RULE 5 NARRATIVE

- OWNER & DEVELOPER: JILL'S HOUSE, INC. C/O WEDDLE BROTHERS CONSTRUCTION CO.
  1201 W. THIRD STREET
  BLOOMINGTON, INDIANA 47402
- JILL'S HOUSE consists of a Residential development on 2.64 acres.
- There is no presence of 100 year floodplains, floodway fringes, or floodways.
- Adjacent areas consist of:
  - Existing retirement community to east
  - Single Family home sites and undeveloped property to the north, south and west
- No natural water features exist on site
- The ultimate receiving water for the project is Lake Griffy.
- There are zero (0) sink holes on site.
- Calculations for peak discharge:
  - 100 year pre-developed: _____ cfs
  - 100 year post-developed: _____ cfs
- Hydraulic unit code – 05120202010070.
- No state or federal water quality permits other than Rule 5 will be required.
- Potential pollutant sources associated with construction:

Pollutant		Source
Sedimentation	Particulates	Mass grading activities
Hydrocarbons	Petroleum	Fuel, oil, antifreeze leaks and /or spills
	Trash	Debris from individual home construction.
	Concrete	Waste from individual home construction

- Potential pollutant sources post construction:

Pollutant		Source
Sedimentation	Particulates	Pavement wear, vehicles, the atmosphere and maintenance activities
Nutrients	Nitrogen & Phosphorus	Atmosphere and fertilizer application
Heavy Metals	Lead	Leaded gasoline from auto exhausts and tire wear
	Zinc	Tire wear, motor oil and grease
	Iron	Auto body rust, steel highway structures such as bridges and guardrails, and moving engine parts
	Copper	Metal plating, bearing and brushing wear, moving engine parts, brake lining wear, fungicides and insecticides
	Cadmium	Tire wear and insecticide application
	Chromium	Metal plating, moving engine parts and brake lining wear
	Nickel	Diesel fuel and gasoline, lubricating oil, metal plating, bushing wear, brake lining wear and asphalt paving
	Manganese	Moving engine parts
	Cyanide	Anti-caking compounds used to keep deicing salt granular
	Sodium, Calcium & & Chloride	Deicing salts
	Sulfates	Roadway beds, fuel and deicing salts
Hydrocarbons	Petroleum	spills, leaks, antifreeze and hydraulic fluids and asphalt surface leachate

- Post construction pollutants will be treated by routing storm runoff through the proposed detention basins which will give the sediment a chance to settle out of the water before being discharged and allowed to flow along the natural ravine offsite.
- Material handling and spill prevention plan:
  - All erosion control measures shall be in place following the sequence of events outlined in the erosion control notes, on this sheet, before mass grading activities begin.
  - During construction all erosion control structures shall be inspected and maintained in accordance of the details on sheets 8 and 9 of these construction plans.
  - No materials shall be stored onsite.
  - All construction equipment shall be inspected regularly and proper preventative maintenance performed to prevent oil, fuel or antifreeze leakage.
  - All fueling and fluid changes shall be done on the stone layout pad using care to prevent spillage. If a spill should occur during fueling or fluid changes the contractor shall remove, properly dispose of and replace the contaminated stone.
  - During individual home construction the home contractor shall keep all construction materials stored neatly and securely. Construction waste shall be picked up and disposed of daily.
  - During individual home construction the home contractor shall construct and and maintain a concrete washout area as shown on the erosion control detail plan for individual home construction and detailed on sheet 9. This area shall be the only area that concrete trucks may washout after competing their delivery.
- Maintenance Plan
  - All detention ponds, and associated outlet structures shall be inspected bi-annually to ensure that all are working properly. If any damage or problems are discovered they shall be repaired or replaced immediately. If excess sedimentation has occurred in the past six (6) months, said sediment shall be removed and properly disposed of. During construction the contractor shall be responsible for these duties. After construction has been completed, the responsibility of inspection and maintenance shall go to the owner.

SOILS MAP

SCALE: 1" = 1/4 MILE

CaD – Caneyville silt loam, 12 to 18 percent slopes.
This strongly sloping, moderately deep, well drained soil is on side slopes of the uplands. Areas are generally elongated. They range from 3 to 200 acres and have a dominant size of about 40 acres.
The available water capacity for this Caneyville soil is low, and permeability is moderately slow. Surface runoff from cultivated areas is rapid. The organic matter content of the surface layer is moderate.
This soil is severely limited for dwellings without basements because of slope. It is severely limited for dwellings with basements because of depth to rock and slope. This soil is severely limited for local roads and streets because of low strength and slope. The limitation for septic tank absorption absorption fields is severe.

