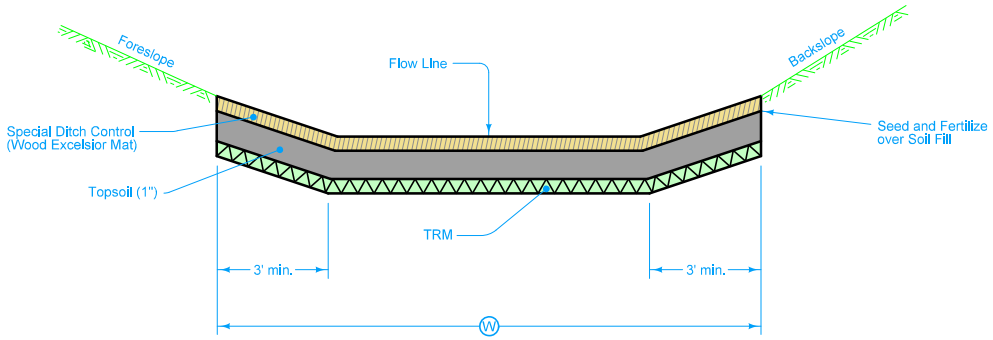
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

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 Excesior Mat

Possible Contract Items:
Turf Reinforcement Mat

Possible Tabulation:
100-22

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	04-19-16

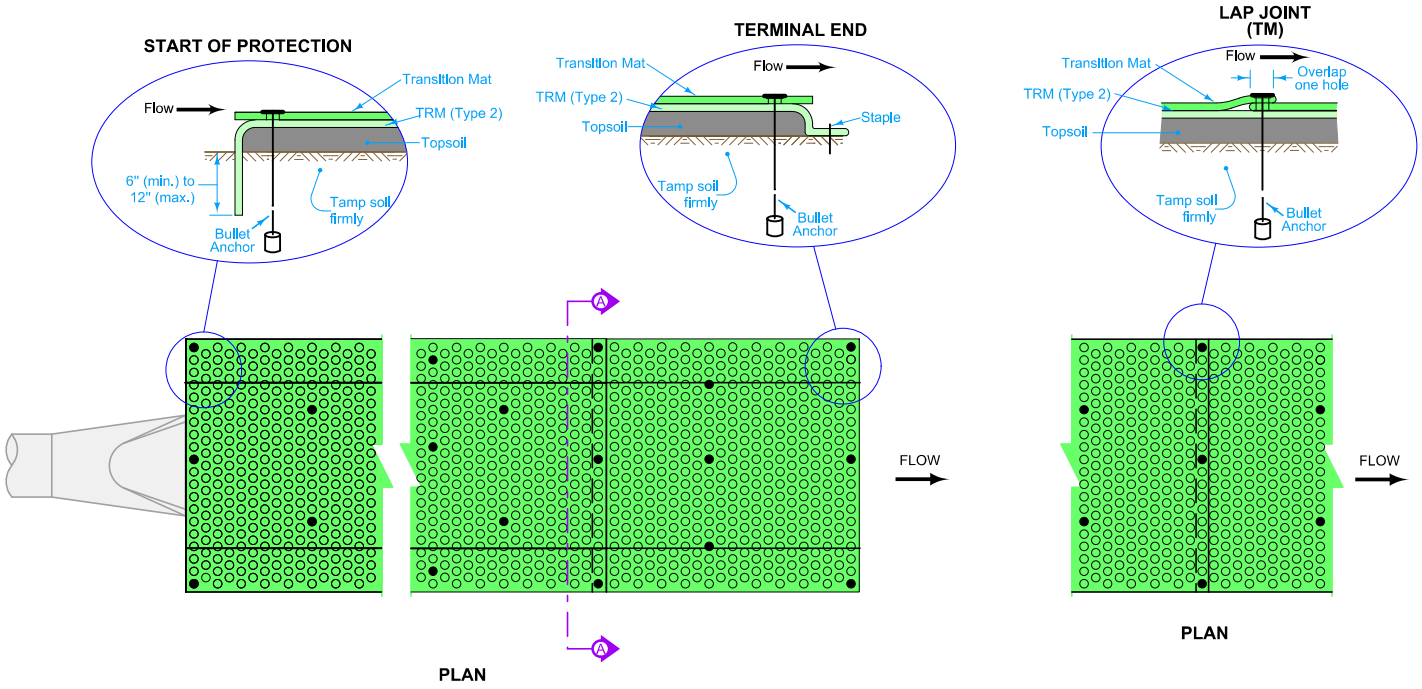
EC-104

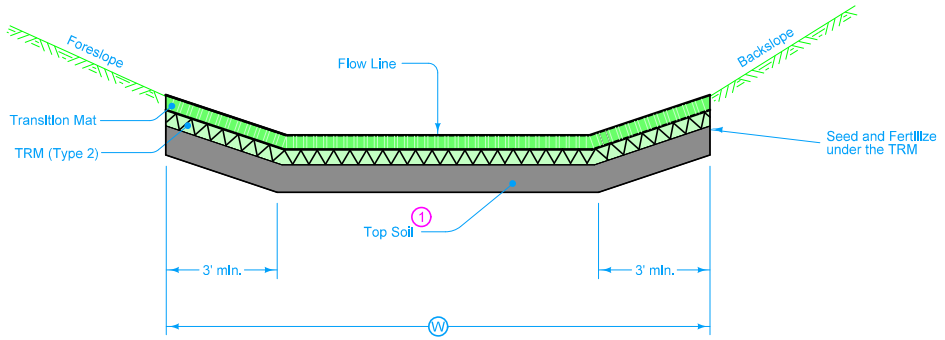
SHEET 1 of 1

REVISIONS: Revised to show placement of erosion control beginning at the end of the apron. Changed color in PLAN views to match wood excelsior mat.

