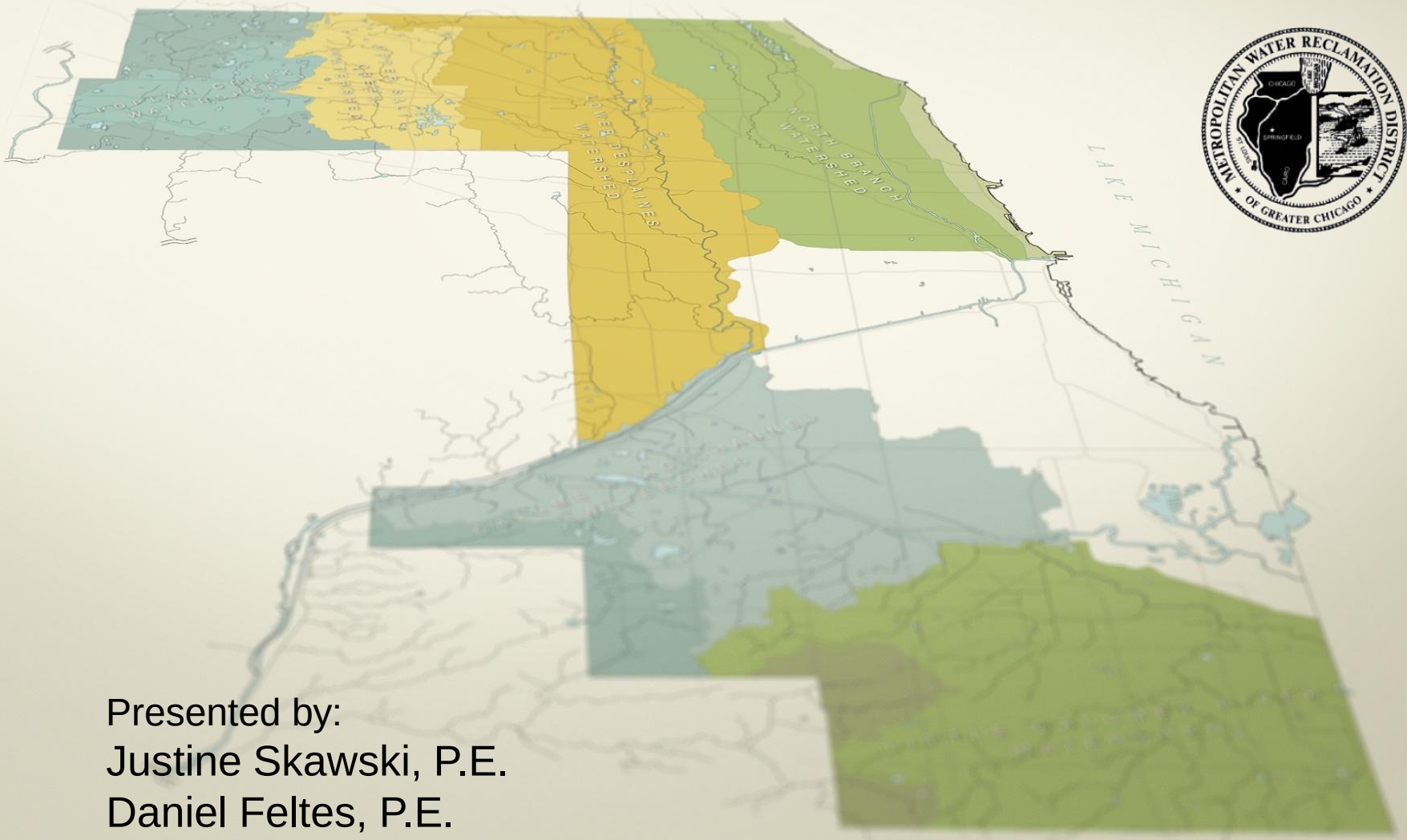
Watershed Management Ordinance (WMO)

Compliance Training
Fall 2015



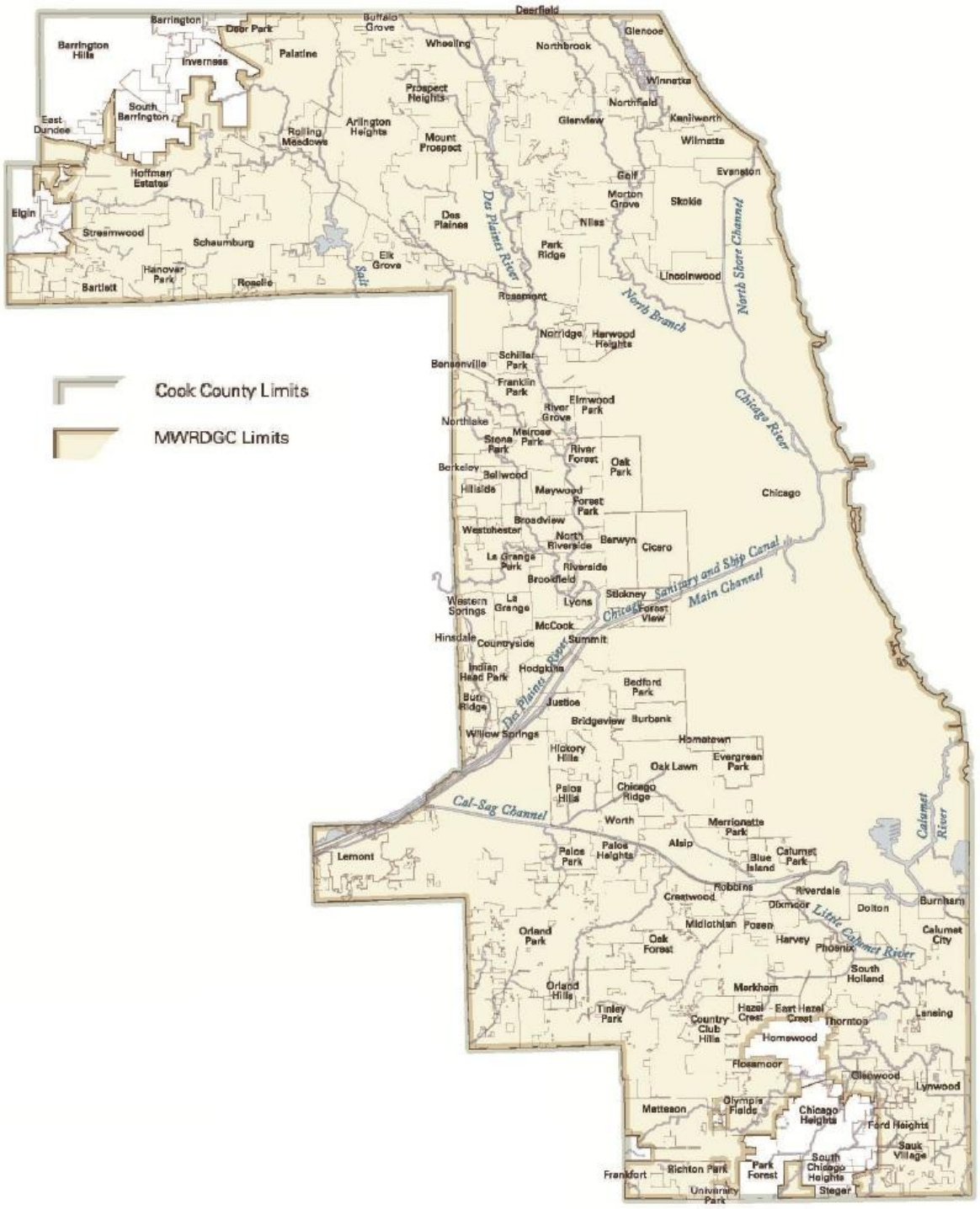
Presented by:
Justine Skawski, P.E.
Daniel Feltes, P.E.

Agenda

- Introduction / WMO Background
- Permit Applicability
- Examples of When / How much Permit
- New Details
- How to Credit and Calculate Volume Control
- Case Studies
- Common Questions
- Top 5 Ways to Get a Permit Fast
- Wrap it up
- Work Shop

Regulatory Area

- Demographics
  - 91% of Cook County
  - 883 square miles
  - 126 municipalities
  - 5.25 million people



Watershed Management Ordinance (WMO)

Objective

Establish uniform, minimum, and comprehensive countywide stormwater management regulations.

Enabling Legislation

"Stormwater management in Cook County shall be under the general supervision of the Metropolitan Water Reclamation District of Greater Chicago." 70 ILCS 2605/7h(a).

"The District may prescribe by ordinance reasonable rules and regulations for floodplain and stormwater management . . . in Cook County." 70 ILCS 2605/7h(d).

WMO Advisory Committee

- Membership
  - Municipalities
  - Nongovernmental Organizations
- Meetings
  - White papers
  - Draft language
  - Discussions
  - Ongoing

WMO Timeline

1972	Sewer Permit Ordinance
2004	Public Act 093-1049
2007	WMO Development
2009	Public Review
2010	Public Comments
2012	Economic Impact Study
2013	WMO Redraft
October 2013	WMO Adoption
May 2014	WMO Effective
July 2014	WMO Revision
August 2015	TGM Update

Sewer Permit Ordinance

- Sanitary Sewers
- Stormwater Detention
  - TP-40 Rainfall Data
  - Modified Rational Method

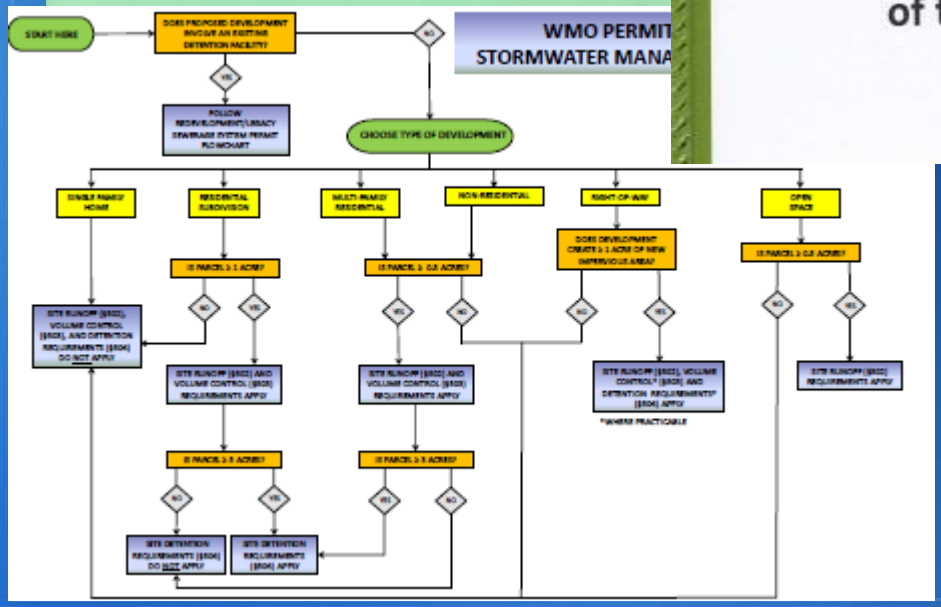
Watershed Management Ordinance

- Sanitary Sewers
- Stormwater Detention
  - Bulletin-70 Rainfall Data
  - Flat Release Rate
  - Hydrograph Method
- Volume Control
- Erosion & Sediment
- Flood Protection Areas
  - Floodplain
  - Floodway
  - Isolated Wetlands
  - Riparian Areas

Watershed Management Ordinance

Effective
May 1, 2014

As amended
July 10, 2014



Technical Guidance Manual for the Implementation of the Watershed Management Ordinance

August 2015

- Ordinance
- Technical Guidance Manual
- Permit Forms
- Flow Charts
- Checklists

Permit Applicability First

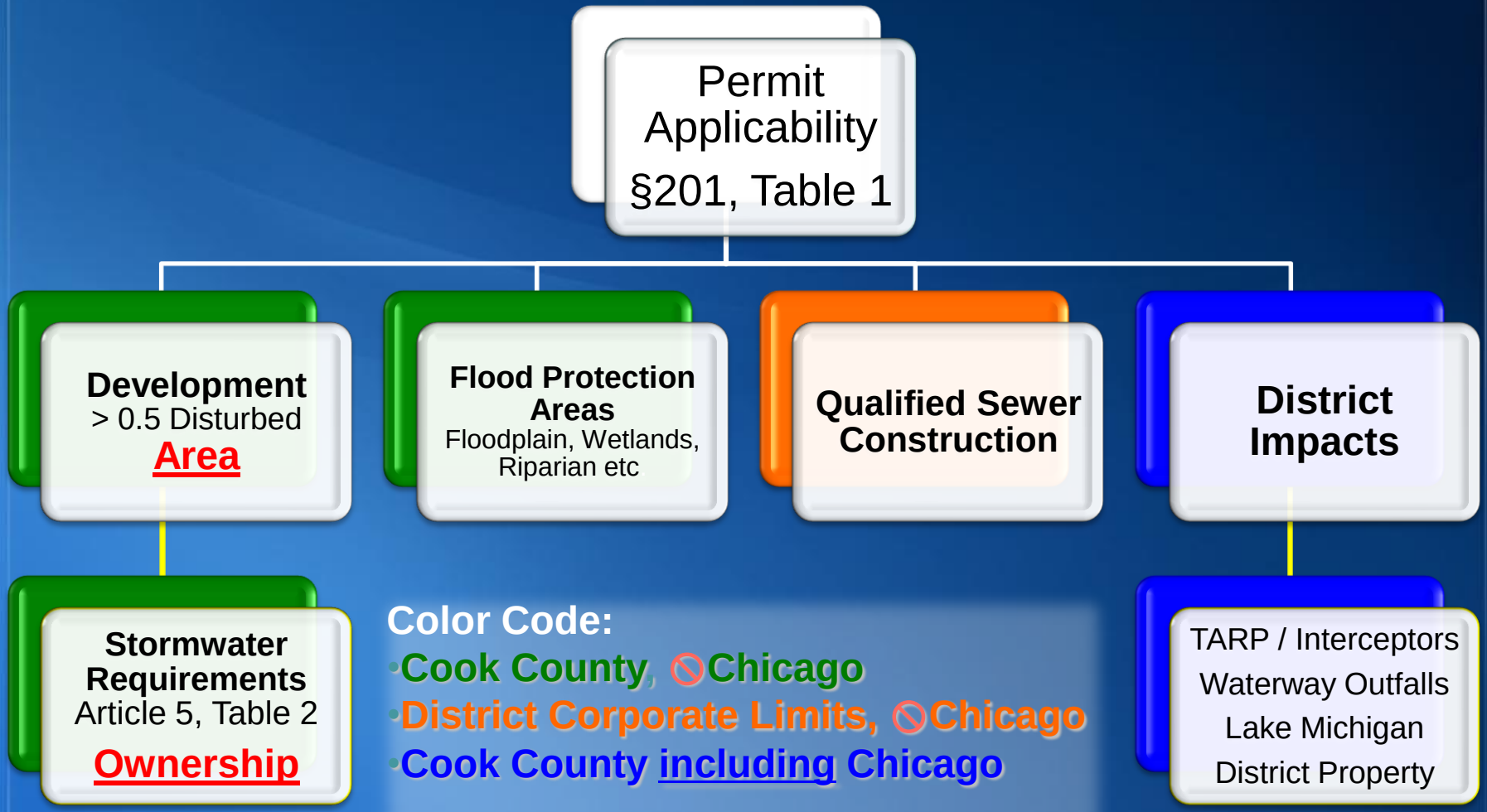


Table 2.
Summary of Site Stormwater Management Requirements[1]

Development Type (See Appendix A for definitions)	§502 Runoff Requirements	§503 Volume Control Requirements[2]	§504 Detention Requirements[2]
Single-Family Home	Exempt	Exempt	Exempt
Residential Subdivision	**Parcels** ≥ 1 acre	**Parcels** ≥ 1 acre	**Parcels** ≥ 5 acres
Multi-Family Residential	**Parcels** ≥ 0.5 acre	**Parcels** ≥ 0.5 acre	**Parcels** ≥ 3 acres ‡
Non-Residential	**Parcels** ≥ 0.5 acre	**Parcels** ≥ 0.5 acre	**Parcels** ≥ 3 acres ‡
Right-of-Way	**New Impervious Area** ≥ 1 acre	**New Impervious Area** ≥ 1 acre †	**New Impervious Area** ≥ 1 acre †
Open Space	**Parcels** ≥ 0.5 acre	Not Applicable	Not Applicable

1 **Site stormwater** management requirements are not required for **maintenance activities** as defined in Appendix A.

2 Requirements are applicable when a **Watershed Management Permit** is required under §201 of this **Ordinance.**

† Where practicable.

‡ Starting the effective date of this **Ordinance,** any new **development** on the **parcel** that totals either individually or in the aggregate to more than one-half (0.5) of an acre.

Watershed Management Permit Required

1) Development is located in a Flood Protection Area (FPA) or causes an indirect wetland impact.
2) Development disturbs 0.5 acres or more
3) Development proposes drainage improvements in combined sewer area or in conjunction with previously permitted detention facility
4) Development involves an outfall to waterway or Lake Michigan
5) Development involves sewer or connection to District interceptor or TARP structure

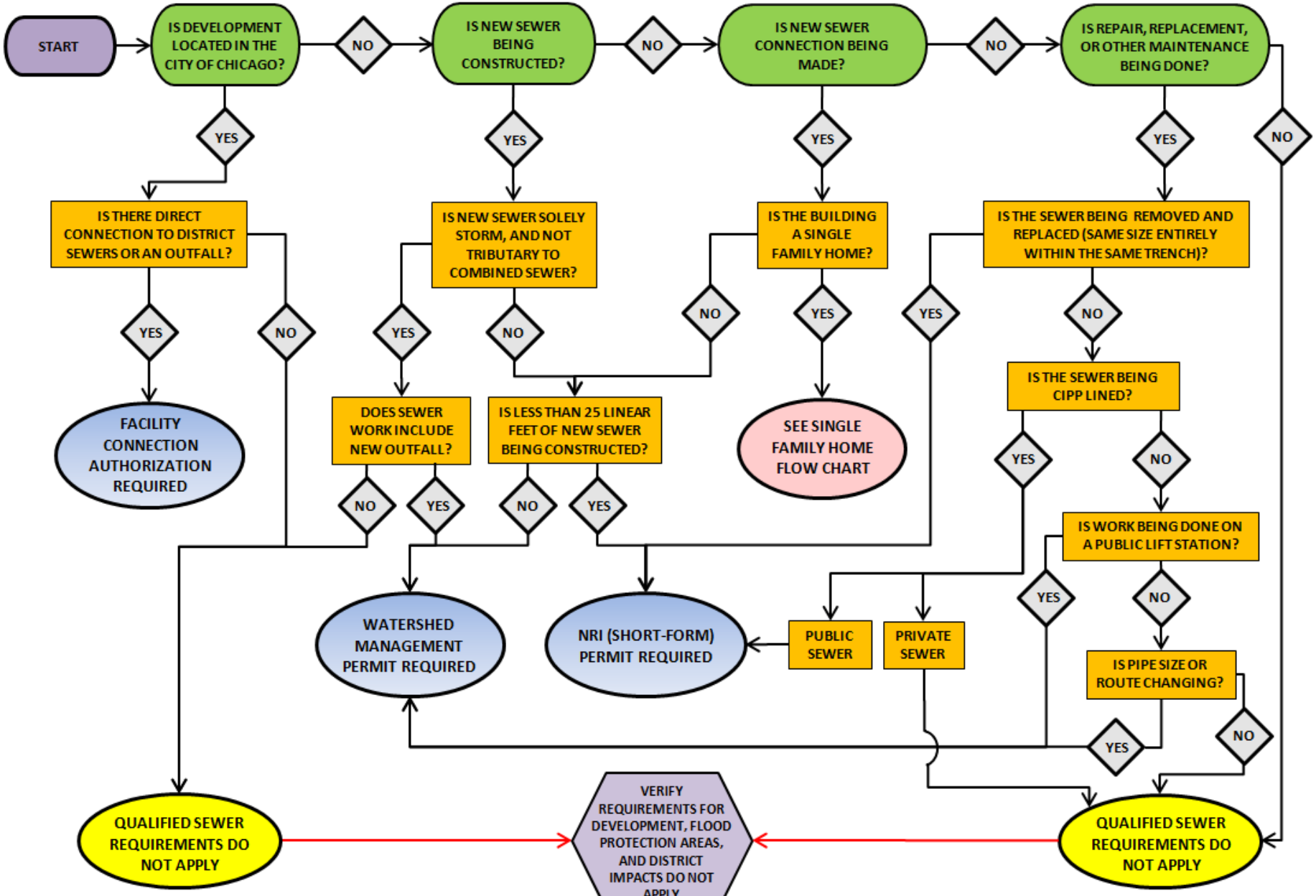
Permits for 1 & 2 may be issued by District or authorized municipality.

Permits for 3, 4 & 5 can only be issued by District.