CrC – Crider silt loam, 6 to 12 percent slopes.
This moderately sloping, deep, well drained soil is on narrow and broad convex ridgetops of the uplands. Areas are generally elongated. They range from 3 to 200 acres and have a dominant size of about 40 acres.
The available water capacity of this Crider soil is high, and permeability is moderate. Runoff from cultivated areas is medium. The organic matter content of the surface layer is low.
This soil is moderately limited for dwellings with and without basements because of slope. This soil is severely limited for local roads and streets by low strength. Limitations are moderate for septic tank absorption fields because of slope and moderate permeability.

CrB – Crider silt loam 2 to 6 percent slopes.
This gently sloping, deep, well drained soil is on narrow and broad convex ridgetops on uplands. Areas are generally elongated. They range from 3 to 400 acres and have a dominant size of about 40 acres.
The available water capacity of this Crider soil is high, and permeability is moderate. Runoff from cultivated areas is medium. The organic matter content of the surface layer is low.
This soil is slightly limited for dwellings. This soil is severely limited for local roads and streets because of low strength. The limitation for septic tank absorption fields is moderate because permeability is moderate.

SOIL LEGEND

Map symbols consist of a combination of letters or of letters and numbers. The first capital letter is the initial one of the map unit name. The lowercase letter that follows separates map units having names that begin with the same letter, except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 3 indicates that the soil is severely eroded.

SYMBOL	NAME
AfB	Alford silt loam, 2 to 6 percent slopes
Ba	Bartle silt loam
BdB	Bedford silt loam, 2 to 6 percent slopes
BkF	Berks–Weikert complex, 25 to 75 percent slopes
Bo	Bonnie silt loam
Bu	Burnside silt loam
CaD	Caneyville silt loam, 12 to 18 percent slopes
Cb	Caneyville–Hagerstown silt loams, karst
ChF	Chetwynd silt loam, 25 to 70 percent slopes
CoF	Corydon Variant–Caneyville Variant complex, 25 to 70 percent slopes
CrB	Crider silt loam, 2 to 6 percent slopes
CrC	Crider silt loam, 6 to 12 percent slopes
CrD	Crider silt loam, 12 to 18 percent slopes
CsC	Crider–Caneyville silt loams, 6 to 12 percent slopes
CtB	Crider–Urban land complex, 2 to 6 percent slopes
CtC	Crider–Urban land complex, 6 to 12 percent slopes
Cu	Cuba silt loam
EbE	Ebal–Gilpin–Hagerstown silt loams, 18 to 25 percent slopes
EcD	Ebal–Wellston–Gilpin silt loams 12 to 18 percent slopes
ExB	Elkinsville silt loam, 2 to 6 percent slopes
ExF	Elkinsville silt loam, upland, 20 to 40 percent slopes
GpD	Gilpin silt loam, 12 to 18 percent slopes
GrD	Gilpin–Gullied land complex, 12 to 22 percent slopes
HaC	Hagerstown silt loam, 6 to 12 percent slopes
HaD	Hagerstown silt loam, 12 to 18 percent slopes
HaE	Hagerstown silt loam, 18 to 25 percent slopes
HbD3	Hagerstown silty clay loam, 12 to 22 percent slopes, severely eroded
Hc	Hagerstown–Caneyville silt loams, karst
Hd	Haymond silt loam
HkF	Hickory silt loam, 25 to 70 percent slopes
HoA	Hosmer silt loam, 0 to 2 percent slopes
HoB	Hosmer silt loam, 2 to 6 percent slopes
HoC	Hosmer silt loam, 6 to 12 percent slopes
HtB	Hosmer–Urban land complex, 2 to 12 percent slopes
IvA	Iva silt loam, 0 to 3 percent slopes
MbB	Martinsville loam, 2 to 6 percent slopes
PaB	Parke silt loam, 2 to 6 percent slopes
PaC	Parke silt loam, 6 to 12 percent slopes
PcD	Parke–Chetwynd silt loam, 12 to 18 percent slopes
PeA	Pekin silt loam, 0 to 2 percent slopes
PeB	Pekin silt loam, 2 to 6 percent slopes
PeC	Pekin silt loam, 6 to 12 percent slopes
Po	Peoga silt loam
PrC	Princeton loam, 4 to 10 percent slopes
PrE	Princeton loam, 18 to 25 percent slopes
RcB	Ryker silt loam, 2 to 6 percent slopes
RcC	Ryker silt loam, 6 to 12 percent slopes
RcD	Ryker silt loam, 12 to 18 percent slopes
Sf	Steff silt loam
St	Stendal silt loam
Sx	Stonelick silt loam
TlA	Tilsit silt loam, 0 to 2 percent slopes
TlB	Tilsit silt loam, 2 to 6 percent slopes
Ua	Udorthents, loamy
Ud	Udorthents–Pits complex
Wa	Wakeland silt loam
WeC	Wellston silt loam, 6 to 12 percent slopes
WmC	Wellston–Gilpin silt loams, 6 to 20 percent slopes
Wo	Whitaker loam
Wr	Wilbur silt loam
ZnC	Zanesville silt loam, 6 to 12 percent slopes
Zo	Zipp silty clay loam
Zp	Zipp silty clay loam, frequently flooded
Zs	Zipp Variant silt loam