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:
Turf Reinforcement Mat

IOWA DOT

REVISION
1 | 04-18-17

STANDARD ROAD PLAN

EC-105

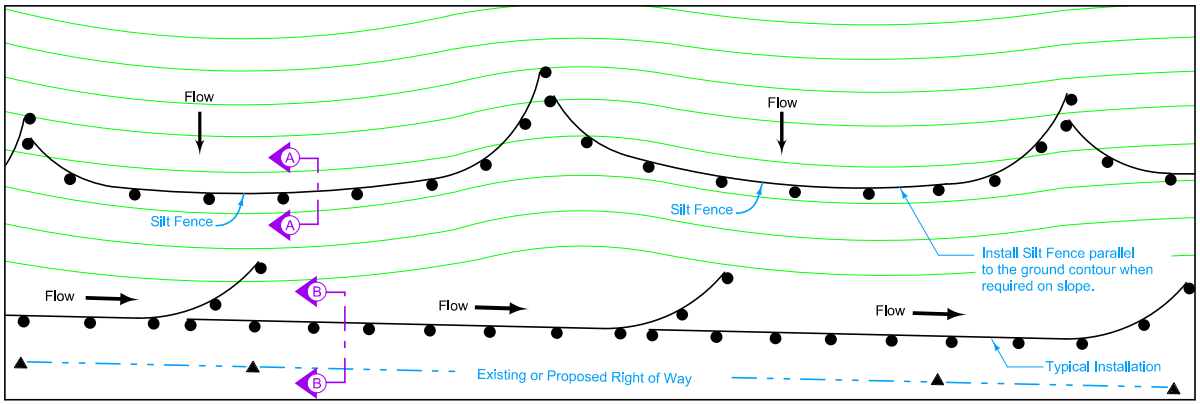
SHEET 1 of 1

REVISIONS: Remove reference to tab.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TRANSITION MAT (TM)

DESIGNER INFO



PLAN FOR SILT FENCE (7)

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 device exerting 60 p.s.i. or greater.

For manual installation, compact with a mechanical or pneumatic tamper.

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 the last 20 feet of the segment to contain runoff as shown.

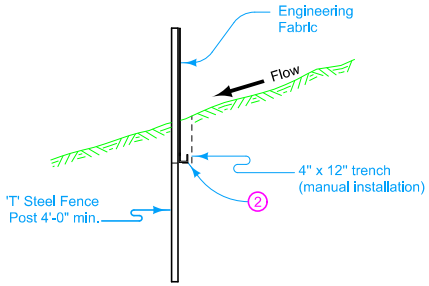
(1) Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire. See back view attachment to post.

(2) For manual installation only, fold engineering fabric along bottom of trench.

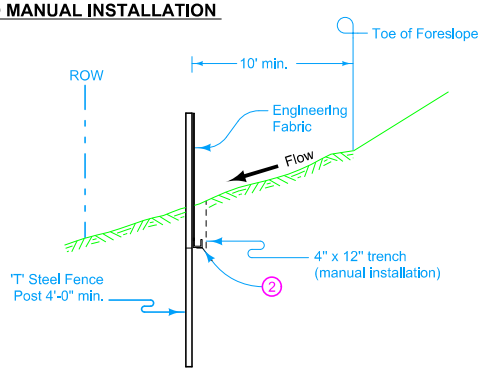
(3) Embed all posts 28 inches below the ground line.

(7) Refer to Tab. 100-17

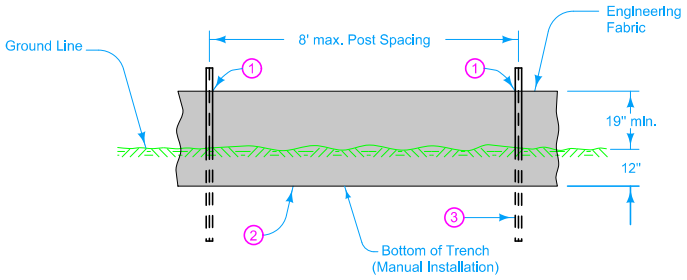
SILT FENCE - MACHINE AND MANUAL INSTALLATION



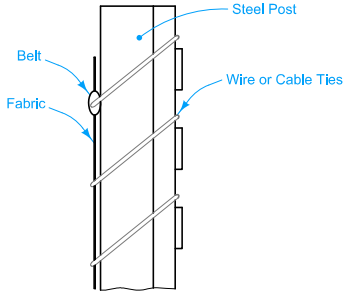
SECTION A-A



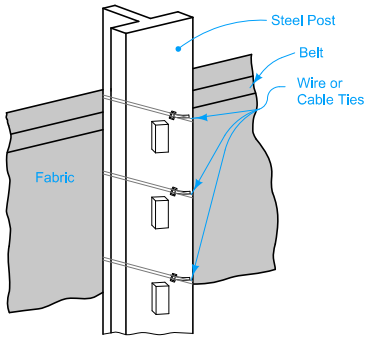
SECTION B-B



FRONT VIEW



PROFILE VIEW
ATTACHMENT TO POST



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	
2	10-18-16

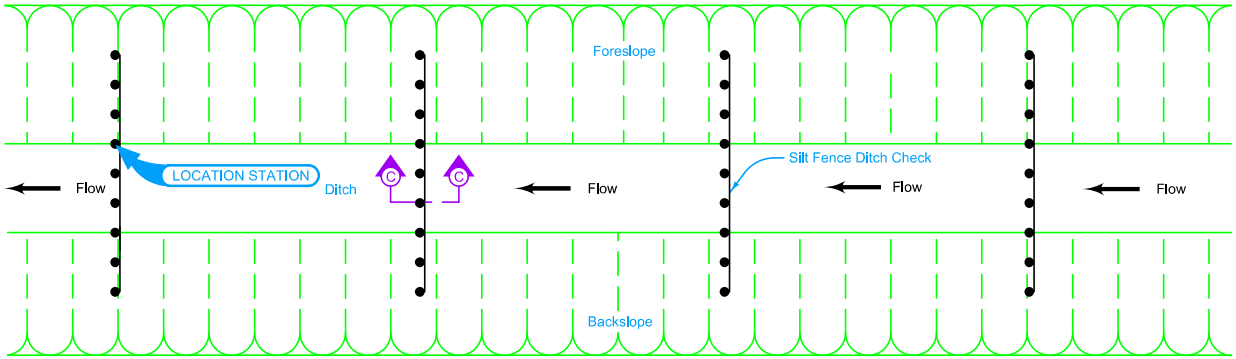
EC-201

SHEET 1 of 3

REVISIONS: Added TYPE 1, TYPE 2, and TYPE 3 to detail names on Pages 2 and 3. Modified note 5 to remove table. Added notes 6, 7, and 8. Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

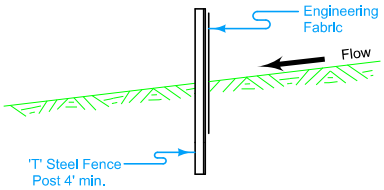
SILT FENCE



PLAN FOR DITCH CHECK (TYPE 1) (8)

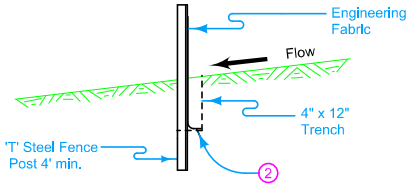
1. Secure top of engineering fabric to steel posts using cable ties (50 lb.) or wire. See attachment to post.
2. For manual installation only, fold engineering fabric along bottom of trench.
3. Embed all posts 28 inches below the ground line.
4. Locate posts at toe of foreslope and toe of backslope and 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).
8. Refer to Tab. 100-18