Development Exempt from WMO Provisions

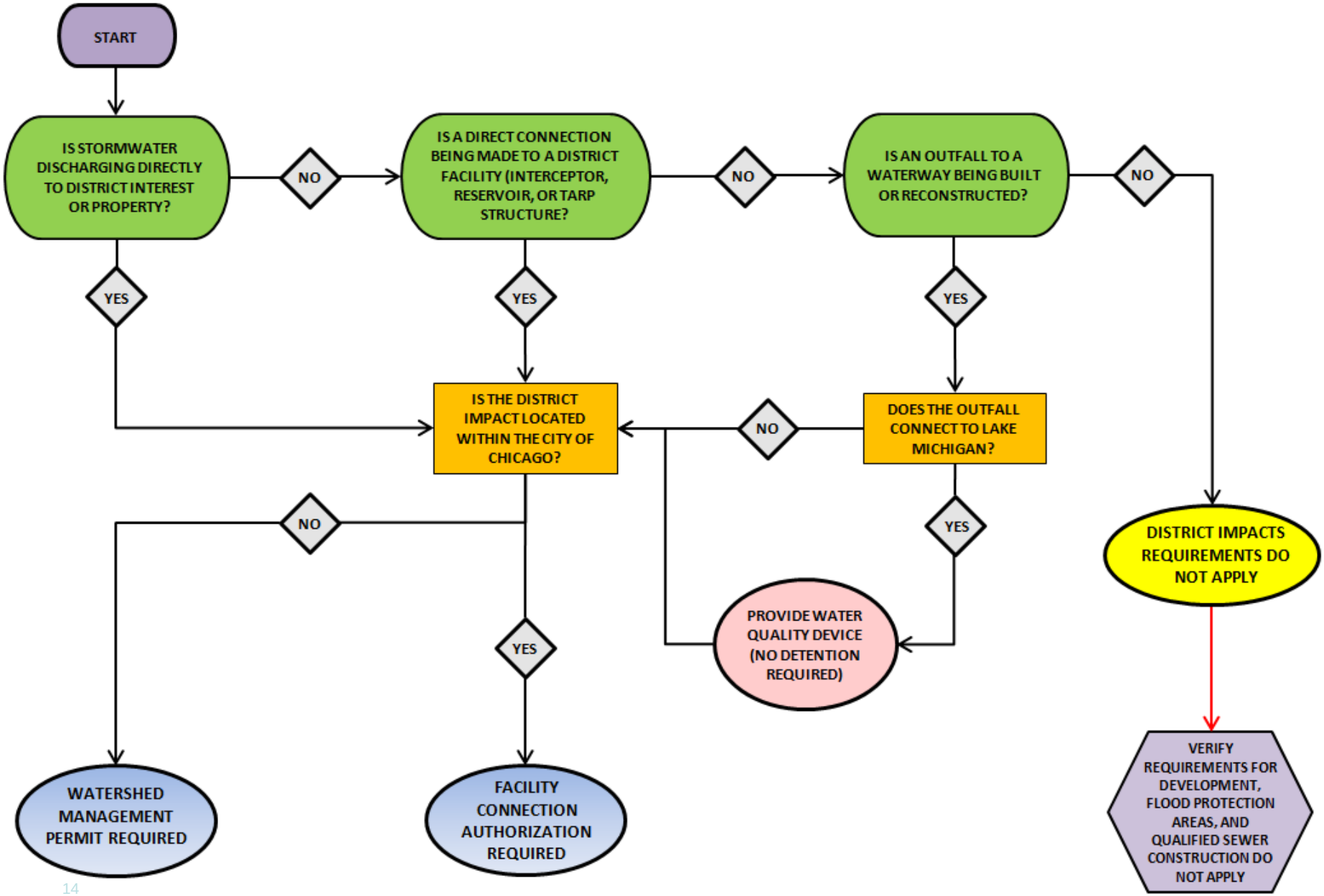
1) Agricultural, maintenance, and public utility activities that meet conditions of § 201.1.D of the WMO
2) Development involves the modification of a septic system, potable water service line, or utility that serves an existing structure
3) Development within the City of Chicago, unless it involves:
   - *Outfall to waterway or Lake Michigan*
   - *Stormwater discharges to District property*
   - *Connections to District sewer, interceptor, or TARP structure*
4) *Development undertaken solely by state or federal agencies (District, IDOT, Corps, Illinois Tollway Authority, etc.)*
5) *Public flood control projects*

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
QUALIFIED SEWER CONTRUCTION* FLOW CHART



*See definition of qualified sewer construction in Appendix A of the WMO.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
DISTRICT IMPACTS FLOW CHART



Example #1 –
Repaving Existing Parking Lot

Total Ownership Area = 15 Acres
Area of Disturbance (Parking Lot Repaving Area) = 12 Acres

Is a WMO Permit Required?

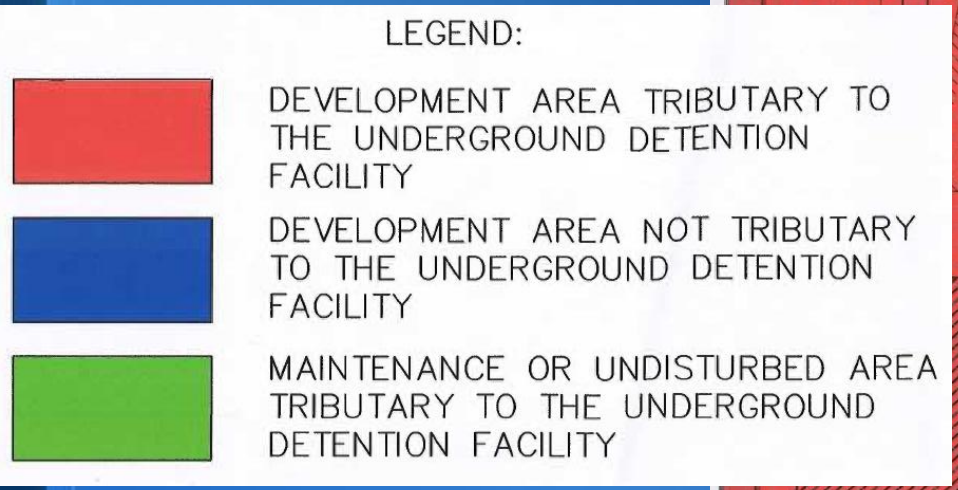
Example #1 – Repaving Existing Parking Lot

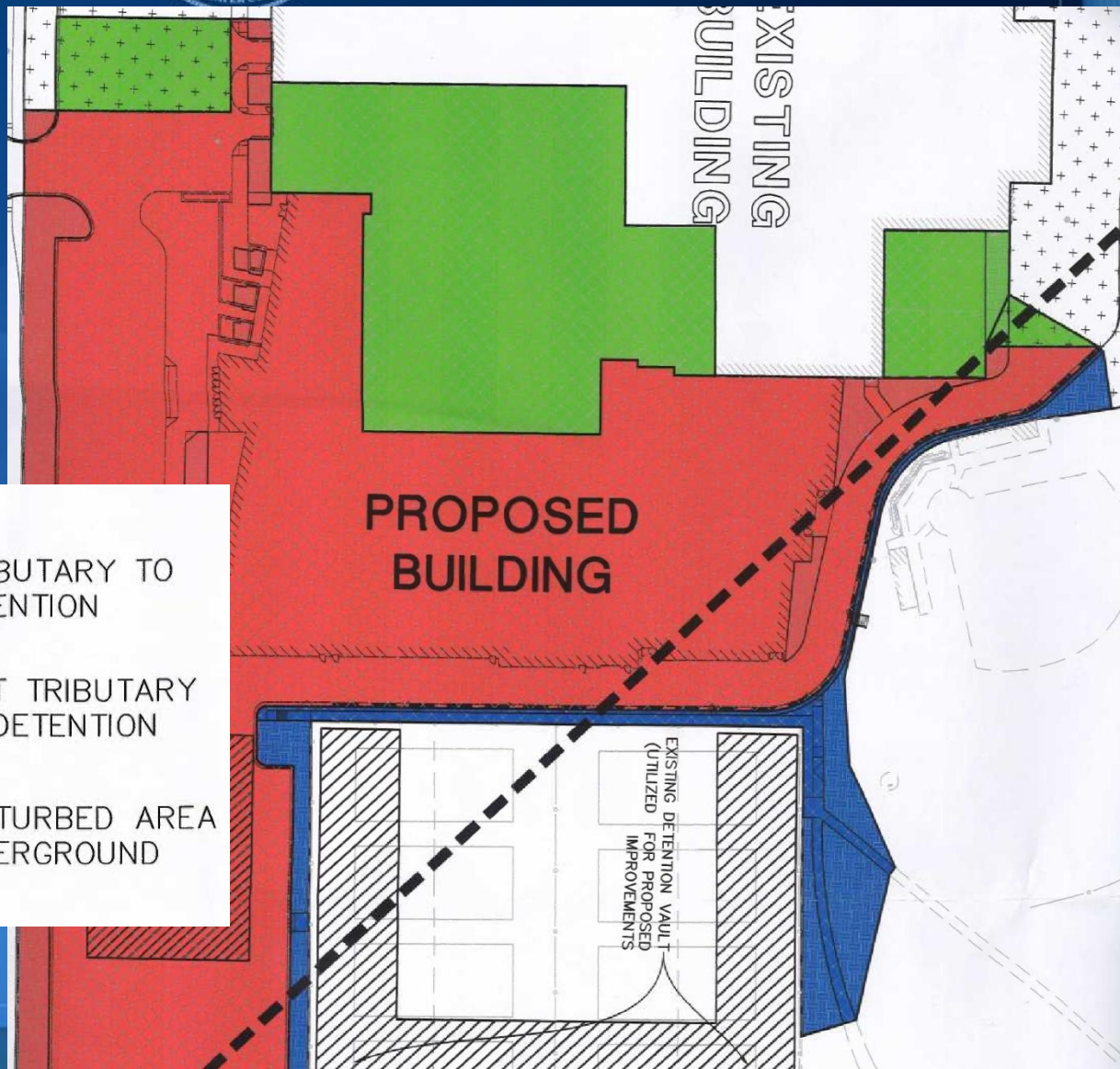
- A Watershed Management Permit **is not required** for this project since repaving an existing parking lot is considered a maintenance activity and therefore is not regulated under WMO
- Maintenance activities, repair, or at-grade replacement of existing impervious areas (roadways and parking lots) do not require a Watershed Management Permit (regardless of mill grind or full depth)
- There are no land disturbance thresholds for maintenance activities
- Maintenance activities do not affect stormwater runoff volume and quality, and therefore are not considered development

Pavement Maintenance

Vs.

Qualified Development





Example #2 –
Underground Utility Project

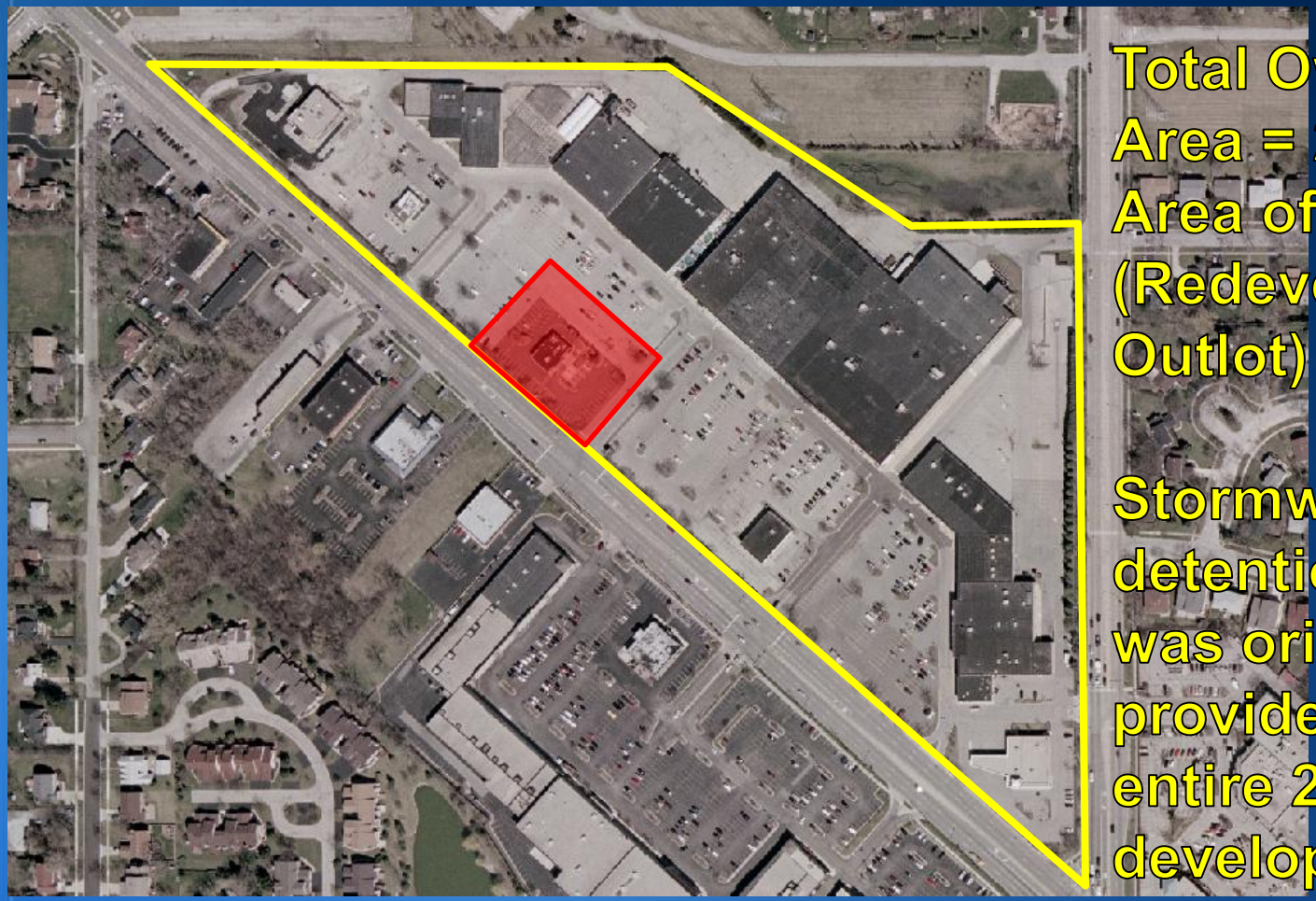
Is a Watershed Management Permit Required?

Example #2 – Underground Utility Project

- A Watershed Management Permit **is not required** for underground utility projects outside of flood protection areas
- Must consist of installing or maintaining utilities other than qualified sewer construction
- Area must be restored to existing grade and vegetative cover
- Soil erosion and sediment control practices are always required, regardless of permitting requirement.

Example #3 –

Redevelopment of 2-Acre Outlot



Total Ownership Area = 20 Acres
Area of Disturbance (Redevelopment of Outlot) = 2 Acres

Stormwater detention was originally provided for the entire 20-acre development

What are the WMO stormwater requirements?

Example #3 – Redevelopment of 2-Acre Outlot

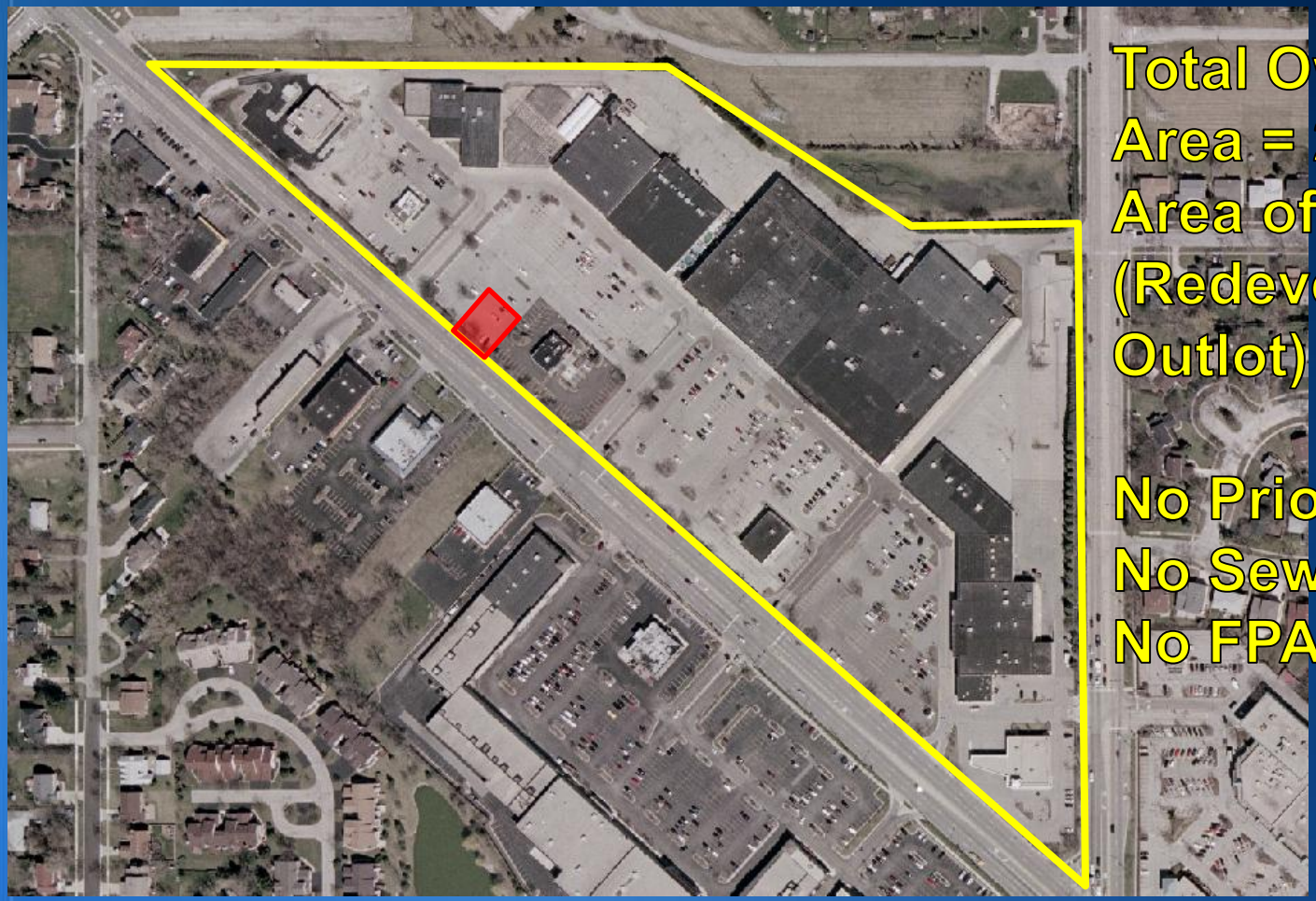
- Disturbs greater than 0.5 acres, therefore Watershed Management Permit **is required**

- Follow Table 2 of WMO for runoff, volume control, and detention requirements:
  - Non-residential development with ownership area of 20 acres
    - Runoff required
    - Volume control required
    - Stormwater detention required

- Follow redevelopment/legacy sewerage system permit flowchart to determine methodology for stormwater detention requirements

Example #4 –

Prior Example; but 0.45 Disturbed



Total Ownership Area = 20 Acres
Area of Disturbance (Redevelopment of Outlot) = 0.45 Acres

No Prior Detention
No Sewer
No FPA

What are the WMO stormwater requirements?

Example #4

0.45 Acre Disturbed out of 20 acre Owned

- No qualified sewer, and no work in the flood protection area. Since the improvement disturbs less than 0.5 acres, **no permit is required**
- "… any new development on the parcel that totals either individually or in the aggregate to more than 0.5…" acre since WMO inception
- Compliance options:
  - Detain now obtain permit
  - Defer and detain (more?) later once aggregate development >0.5 ac
- Obtain a permit determination letter

WMO Flexible Compliance

- Phased release rate
  - 0.30 cfs/ac first five years
  - Watershed specific study
- Stormwater detention trading
- Credit volume control towards detention
- Reasonable options for volume control
- Authorized municipalities
- Multi-county municipalities

Recent WMO Developments

- Lessons Learned Since Inception
- WMO Permits Data
- New and Improved:
  - Flow Charts
  - TGM Update
  - Volume Control Details

WMO Volume Control Details

wmo.mwrd.org

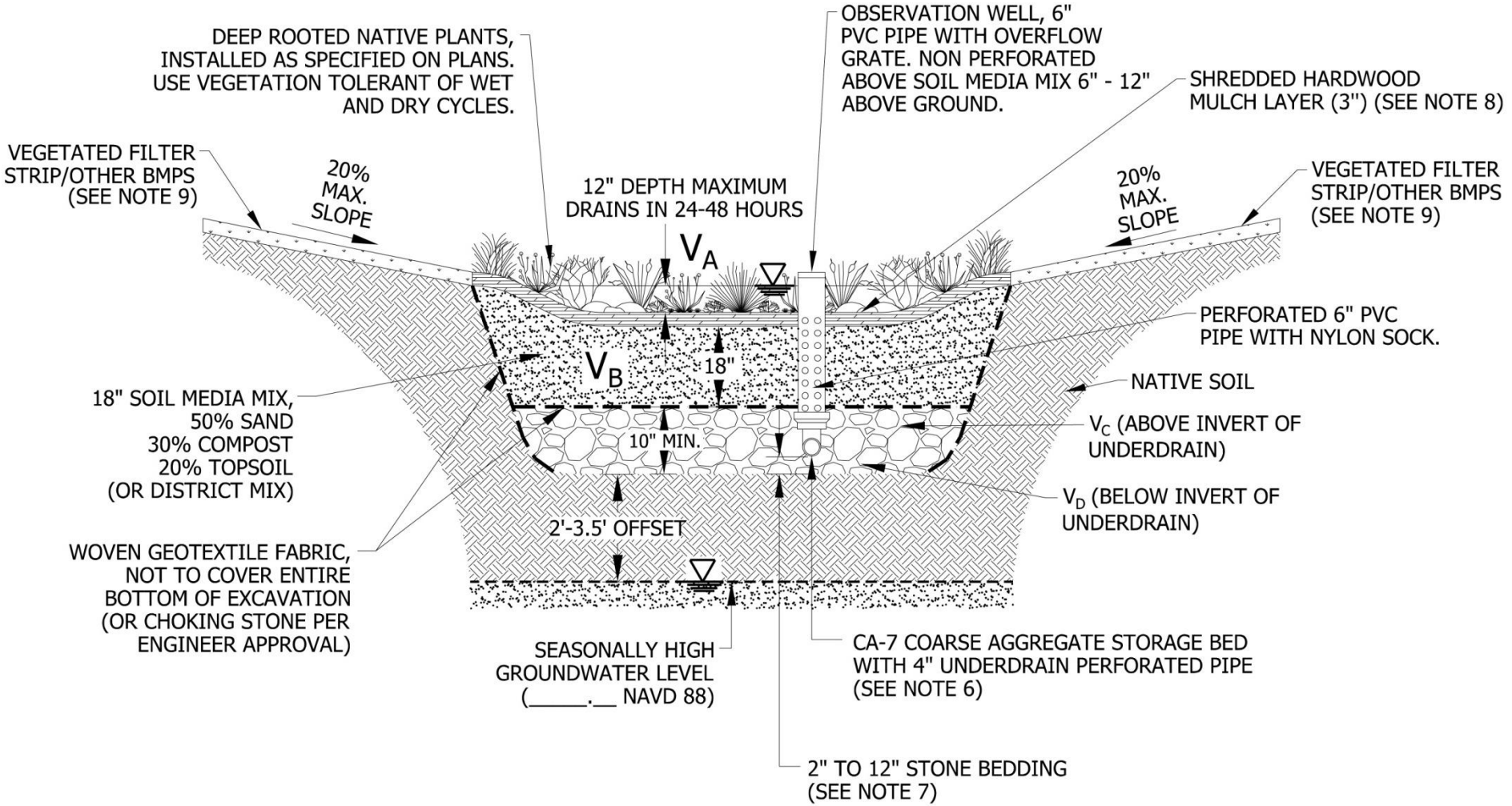
Appendix C. Standard Details & Notes (29 MB) (Updated July 2015)

