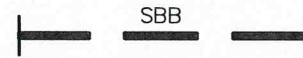
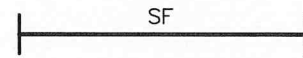


STRAW (OR HAY) BALE BARRIER



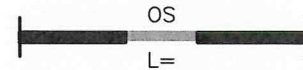
SILT FENCE



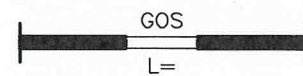
STABILIZED CONSTRUCTION ENTRANCE



OUTLET STRUCTURE.



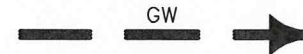
GRASS OUTLET STRUCTURE



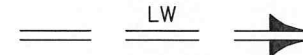
DIVERSION



GRASSED WATERWAY.



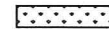
LINED WATERWAY



SEDIMENT BASIN



RIPRAP



NOTE:FOR ILLUSTRATIVE
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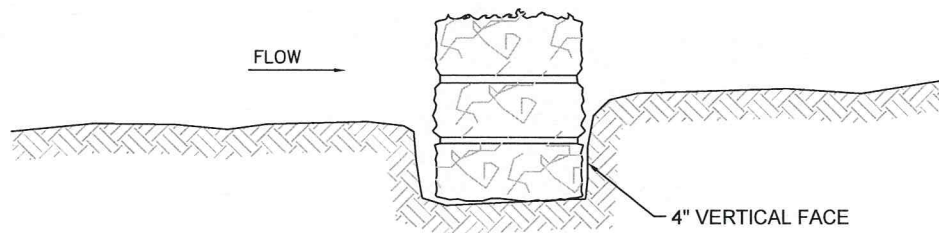
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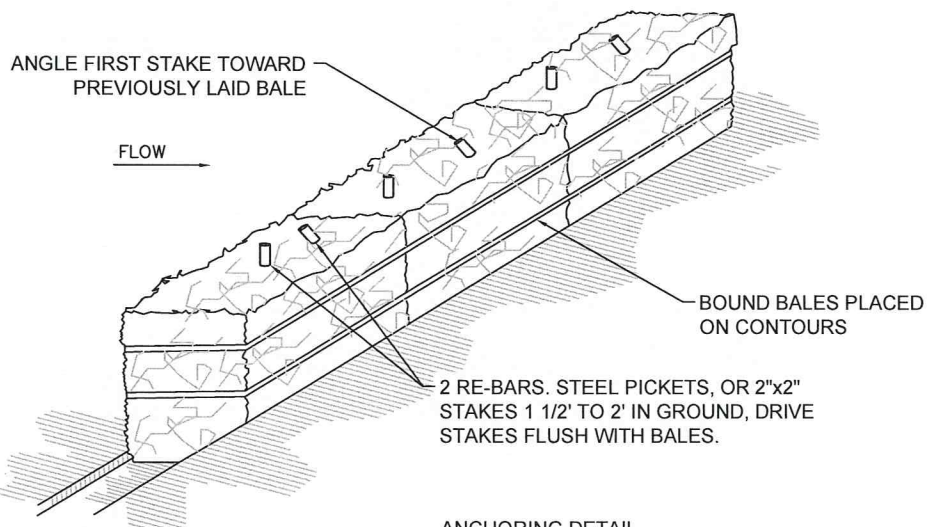
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**FIG. 9-1 STANDARD SYMBOLS FOR SOIL EROSION
AND SEDIMENT CONTROL**

SCALE:
NTS

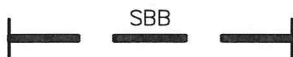


BEDDING DETAIL



ANCHORING DETAIL

STANDARD SYMBOL



NOTE: FOR ILLUSTRATIVE
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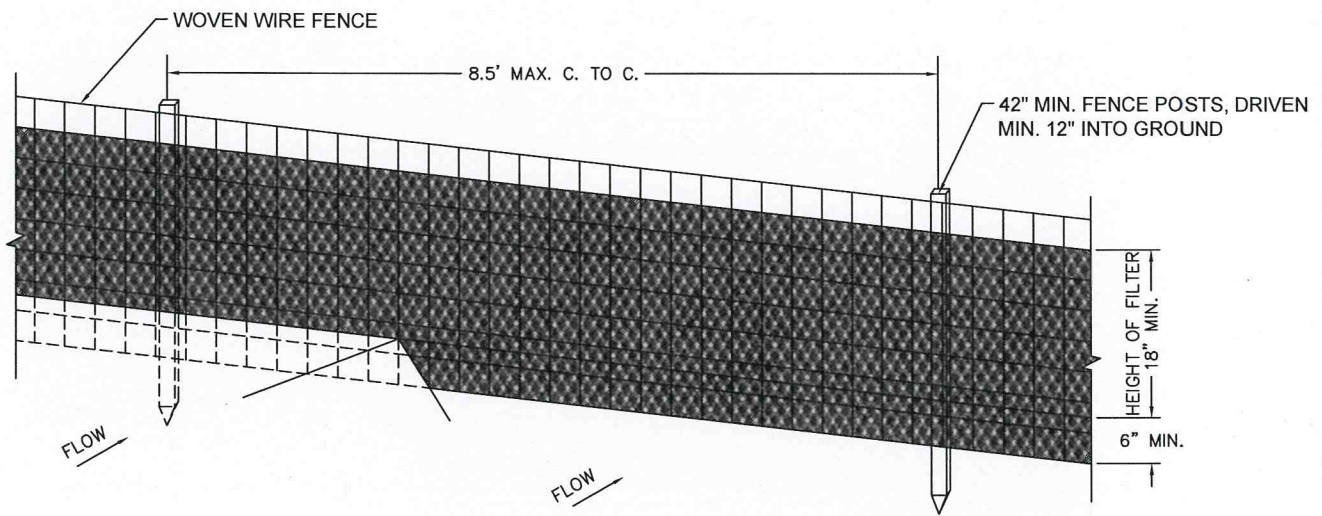
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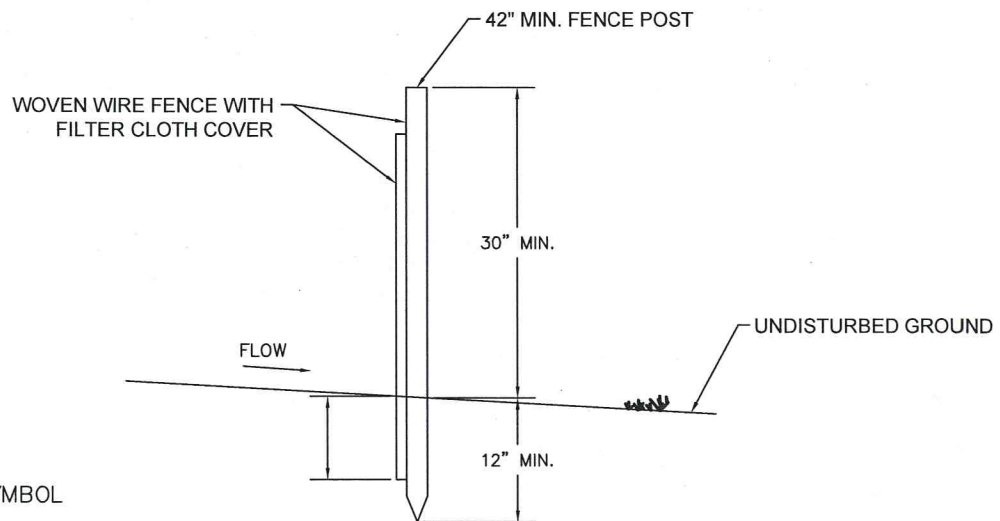
FIG. 9-2

STRAW BALE BARRIER

SCALE:
NTS



PERSPECTIVE VIEW



STANDARD SYMBOL

SF

SECTION

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



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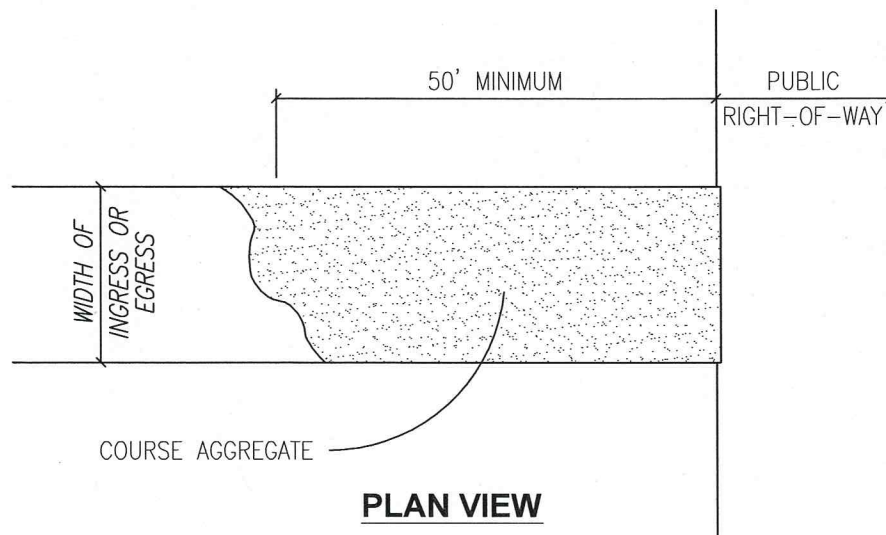
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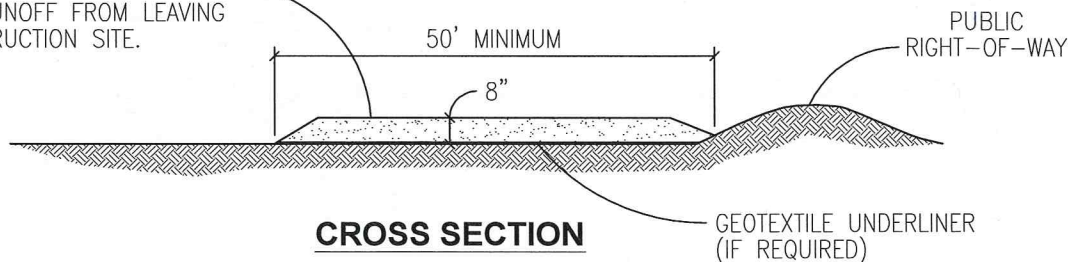
FIG. 9-3

SILT FENCE

SCALE:
NTS



MUST BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.