DITCH CHECK - MACHINE INSTALLATION

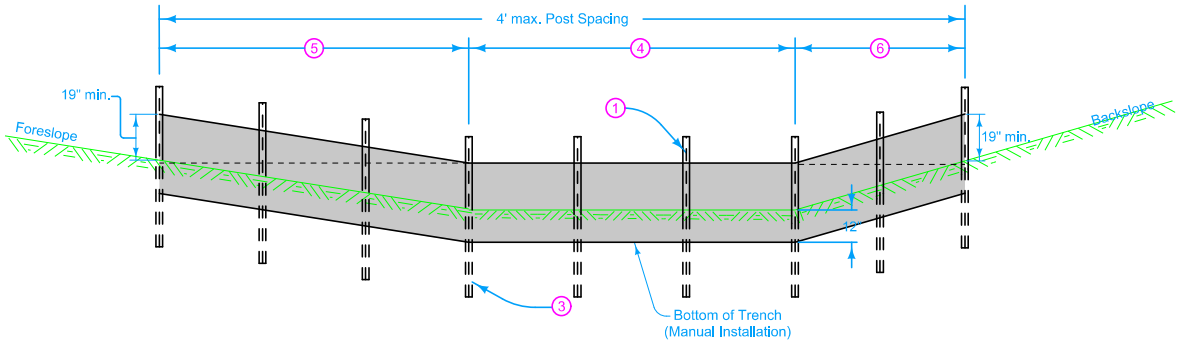


SECTION C-C

DITCH CHECK - MANUAL INSTALLATION



SECTION C-C



FRONT VIEW

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-18-16

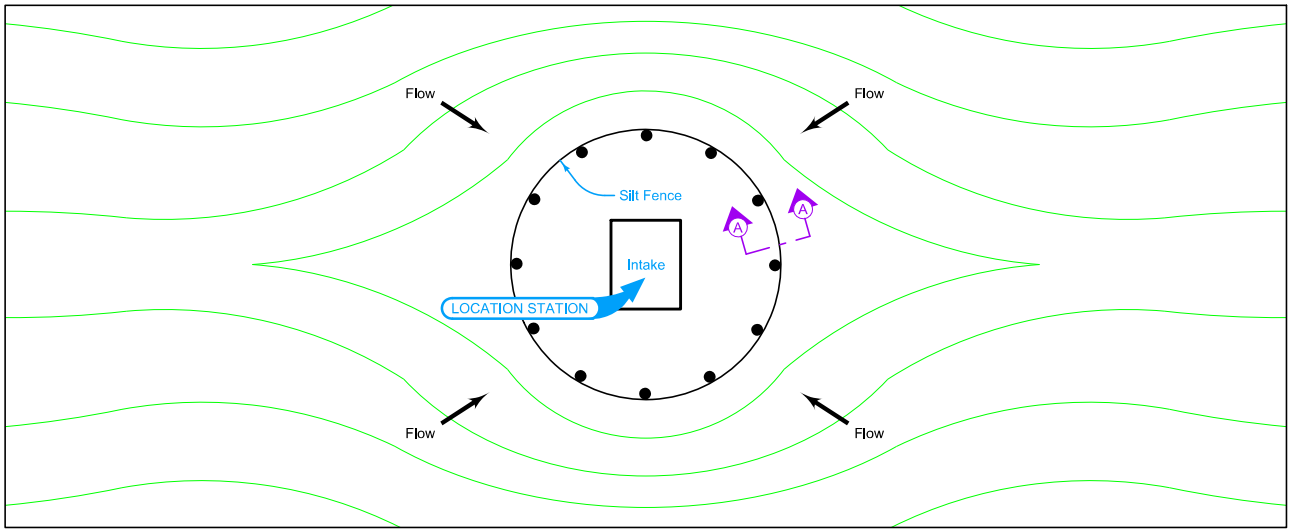
EC-201

SHEET 2 of 3

REVISIONS: Added TYPE 1 on Page 2. Added TYPES 2 and 3 on Page 3. Modified note 5 and added notes 6, 7, and 8. Removed foreslope table and replaced with note.

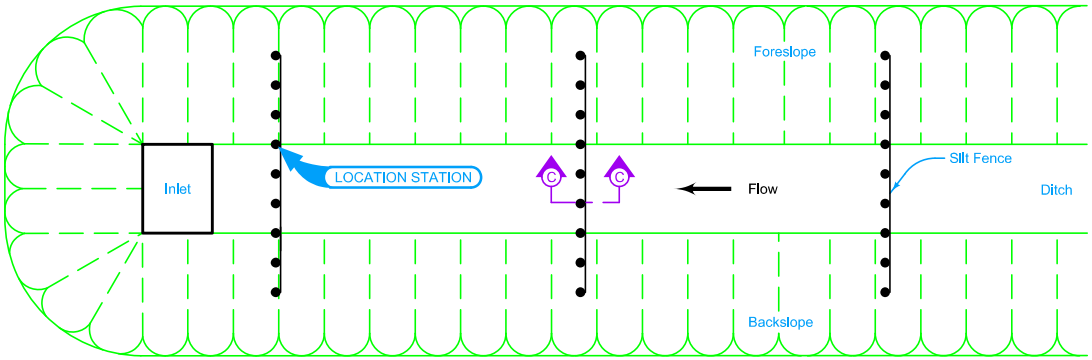
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

SILT FENCE



PLAN FOR SILT FENCE AT INTAKE (TYPE 2) (8)

(8) Refer to Tab. 100-18



Contour Lines

PLAN FOR SILT FENCE DITCH CHECK AT INLET (TYPE 3) (8)

IOWA DOT

STANDARD ROAD PLAN

REVISION 2 10-18-16

EC-201

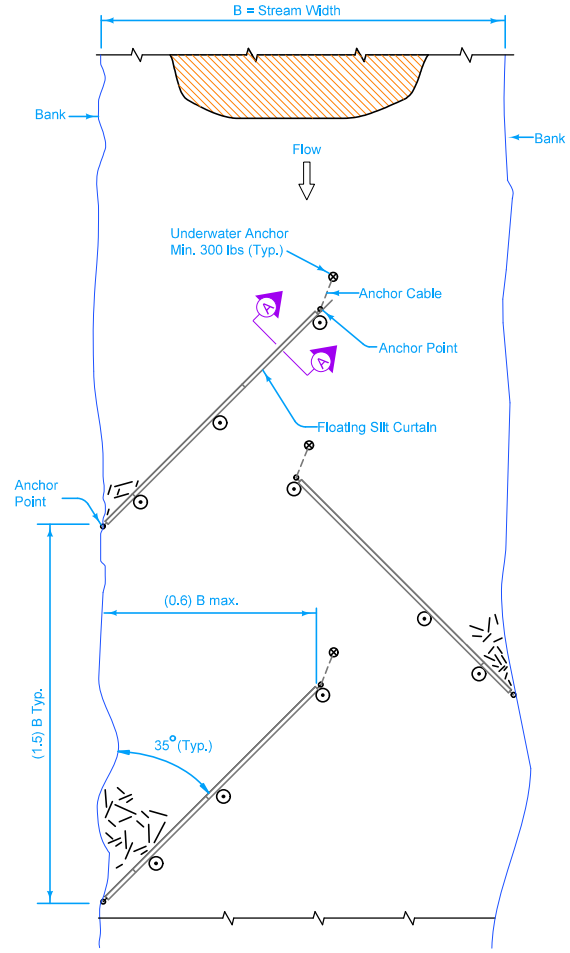
SHEET 3 of 3

REVISIONS: Added TYPE 1 on Page 2. Added TYPES 2 and 3 on Page 3. Modified note 5 and added notes 6, 7, and 8. Removed foreslope table and replaced with note.