Volume Control Details		
Bioretention Facility	PDF	DWG
Bioswale (Must be used with Check Dam)	PDF	DWG
Bioswale Check Dam	PDF	DWG
Constructed Wetlands	PDF	DWG
Drywell	PDF	DWG
Green Roof	PDF	DWG
Infiltration Trench	PDF	DWG
Lake Michigan Outfall Water Quality Device	PDF	DWG
Observation Well	PDF	DWG
Permeable Pavers	PDF	DWG
Rain Cistern/Water Reuse System	PDF	DWG
Removable Hood for Catch Basin and Water Quality Structures	PDF	DWG
Sediment Forebay/Pretreatment Basin	PDF	DWG
Signage for Permeable Pavement	PDF	
Storage Below Outlet of Detention Basin	PDF	DWG
Vegetated Filter Strip (Flow-Through)	PDF	DWG
Volume Control Pretreatment Measures	PDF	DWG
Volume Control Storage Matrix	PDF	DWG

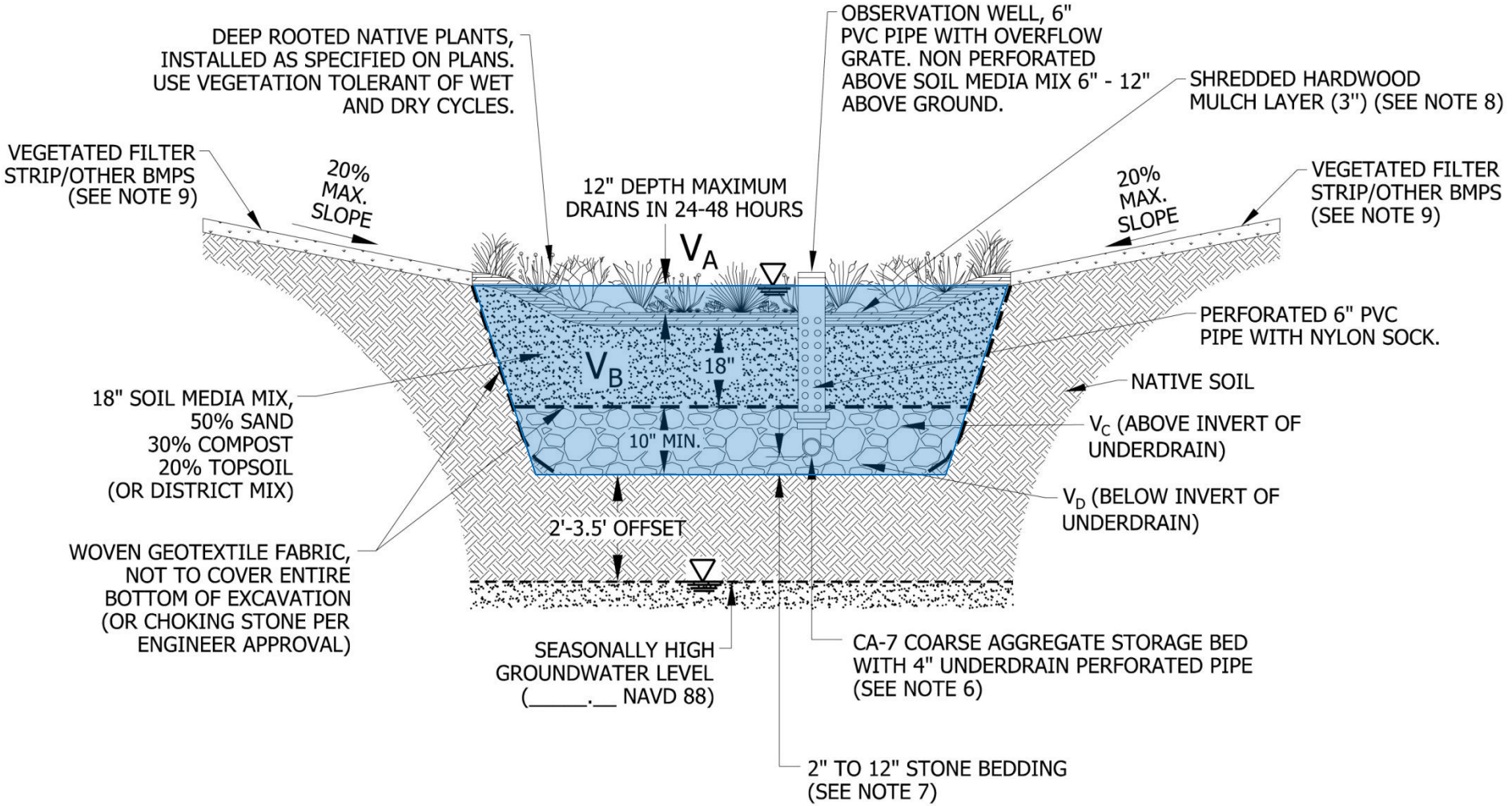
General Notes and Exhibits		
MWRD General Notes	PDF	DWG
Example Drainage Exhibit	PDF	DWG
Example Exhibit R	PDF	DWG
Example Routing Exhibit	PDF	DWG

Stormwater and Floodplain Details		
Emergency Overflow Weir	PDF	DWG
Floodplain Garage	PDF	DWG
Outlet Control Structure (Plate)	PDF	DWG
Outlet Control Structure (Wall)	PDF	DWG
Parking Lot Detention	PDF	DWG
Signage for Parking Lot Detention	PDF	
Vortex Restrictor	PDF	DWG
Window Well	PDF	DWG

Sanitary Sewer Details		
Concrete Cradle	PDF	DWG
Concrete Encasement	PDF	DWG
Dog House Manhole	PDF	DWG
Drop Manhole Connection	PDF	DWG
Rigid And Flexible Pipe Installation	PDF	DWG
Forcemain Discharge to Gravity Manhole	PDF	DWG
Large Grease Basin	PDF	DWG
Methods for Connecting to MWRD Manholes	PDF	DWG
Riser for Sanitary Service Lateral	PDF	DWG
Sanitary Manhole Type A and B	PDF	DWG
Small Grease Basin	PDF	DWG
Water Separation Requirements	PDF	DWG



VOLUME TYPE	POROSITY	MEDIA VOLUME	STORAGE VOLUME	VOLUME PROVIDED
SURFACE STORAGE	1.00	V_A	1.00 x V_A	
SOIL MEDIA MIX	0.25	V_B	0.5 x 0.25 x V_B	
COARSE AGG. (ABOVE INVERT)	0.36	V_C	0.5 x 0.36 x V_C	
COARSE AGG. (BELOW INVERT)	0.36	V_D	0.36 x V_D	
			TOTAL	



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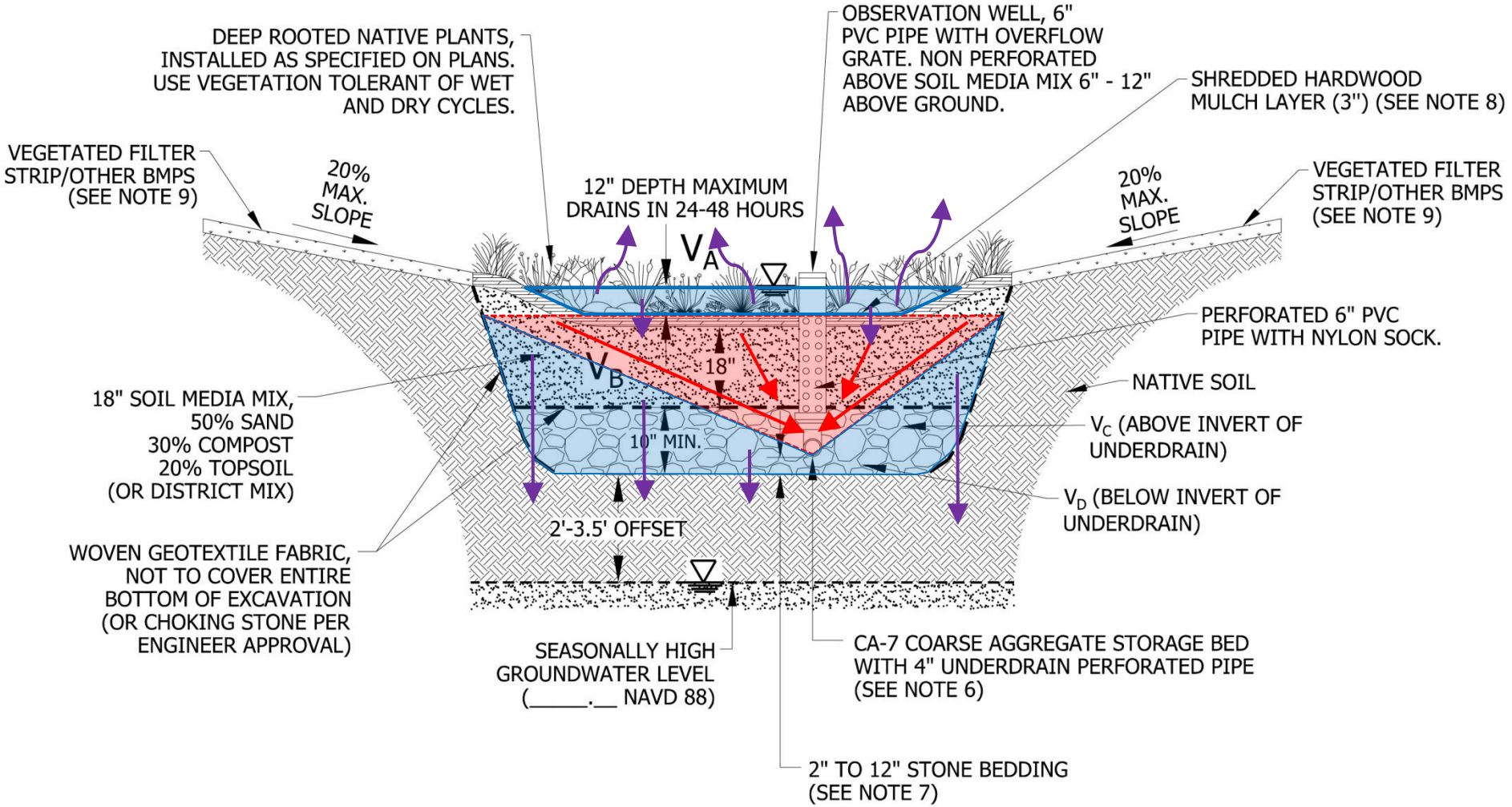

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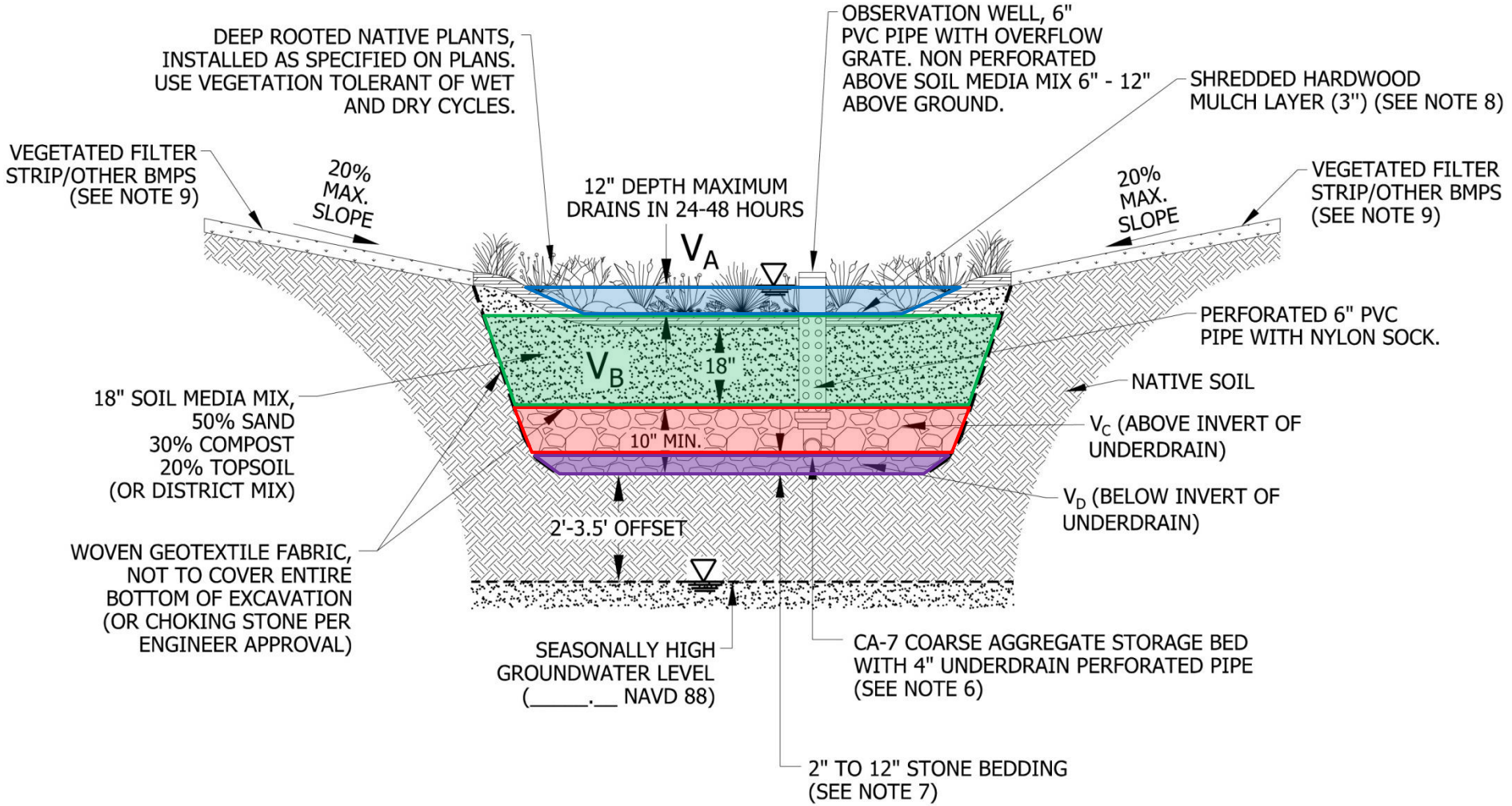

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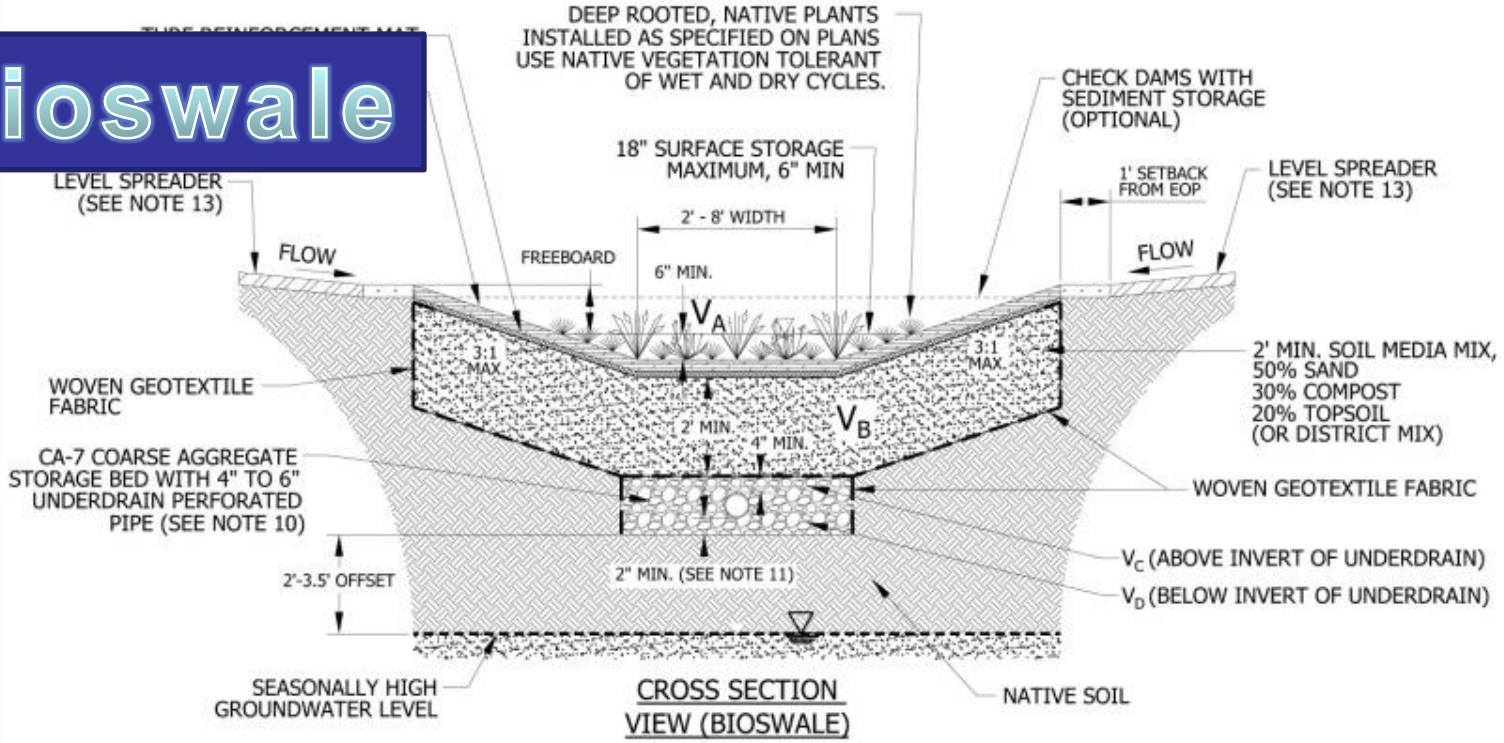
			TOTAL	

Bioswale



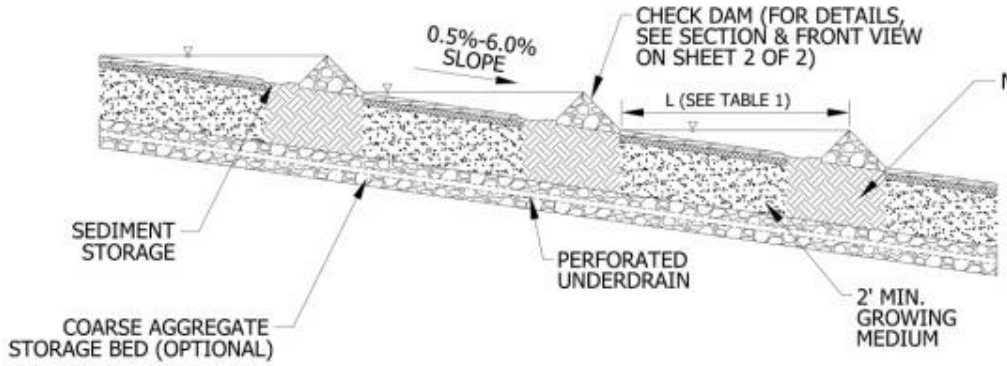
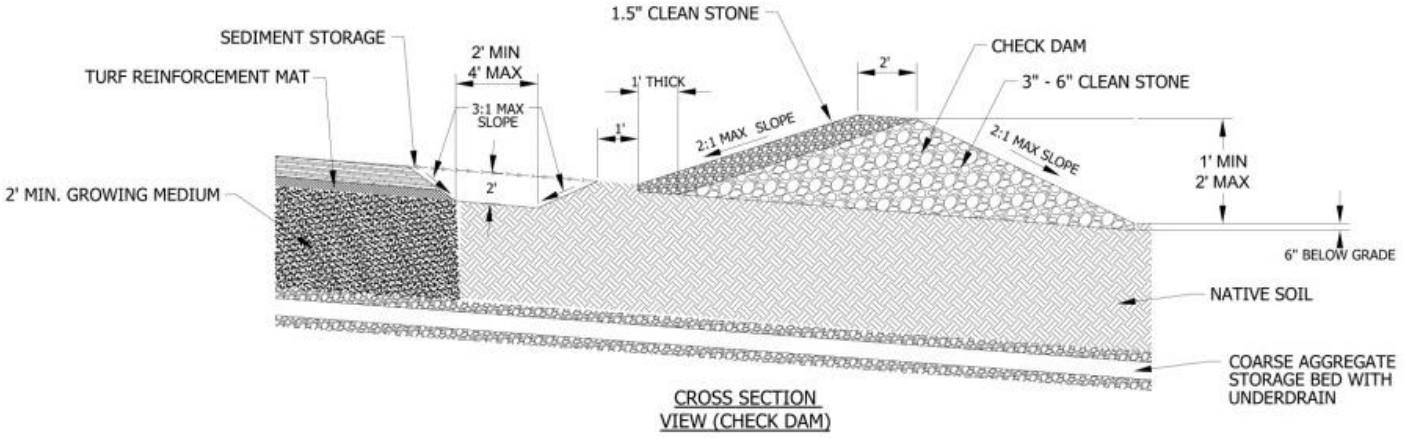


Table 1

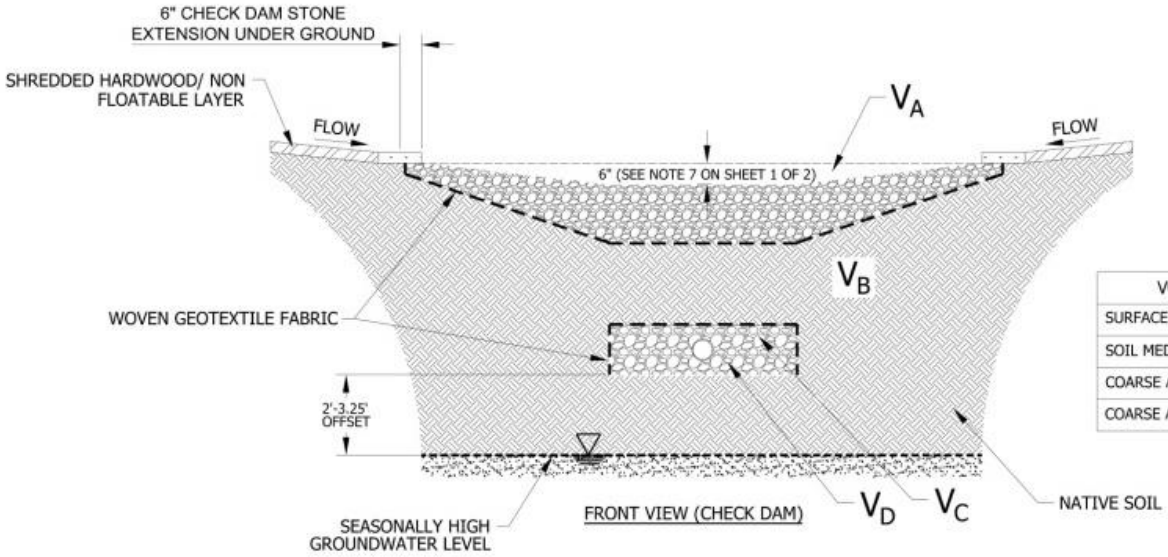
DITCH SLOPE (%)	SPACING L (feet)
1	200
2	100
4	50
6	33