INSTALLATION:

- CLEAR THE AREA OF DEBRIS, ROCKS OR PLANTS THAT WILL INTERFERE WITH INSTALLATION.
- GRADE THE AREA FOR THE ENTRANCE TO FLOW BACK ON TO THE CONSTRUCTION SITE. RUNOFF FROM THE STABILIZED CONSTRUCTION ENTRANCE ONTO A PUBLIC STREET WILL NOT BE ACCEPTED.
- PLACE GEOTEXTILE FABRIC IF REQUIRED.
- PLACE ROCK AS REQUIRED.
- ROCK SIZE – 3 TO 5 INCHES OPEN GRADED ROCK.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



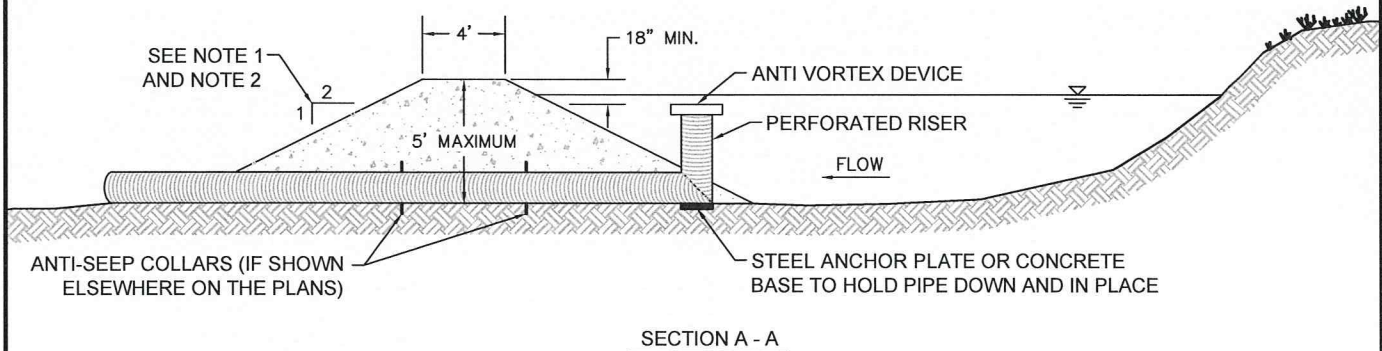
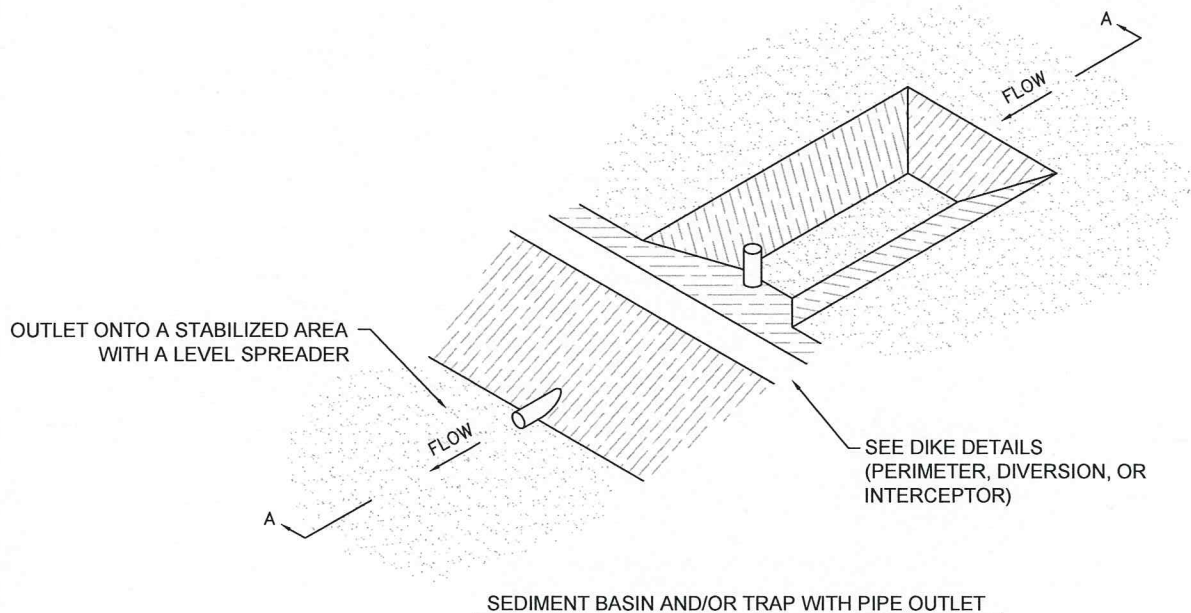
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FIG. 9-4 STABILIZED CONSTRUCTION ENTRANCE

**SCALE:
NTS**



SEDIMENT BASIN USAGE GUIDELINES

A SEDIMENT BASIN MAY BE USED TO PRECIPITATE SEDIMENT OUT OF RUNOFF DRAINING FROM AN UNSTABILIZED AREA.

BASINS: THE DRAINAGE AREA FOR A SEDIMENT BASIN SHOULD NOT EXCEED 100 ACRES. THE BASIN CAPACITY SHALL BE AT LEAST 1800 CF/ACRE OF DRAINAGE AREA (0.5" OVER THE DRAINAGE AREA).

THE BASIN SHOULD HAVE A 40 HOUR DRAW-DOWN TIME WITH AN EMERGENCY SPILLWAY. THE SPILLWAY MAY BE DESIGNED TO PASS THE PEAK RATE OF RUNOFF FROM A 25 YEAR FREQUENCY STORM. THE 100 YEAR STORM SHOULD BE INVESTIGATED TO CONSIDER POSSIBLE FLOODING IMPACTS.

THE ENTRANCE INTO THE BASIN SHOULD BE PROTECTED FROM EROSION. THE BASIN SHOULD BE CLEANED WHEN THE CAPACITY HAS BEEN REDUCED BY 1/3.

ADDITIONAL CONSTRUCTION NOTES:

1. SIDE SLOPES WITHIN THE SAFETY CLEAR ZONE OF A ROADWAY SHALL BE 6:1 OR FLATTER. PROTECT THE TRAVELING PUBLIC FROM INLET STACKS WITHIN THE CLEAR ZONE.
2. SEDIMENT BASINS SHALL HAVE SIDE SLOPES OF 3:1 OR FLATTER.

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



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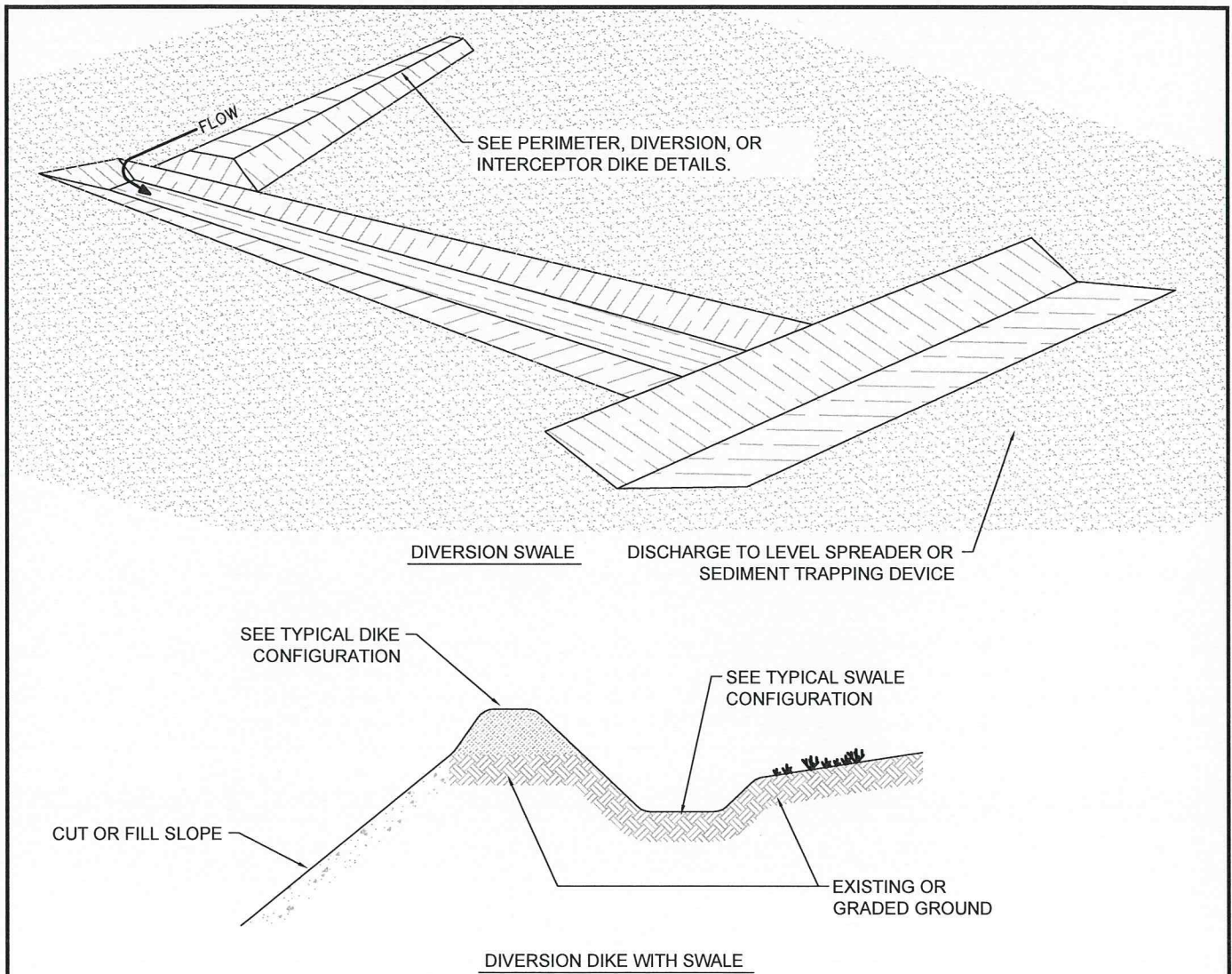
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FIG. 9-5

SEDIMENT BASIN

SCALE:
NTS

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SWALE AND DIKE/SWALE USAGE GUIDELINES

A SWALE OR DIKE/SWALE MAY BE USED TO INTERCEPT RUNOFF AND DIVERT IT AROUND UNSTABILIZED AREAS OR TO DIVERT SEDIMENT LADEN RUNOFF TO AN EROSION CONTROL DEVICE (SEDIMENT BASIN OR ROCK TRAP, ROCK FILTER DAM, ETC.).