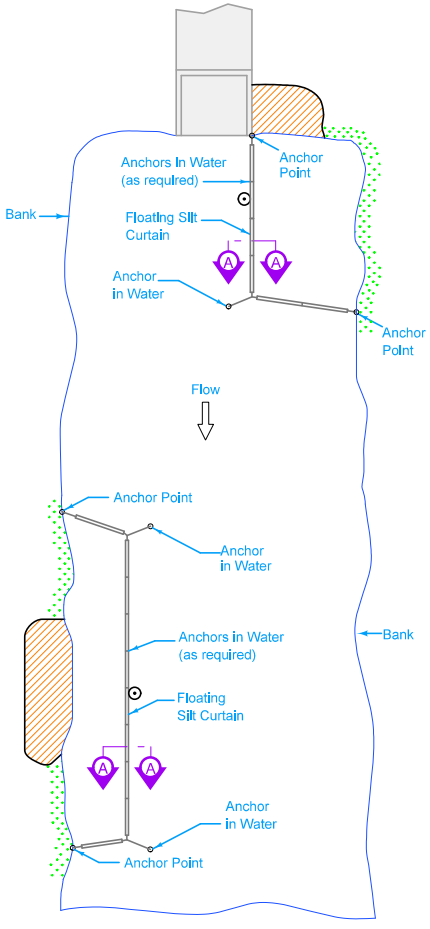
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

SILT FENCE

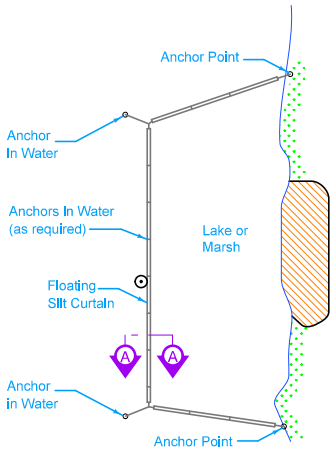
DESIGNER INFO



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	
6	10-21-14

STANDARD ROAD PLAN

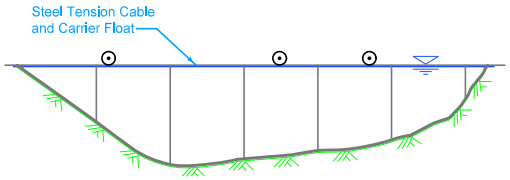
EC-202

SHEET 1 of 2

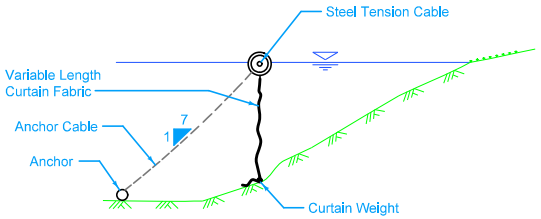
REVISIONS: Removed 100' typical spacing between anchors on page 2. Added possible contract item. Removed sections of standard notes and circle note 1.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

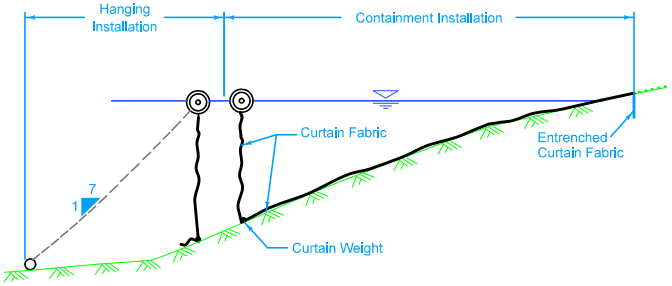
FLOATING SILT CURTAIN



PROFILE



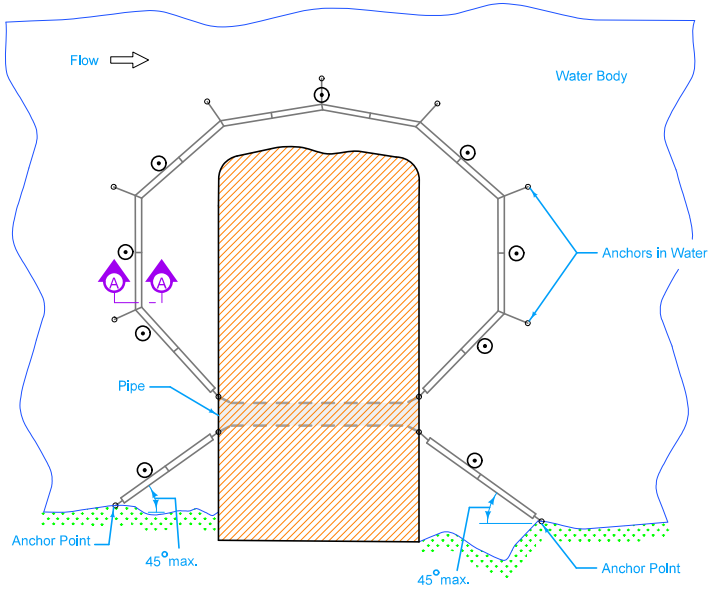
SECTION A-A
Hanging Installation



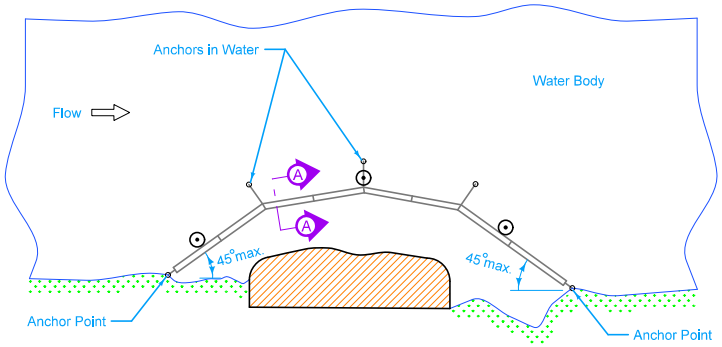
SECTION A-A
Containment Installation (1)