PRACTICE 3.25 ROCK CHECK DAM

REQUIREMENTS (Exhibit 3.25–B and C)

Contributing drainage area: 2 acres maximum.
Dam center: 2 ft. maximum height but at least 9 in. lower than the outer edges at natural ground elevation.
Dam side slope: 2:1 or flatter.
Distance between dams: Spaced so the toe of the upstream dam is the same elevation as the top of the downstream dam.
Overflow areas along channel: Stabilized to resist erosion.
Rock size: INDOT Revetment Riprap.

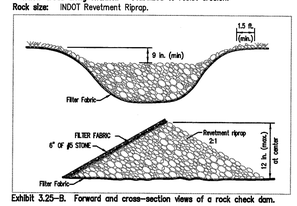


Exhibit 3.25–B. Forward and cross-section views of a rock check dam.

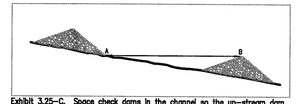


Exhibit 3.25–C. Space check dams in the channel so the up–stream dam toe elevation (A) and down–stream dam top elevation (B) are the same.

INSTALLATION

1. Excavate a cutoff trench into the ditch banks, and extend it a minimum of 18 in. beyond the abutments.
2. Place the rock in the cutoff trench and channel to the lines and dimensions shown in Exhibit 3.25–B––i.e., center a maximum of 2 ft. high yet 9 in. below where the dam abuts the channel banks.
3. Extend the rock at least 18 in. beyond the channel banks to keep overflow water from undercutting the dam as it re–enters the channel.
4. Install as many dams as necessary to satisfy the spacing requirement shown in Exhibit 3.25–C.
5. Stabilize the channel above the uppermost dam.
6. Recognizing that water will flow over and around the lowermost dam, protect the channel downstream from it with an erosion–resistant lining for a distance of 6 ft. unless the channel is protected through other means.

MAINTENANCE

- Inspect check dams and the channel after each storm event, and repair and damage immediately.
- If significant erosion occurs between dams, install a riprap liner in that portion of the channel (Practice 3.32).
- Remove sediment accumulated behind each dam as needed to maintain channel capacity, to allow drainage through the dam, and to prevent large flows from displacing sediment.
- Add rock to the dams as needed to maintain design height and cross section.
- When the dams are no longer needed, remove the rock and stabilize channel, using an erosion–resistant lining if necessary.

PRACTICE 3.16 RIPRAP

PURPOSE

- To protect slopes, streambanks, channels, or similar areas subject to erosion by water.

REQUIREMENTS

Rock: Hard, angular, and weather–resistant, having a specific gravity of at least 2.5.
Gradation: Well–graded stone, 50% (by weight) larger than the specified d_{50}; however, the largest pieces should not exceed two times the specified d_{50}, and no more that 15% of the pieces (by weight) should be less than 3 in.
Filter: Use geotextile fabric for stabilization and filtration or sand/gravel layer placed under all permanent riprap installations.
Slope: 2:1 or flatter, unless approved in the erosion and sediment control plan.
Minimum thickness: Two times the specified d_{50} stone diameter.

INSTALLATION (Exhibit 3.16–B)

SUBGRADE PREPARATION:

1. Remove brush, trees, stumps, and other debris.
2. Excavate only deep enough for both filter and riprap; over–excavation increases the amount of spoil considerably (Practice 3.32).
3. Compact any fill material to the density of the surrounding undisturbed soil.