THE DRAINAGE AREA CONTRIBUTING RUNOFF TO A SWALE OR DIKE/SWALE SHOULD NOT EXCEED 5 ACRES. THE SPACING OF SWALES AND DIKE/SWALES SHOULD BE AS FOLLOWS:

| SLOPE OF DISTURBED AREAS ABOVE DIKE | GREATER THAN 10% | 5 - 10% | LESS THAN 5% |
|-------------------------------------|------------------|---------|--------------|
| MAXIMUM DISTANCE BETWEEN DIKES | 100' | 200' | 300' |

INTERCEPTED RUNOFF FLOWING IN A SWALE OR DIKE/SWALE SHOULD OUTLET TO A STABILIZED AREA (VEGETATION, ROCK, ECT.).

NOTE:FOR ILLUSTRATIVE PURPOSES ONLY



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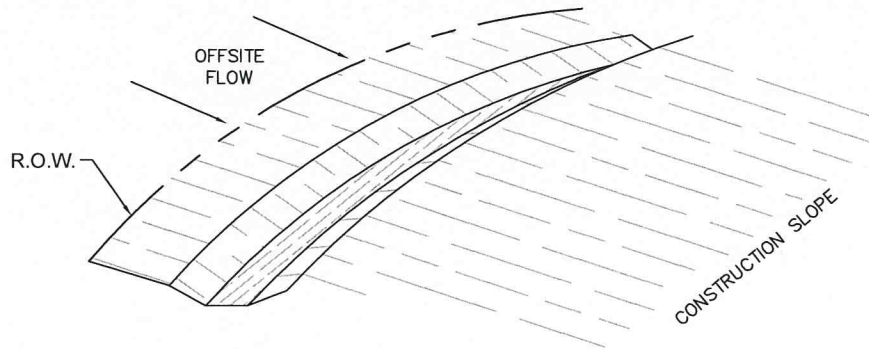
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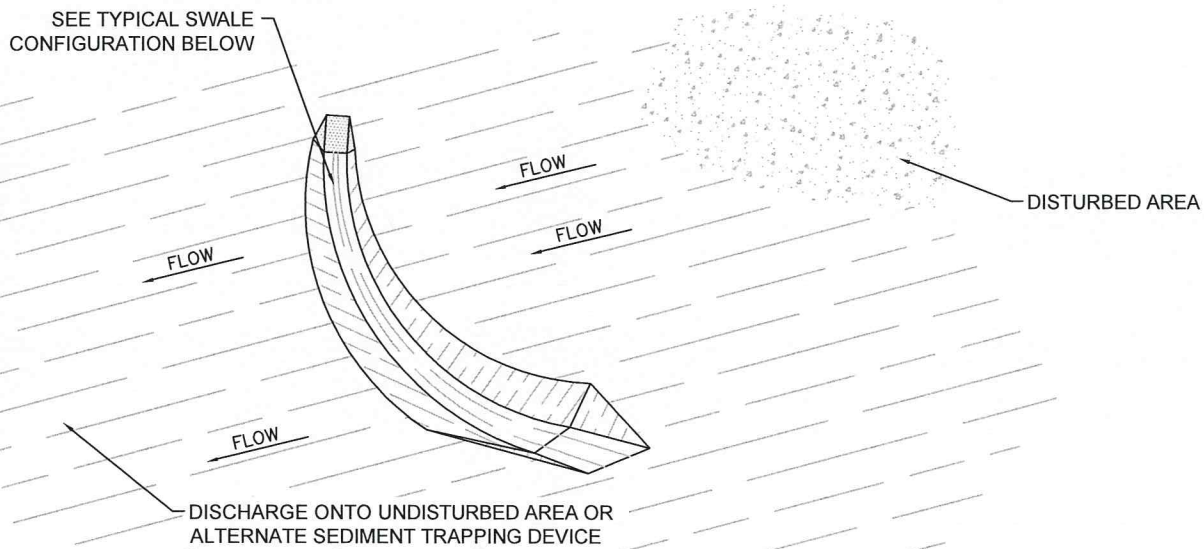
FIG. 9-6

DIVERSION

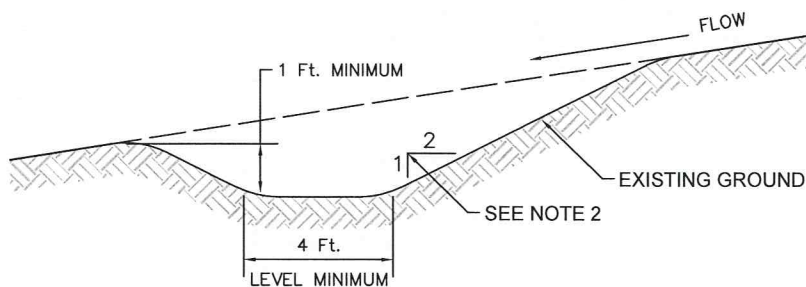
SCALE:
NTS



PERIMETER SWALE



INTERCEPTOR SWALE



TYPICAL SWALE CONFIGURATION

GENERAL NOTES:

- 1) DIMENSIONS OF SWALE MAY BE MODIFIED WITH PRIOR APPROVAL OF THE ENGINEER.
- 2) SIDE SLOPES WITHIN THE SAFETY CLEAR ZONE OF A ROADWAY SHALL BE 6:1 OR FLATTER.
- 3) GRADING SHALL BE SHOWN ELSE WHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
- 4) THE ENGINEER RESERVES THE RIGHT TO MODIFY THE DIMENSIONS SHOWN FOR THE SWALE DEPENDENT ON RUNOFF VOLUME CHARACTERISTICS.
- 5) SWALES THAT ARE IN PLACE FOR MORE THAN 14 CALENDER DAYS SHOULD BE STABILIZED THROUGH SEEDING OR OTHER MEASURES TO CONTROL SEDIMENT RUNOFF.
- 6) THE GUIDELINES SOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



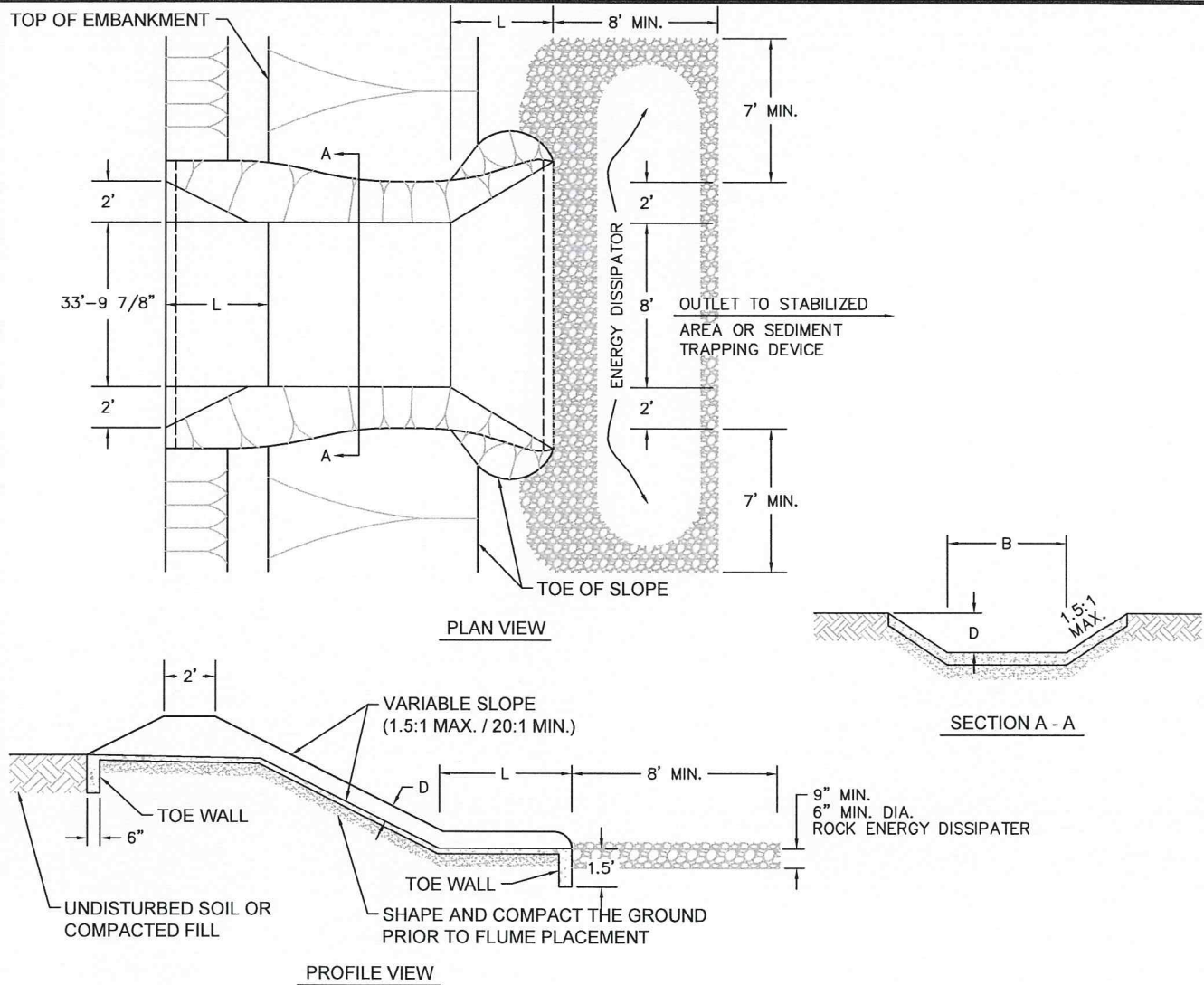
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FIG. 9-7 GRASSED WATERWAY OR OUTLET

SCALE:
NTS



GENERAL NOTES

1. THE GROUP/SIZE IS A DESIGNATOR FOR THE DIMENSIONS OF THE PAVED FLUME. THE GROUP/SIZE IS DESIGNATED BY A LETTER (A OR B) AND THE BOTTOM (B) DIMENSION. THE APPROPRIATE SIZE SHALL BE INDICATED ON THE CONSTRUCTION PLANS.
2. FOR HIGH VELOCITY FLOWS, THE AGGREGATE OF THE ENERGY DISSIPATER SHOULD BE SECURED WITH 20-GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMETER HEXAGONAL OPENINGS. THE AGGREGATE SHOULD BE PLACED ON THE MESH TO THE DIMENSIONS SPECIFIED. THE MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE AGGREGATE AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
3. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