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

STANDARD ROAD PLAN

REVISION
6 | 10-21-14

EC-202

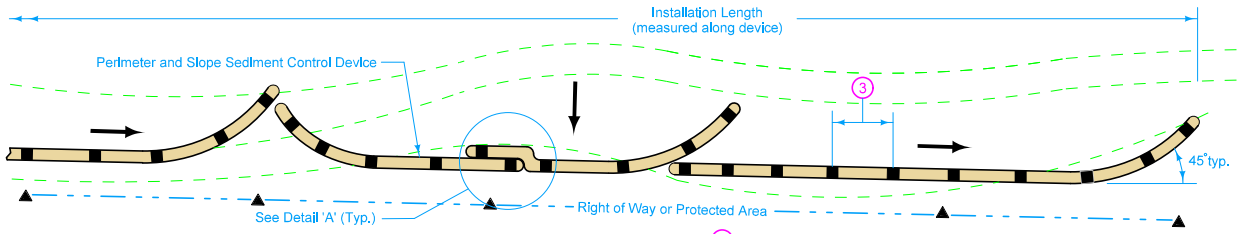
SHEET 2 of 2

REVISIONS: Removed 100' typical spacing between anchors on page 2. Added possible contract item. Removed sections of standard notes and circle note 1.

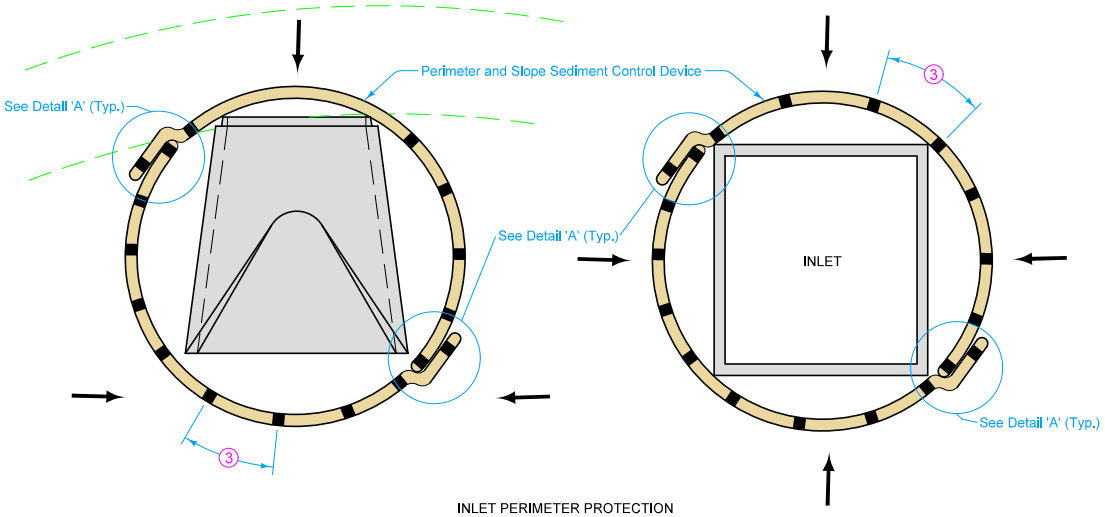
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

FLOATING SILT CURTAIN

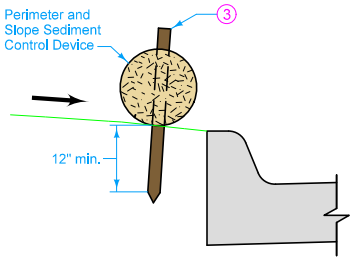
DESIGNER INFO



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.

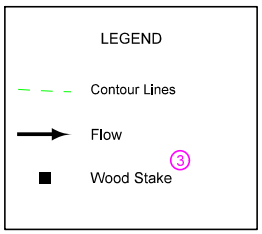
(1) Overlap joints per Detail 'A'. Turn the lower 10 feet of each run up the slope to help contain runoff. When placed such that runoff is conveyed along the device, additional run-ups and/or means may be required to reduce erosion along the device. Run-ups will be included in the installation length.

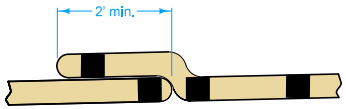
(2) Extra material required to install overlaps will not be included in the installation length.

(3) Space 1" X 1" wood stakes at 4 foot maximum spacing.

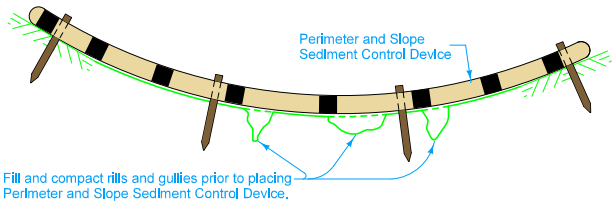
Possible Contract Item:
Perimeter and Slope Sediment Control Device

Possible Tabulation:
100-19





DETAIL 'A' (2)
(Overlap Joint)



DETAIL 'B'