SLOPES ABOVE 6% ARE NOT RECOMMENDED

Bioswale



CROSS SECTION
VIEW (CHECK DAM)



FRONT VIEW (CHECK DAM)

TABLE 2

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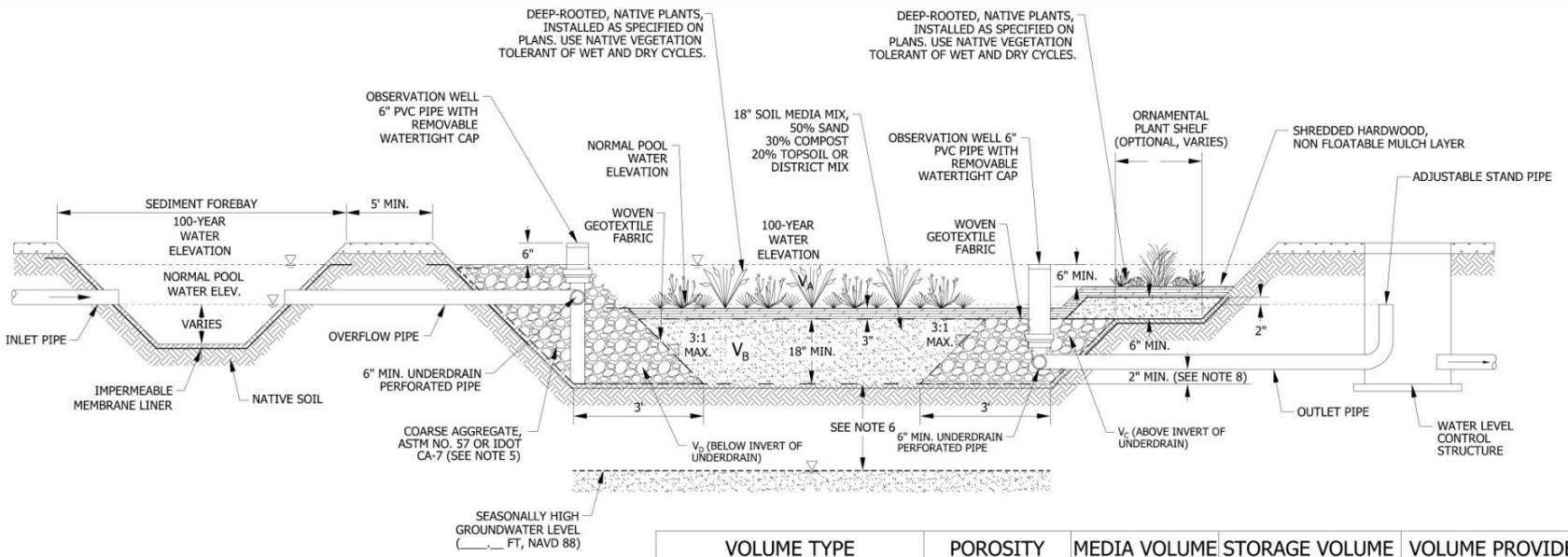
Constructed Wetland



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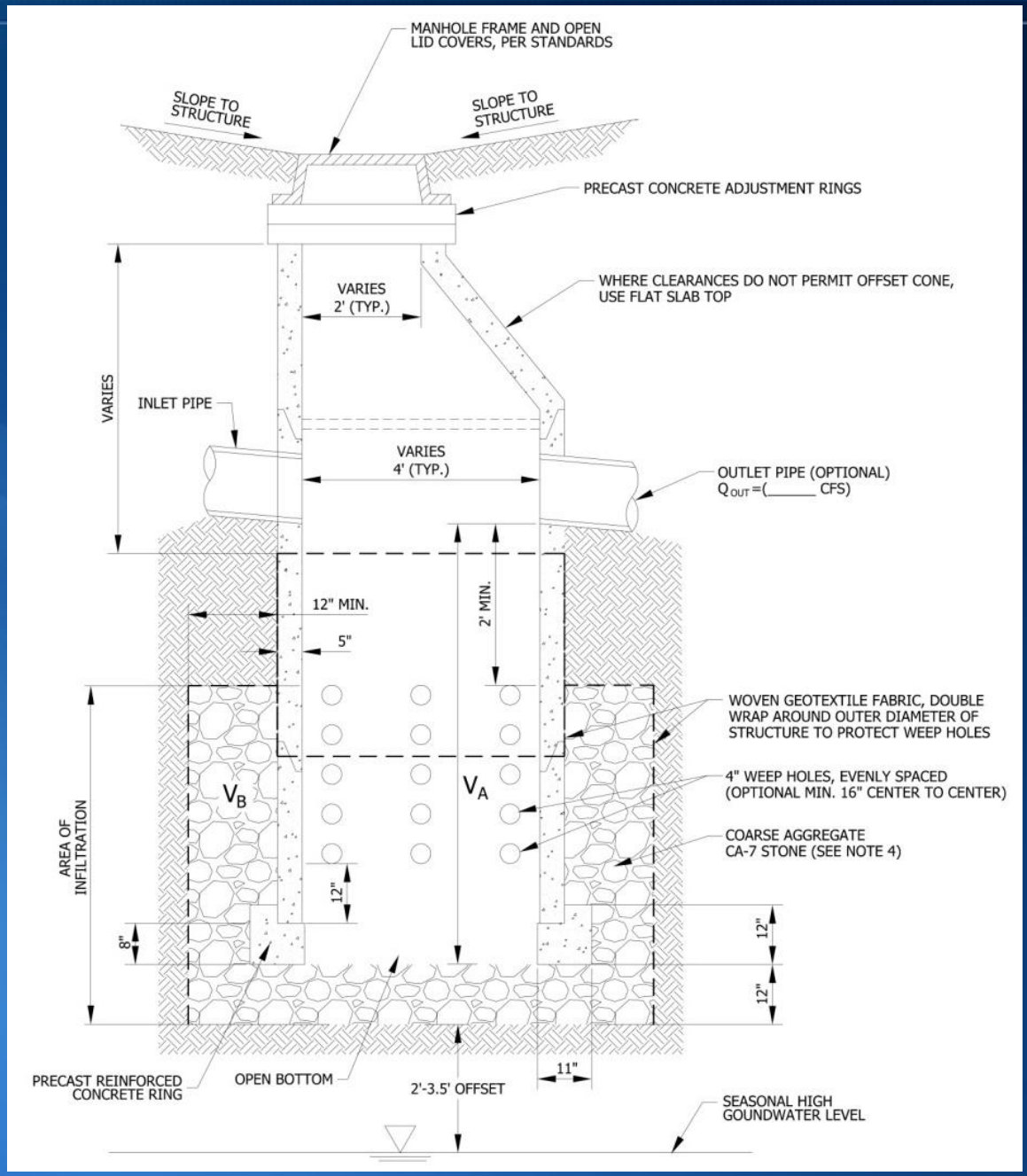
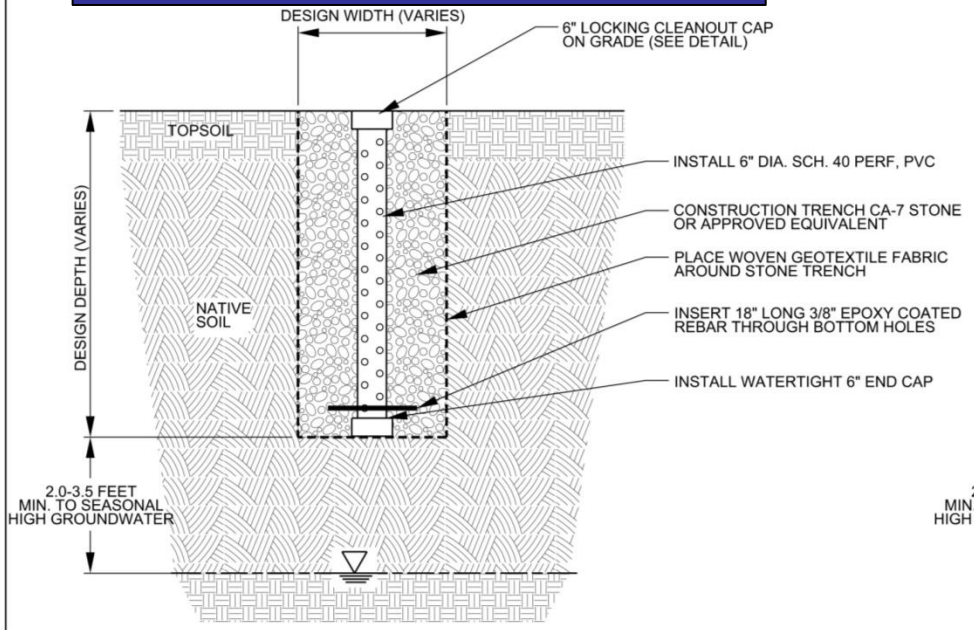
COARSE AGG. (BELOW INVERT)	0.36	V_D	0.36 x V_D	
			TOTAL	

NOTES:
1. OFFSET A MINIMUM OF 10 FEET FROM FOUNDATIONS UNLESS WATERPROOFED, 20 FEET FROM SANITARY SEWERS, 20 FEET FROM ROADWAY GRAVEL SHOULDER AND 100 FEET FROM POTABLE WATER WELLS OR SEPTIC TANKS.
2. AVOID INSTALLATION ON SLOPES GREATER THAN 15 TO 1 AND ABOVE COMPACTED FILL.
3. WETLAND LENGTH TO WIDTH RATIO SHOULD RANGE FROM 2 TO 3.
4. WOVEN GEOTEXTILE FABRIC SHALL MEET REQUIREMENTS OF IUM MATERIAL SPECIFICATION 592 GEOTEXTILE, TABLE 1, CLASS 1, WITH AN APPARENT OPENING SIZE OF 50 MM.
5. STONE STORAGE OPTIONS ARE CA-7, DISTRICT VULCAN MIX, OR APPROVED ALTERNATE. NO RECYCLED MATERIALS.
6. MINIMUM DISTANCE OF 2 FEET (3.5 FEET IN COMBINED SEWER AREAS) BETWEEN BOTTOM OF BMP AND SEASONALLY HIGH GROUNDWATER LEVEL.
7. UNDERDRAINS ARE REQUIRED IN TYPICAL CLAYEY SOILS WHERE INFILTRATION RATES ARE LESS THAN 0.5 INCH/HOUR. MAXIMUM OF 1 UNDERDRAIN PER 30 FEET. PROVIDE A SOIL REPORT DOCUMENTING NATIVE INFILTRATION RATE TO FOREGO UNDERDRAINS.
8. MINIMUM UNDERDRAIN BEDDING OF TWO INCHES, MAXIMUM OF 12 INCHES.
9. FOLLOW THE REQUIRED PRETREATMENT MEASURES LISTED ON THE VOLUME CONTROL PRETREATMENT MEASURES DETAIL (PAGE 17).

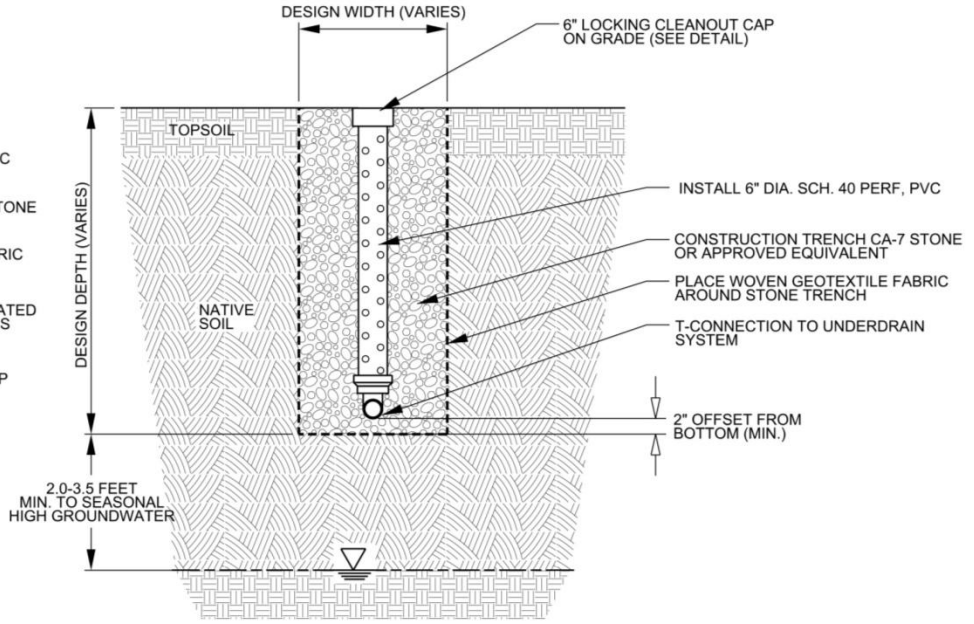
Drywell


MANHOLE FRAME AND OPEN LID COVERS, PER STANDARDS
SLOPE TO STRUCTURE
SLOPE TO STRUCTURE
PRECAST CONCRETE ADJUSTMENT RINGS
WHERE CLEARANCES DO NOT PERMIT OFFSET CONE, USE FLAT SLAB TOP
VARIES 2' (TYP.)
VARIES
INLET PIPE
VARIES 4' (TYP.)
OUTLET PIPE (OPTIONAL) Q_{OUT} =(_____ CFS)
12" MIN.
5"
2' MIN.
WOVEN GEOTEXTILE FABRIC, DOUBLE WRAP AROUND OUTER DIAMETER OF STRUCTURE TO PROTECT WEEP HOLES
4" WEEP HOLES, EVENLY SPACED (OPTIONAL MIN. 16" CENTER TO CENTER)
COARSE AGGREGATE CA-7 STONE (SEE NOTE 4)
V_B
V_A
AREA OF INFILTRATION
12"
8"
12"
12"
PRECAST REINFORCED CONCRETE RING
OPEN BOTTOM
2'-3.5' OFFSET
11"
SEASONAL HIGH GOUNDWATER LEVEL

Observation Well

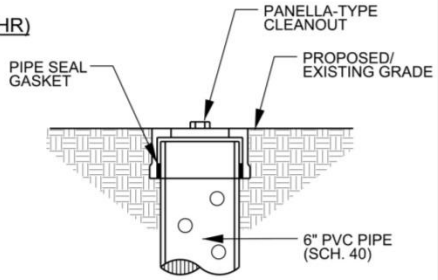


WITHOUT UNDERDRAIN
(SOIL INFILTRATION CAPACITY ≥0.5 IN/HR)



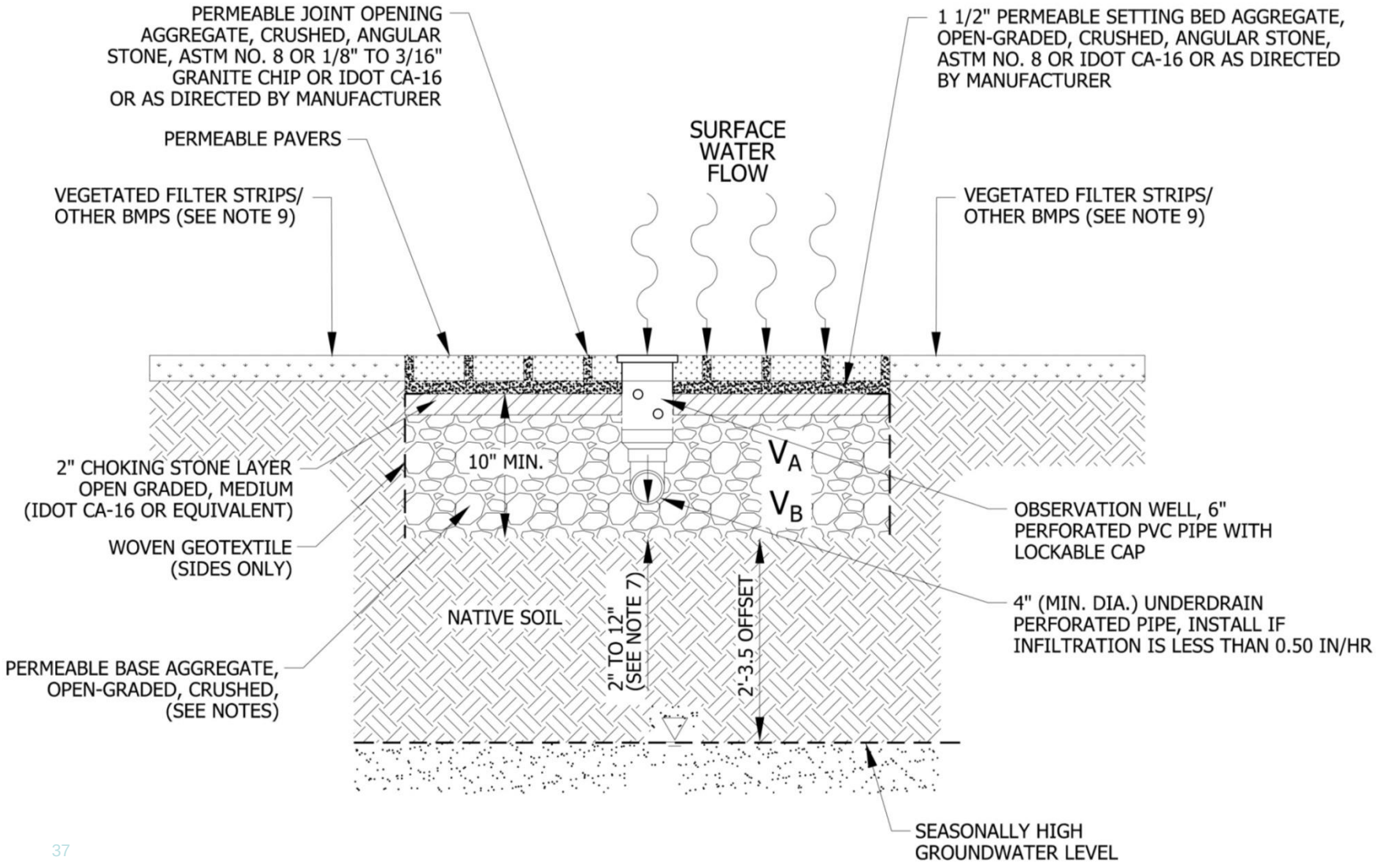
WITH UNDERDRAIN
(SOIL INFILTRATION CAPACITY <0.5 IN/HR)

NOTES:
1) ONE OBSERVATION WELL SHALL BE INSTALLED PER 40,000 SQ. FT. OF SURFACE AREA.
2) PERFORATIONS SHALL BE 3/8" CIRCULAR HOLES, 4" ON CENTER, 90° AROUND PIPE.
3) OBSERVATION WELL FOR BIORETENTION FACILITIES SHALL EXTEND 6"-12" ABOVE GRADE AND CONTAIN AN OVERFLOW GRATE INSTEAD OF LOCKING CAP.
4) PIPES/FITTINGS SHALL BE SCHEDULE 40 PVC OR HIGHER QUALITY, 6" DIAMETER MINIMUM.



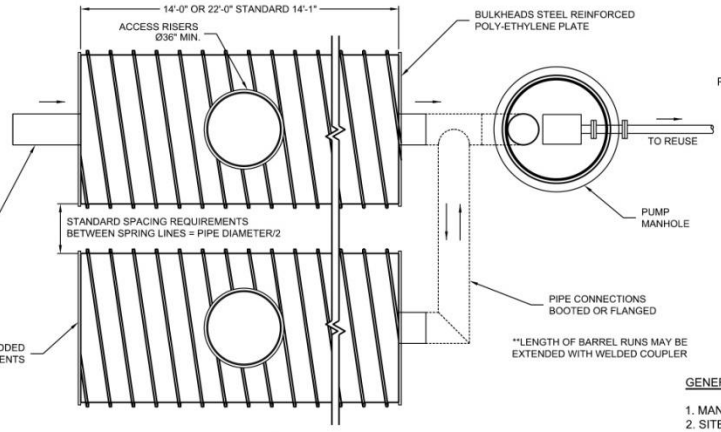
OBSERVATION WELL
CLEANOUT CAP DETAIL

Permeable Pavers

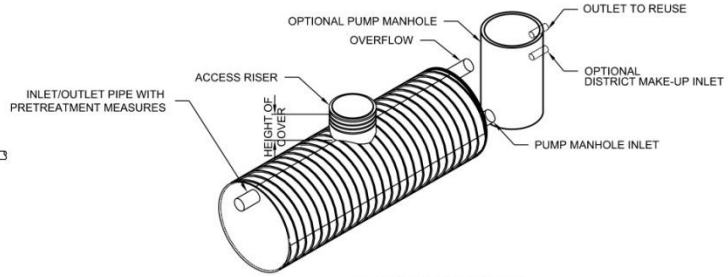


Stormwater Reuse

STORAGE AVAILABILITY PER DIAMETER		
DIAMETER (IN / mm)	AVAILABLE STORAGE PER L.F. (C.F. / m3)	AVAILABLE STORAGE PER L.F. (GAL. / L)
48 / 1200	12.17 / 0.34	91.02 / 345
54 / 1350	15.40 / 0.44	115.20 / 437
60 / 1500	19.01 / 0.54	142.22 / 539
72 / 1800	27.38 / 0.77	204.79 / 776
84 / 2100	37.26 / 1.05	278.74 / 1056
96 / 2400	48.67 / 1.38	364.07 / 1380
120 / 3000	76.05/ 2.15	568.87 / 2156

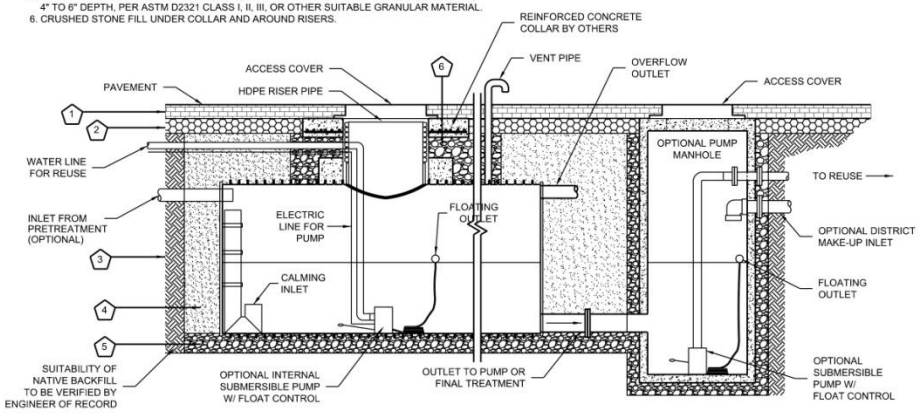


PLAN VIEW



ISOMETRIC VIEW

KEY
1. RIGID OR FLEXIBLE PAVEMENT.
2. GRANULAR COMPACTED ROAD BASE.
3. ANY SUITABLE NATIVE OR GENERAL BACKFILL, SEE ENGINEER PLANS.
4. WELL GRADED GRANULAR FILL. ASTM D2321 CLASS I, II, III, OR EQUIVALENT. COMPACT TO MIN. 90% STANDARD DENSITY PER AASHTO T99. MAY INCLUDE ROAD BASE.
5. RELATIVELY LOOSE GRANULAR BEDDING, ROUGHLY SHAPED TO FIT BOTTOM OF BARREL, 4" TO 6" DEPTH, PER ASTM D2321 CLASS I, II, III, OR OTHER SUITABLE GRANULAR MATERIAL.
6. CRUSHED STONE FILL UNDER COLLAR AND AROUND RISERS.