PAVED FLUME USAGE GUIDELINES

A PAVED FLUME SHOULD BE CONSTRUCTED TO DRAIN CONCENTRATED SURFACE RUNOFF SAFELY DOWN SLOPES WITHOUT CAUSING EROSION. THE DRAINAGE AREA CONTRIBUTING RUNOFF TO A PAVED FLUME SHOULD NOT EXCEED THAT GIVEN IN THE DESIGN CRITERIA ABOVE. THE PAVED FLUME SHOULD BE SIZED TO DRAIN THE PEAK RATE OF RUNOFF WITHOUT OVERTOPPING THE EMBANKMENT AT THE EARTH DIKE ENTRANCE. A 25 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE.

| DESIGN CRITERIA | | | | | |
|-----------------|----------------|--------|--------|--------|-----------------------|
| GROUP / SIZE | B BOTTOM WIDTH | H MIN. | D MIN. | L MIN. | MAXIMUM DRAINAGE AREA |
| A-2 | 2' | 1.5' | 8" | 5' | 5 ACRES |
| A-4 | 4' | 1.5' | 8" | 5' | 8 ACRES |
| A-6 | 6' | 1.5' | 8" | 5' | 11 ACRES |
| A-8 | 8' | 1.5' | 8" | 5' | 14 ACRES |
| A-10 | 10' | 1.5' | 8" | 5' | 18 ACRES |
| B-4 | 4' | 2' | 10" | 6' | 14 ACRES |
| B-6 | 6' | 2' | 10" | 6' | 20 ACRES |
| B-8 | 8' | 2' | 10" | 6' | 25 ACRES |
| B-10 | 10' | 2' | 10" | 6' | 31 ACRES |
| B-12 | 12' | 2' | 10" | 6' | 36 ACRES |

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



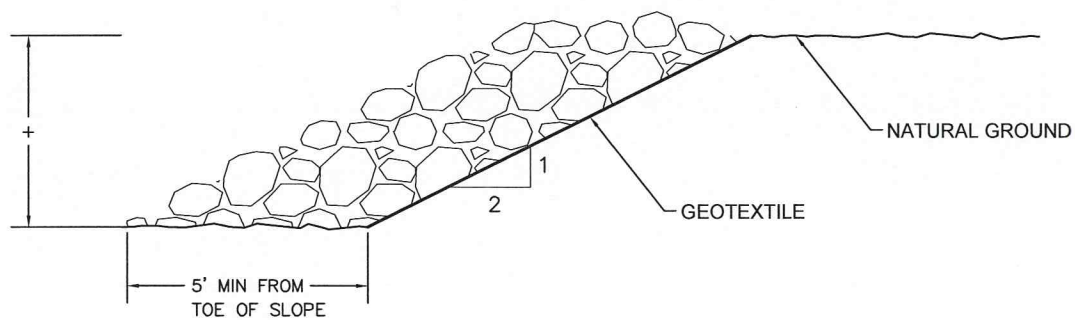
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FIG. 9-8 LINED WATERWAY OR OUTLET

SCALE:
NTS



+ = 2 x AVERAGE DIAMETER
OF RIPRAP
MINIMUM ROCK DIAMETER = 12"
MAXIMUM SLOPE = 2H : 1V

NOTE:FOR ILLUSTRATIVE
PURPOSES ONLY



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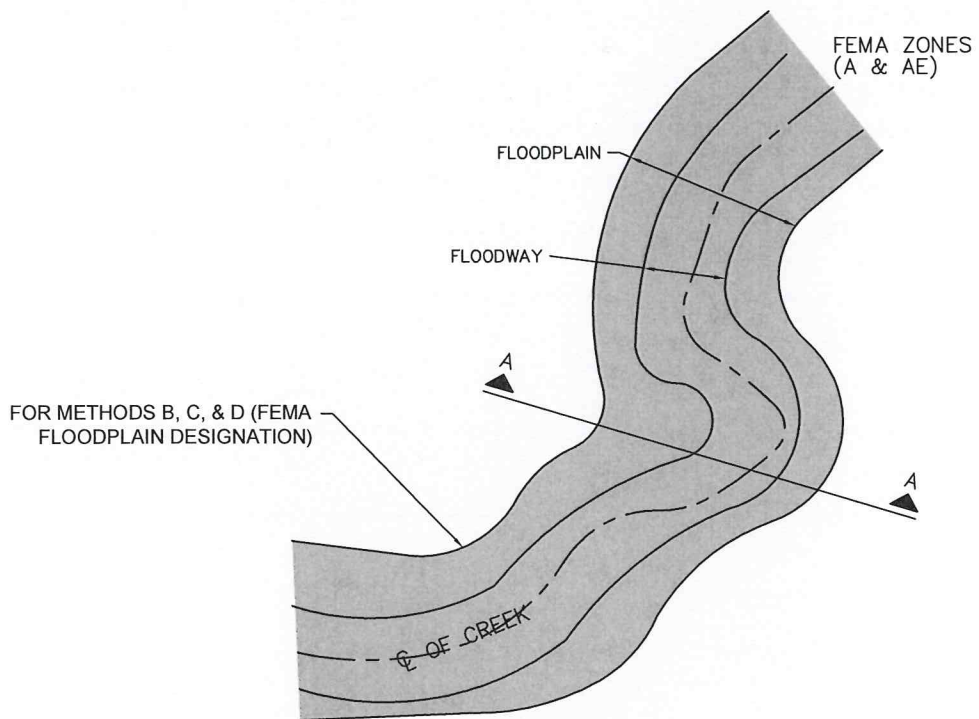
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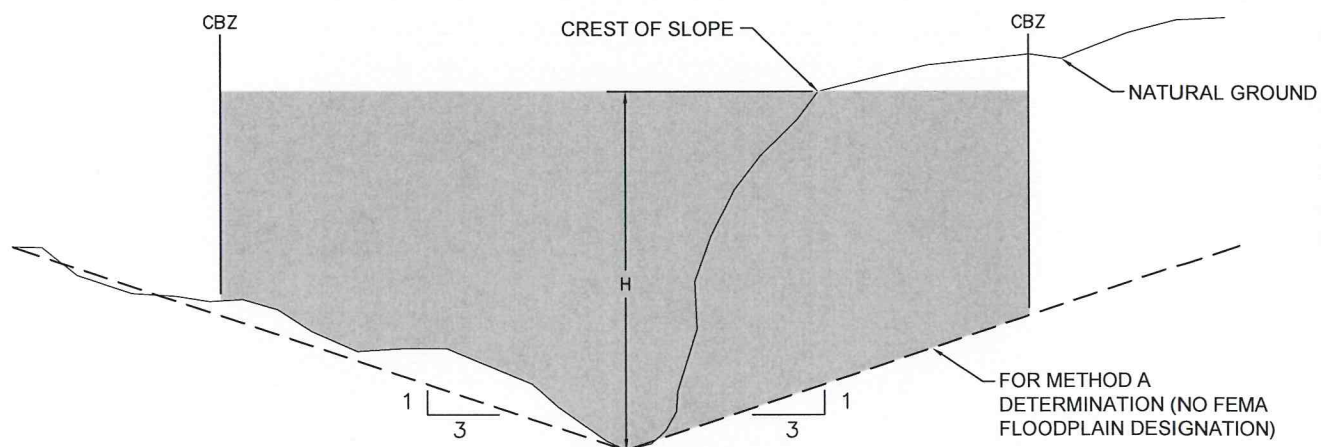
FIG. 9-9

RIPRAP

SCALE:
NTS



PLAN VIEW



— CREEK BUFFER ZONE

PROFILE
SECTION A-A

NOTE: FOR ILLUSTRATIVE
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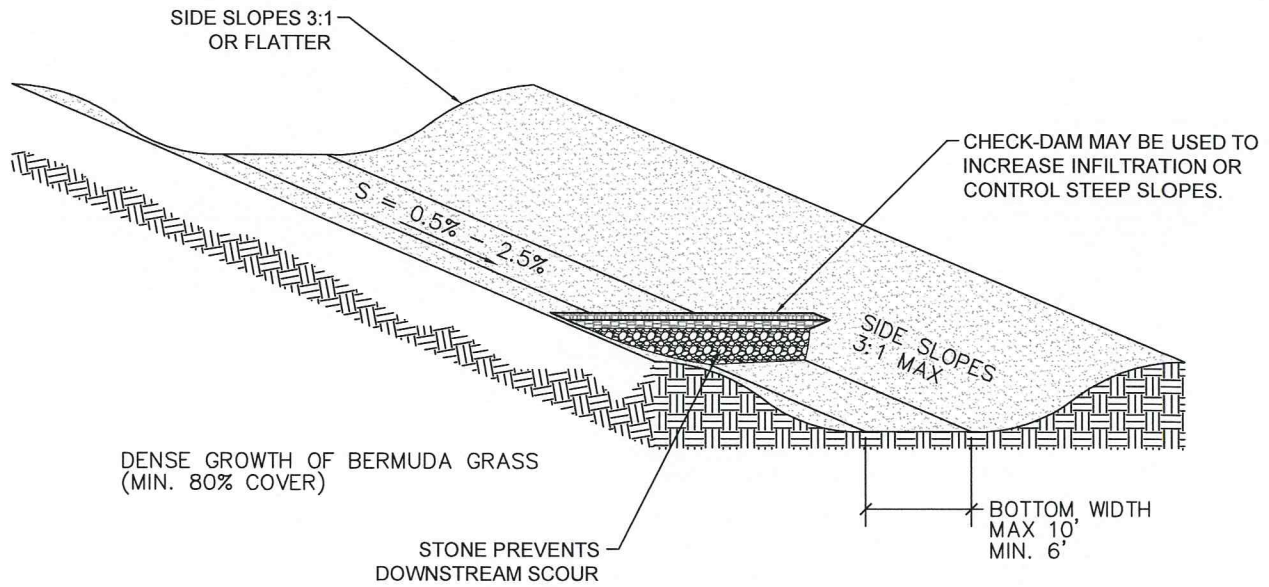
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FIG. 9-10 CREEK BUFFER ZONE