IOWA DOT

REVISION	
3	04-18-17

STANDARD ROAD PLAN

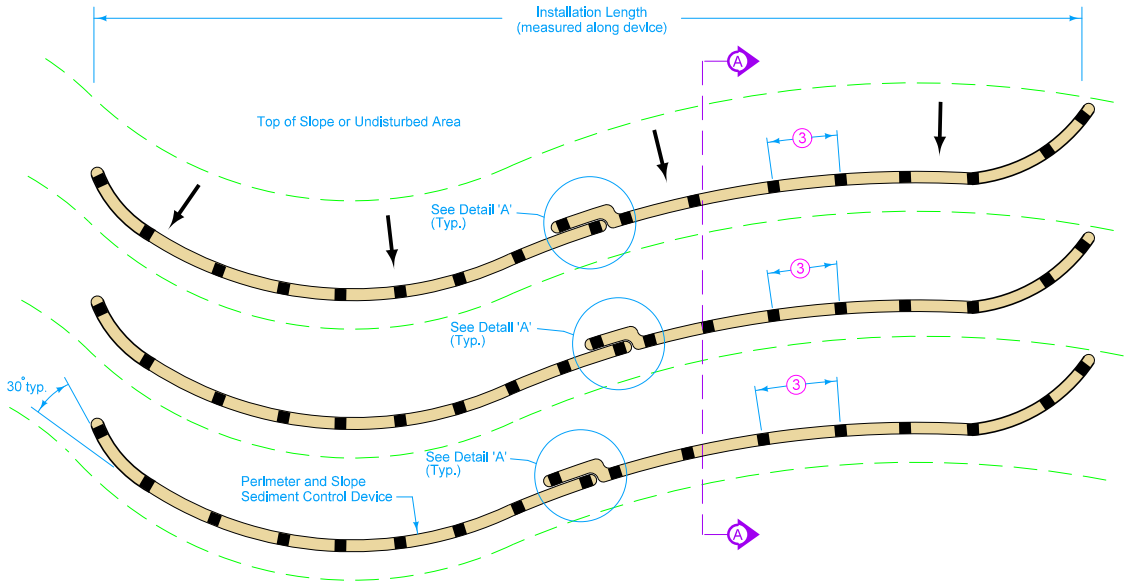
EC-204

SHEET 1 of 3

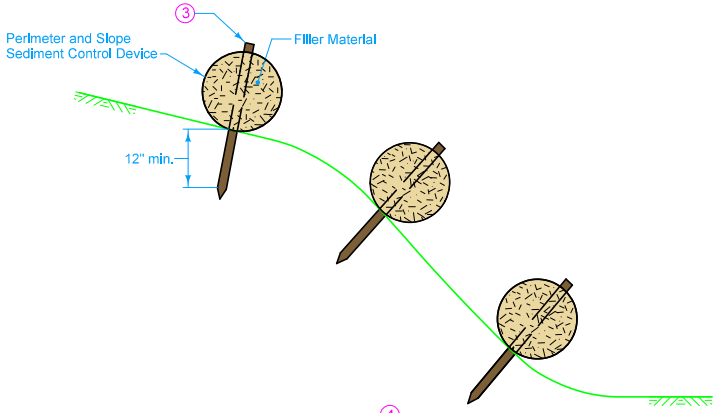
REVISIONS: Added Designer Info button. Modified notes to remove wattles and filter socks. Removed overlap joint on Ditch Protection view on page 3.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICES



SLOPE PROTECTION (4)



SECTION A-A (4)
Installation

LEGEND

- Contour Lines
- Flow
- Wood Stake (3)

(3) Space 1" X 1" wood stakes at 4 foot maximum spacing.

(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.

IOWA DOT

REVISION 3 04-18-17

STANDARD ROAD PLAN

EC-204

SHEET 2 of 3

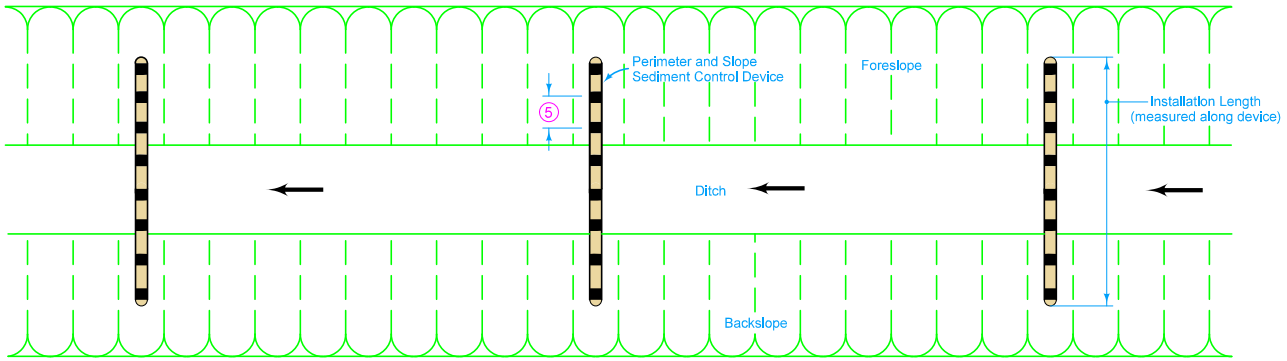
REVISIONS: Added Designer Info button. Modified notes to remove wattles and filter socks. Removed overlap joint on Ditch Protection view on page 3.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

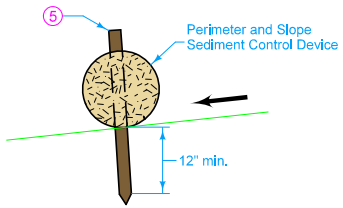
PERIMETER AND SLOPE SEDIMENT CONTROL DEVICES

⑤ Space 1" X 1" wood stakes at 2 foot maximum spacing.

⑥ Install Ditch Protection perpendicular to ditch. Overlap joints per Detail 'A'.



DITCH PROTECTION ⑥



INSTALLATION IN DITCH

LEGEND

Contour Lines

Flow

Wood Stake ⑤

IOWA DOT

STANDARD ROAD PLAN

REVISION 3 04-18-17

EC-204

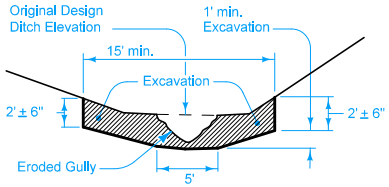
SHEET 3 of 3

REVISIONS: Added Designer Info button. Modified notes to remove wattles and filter socks. Removed overlap joint on Ditch Protection view on page 3.

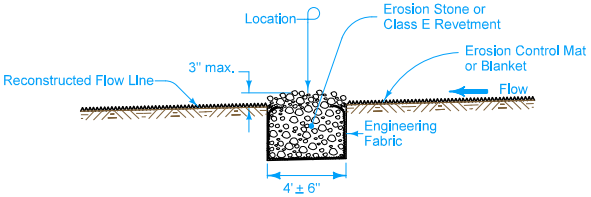
Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICES

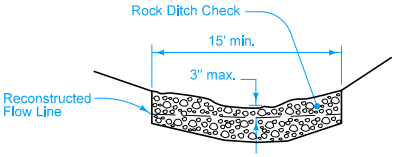
DESIGNER INFO



EXCAVATION SECTION

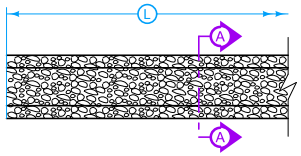


LONGITUDINAL SECTION AT CENTERLINE OF DITCH

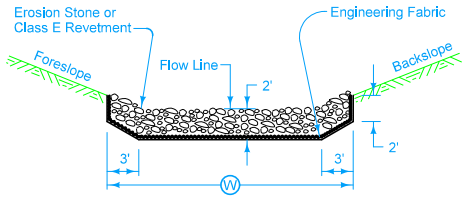


DITCH CHECK SECTION

TYPE 1
(Rock Ditch Check)