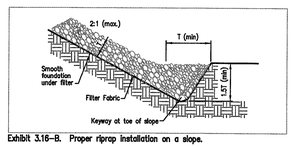


Exhibit 3.16–B. Proper riprap installation on a slope.

4. Cut a keyway in stable material at the base of the slope to reinforce the toe; keyway depth should be 1 1/2 times the design thickness of the riprap and should extend a horizontal distance equal to the design thickness.
5. Smooth the graded foundation.

FILTER PLACEMENT:

1. If using geotextile fabric, place it on the smoothed foundation, overlap The edges at least 12 in., and secure with anchor pins spaced every 3 ft. along the overlap. (For large riprap, consider a 4–in. layer of sand to protect the fabric.)
2. If using a sand/gravel filter, spread the well–graded aggregate in a uniform layer to the required thickness (6 in. minimum); if two or more layers are specified, place the layer of smaller gradation first, and avoid mixing the layers.

RIPRAP PLACEMENT:

1. Immediately after installing the filter, add the riprap to full thickness in one operation. (Do not dump through chutes or use any method that causes segregation of rock sizes or that will dislodge or damage the underlying filter material.)
2. If fabric is damaged, remove the riprap and repair by adding another layer of fabric, overlapping the damaged area by 12 in.
3. Place smaller rock in voids to form a dense, uniform, well–graded mass. (Selective loading at the quarry and some hand placement may be needed to ensure an even distribution of rock material.)
4. Blend the rock surface smoothly with the surrounding area to eliminate protrusions or overfalls.

MAINTENANCE

- Inspect periodically for displaced rock material, slumping, and erosion at edges, especially downstream or downslope. (Properly designed and installed riprap usually requires very little maintenance if promptly repaired.)

PRACTICE 3.01 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT PAD

PURPOSE

- To provide a stable entrance/exit condition from the construction site.
- To keep mud and sediment off public roads.

REQUIREMENTS (Exhibit 3.01–B)

Material: 2–3 in. washed stone (INDOT CA No. 2) over a stable foundation.
Thickness: 6 in. minimum
Width: 20 ft. minimum or full width of entrance/exit roadway, whichever is greater.
Length: 50 ft. minimum. The length can be shorter for small sites such as for an individual home.
Washing facility (optional): Level area with 3 in. washed stone minimum or a commercial rack, and waste water diverted to a sediment trap or basin (Practice 3.72).
Geotextile fabric underliner: May be used under wet conditions or for soils within a high seasonal water table to provide greater bearing strength.

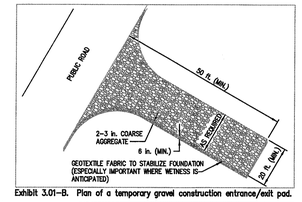


Exhibit 3.01–B. Plan of a temporary gravel construction entrance/exit pad.

INSTALLATION (Exhibit 3.01–C)

1. Avoid locating on steep slopes or at curves in public roads.
2. Remove all vegetation and other objectionable material from the foundation area, and grade and crown for positive drainage.
3. If slope towards the road exceeds 2%, construct a 6–8 in.–high water bar (ridge) with 3:1 side slopes across the foundation area about 15 ft. from the entrance to divert runoff away from the road (Practice 3.24) (see Exhibit 3.01–C).
4. Install pipe under the pad if needed to maintain proper public road drainage.
5. If wet conditions are anticipated, place geotextile fabric on the graded foundation to improve stability.
6. Place stone to dimensions and grade shown in the erosion/sediment control plan, leaving the surface smooth and sloped for drainage.
7. Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

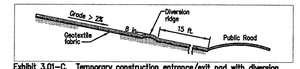


Exhibit 3.01–C. Temporary construction entrance/exit pad with diversion ridge where grade exceeds 2%

MAINTENANCE

- Inspect entrance pad and sediment disposal area weekly and after storm events or heavy use.
- Reshape pad as needed for drainage and runoff control.
- Top dress with clean stone as needed.
- Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing should only be used if the water is conveyed into a sediment trap or basin.
- Repair any broken road pavement immediately.

PRACTICE 3.54 STRAW BALE DROP INLET PROTECTION

PURPOSE

To capture sediment at the inlet to a storm drain, allowing full use of the drain system during the construction period.
(NOTE: This practice not recommended for paved surfaces due to lack of an anchoring system.)