SCALE:
NTS

SWALE SLOPES AS CLOSE
TO ZERO AS DRAINAGE
WILL PERMIT



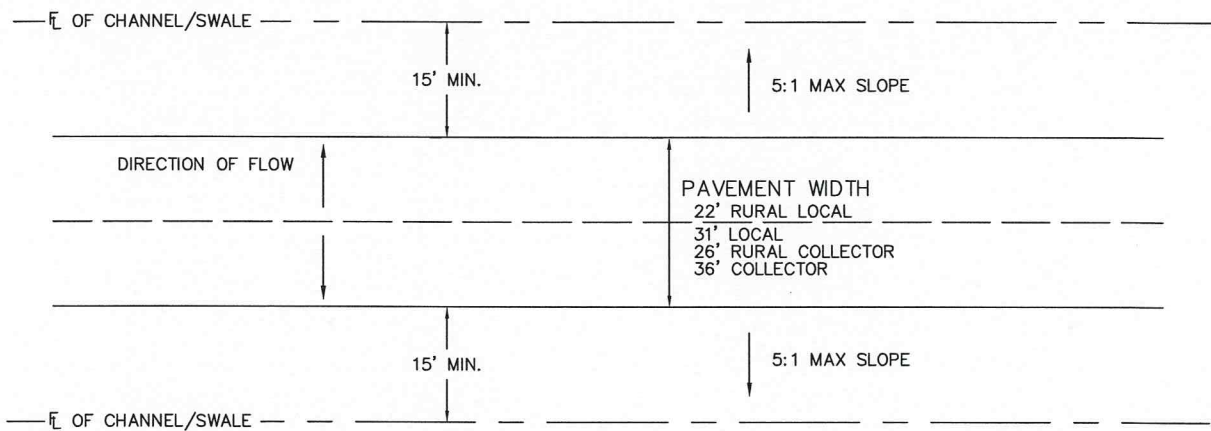
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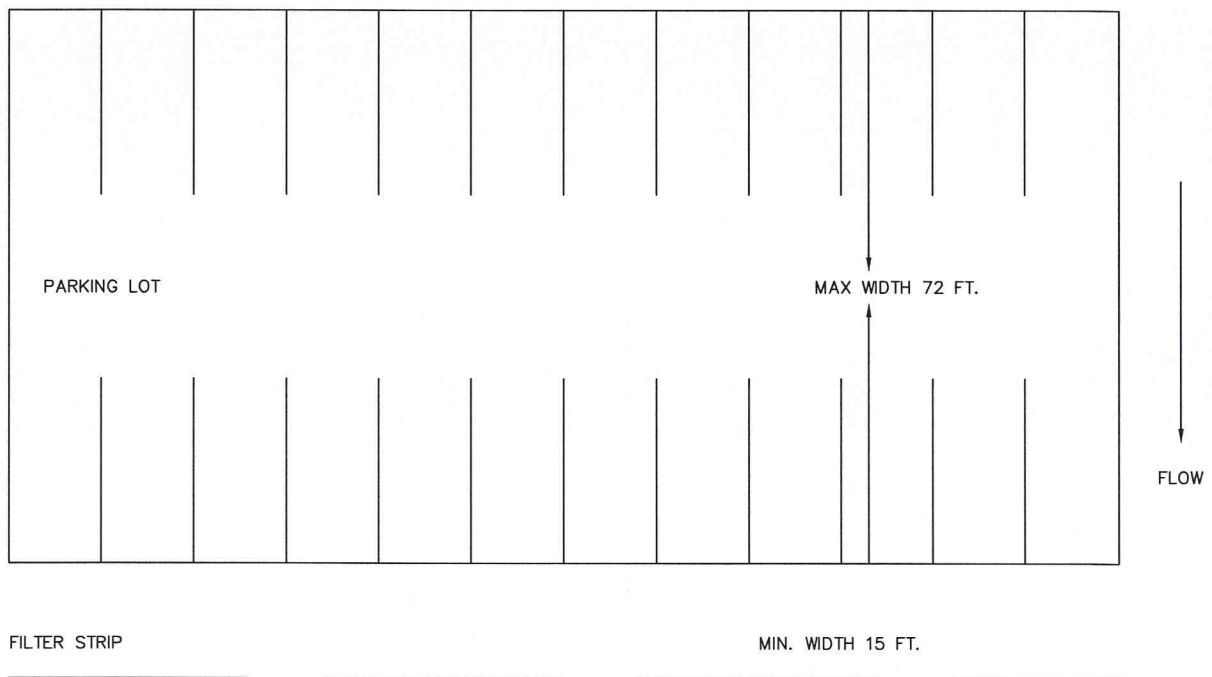
FIG. 9-11 VEGETATED SWALES

SCALE:
NTS



NOTE 1: MINIMUM VEGETATIVE COVER (BERMUDA GRASS) = 80%

VEGETATED FILTER STRIP ALONG ROADWAY



VEGETATED FILTER STRIP ALONG PARKING LOT



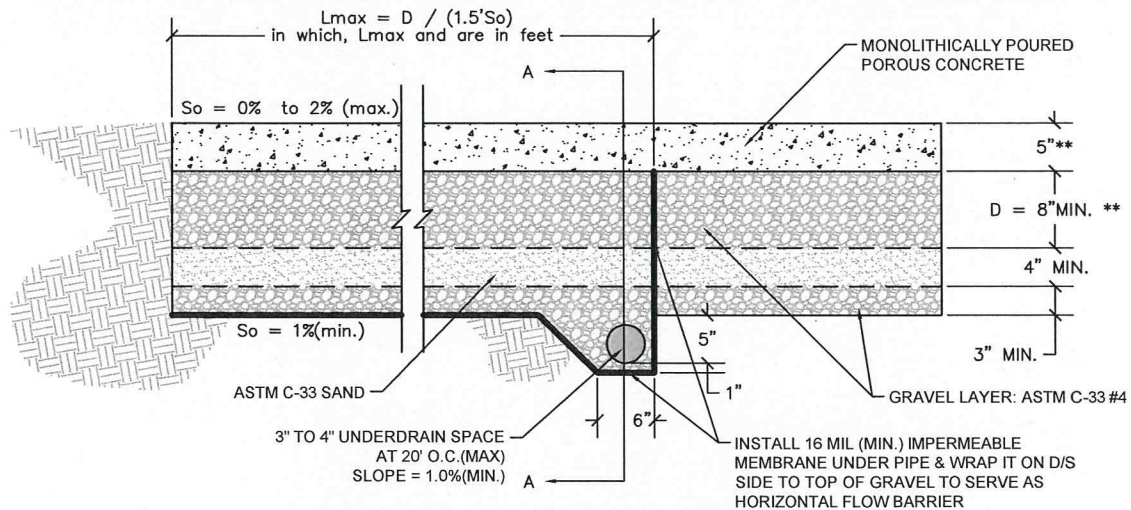
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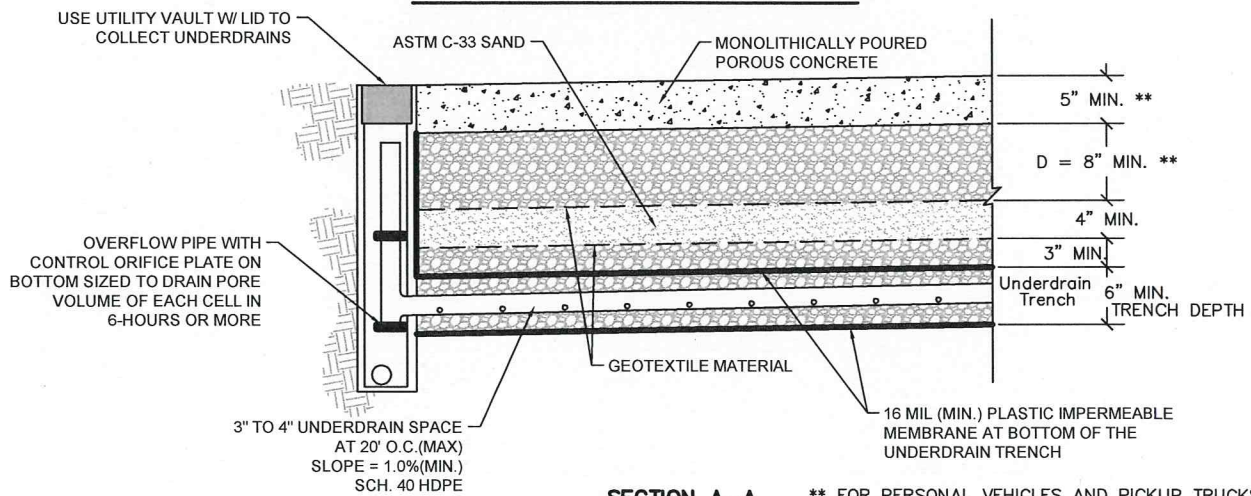
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FIG. 9-12 VEGETATED FILTER STRIPS

SCALE:
NTS



**POURED CONCRETE POROUS PAVEMENT (PCP)
SECTION WITH AN UNDERDRAIN SYSTEM**



SECTION A-A

** FOR PERSONAL VEHICLES AND PICKUP TRUCKS. THICKER SECTION MAY BE REQUIRED FOR HEAVIER VEHICLES. CONSULT WITH PAVEMENT ENGINEER FOR NEEDED THICKNESS OF CONCRETE SLAB.

SCHEMATIC OF PERMEABLE CONCRETE INSTALLATION (AFTER UCFCO, 2004)

RECOMMENDATIONS FOR PERMEABLE CONCRETE WITHOUT UNDERDRAIN

BASE MATERIALS: BASE MATERIAL MUST CONSIST OF CLEAN, DURABLE, ASTM C-33 NO.4 AGGREGATE 8 INCHES THICK.