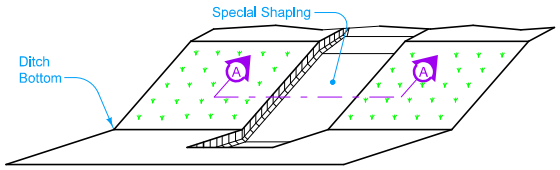


PLAN

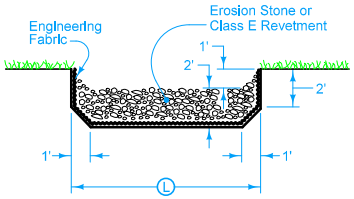


SECTION A-A

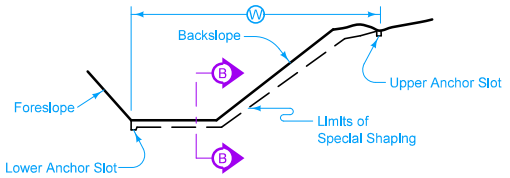
TYPE 2
(Rock Ditch)



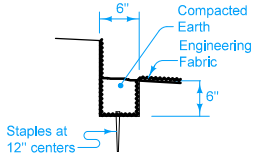
ISOMETRIC VIEW



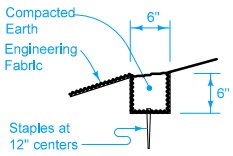
SECTION A-A



TYPICAL SECTION

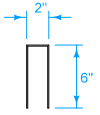


LOWER ANCHOR SLOT

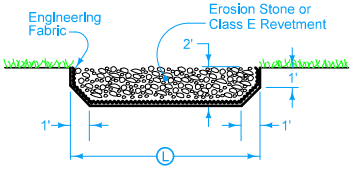


UPPER ANCHOR SLOT

TYPE 3
(Rock Flume)



STAPLE
(No. 11 wire)



SECTION B-B

Class 10 excavation required to install Rock Erosion Control is incidental and will not be paid for separately.

Possible Contract Items:
Erosion Stone
Class E Revetment
Engineering Fabric

Possible Tabulation:
100-23

IOWA DOT

STANDARD ROAD PLAN

REVISION	
1	10-18-16

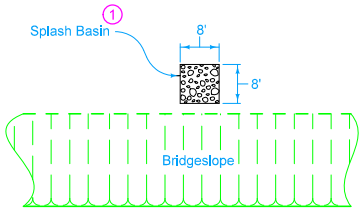
EC-301

SHEET 1 of 2

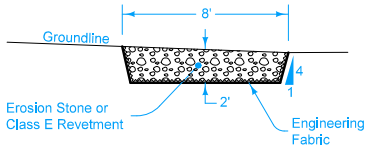
REVISIONS: Modified details for Type 3 and Type 4 Installations. Deleted old note 2 and renumbered old note 3 as note 2. Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

ROCK EROSION CONTROL (REC)

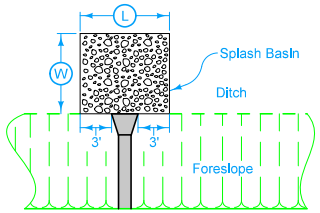


PLAN

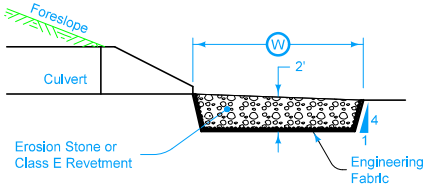


TYPICAL SECTION

SPLASH BASIN UNDER BRIDGE DRAIN



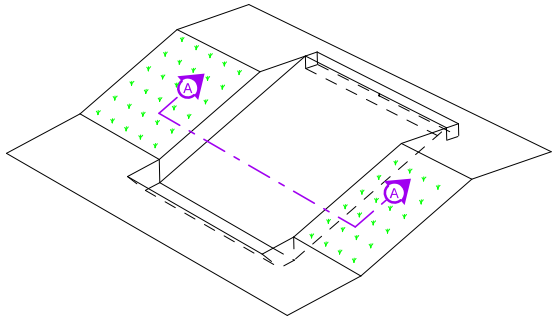
PLAN



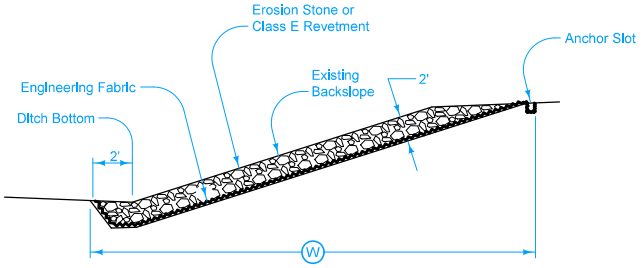
TYPICAL SECTION

SPLASH BASIN AT PIPE CULVERT OUTLET

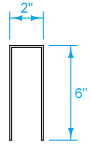
TYPE 4
(Rock Splash Basin)



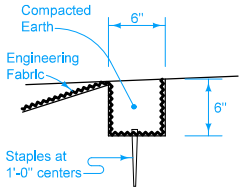
ISOMETRIC VIEW



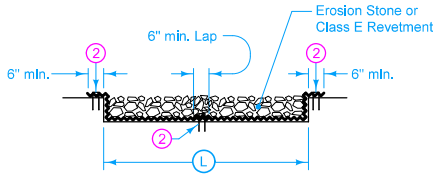
TYPICAL SECTION



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

REVISION	
1	10-18-16

STANDARD ROAD PLAN

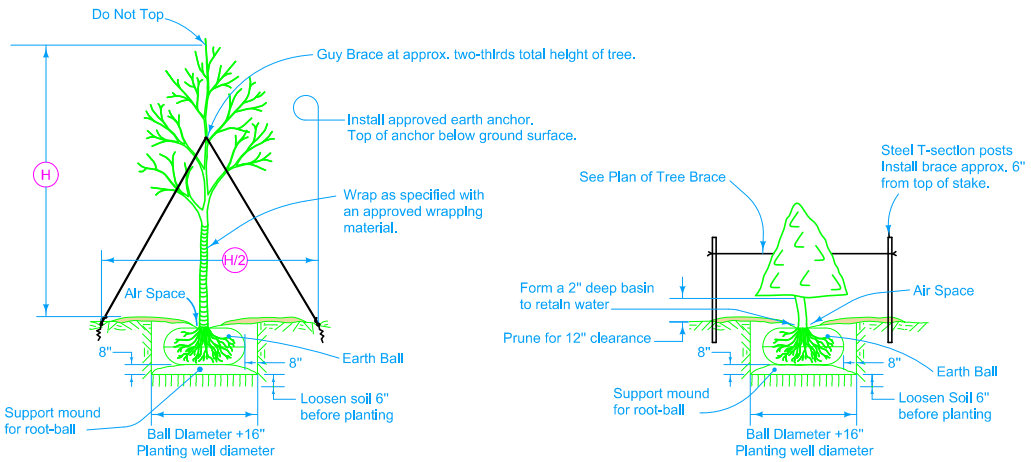
EC-301

SHEET 2 of 2

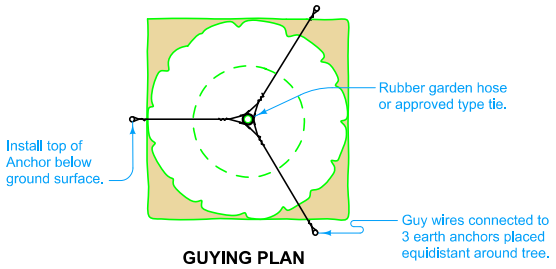
REVISIONS: Modified details for Type 3 and Type 4 Installations. Deleted old note 2 and renumbered old note 3 as note 2. Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