REQUIREMENTS

Contributing drainage area: 1 acre maximum.
Effective life: Less than 3 months.
Capacity: Runoff from a 2–yr. frequency, 24–hr. duration storm event entering a storm drain without bypass flow.
Approach: Pool area flat, with sediment storage of 945 cu.ft./acre disturbed.
Bale dimensions: Approximately 14 in. x 18 in. x 36 in.
Height of bales above inlet: 14 in. (i.e., 18 in. bales entrenched 4 in.).
Anchoring: Two 36–in. long (minimum) steel rebars or 2 x 2–in. hardwood stakes driven through each bale.

INSTALLATION (Exhibit 3.54–B)

1. To reduce bypass flow, ensure that the top of the bales will be at least 6 in. below ground elevation on the downslope side of the inlet. This may require constructing below the inlet a temporary dike OR using the straw bale drop inlet protection in conjunction with an excavated drop inlet protection (Practice 3.51).
2. Excavate a trench at least 4 in. deep and a bales width around the inlet.
3. Place the bales lengthwise in the trench so the bindings are oriented around the sides, rather than top and bottom, to minimize deterioration of the bindings.
4. Allow the bales to overlap at the corners, and abut them tightly against eachother.
5. Anchor the bales by driving two 36–in. long steel rebars of 2x2–in. hardwood stakes through each bale until nearly flush at the top. Drive the first stake at an angle towards the previously laid bale to force the bales together.
6. Chink (tightly wedge) straw into any gaps between gales to prevent sediment–laden water from flowing directly into the inlet.
7. Backfill and compact the excavated soil 4 in. high against the outside of the bales.

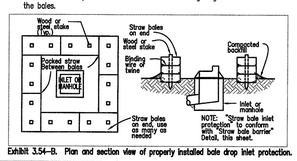


Exhibit 3.54–B. Plan and section view of properly installed bale drop inlet protection.

MAINTENANCE

- Inspect the drop inlet protection after each storm event, and make needed repairs immediately.
- Remove sediment from the pool area to ensure adequate runoff storage for the next rain, taking care to not damage or undercut the bales.
- When the contributing drainage area has been stabilized, remove all bales, construction material, and sediment and dispose of properly, grade the disturbed area to the elevation of the top of the inlet and stabilize.

PRACTICE 3.74 SILT FENCE (SEDIMENT FENCE)

PURPOSE

To retain sediment from small, sloping disturbed areas by reducing the velocity of sheet flow.
(NOTE: Silt fence captures sediment by ponding water to allow deposition, not by filtration. Although the practice usually works best in conjunction with temporary basins, traps, or diversions, it can be sufficiently effective to be used alone. A silt fence is not recommended for use as a diversion; nor is it to be used across a stream, channel or anywhere that concentrated flow is anticipated.)

REQUIREMENTS (Exhibit 3.74–B and C)

Drainage Area: Limited to 1/4 acre per 100 ft. of fence; further restricted by slope steepness (see Exhibit 3.74–B).
Location: Fence nearly level, approximately following the land contour, and at least 10 ft. from toe of slope to provide a broad, shallow sediment pool.
Trench: 8 in. minimum depth, flat–bottom or v–shaped, filled with compacted soil or gravel to bury lower portion of support wire and/or fence fabric.
Support posts: 2 x 2–in. hardwood posts (if used) or steel fence posts set at least 1 ft. deep.* (Steel posts should projections for fastening fabric.)
Spacing of posts: 8 ft. maximum if fence supported by wire, 6 ft. for extra–strength fabric without wire backing.

Exhibit 3.74–B. Maximum Land Slope and Distance for Which a Silt Fence Is Applicable.

Land slope	Max. distance above fence
Less than 2%	100 ft.
2 to 5%	75 ft.
5 to 10%	50 ft.
10 to 20%	25 ft.
More than 20%	15 ft.

Fence height: High enough so depth of impounded water does not exceed 1 1/2 ft. at any point along fence line.
Support wire (optional): 14 gauge, 6 in. wire fence (needed if using standard–strength fabric).
Fence fabric: Woven or non–woven geo–textile fabric with specified filtering efficiency and tensile strength (see Exhibit 3.74–C) and containing UV inhibitors and stabilizers to ensure 6–mo. minimum life at temperatures 0°–120°F.

* Some commercial silt fences come ready to install, with support posts attached and requiring now wire support.

Exhibit 3.74–C. Specifications Minimums for Silt Fence Fabric.