GEOTEXTILE FABRIC: A LAYER OF GEOTEXTILE FABRIC COMPLYING WITH THE MINIMUM SPECIFICATIONS LISTED BELOW ARE TO BE PLACED ON TOP OF THE NATURAL SUBSOIL PRIOR TO PLACING BASE MATERIAL. THE FABRIC SHOULD BE EXTENDED UP THE THE NATURAL EARTH SIDES AND OVER THE TOP OF ANY ADJACENT BERM. THE PURPOSE OF THE FABRIC IS TO PREVENT MIGRATION OF FINE MATERIAL FROM SUBSOIL INTO THE GRAVEL.

| PROPERTY | TEST METHOD | UNIT | SPECIFICATIONS |
|-----------------------|-------------------|--------------------|----------------|
| Unit Weight | | oz/yd ² | 8 |
| Filtration Rate | | in/sec | 0.08 |
| Puncture Strength | ASTM D-751* | lb | 125 |
| Mullen Burst Strength | ASTM D-751 | psi | 400 |
| Tensile Strength | ASTM D-1682 | lb | 200 |
| Equiv. Opening Size | US Standard Sieve | No. | 80 |

*modified



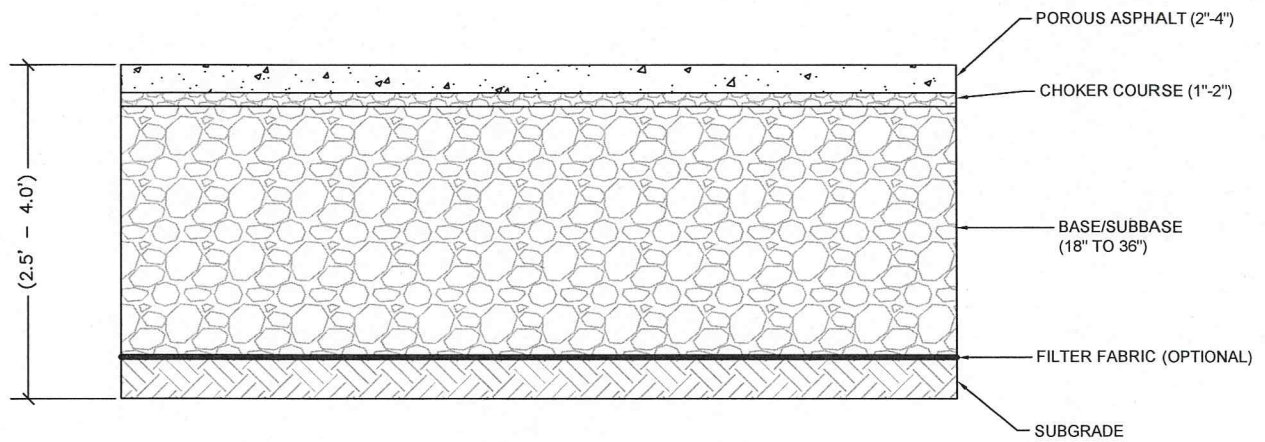
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FIG. 9-13a PERMEABLE AND SEMI-PERVIOUS PAVEMENT
PERMEABLE CONCRETE

SCALE:
NTS



**TABLE 1. ASPHALT MIX
(ADAMS, 2003)**

| SIEVE SIZE | % PASSING |
|------------|-----------|
| 1/2 IN | 100 |
| 3/8 IN | 95 |
| #4 | 35 |
| #8 | 15 |
| #16 | 10 |
| #30 | 2 |

PERCENT
BITUMINOUS
ASPHALT 5.75-
6.0% BY WEIGHT



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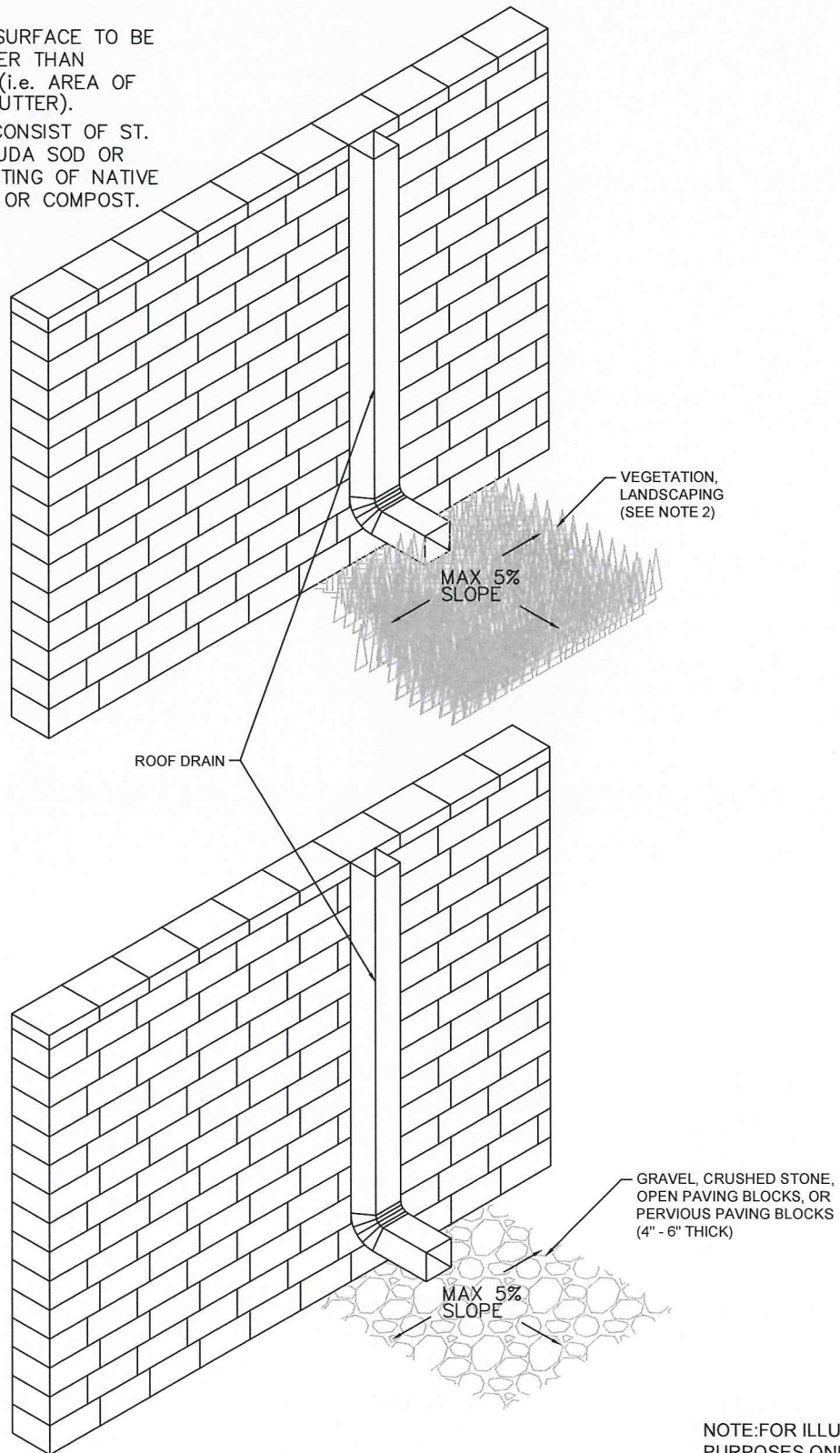
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FIG. 9-13b PERMEABLE AND SEMI-PERVIOUS PAVEMENT
POROUS ASPHALT

SCALE:
NTS

NOTES:

- 1) AREA OF PERVIOUS SURFACE TO BE EQUAL TO OR GREATER THAN CONTRIBUTING AREA (i.e. AREA OF ROOF DRAINING TO GUTTER).
- 2) VEGETATION SHALL CONSIST OF ST. AUGUSTINE OR BERMUDA SOD OR LANDSCAPING CONSISTING OF NATIVE PLANTS WITH MULCH OR COMPOST.



NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



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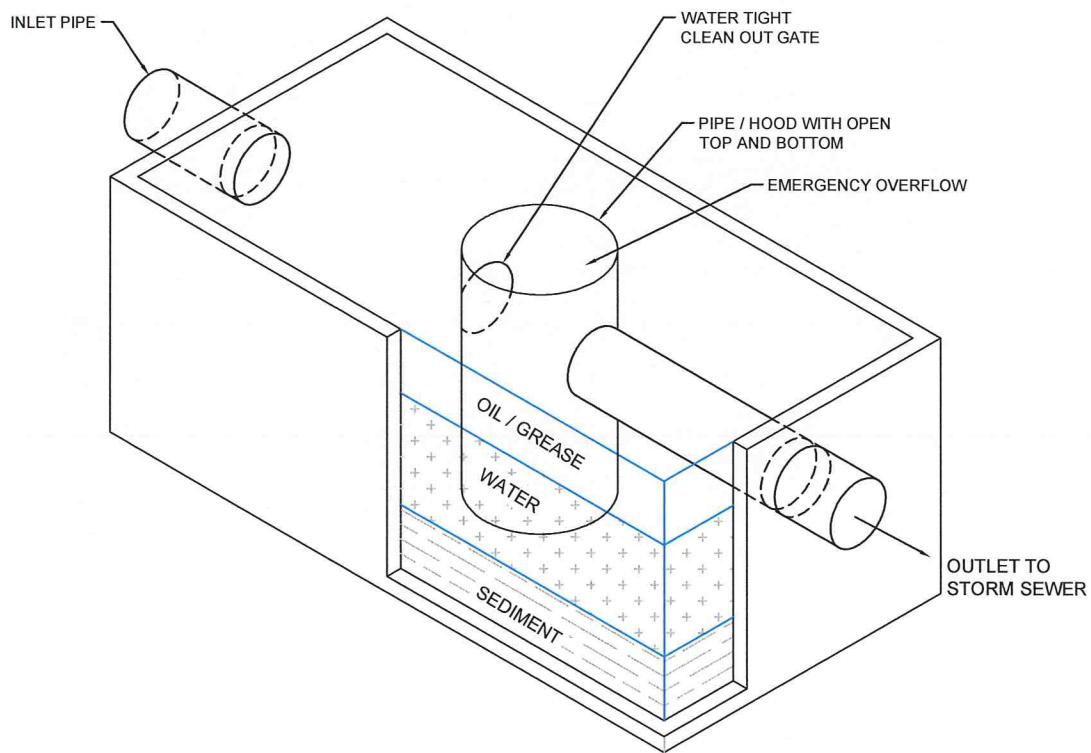
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FIG. 9-14

DISCHARGE OF ROOF DRAINS
TO PERVIOUS SURFACE

SCALE:
NTS



CROSS SECTION VIEW

OIL/GRIT SEPARATOR:
SC - TYPE SEPARATOR

NOTE:FOR ILLUSTRATIVE
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FIG. 9-15a