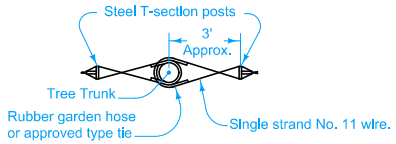
ROCK EROSION CONTROL (REC)



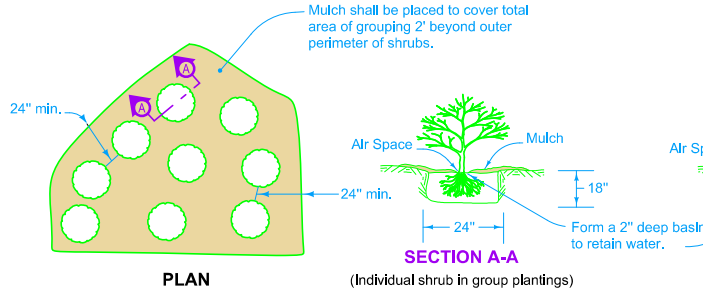
BALLED AND BURLAPPED PLANTING



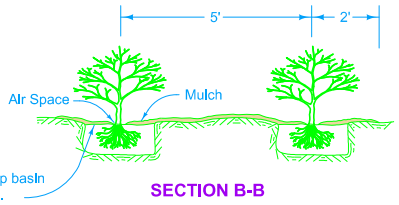
GUYING PLAN



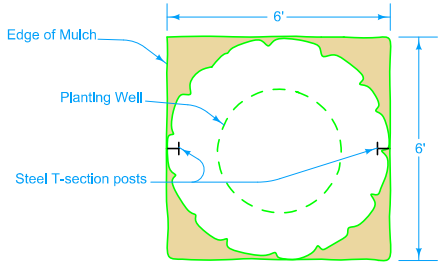
PLAN OF TREE BRACE



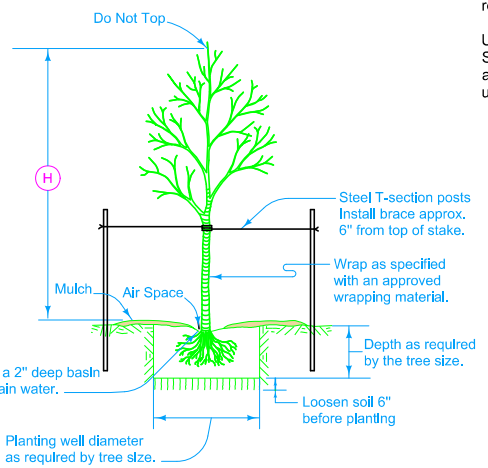
PLANTING OF IRREGULAR SHRUB GROUPS



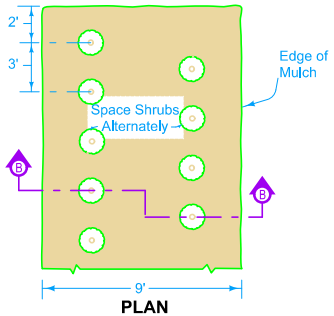
LIVING SNOW FENCE



PLAN FOR INSTALLING MULCH



BARE ROOT PLANTING



PLAN

Refer to detail project plans for additional information regarding planting location and layout.

When no specific requirement is indicated, complete planting as directed by the Engineer.

Till entire area to be mulched with a rotary tiller or other method approved by the Engineer.

Rake smooth the entire area to be mulched and ensure it is free of vegetation, debris, clods and rocks. Form a 2 inch deep basin around plants to retain water. Plant plants at the same depth as they were in the nursery.

Follow mulch material and depth as designated on the plans. Pull mulch back ½ inch to 1 inch from the plants to allow air circulation at a uniform depth to reflect the 2 inch basin.

Pruning consists of removing dead, broken, and irregular branches only. Do not prune the tops of plants unless it is to remove dead or broken material.

Use steel posts complying with Article 4154.09 of the Standard Specifications for staking. For trees 5 feet in height and less use posts 5 feet in length. For trees taller than 5 feet use posts 7 feet in length.

IOWA DOT

REVISION	
1	04-21-15

STANDARD ROAD PLAN

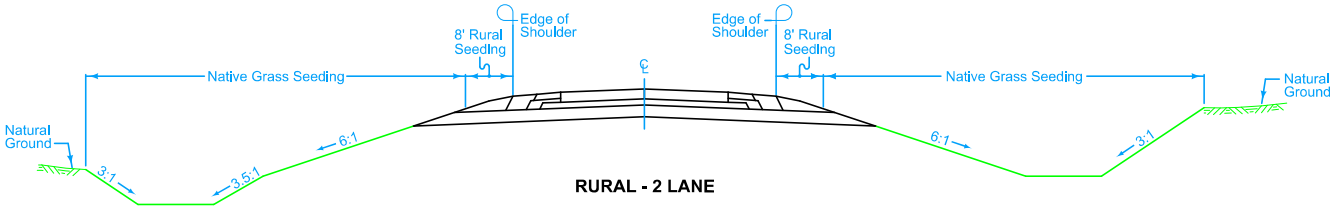
EC-501

SHEET 1 of 1

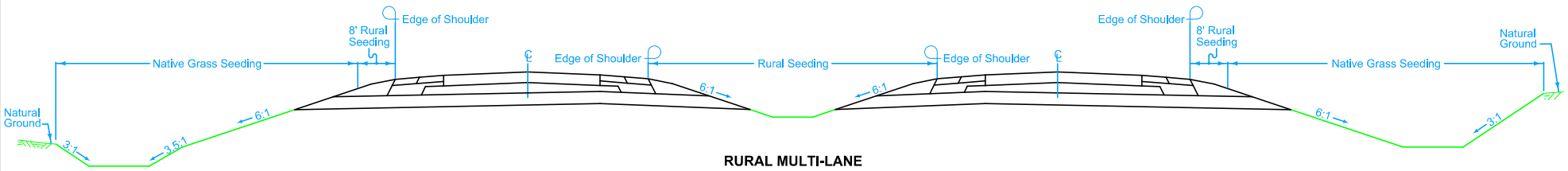
REVISIONS: Replaced DOT logo with new version.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

TREES AND SHRUBS



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