ELEVATION VIEW

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE, CAPACITY AND BACKFILL DETAILS, TO BE PROVIDED BY MANUFACTURER.
3. ALL ELEVATIONS, DIMENSIONS AND LOCATIONS OF RISERS AND INLETS SHALL BE VERIFIED BY THE ENGINEER OF RECORD.
4. PRIOR TO INSTALLATION OF THE SYSTEM A PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED. THOSE REQUIRED TO ATTEND ARE THE SUPPLIER OF THE SYSTEM, THE GENERAL CONTRACTOR, SUB-CONTRACTORS AND THE ENGINEER.
5. THE CISTERN IS MANUFACTURED FROM STEEL REINFORCED POLYETHYLENE PLASTIC.
6. SYSTEM TO MEET AASHTO HS20/HS25 LIVE LOADING, PER AASHTO LRFD SECTION 12.
7. ACCESS COVERS TO MEET AASHTO M306 LOAD RATING.
8. MINIMUM COVER IS EQUAL TO PIPE DIAMETER/5 AND NO LESS THAN 12-INCHES FROM TOP OF PIPE TO BOTTOM OF PAVEMENT. Ø72" AND Ø84" PIPE MINIMUM COVER IS 18-INCHES, Ø96" PIPE MINIMUM COVER IS 24-INCHES, Ø120" PIPE MINIMUM COVER IS 36-INCHES.
9. FOLLOW THE REQUIRED PRETREATMENT MEASURES LISTED ON THE VOLUME CONTROL PRETREATMENT MEASURES DETAIL (PAGE 17).

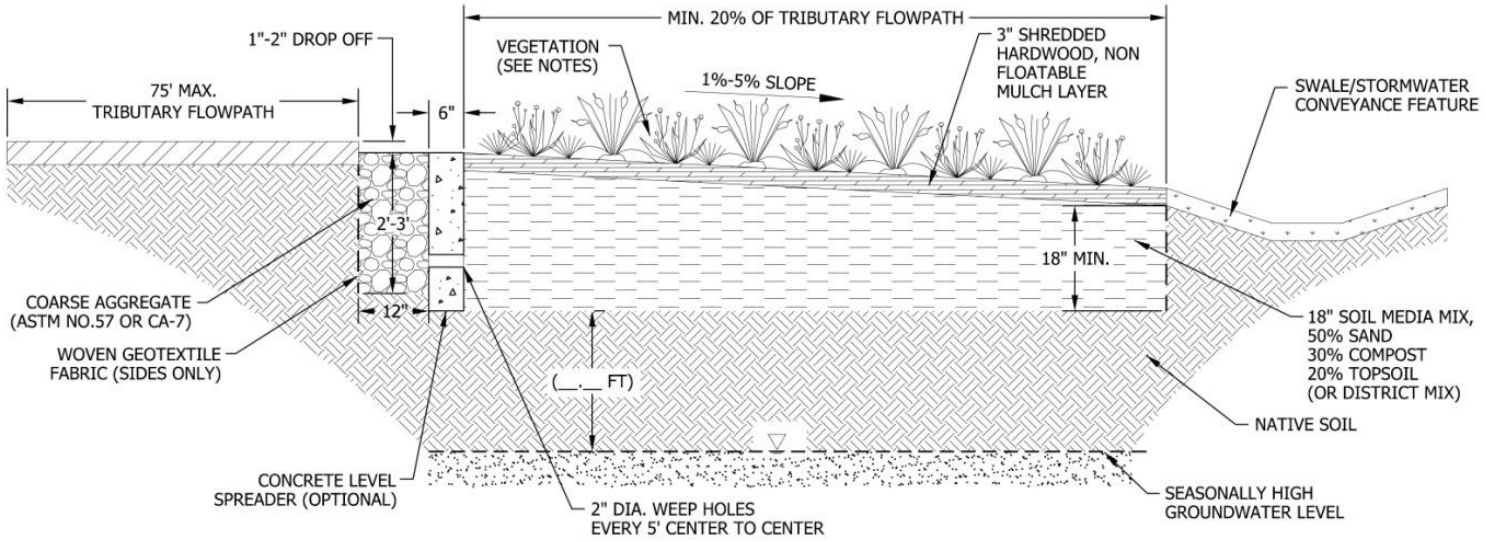
INSTALLATION NOTES

A. INSTALLATION GUIDE TO BE REVIEWED BY CONTRACTOR PRIOR TO INSTALLATION.
B. CONTRACTOR TO PROVIDE, INSTALL AND GROUT ALL INLET AND OUTLET PIPES.
C. CONTRACTOR TO PROVIDE AND INSTALL ALL BEDDING AND BACKFILL MATERIAL.
D. PRIOR TO PLACING BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, A GEOGRID SHALL BE UTILIZED OR UNSUITABLE MATERIAL SHALL BE REMOVED AND BROUGHT BACK TO GRADE WITH FILL MATERIAL AS APPROVED BY THE ENGINEER OF RECORD. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE BEDDING MATERIAL CAN BE PLACED.
E. STONE EMBEDMENT MATERIAL SHALL BE INSTALLED TO 95% STANDARD PROCTOR DENSITY AND PLACED IN 6-INCH TO 8-INCH LIFTS SUCH THAT THERE IS NO MORE THAN A TWO LIFT DIFFERENTIAL BETWEEN ANY OF THE BARRELS AT ANY TIME. GRANULAR BACKFILL MATERIAL SHALL BE COMPACTED TO 90% SPD. BACKFILLING SHALL BE ADVANCED ALONG THE LENGTH OF THE BARRELS AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING AND DISPLACEMENT OF THE BARRELS. THE MINIMUM PIPE SPACING MUST BE MAINTAINED.
F. REFER TO INSTALLATION GUIDE FOR TEMPORARY CONSTRUCTION LOADING GUIDELINES.
G. IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.
H. GENERAL INSTALLATION METHODS AND MATERIALS TO BE IN ACCORDANCE WITH ASTM D2321.

OPERATION NOTES

1. PROPERTY OWNER MUST INSPECT AND EXERCISE ANNUALLY.
2. THE STORAGE MUST DEWATER IN 72 HOURS OR 12 HOURS BEFORE STORM EVENT.
3. CISTERN MUST BE PROTECTED FROM FREEZING EFFECTS.

Vegetated Filter Strip



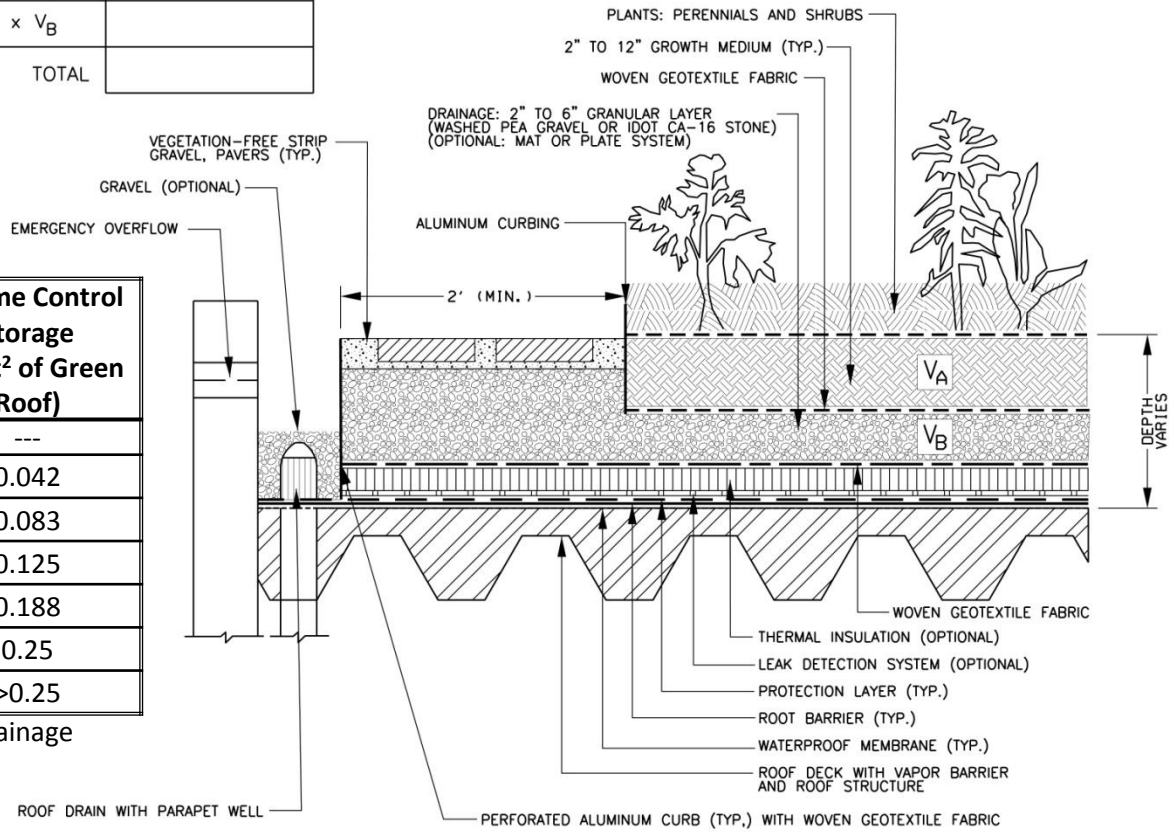
NOTES:
1. MULCH LAYER SHALL BE HARDWOOD MULCH OR OTHER NON-FLOATING GROUND COVER.
2. AVOID INSTALLATION ON SLOPES GREATER THAN 15 TO 1 AND ABOVE COMPACTED FILL.
3. LONGEST FLOW PATH OF CONTRIBUTING DRAINAGE AREA MUST NOT EXCEED 75 FEET.
4. WOVEN GEOTEXTILE FABRIC SHALL MEET REQUIREMENTS OF IUM MATERIAL SPECIFICATION 592 GEOTEXTILE, TABLE 1, CLASS 1, WITH AN APPARENT OPENING SIZE OF 50.
5. COARSE AGGREGATE OPTIONS ARE CA-7, DISTRICT VULCAN MIX, OR APPROVED ALTERNATE. NO RECYCLED MATERIALS ARE ALLOWED.
6. FOLLOW THE REQUIRED PRETREATMENT MEASURES LISTED ON THE VOLUME CONTROL PRETREATMENT MEASURES DETAIL.

VOLUME TYPE	POROSITY	MEDIA VOLUME	STORAGE VOLUME	VOLUME PROVIDED
GROWTH MEDIUM	0.25	V_A	0.25 x V_A	
DRAINAGE LAYER	0.25	V_B	0.25 x V_B	
			TOTAL	

Green Roof

Media Depth* (inches)	Void Ratio	Reduced CN	Reduced Runoff Coefficient, C	Volume Control Storage (ft^3/ft^2 of Green Roof)
0	---	98	0.90	---
2	0.25	94	0.83	0.042
4	0.25	90	0.74	0.083
6	0.25	85	0.66	0.125
9	0.25	79	0.54	0.188
12	0.25	72	0.40	0.25
>12	0.25	63	0.10	>0.25

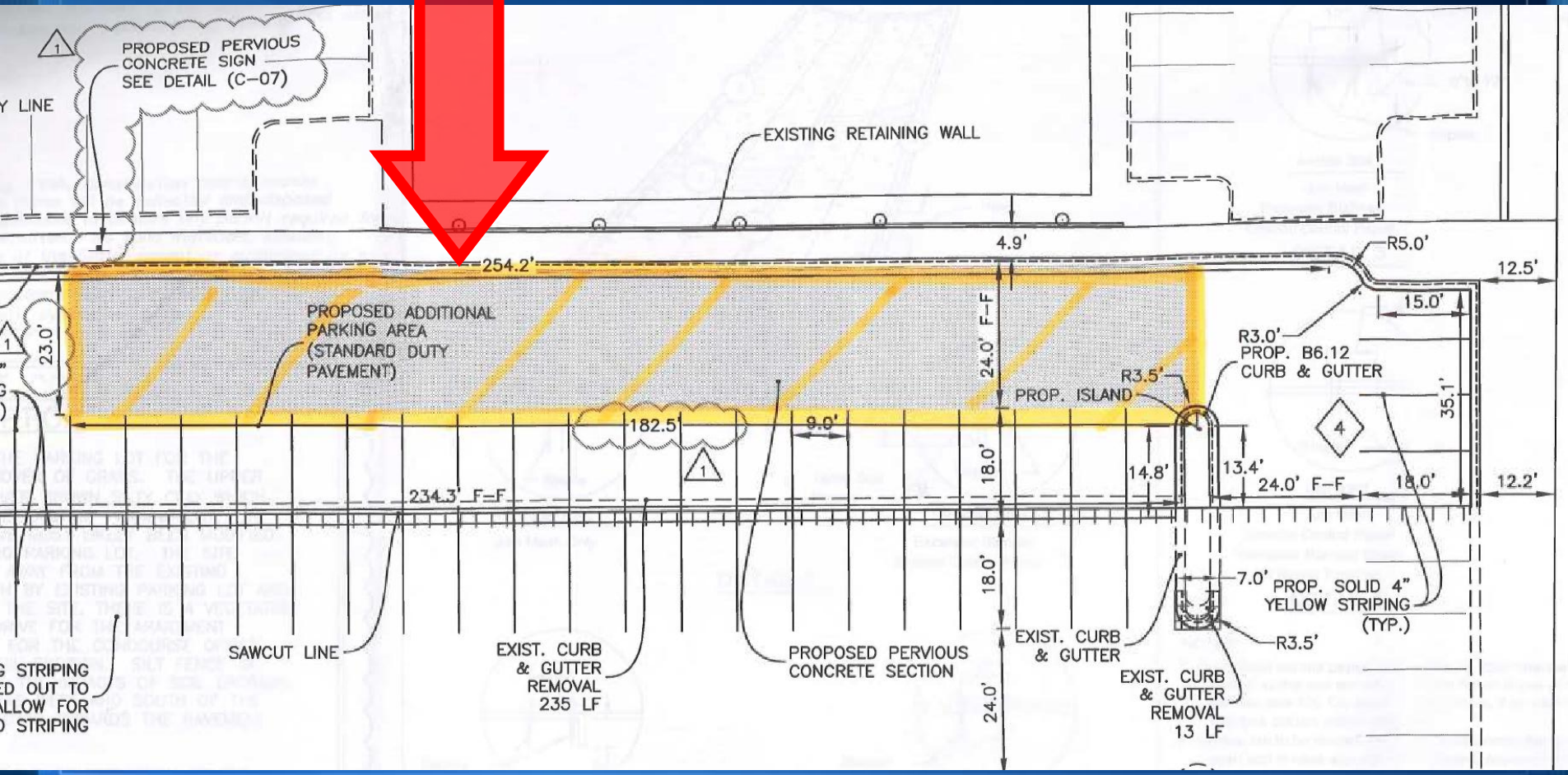
*Media Depth includes growing medium layer and drainage layer



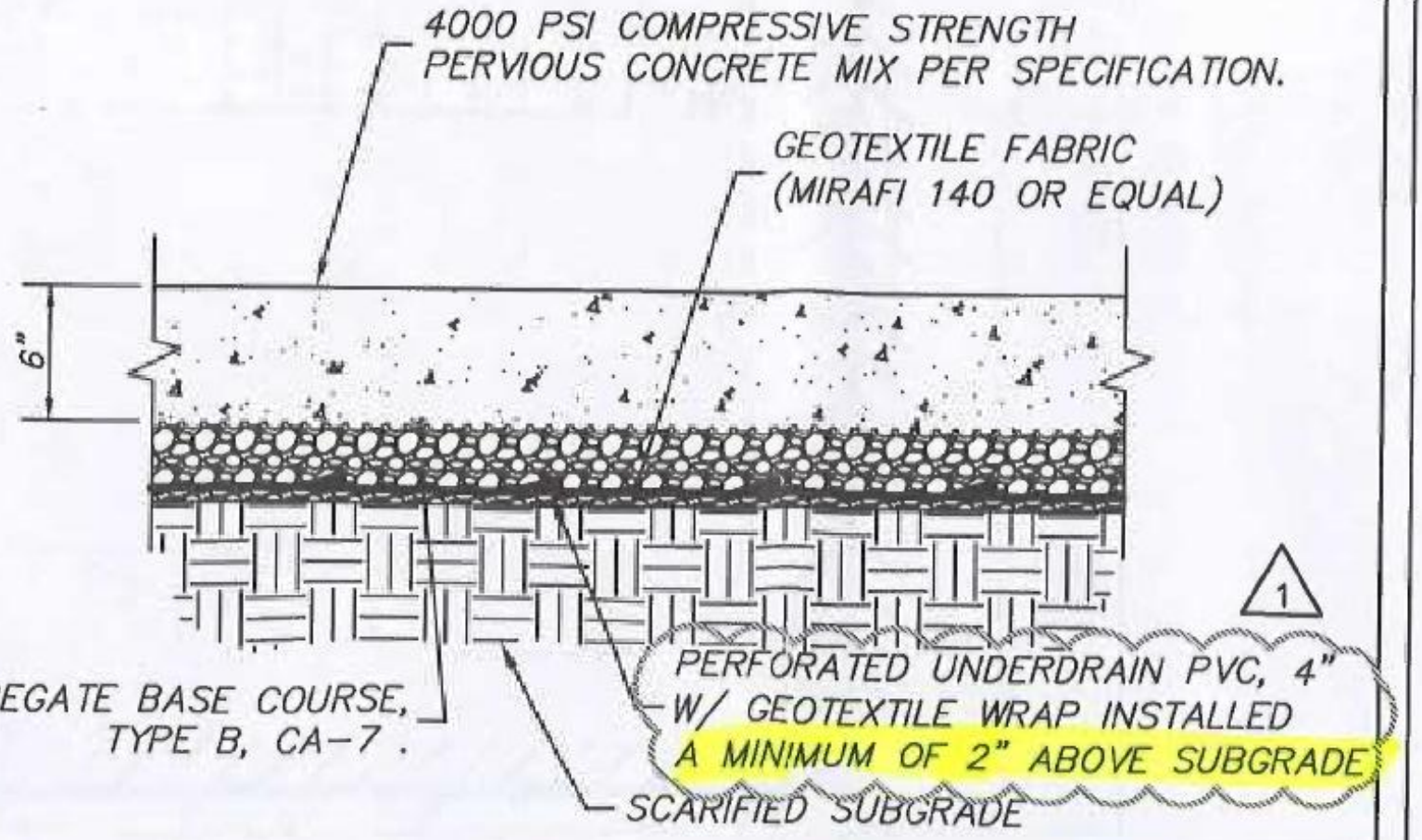
NOTES:
1) WOVEN GEOTEXTILE FABRIC SHALL MEET REQUIREMENTS OF SPECIFICATION IUM 592 GEOTEXTILE, TABLE 1, CLASS I, WITH AN APPARENT OPENING SIZE OF 50.
2) PLANTINGS SHALL BE SELECTED ACCORDING TO ASTM E2400-06, *GUIDE FOR SELECTION, INSTALLATION AND MAINTENANCE OF PLANTS FOR GREEN (VEGETATED) ROOF SYSTEMS.*
3) GROWTH MEDIA SHALL CONSIST OF 80% LIGHTWEIGHT INORGANIC MATERIALS AND 20% ORGANIC MATTER.
4) THERE SHALL BE A MINIMUM SETBACK OF 2-FEET FROM ROOF PERIMETER AND ROOF PENETRATIONS.