Physical Property	Woven Fabric	Non–woven fabric
Filtering efficiency	85%	85%
Tensile strength at 20% elongation:		
Standard strength	30lbs./linear in.	50lbs./linear in.
Extra strength	50lbs./linear in.	70lbs./linear in.
Slurry flow rate	0.3 gal./min./sq.ft.	4.5 gal./min./sq.ft.
Water flow rate	15 gal. /min./sq.ft.	220 gal./min./sq.ft.
UV resistance	70%	85%

Outlet (optional): To allow for safe storm flow bypass without overtopping fence. Placed along fence line to limit water depth to 1 1/2 ft. maximum; crest––1 ft. high maximum; weir width––4 ft. maximum; splash pad––5 ft. wide, 3 ft. long, 1 ft. thick minimum.

INSTALLATION

SITE PREPARATION:

1. Plan for the fence to be at least 10 ft. from the toe of the slope to provide a sediment storage area.
2. Provide access to the area if sediment cleanout will be needed.

OUTLET CONSTRUCTION (OPTIONAL)

1. Determine the appropriate location for a reinforced, stabilized bypass flow outlet.
2. Set the outlet elevation so that water depth cannot exceed 1 1/2 ft. at the lowest point along the fence line.
3. Locate the outlet weir support posts no more than 4 ft. apart, and install a horizontal brace between them. (Weir height should be no more than 1 ft. and water depth no more than 1 1/2 ft. anywhere else along the fence.)
4. Excavate the foundation for the outlet splash pad to minims of 1 ft. deep, 5 ft. wide and 5 ft. long on level grade
5. Fill the excavated foundation with INDOT CA No. 1 stone, being careful that the finished surface blends with the surrounding area, allowing no overfall.
6. Stabilize the area around the pad.

OUTLET CONSTRUCTION (OPTIONAL)

1. Along the entire intended fence line, dig an 8 in. deep flat–bottomed or V–shaped trench.
2. On the downslope side of the trench, drive the wood or steel support posts at least 1 ft. into the ground, spacing them no more than 8 ft. apart if If the fence is supported by wire or 6 ft. if extra strength fabric is used without support wire. Adjust spacing, if necessary, to ensure that posts are set at the low points along the fence line. (NOTE: If the fence has pre–attached posts or stakes, drive them deep enough so the fabric is satisfactory in the trench as described in step 6.)
3. Faster support wire fence to the upslope side of the posts, extending it 8 in. into the trench.
4. Run a continuous length of geotextile fabric in front of the support wire and posts avoiding joints, particularly at low points in the fence line.
5. If a joint is necessary, mail the overlap to the nearest post with a lath.
6. Place the bottom 1 ft. of fabric in the 8 in. deep trench, extending the remaining 4 in. toward the upslope side.
7. Backfill the trench with compacted earth or gravel.
   NOTE: If using a pre–packed commercial silt fence rather than constructing one, follow the manufacturer's installation instructions.

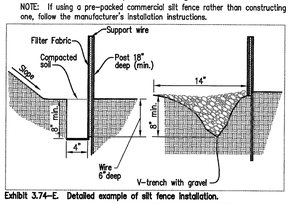
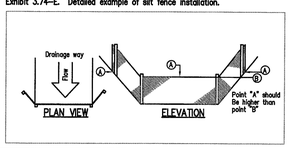


Exhibit 3.74–E. Detailed example of silt fence installation.



MAINTENANCE

- Inspect the silt fence periodically and after each storm event.
- If fence fabric tears, starts to decompose or in any way becomes ineffective, replace the affected portion immediately.
- Remove deposited sediment when it reaches half the height of the fence at its lowest point or is causing the fabric to bulge.
- Take care to avoid undermining the fence during clean out.
- After the contributing area has been stabilized, remove the fence and sediment deposits, bring the disturbed area to grade, and stabilize.

NOTE: CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS & DEPTHS AND NOTIFY ENGINEER OF ANY INACCURACIES IN LOCATION OR ELEVATION OR ANY CONFLICTS PRIOR TO & AFTER ANY EXCAVATION. NO PAYMENT SHALL BE MADE TO CONTRACTOR FOR UTILITY DESTRUCTION OR UNDERGROUND CHANGES REQUIRED DUE TO CONFLICTING ELEVATIONS.

revisions:

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ANDREW M. SCALES REGISTERED NO. 10606552 STATE OF INDIANA PROFESSIONAL ENGINEER
01/12/07
certified by:

Proposed:
JILL'S HOUSE
751 Tamarack Trail
Bloomington Indiana

title: EROSION CONTROL DETAILS

designed by: AMS
drawn by: EJF
sheet no: 7 of 8
project no.: 4006100