**SUBSURFACE TREATMENT DEVICES
SC - TYPE SEPARATOR**

SCALE:
NTS

WATER
OUTLET

SEPARATOR
VAULT

OIL
INLET

WATER
INLET

COALESCING
PLATES

FLOW BAFFLE

PLAN VIEW

OIL/GRIT SEPARATOR:
CPS - SEPARATOR



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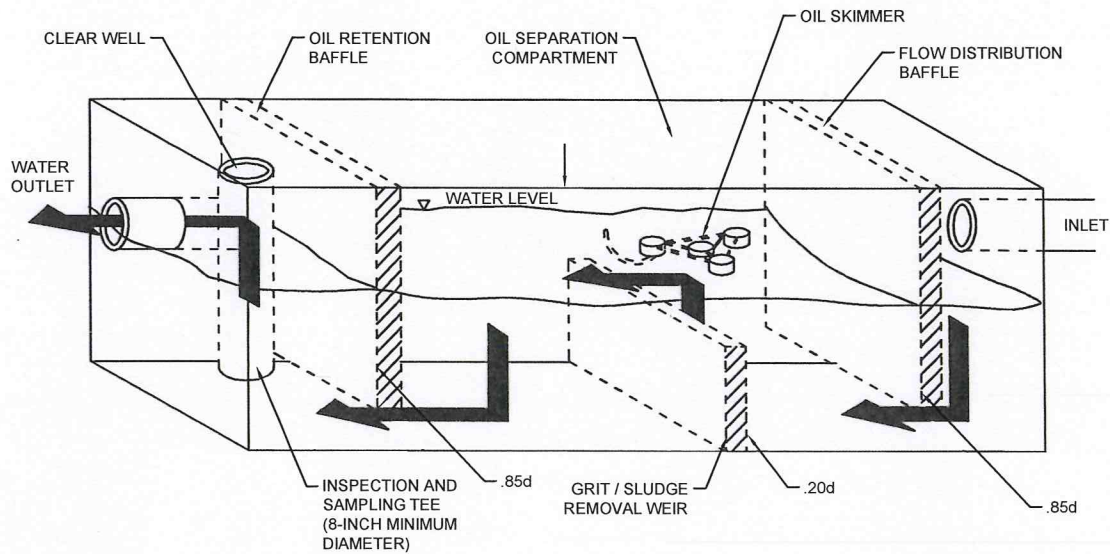
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FIG. 9-15b

SUBSURFACE TREATMENT DEVICES
CPS - SEPARATOR

SCALE:
NTS



CATCH BASIN VOLUME = 0.5 - 1.5 CUBIC YARDS

"d" = DEPTH OF VAULT

OIL/GRIT SEPARATOR:
API - SEPARATOR



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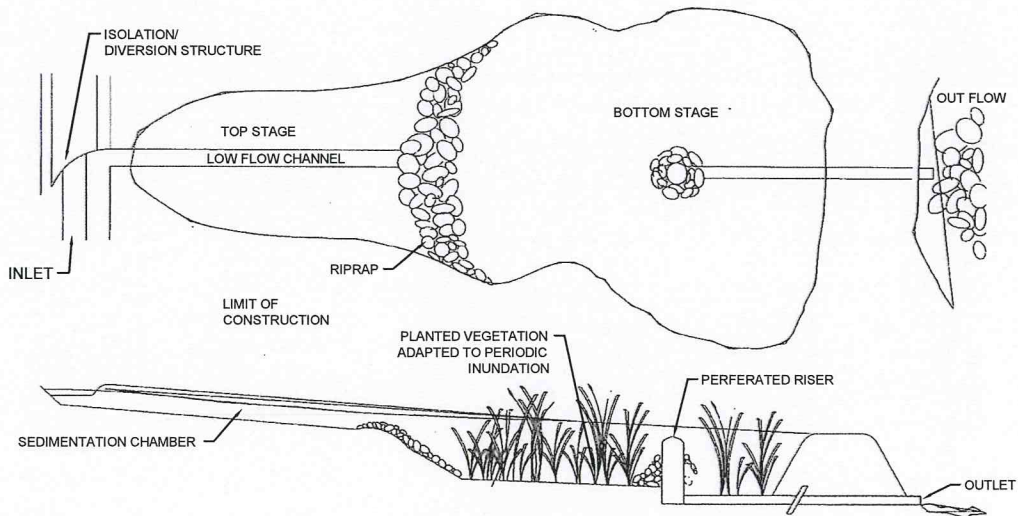
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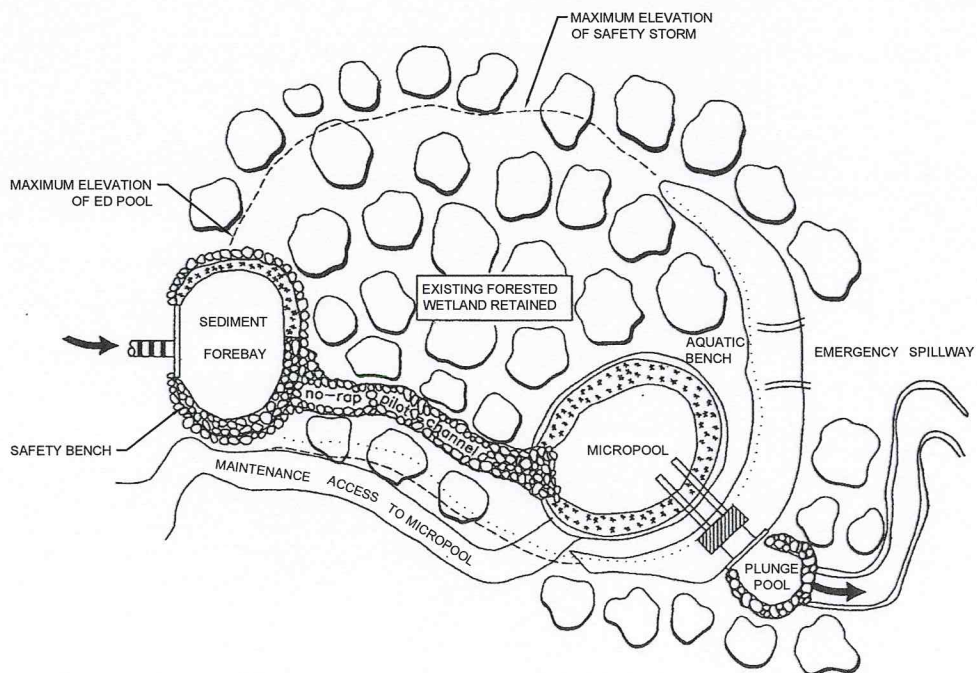
FIG. 9-15c

**SUBSURFACE TREATMENT DEVICES
API - SEPARATOR**

SCALE:
NTS



SCHEMATIC OF A TWO STAGE EXTENDED DETENTION BASIN (LCRA, 1998)



Source: Schueler, 1991.

SCHEMATIC OF AN ENHANCED EXTENDED DETENTION BASIN (SCHUELER, 1992)

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



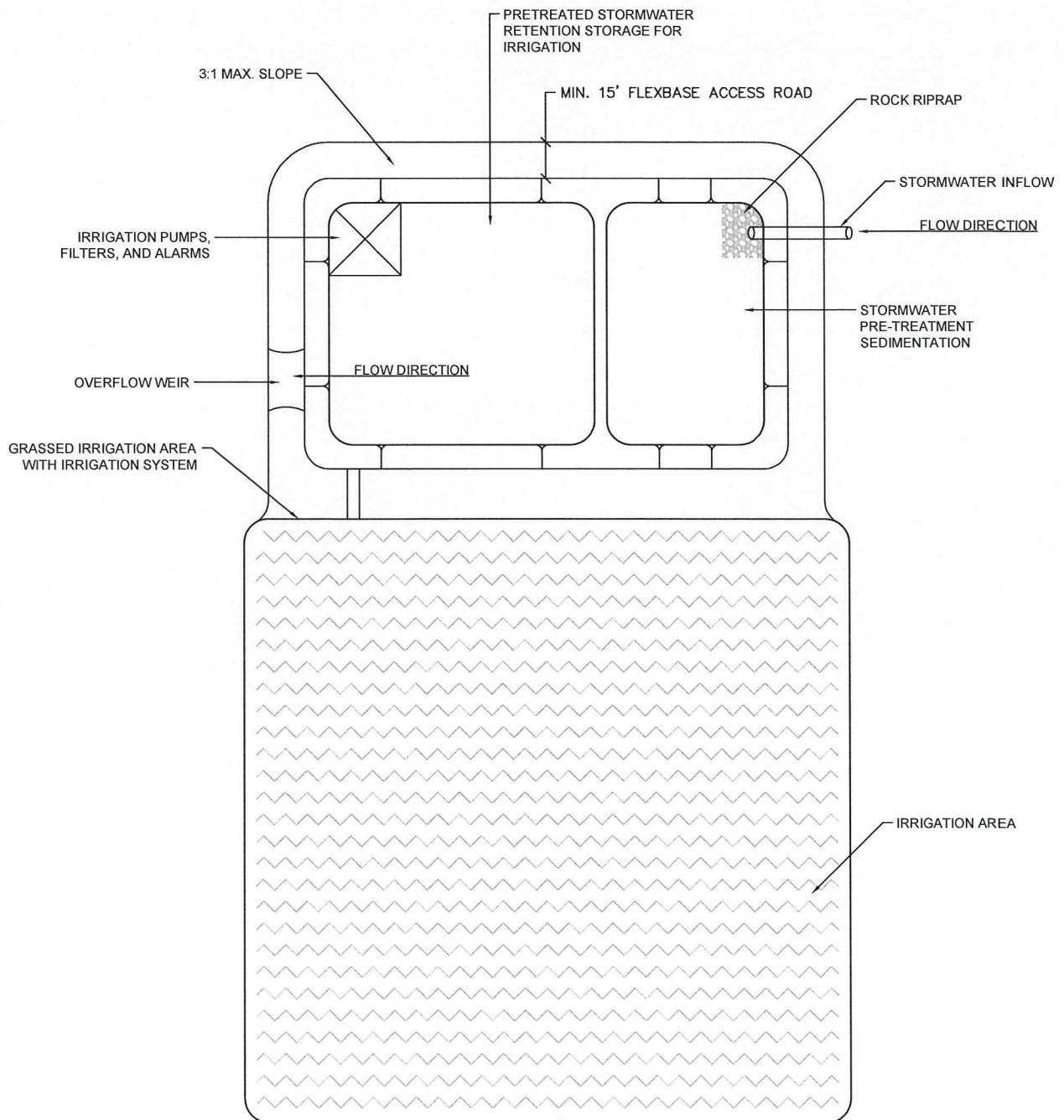
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FIG. 9-16 EXTENDED DETENTION BASIN