Issued Permits -- Case Studies

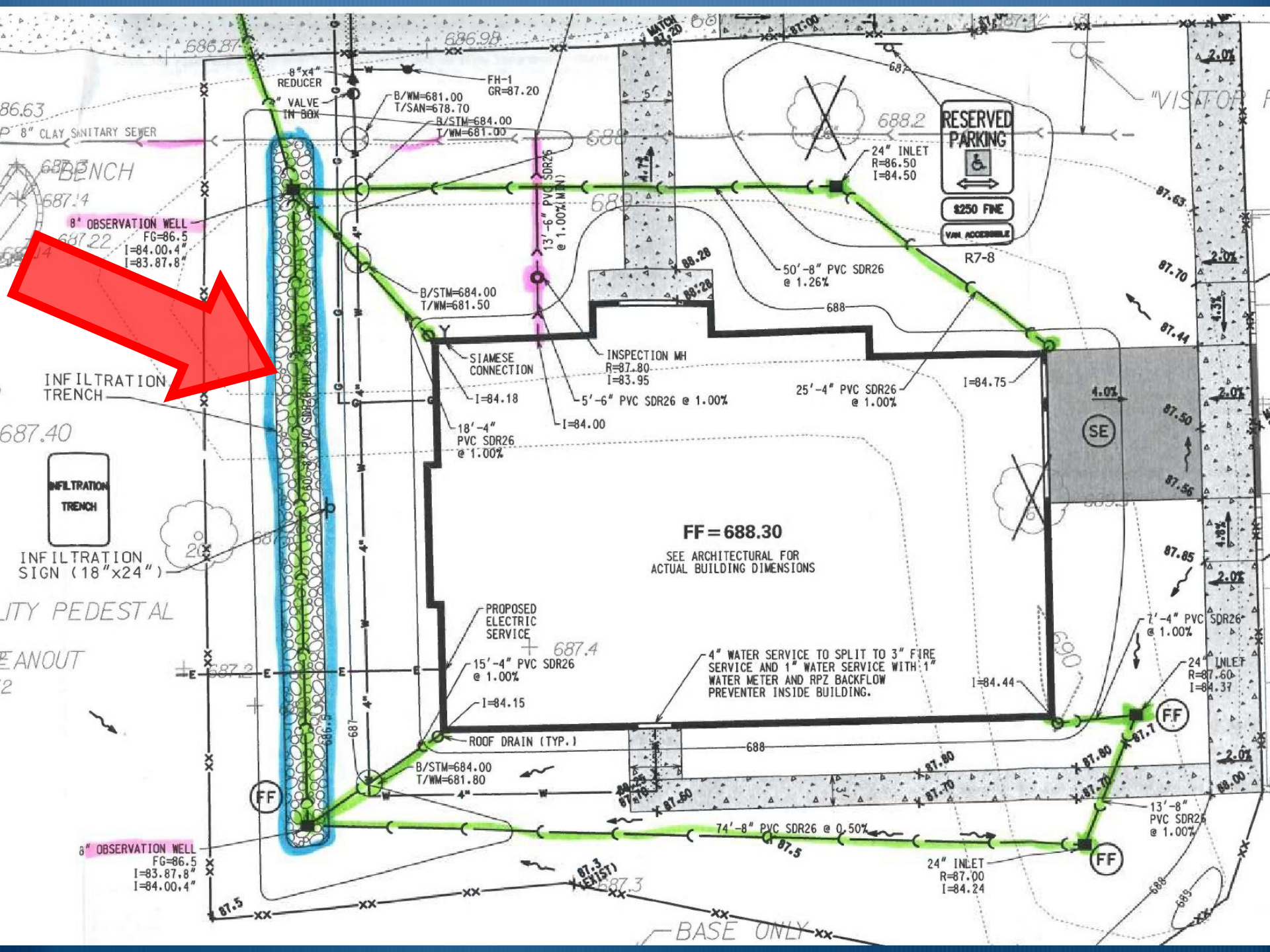

SPORTS
MEDICINE
ATHLETICO

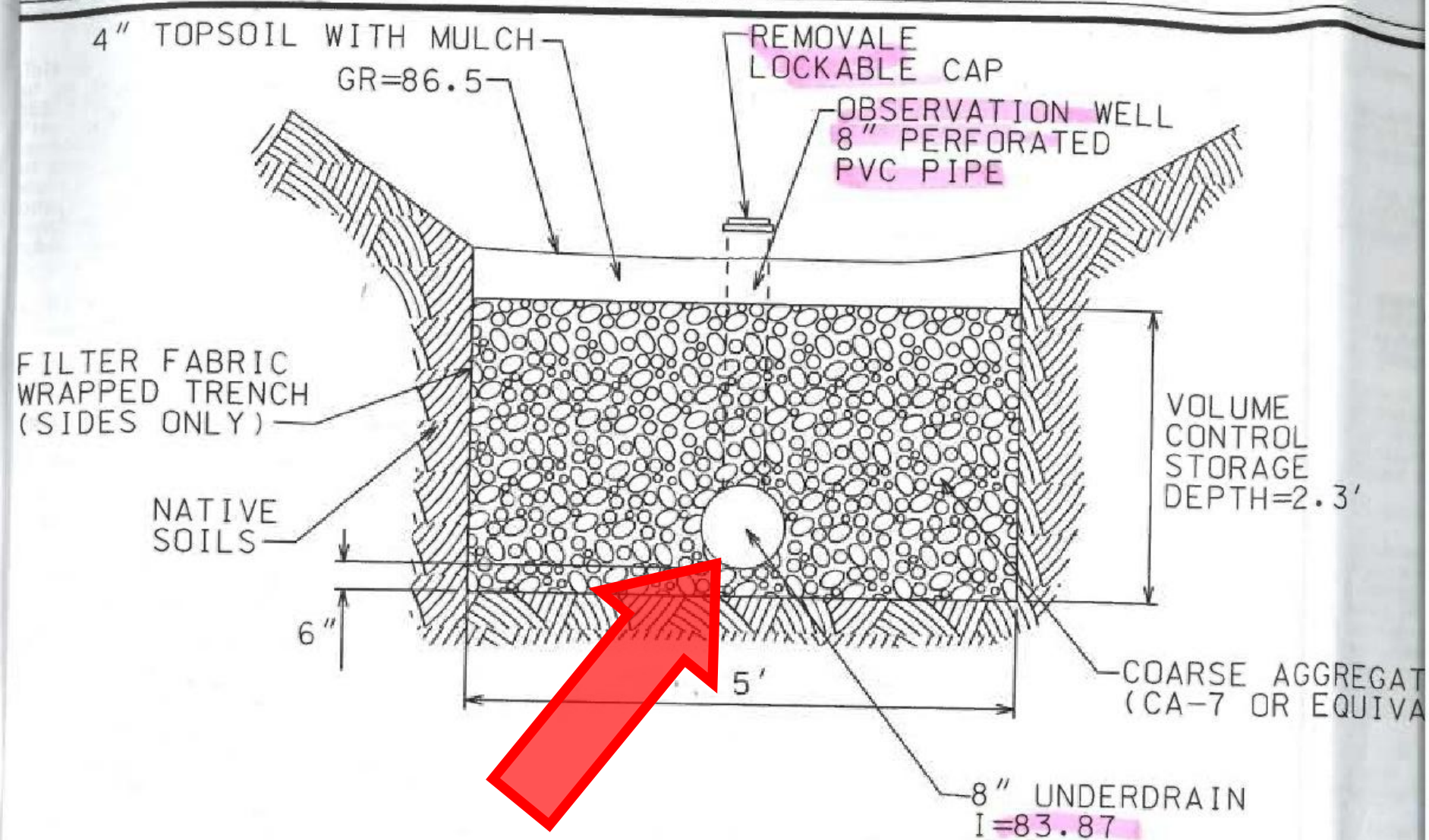

PROPOSED PERVIOUS CONCRETE SIGN SEE DETAIL (C-07)
EXISTING RETAINING WALL
254.2'
4.9'
R5.0'
12.5'
15.0'
23.0'
PROPOSED ADDITIONAL PARKING AREA (STANDARD DUTY PAVEMENT)
24.0' F-F
R3.5'
PROP. ISLAND
R3.0' PROP. B6.12 CURB & GUTTER
35.1'
182.5'
9.0'
18.0'
14.8'
13.4'
24.0' F-F
18.0'
12.2'
234.3' F-F
7.0' PROP. SOLID 4" YELLOW STRIPING (TYP.)
SAWCUT LINE
EXIST. CURB & GUTTER REMOVAL 235 LF
PROPOSED PERVIOUS CONCRETE SECTION
EXIST. CURB & GUTTER
R3.5'
EXIST. CURB & GUTTER REMOVAL 13 LF
24.0'

PERVIOUS CONCRETE PAVEMENT SECTION

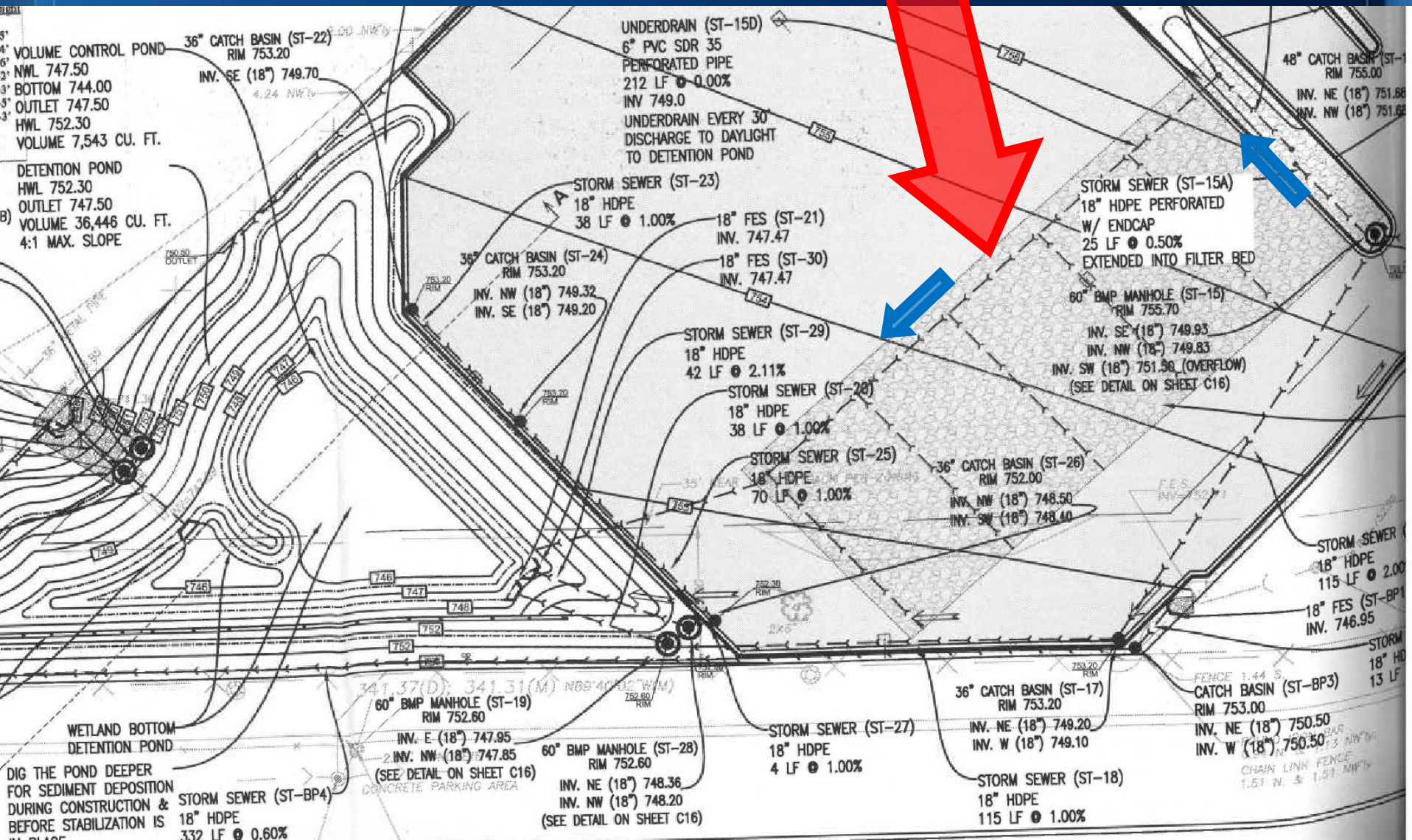


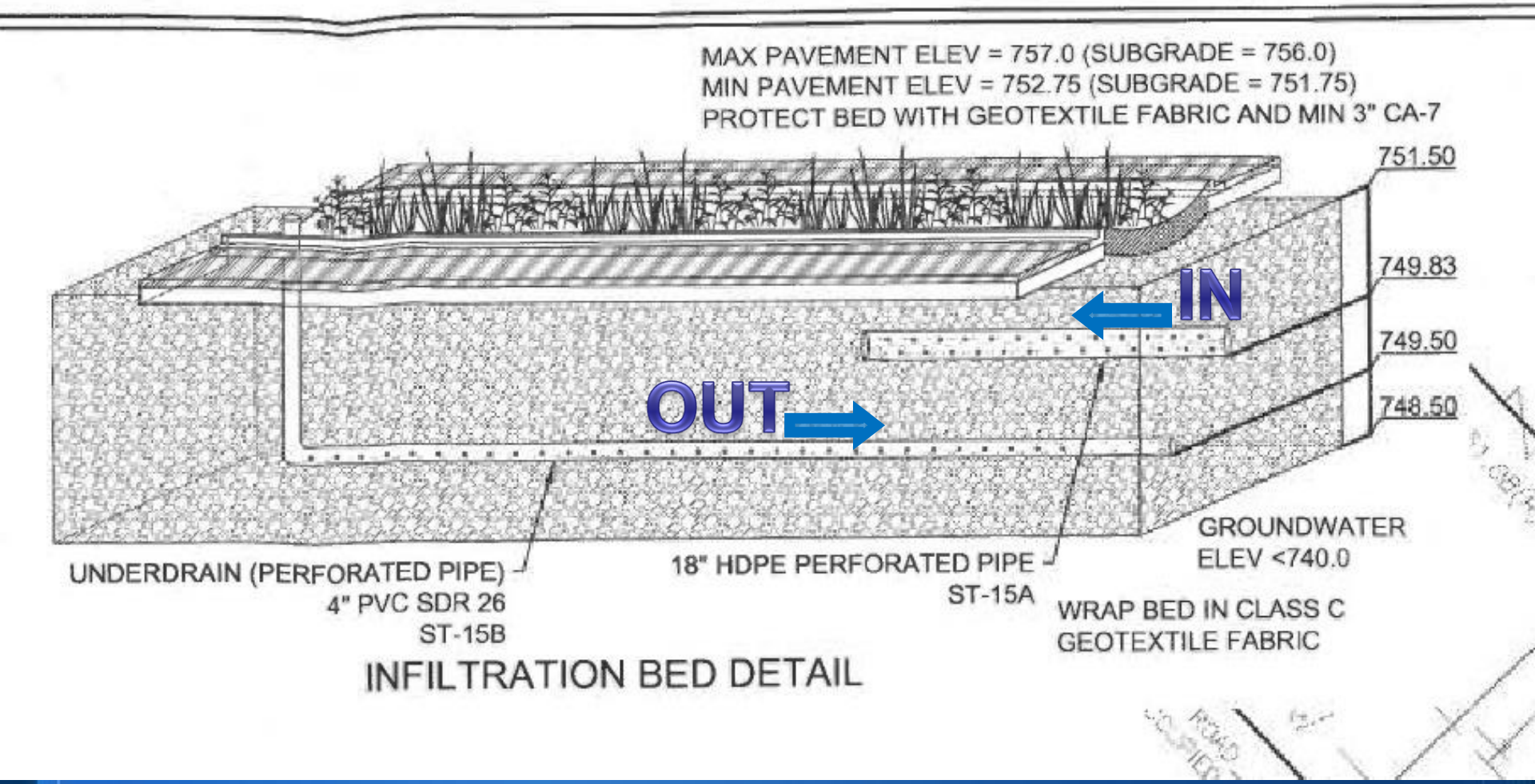

INFILTRATION
TRENCH


8"x4" REDUCER
FH-1
GR=87.20
2" VALVE IN BOX
B/WM=681.00
T/SAN=678.70
B/STM=684.00
T/WM=681.00
8" CLAY SANITARY SEWER
BENCH
8" OBSERVATION WELL
FG=86.5
I=84.00.4"
I=83.87.8"
INFILTRATION TRENCH
INFILTRATION SIGN (18"x24")
13'-6" PVC SDR26 @ 1.00%(MIN)
24" INLET
R=86.50
I=84.50
RESERVED PARKING
$250 FINE
VAN ACCESSIBLE
R7-8
50'-8" PVC SDR26
@ 1.26%
B/STM=684.00
T/WM=681.50
SIAMESE CONNECTION
I=84.18
INSPECTION MH
R=87.80
I=83.95
I=84.00
5'-6" PVC SDR26 @ 1.00%
18'-4" PVC SDR26 @ 1.00%
25'-4" PVC SDR26 @ 1.00%
I=84.75
FF=688.30
SEE ARCHITECTURAL FOR ACTUAL BUILDING DIMENSIONS
PROPOSED ELECTRIC SERVICE
15'-4" PVC SDR26 @ 1.00%
I=84.15
4" WATER SERVICE TO SPLIT TO 3" FIRE SERVICE AND 1" WATER SERVICE WITH 1" WATER METER AND RPZ BACKFLOW PREVENTER INSIDE BUILDING.
I=84.44
7'-4" PVC SDR26 @ 1.00%
24" INLET
R=87.60
I=84.37
ROOF DRAIN (TYP.)
B/STM=684.00
T/WM=681.80
74'-8" PVC SDR26 @ 0.50%
13'-8" PVC SDR26 @ 1.00%
24" INLET
R=87.00
I=84.24
8" OBSERVATION WELL
FG=86.5
I=83.87.8"
I=84.00.4"
BASE ONLY
SE
FF

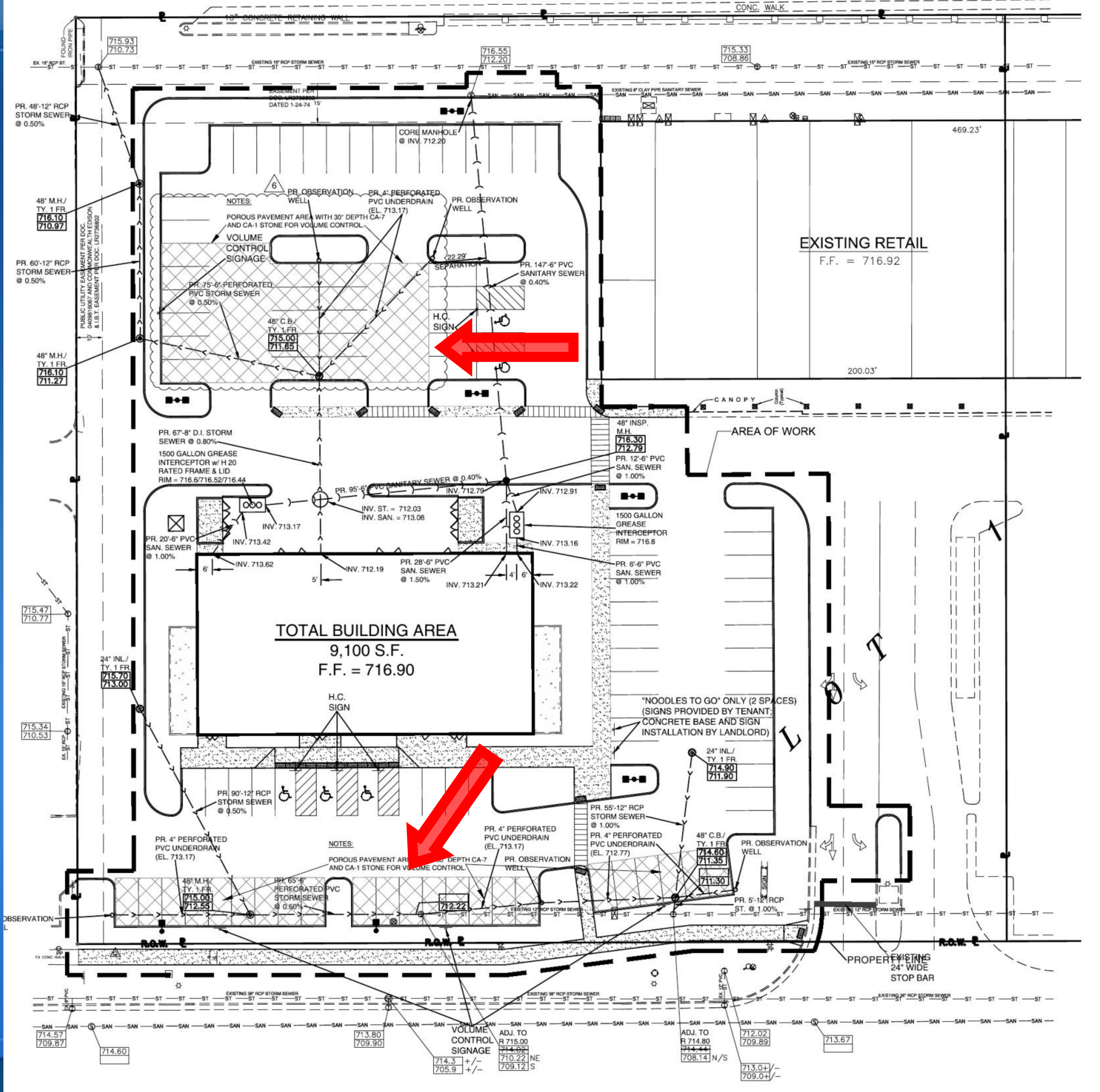


VOLUME CONTROL PRACTICE
INFILTRATION TRENCH


VOLUME CONTROL POND
NWL 747.50
BOTTOM 744.00
OUTLET 747.50
HWL 752.30
VOLUME 7,543 CU. FT.
DETENTION POND
HWL 752.30
OUTLET 747.50
VOLUME 36,446 CU. FT.
4:1 MAX. SLOPE
36" CATCH BASIN (ST-22)
RIM 753.20
INV. SE (18") 749.70
UNDERDRAIN (ST-15D)
6" PVC SDR 35
PERFORATED PIPE
212 LF @ 0.00%
INV 749.0
UNDERDRAIN EVERY 30'
DISCHARGE TO DAYLIGHT
TO DETENTION POND
STORM SEWER (ST-23)
18" HDPE
38 LF @ 1.00%
18" FES (ST-21)
INV. 747.47
36" CATCH BASIN (ST-24)
RIM 753.20
INV. NW (18") 749.32
INV. SE (18") 749.20
18" FES (ST-30)
INV. 747.47
STORM SEWER (ST-29)
18" HDPE
42 LF @ 2.11%
STORM SEWER (ST-28)
18" HDPE
38 LF @ 1.00%
STORM SEWER (ST-25)
18" HDPE
70 LF @ 1.00%
36" CATCH BASIN (ST-26)
RIM 752.00
INV. NW (18") 748.50
INV. SW (18") 748.40
STORM SEWER (ST-15A)
18" HDPE PERFORATED
W/ ENDCAP
25 LF @ 0.50%
EXTENDED INTO FILTER BED
60" BMP MANHOLE (ST-15)
RIM 755.70
INV. SE (18") 749.93
INV. NW (18") 749.83
INV. SW (18") 751.50 (OVERFLOW)
(SEE DETAIL ON SHEET C16)
48" CATCH BASIN (ST-1
RIM 755.00
INV. NE (18") 751.68
INV. NW (18") 751.68
STORM SEWER
18" HDPE
115 LF @ 2.00
18" FES (ST-BP1
INV. 746.95
STORM
18" HD
13 LF
WETLAND BOTTOM
DETENTION POND
DIG THE POND DEEPER
FOR SEDIMENT DEPOSITION
DURING CONSTRUCTION &
BEFORE STABILIZATION IS
STORM SEWER (ST-BP4)
18" HDPE
332 LF @ 0.60%
60" BMP MANHOLE (ST-19)
RIM 752.60
INV. E (18") 747.95
INV. NW (18") 747.85
(SEE DETAIL ON SHEET C16)
CONCRETE PARKING AREA
60" BMP MANHOLE (ST-28)
RIM 752.60
INV. NE (18") 748.36
INV. NW (18") 748.20
(SEE DETAIL ON SHEET C16)
STORM SEWER (ST-27)
18" HDPE
4 LF @ 1.00%
36" CATCH BASIN (ST-17)
RIM 753.20
INV. NE (18") 749.20
INV. W (18") 749.10
STORM SEWER (ST-18)
18" HDPE
115 LF @ 1.00%
CATCH BASIN (ST-BP3)
RIM 753.00
INV. NE (18") 750.50
INV. W (18") 750.50
FENCE
CHAIN LINK FENCE

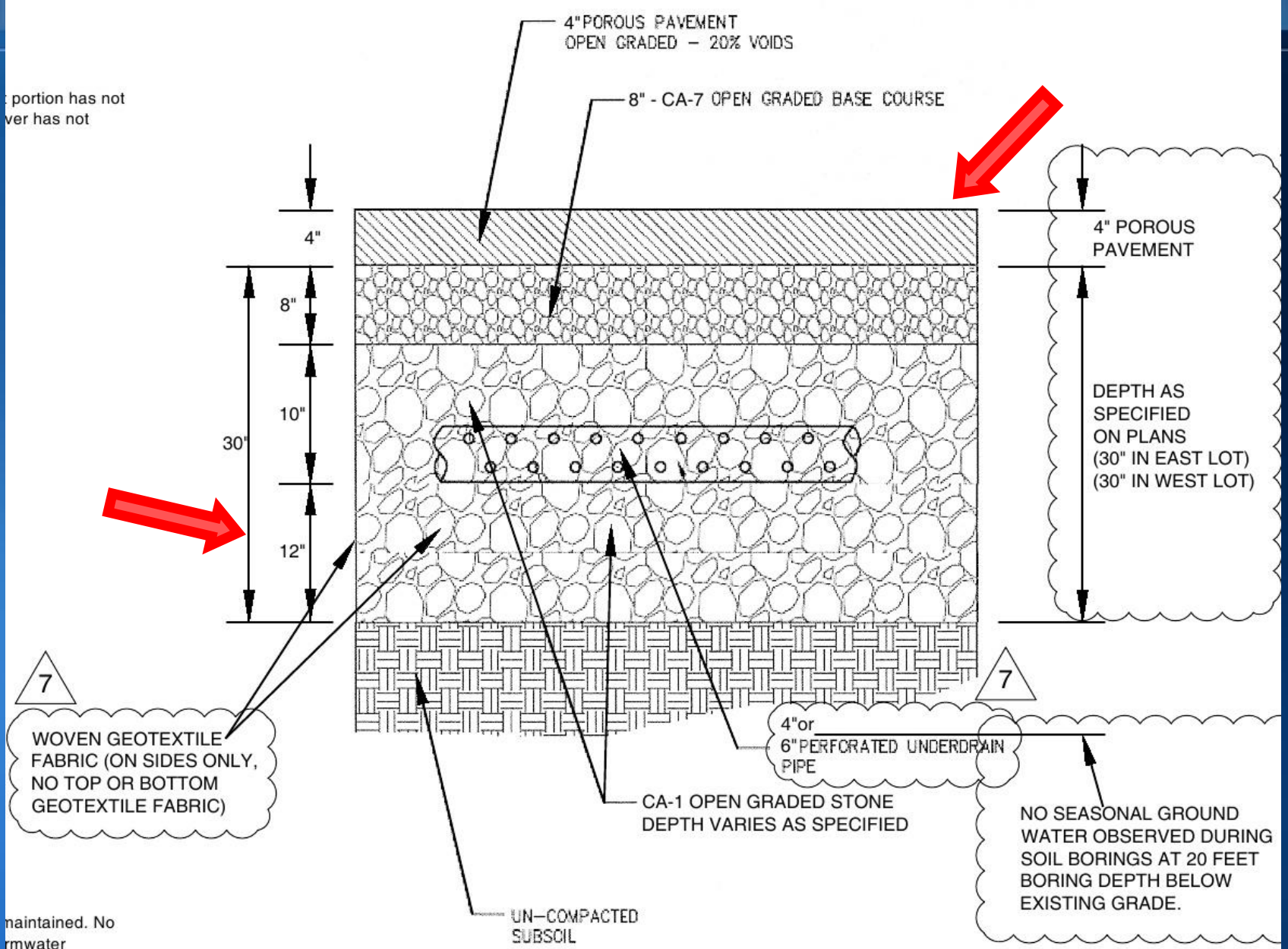


INFILTRATION BED DETAIL



TOTAL BUILDING AREA
9,100 S.F.
F.F. = 716.90
EXISTING RETAIL
F.F. = 716.92
AREA OF WORK
NOTES:
POROUS PAVEMENT AREA WITH 30" DEPTH CA-7 AND CA-1 STONE FOR VOLUME CONTROL.
VOLUME CONTROL SIGNAGE
"NOODLES TO GO" ONLY (2 SPACES) (SIGNS PROVIDED BY TENANT; CONCRETE BASE AND SIGN INSTALLATION BY LANDLORD)
1500 GALLON GREASE INTERCEPTOR w/ H 20 RATED FRAME & LID RIM = 716.6/716.52/716.44
PROPERTY LINE
EXISTING 24" WIDE STOP BAR
LOT

portion has not
ver has not

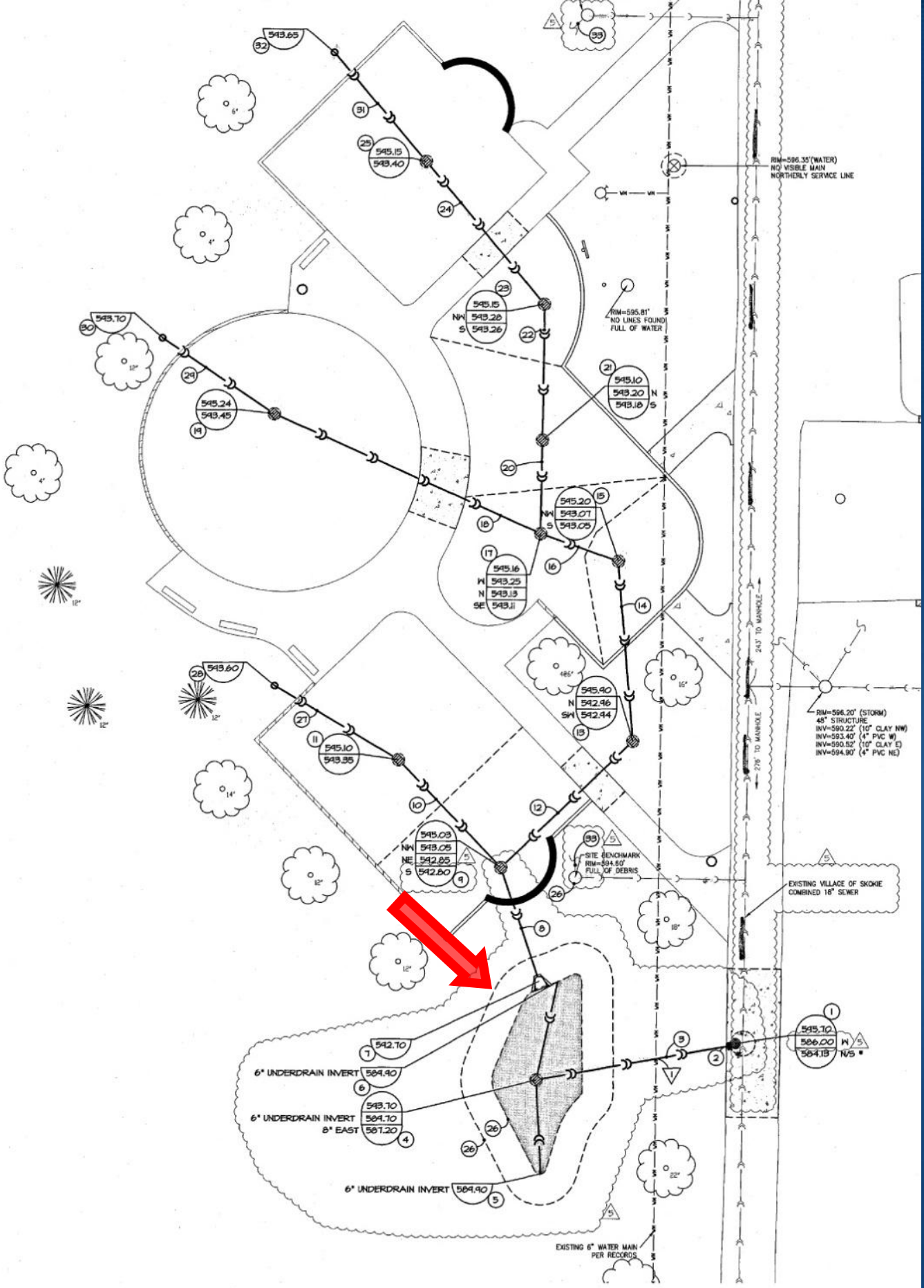


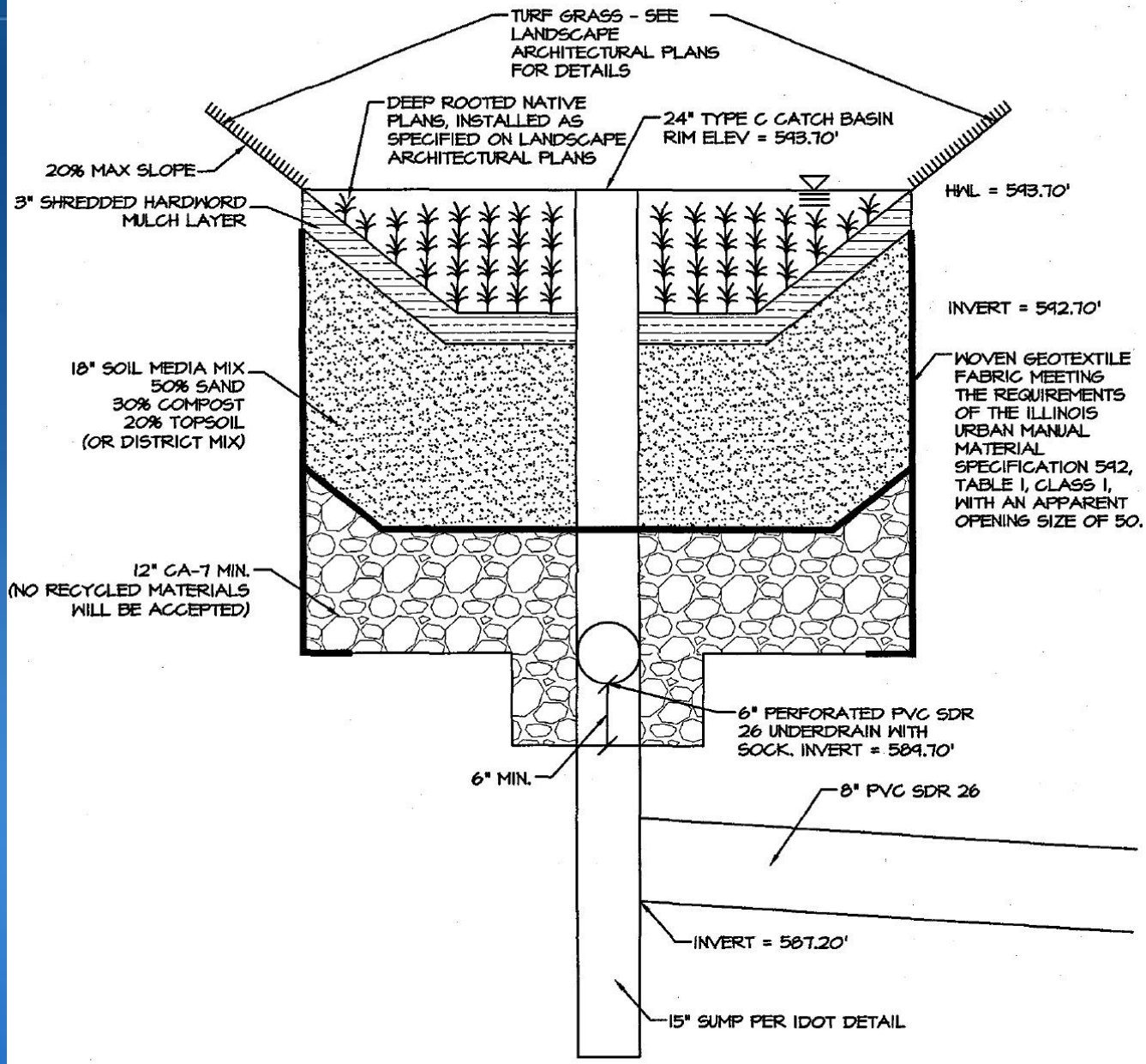
naintained. No
rmwater
ent sediment from

early or as-needed

POROUS H.M.A. PAVEMENT DETAIL

3 6


RIM=596.35'(WATER)
NO VISIBLE MAIN
NORTHERLY SERVICE LINE
RIM=595.81'
NO LINES FOUND
FULL OF WATER
243' TO MANHOLE
276' TO MANHOLE
RIM=596.20' (STORM)
48" STRUCTURE
INV=590.22' (10" CLAY NW)
INV=593.40' (4" PVC W)
INV=590.52' (10" CLAY E)
INV=594.90' (4" PVC NE)
SITE BENCHMARK
RIM=594.60'
FULL OF DEBRIS
EXISTING VILLAGE OF SKOKIE
COMBINED 18" SEWER
6" UNDERDRAIN INVERT 589.90
6" UNDERDRAIN INVERT 589.70
8" EAST 587.20
6" UNDERDRAIN INVERT 589.90
EXISTING 6" WATER MAIN
PER RECORDS



5 DETAIL - RAIN GARDEN

SCALE: 1"=1' VERTICAL, 1"=4' HORIZONTAL

NOTE: NO GROUND WATER TABLE ENCOUNTERED DOWN TO 579.60' DURING GEOTECHNICAL INVESTIGATION

Does an existing conventional wet pond satisfy Volume Control for new Development?

Short answer: No

- **Is there a new stormwater benefit created?**
- **Existing systems can be retrofitted, permitted, and improved**

Volume Control Detention Retrofit

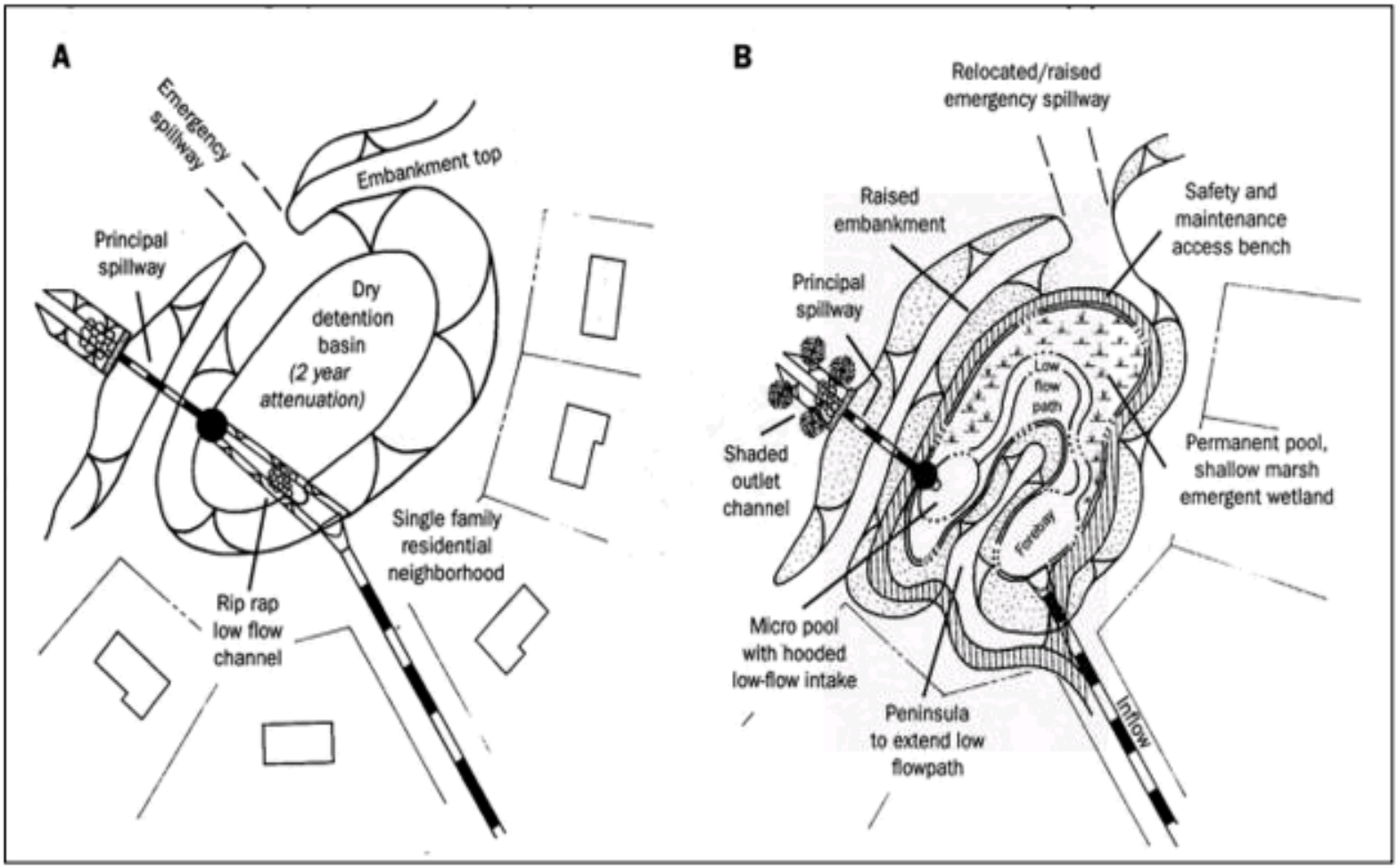
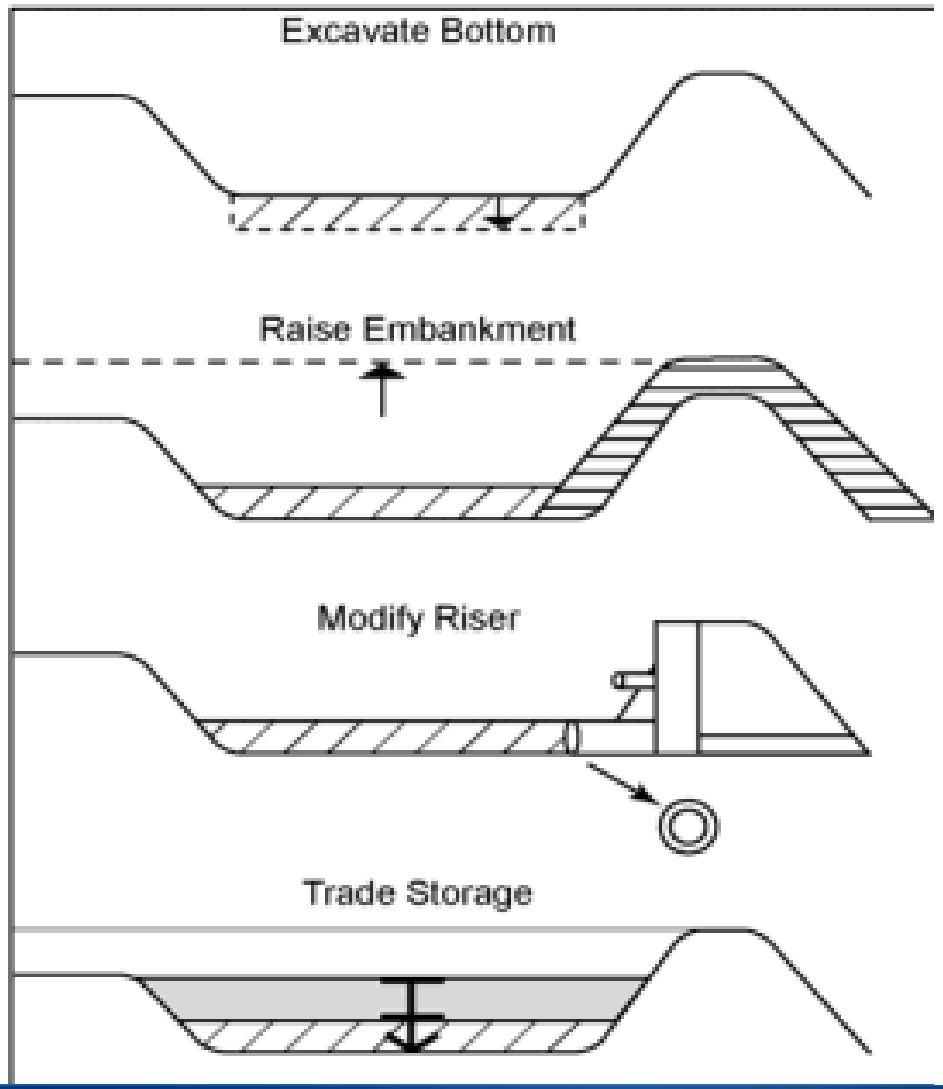