SCALE:
NTS



NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



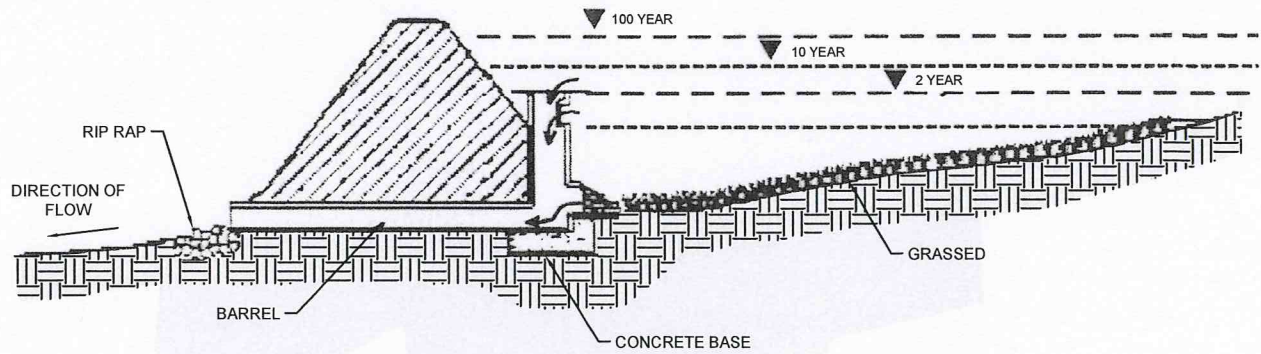
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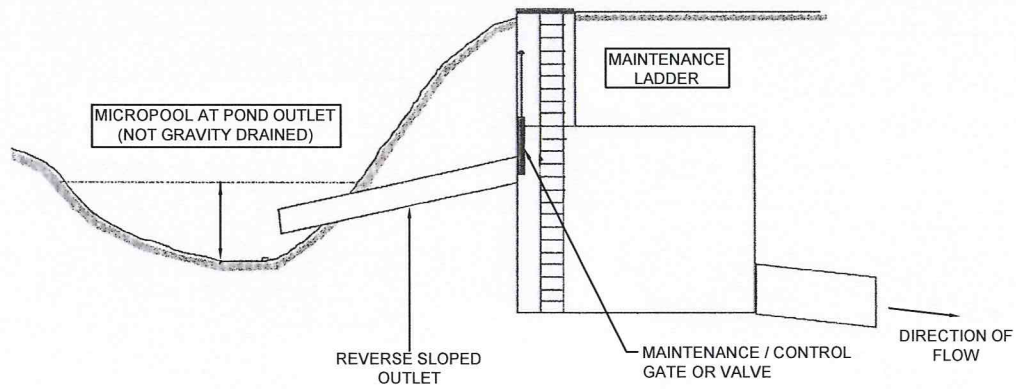
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FIG. 9-17 RETENTION PONDS

SCALE:
NTS



TYPICAL DRY POND
Source: NVPDC, 1992.



DRY POND MICROPOOL AND REVERSED-SLOPE OUTLET PIPE
Source: Ontario Ministry of the Environment, 1999.



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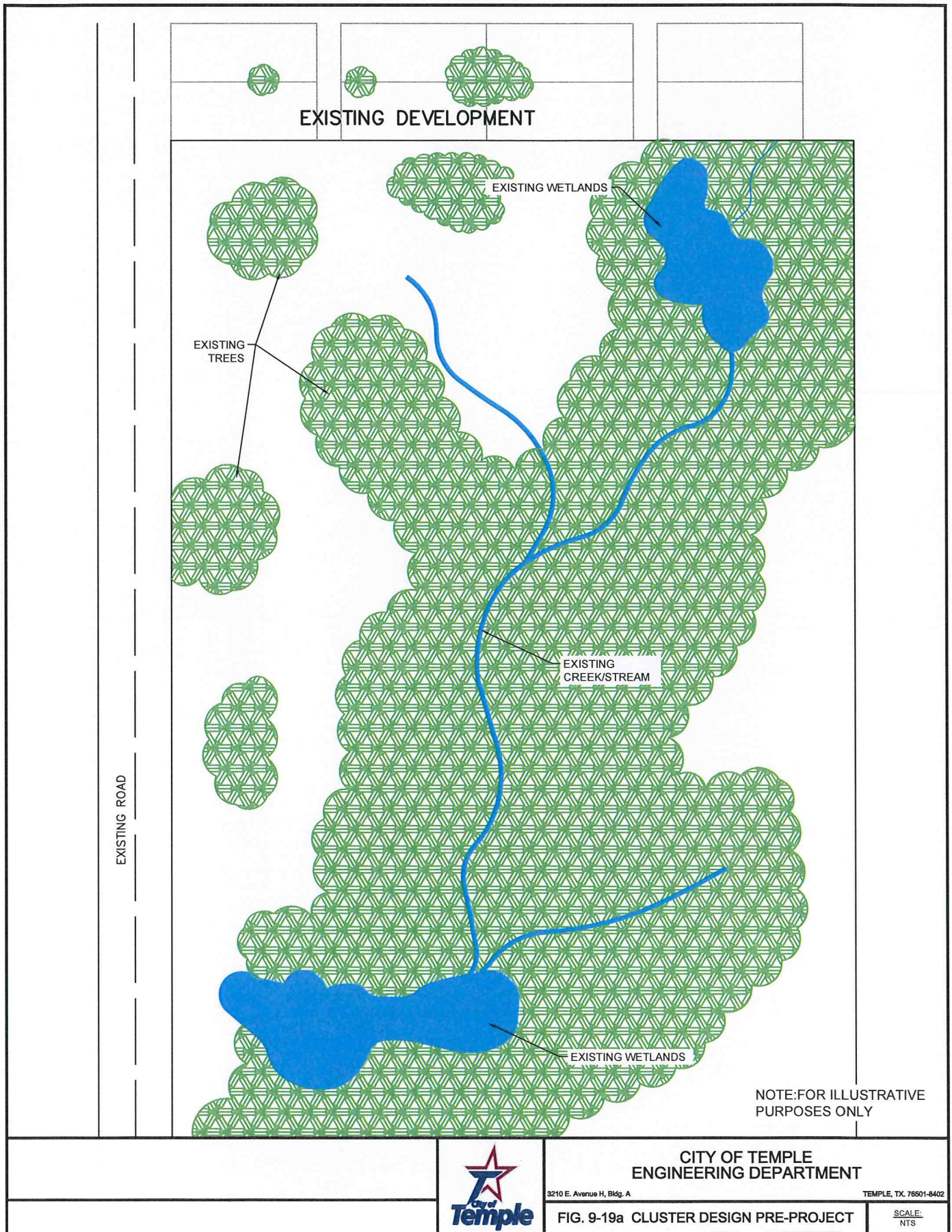
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FIG. 9-18

DETENTION POND OUTLET FOR EROSION PROTECTION
AND STORM WATER QUALITY BENEFITS

SCALE:
NTS



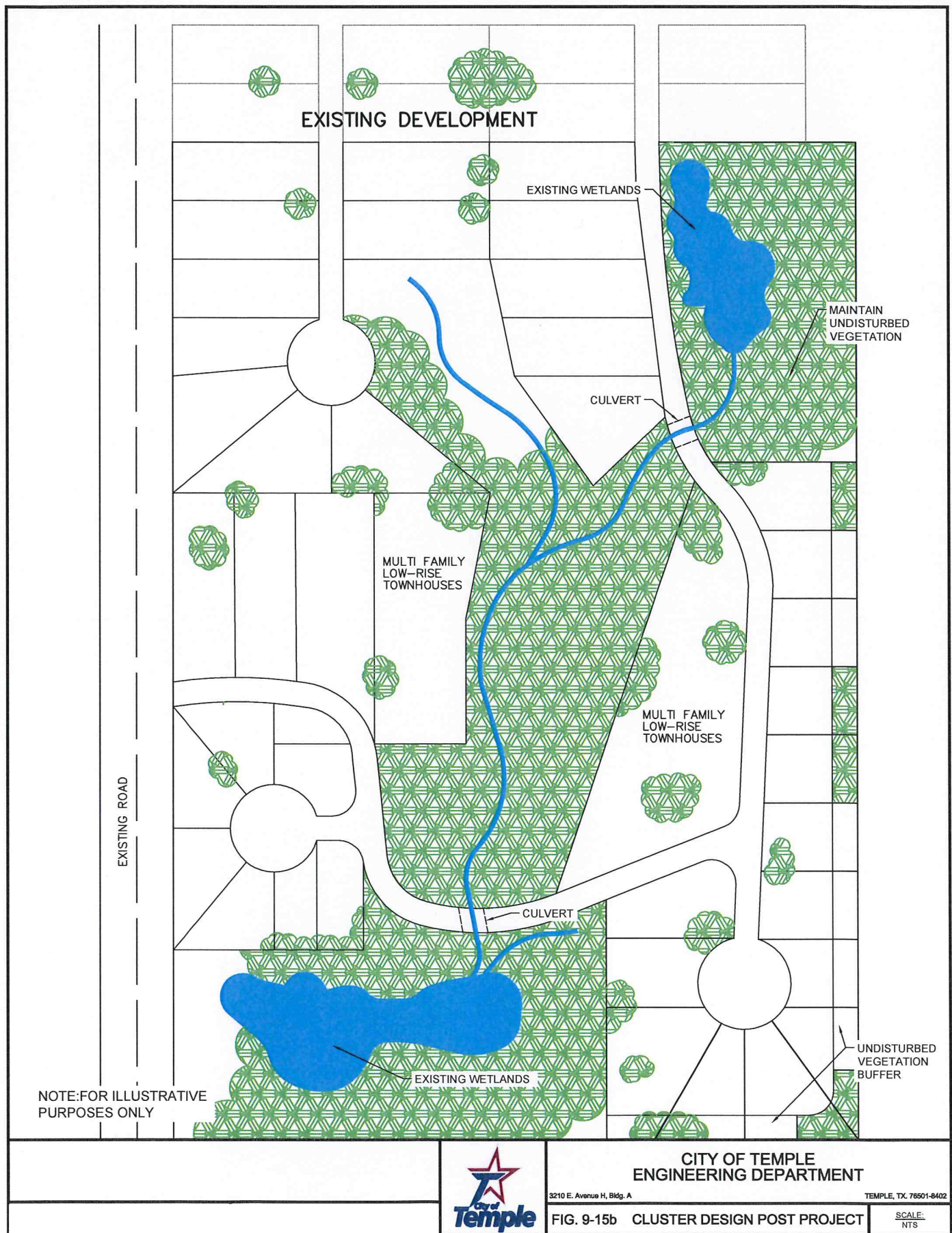
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FIG. 9-19a CLUSTER DESIGN PRE-PROJECT

SCALE:
NTS





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FIG. 9-20 PRESERVATION OF EXISTING TREE CANOPY

SCALE:
NTS