Figure 8: Schematic showing conversion of a dry pond to a shallow marsh

http://www.dupagerivers.org/documents/CWPStormwaterRetrofitManual_000.pdf



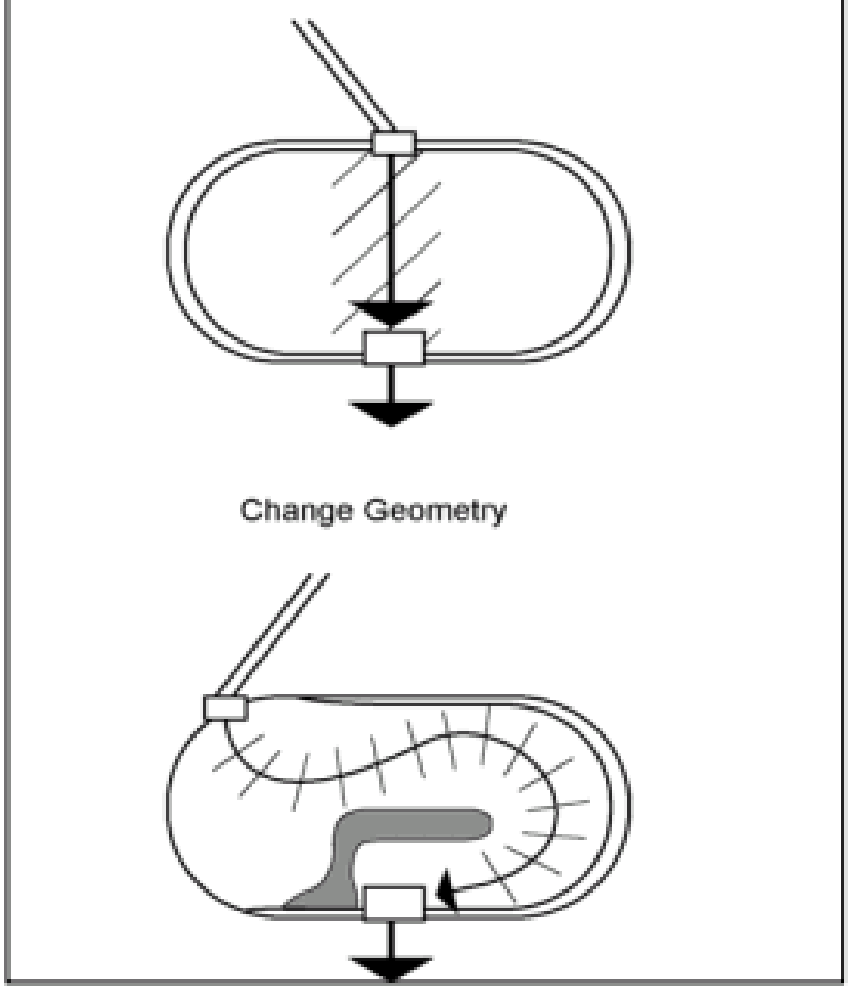


Figure 1: Five strategies to retrofit a pond

http://www.dupagerivers.org/documents/CWPStormwaterRetrofitManual_000.pdf

Volume Control Detention Retrofit

http://www.hazenandsawyer.com/work/projects/lemon-creek-watershed/

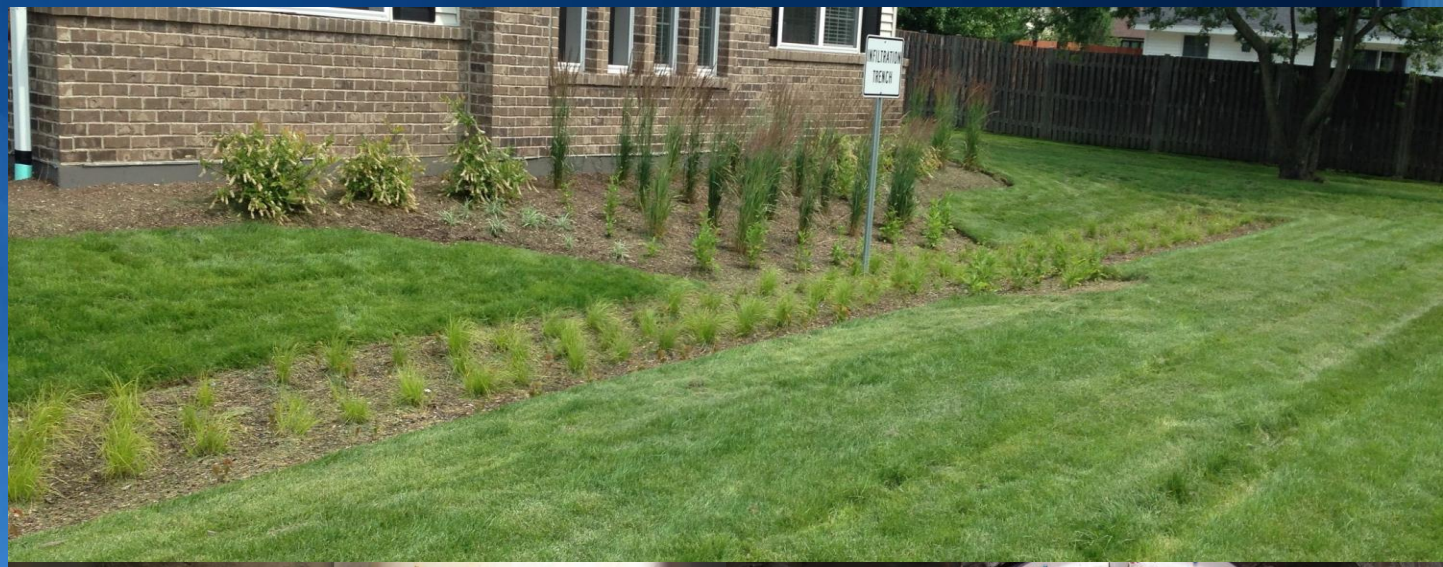
Maintenance

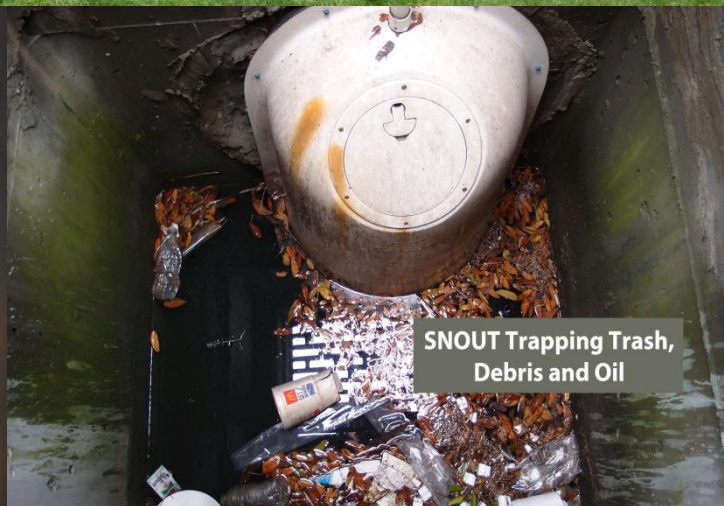
Which flow through practice would you want to clean?

Swale

Vs.

Snout





Maintenance

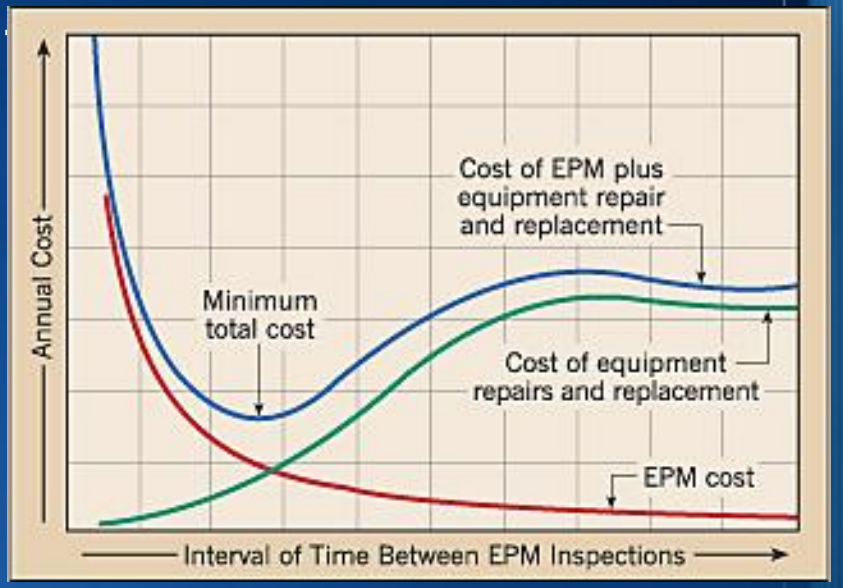
- Underground Detention Systems

  Adequate Access and Steps
  - Each inflow connection, where debris accumulates
  - At Outlet, where debris clogs

- Maintenance Plan / Schedule R
  - Required for Volume Control or Sole Permittee
  - Not Required for ‘Sanitary Only’ Permit
  - Municipal Projects:
    - Maintenance Plan must be a part plan set
    - Schedule R is not required

Maintenance

- Proactive vs. Reactive
  - More costly without a plan (grey or green)
  - How do you want to pay?: Capital or O&M / Replace
  - Inspection, Inspection, Inspection…
  - Scheduled (Pre & Post Winter)
- Short Term
  - Establishment and break-in
  - More time and inspection to adjust
- Long Term
  - Regular Schedule
  - Still deal with big storms
- Consider Winter (cold and snow removal)
- Consider loading rates and “run-on”



Common Questions

How do you meet the volume control requirements for sites with contaminated soils?

There are many sites, such as those with contaminated soils or fueling stations, where it would be impractical to use infiltration practices. For these sites, the WMO volume control requirements can be met by providing flow-through practices or a reduction in impervious area.

I am working on a redevelopment and the original detention facility was permitted using a lower pervious runoff coefficient than what is currently required. Will I be penalized for this when I calculate the detention for the redevelopment?

No, the applicant will not be penalized for this. The applicant must redo the existing detention volume calculations using the current runoff coefficients, so that an “apples to apples” comparison of existing and proposed conditions can be made to determine if any additional detention volume is required.

The soils on my site have infiltration rates greater than 0.5 in/hr. Do I still have to install underdrains in the volume control practice?

Underdrains are not required if it can be demonstrated that the native soils have an infiltration rate of 0.5 in/hr or greater. The infiltration rate must be measured with a infiltrometer test and meet the requirements of ASTM D3385. Calculations will need to show that the retention based system will dewater in approximately 72 hrs.

Is credit given to developments that provide more than the one inch of required volume control storage?

For regular developments, the additional volume control storage provided in excess of the required one inch is credited in the form of an even more reduced curve number. For redevelopments, the provided volume control storage is credited toward the required detention volume.

What are the impact fees?

Impact fees are rarely required.

Generally, they are applicable only to those areas annexed into the District on or after July 9, 1998, which have not already paid the full connection impact fee.

These fees recoup District capacity expansion cost for our WRPs and collection systems

Top 5 Tips:

For Super Fast Permit Approval !!!

1.

2.

3.

4.

5.

Top 5 Tips:
For Super Fast Permit Approval !!!

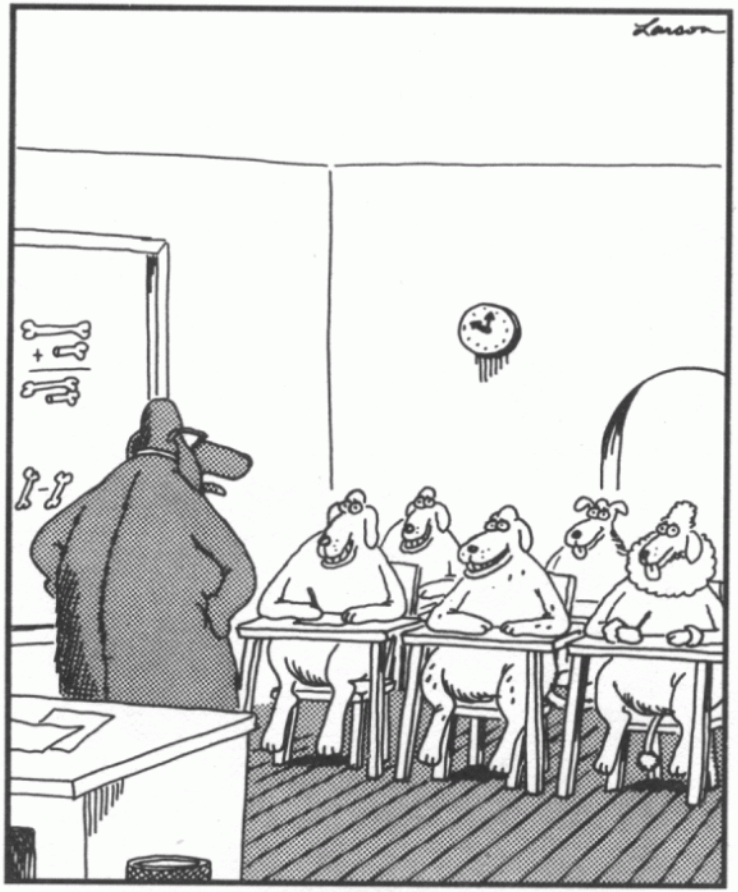
1.

2.

3.

4.

5. Read and Review:
   WMO, TGM, and Examples



"Well, here we go again. ... Did anyone here *not* eat his or her homework on the way to school?"

Top 5 Tips:

For Super Fast Permit Approval !!!

1.

2.

3.

4. Ask for Help

5. Read and Review:
   WMO, TGM, and Examples

Top 5 Tips:

For Super Fast Permit Approval !!!

1.

2.

3. Sign the Permit

4. Ask for Help

5. Read and Review:
   WMO, TGM, and Examples

Top 5 Tips:

For Super Fast Permit Approval !!!

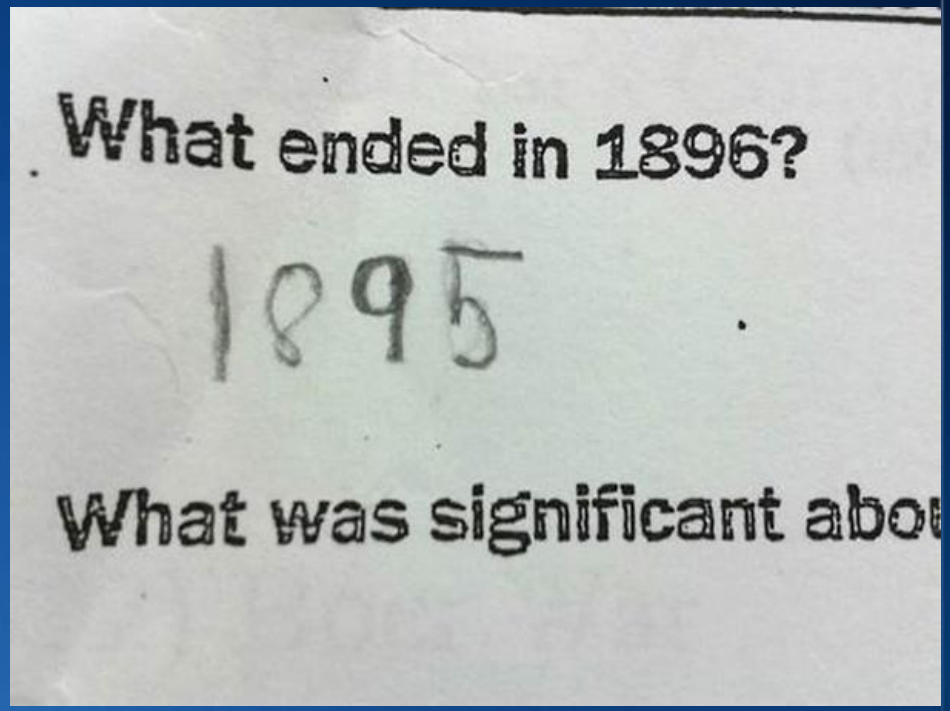
1.

2. Forms:
   Complete & Consistent

3. Sign The Permit

4. Ask for Help

5. Read and Review:
   WMO, TGM, and Examples



WMO Checklist

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
WATERSHED MANAGEMENT (WMO) PERMIT APPLICATION MINIMUM SUBMITTAL REQUIREMENTS CHECKLIST

Before the MWRD can accept a Watershed Management Permit application submittal, assign it a permit application number, and initiate engineering review; the submittal must include all the items listed below. Incomplete applications will be returned, unreviewed, to the applicant.

General Submittal Requirements:

1. ☐ One (1) copy of this form, checked as appropriate
2. ☐ Four (4) copies of the Watershed Management Permit application (Cover, Schedule A, Schedule B, Schedule C, General Conditions, and Engineering Certifications, original signatures with seals)
   - ☐ Municipality's (Permittee's) signature on permit form (page 9)
   - ☐ Owner/developer's (Co-permittee's) signature on permit form (page 9)
   - ☐ Design Engineer's signature and seal on permit form (page 8)
   - ☐ Municipal/Systems Engineer's signature and seal on permit form (page 8)
   - ☐ Inspection Engineer's signature and seal on permit form (page 8)
3. ☐ Two (2) copies of plan set (signed and sealed), as required to initiate review
   Note that four (4) copies of the plans will be required as part of final permit approval (2 copies + 2 original)
4. ☐ One (1) copy of Fee Payment Voucher form & a check for appropriate fees (no personal checks accepted)
5. ☐ One (1) copy of all completed detailed submittal checklists (as specific to the site and development type)
6. ☐ One (1) copy of all supporting calculations, exhibits, etc., as required by the applicable submittal checklists

If the application submittal is for a project that is on the existing development plans list, check the box below; and refer to Legacy Sewerage System Permit application information and provide appropriate legacy permit forms and checklist.

☐ Project is on existing development plans list

If you have any questions, please contact MWRD Engineering Department Permit Section at (312) 751-3255.

For reference, a typical permit schedule package might include the following specific permit schedules, in addition to the base permit application. Circle the example package used as a guide and check the applicable schedule boxes for this application:

Development with Stormwater Detention
- ☐ Schedule D WMO (or)
- ☐ Schedule D Legacy
- ☐ Schedule K & Exhibit A
- ☐ Schedule R & Exhibit R
- ☐ Schedule P

Sanitary Sewer Only
- ☐ Schedule K
- ☐ Schedule O (Direct)

or
- ☐ NRI only

Development with Floodplain and Wetlands
- ☐ Schedule D WMO (or)
- ☐ Schedule D Legacy
- ☐ Schedule K & Exhibit A
- ☐ Schedule L (if undetained area)
- ☐ Schedule H
- ☐ Schedule P
- ☐ Schedule R & Exhibit R
- ☐ Schedule W

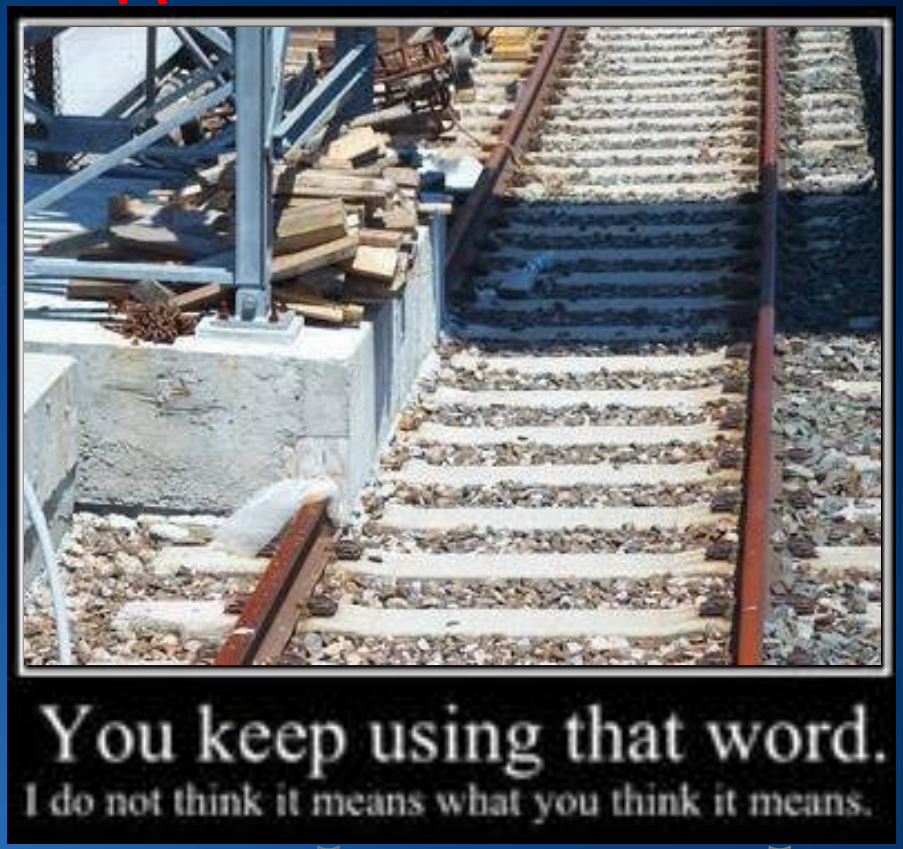
Storm Sewer Only (ROW, no parcel development)
- ☐ Schedule O (for outfall)
- ☐ Schedule P

Breaking News:
Just two (2) copies now!

Top 5 Tips:

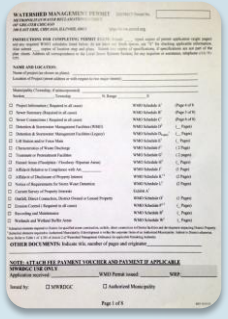
For Super Fast Permit Approval !!!

1. Start <u>before</u> your deadline
2. Forms:
   Complete & Consistent
3. Sign The Permit
4. Ask for Help
5. Read and Review:
   WMO, TGM, and Examples



Quality Control

Permit Timeline



Design Project

Apply for MWRD Permit

Obtain Permit

Mobilize
- MWRD Erosion Inspection

Sewer Work
- MWRD Inspect

Substantial Completion
- MWRD Inspect

Occupancy

$$

WMO Article 8
Infiltration / Inflow Control Program (IICP)

What is an I/I Program?

An ongoing maintenance, operation, and rehabilitation effort to identify and remove groundwater infiltration and stormwater inflow sources from the sanitary sewer system

- Adopted: July 10, 2014
- Applicability:

  All satellite entities that own/operate separate sanitary sewer systems tributary to MWRD
- Short Term Requirements (2014 – 2019)
- Private Sector Program
- Long Term Operation & Maintenance Program
- Annual Reporting
- Non-Compliance

Authorized Municipalities

- **Definition**
  - ***A Cook County municipality authorized by the District to issue Watershed Management Permits within its corporate boundaries*.**
- **Applicable WMO Provisions**
  - Section 100.3 allows municipalities to become authorized.
  - Article 14 defines roles and responsibilities of Authorized Municipalities.
- **Legal Relationship of Authorized Municipality.**
  - Adopts WMO by reference under own municipal powers.
  - Enters IGA with MWRD.

Managing Stormwater

The WMO aims to protect public health, safety, and welfare, and Cook County homes and businesses from flood damage by managing and mitigating the effects of development and redevelopment on stormwater drainage. It provides uniform minimum stormwater management regulations for Cook County that are consistent with the region.

The WMO replaces the MWRD's repealed Sewer Permit Ordinance (SPO). WMO permit requirements are more comprehensive than those of the SPO.

How it Works

The WMO establishes rules and guidelines for development to ensure that flooding problems are not exacerbated. Permits are required prior to start of construction for new projects as described inside.

Single Family Homes

The WMO was not intended to regulate most single family homes. When a new development is located in or near a Flood Protection Area, a permit may be required. See "WMO: A Quick Guide for Homeowners" and the WMO.

For More Information
please visit wmo.mwrd.org
or contact the MWRD at 312.751.3255
or WMOInbox@mwrd.org

WMO: A Quick Guide for Developers

This pamphlet is an introduction for developers to the requirements and permit compliance process of the Metropolitan Water Reclamation District of Greater Chicago's Watershed Management Ordinance.

Metropolitan Water Reclamation District of Greater Chicago

A Quick Guide for Developers

Watershed Management Ordinance

WMO Informational Brochure

Managing Stormwater

The WMO aims to protect public health, safety, and welfare, and Cook County homes and businesses from flood damage by managing and mitigating the effects of urbanization on stormwater drainage. It provides uniform minimum stormwater management regulations for Cook County that are consistent with the region.

The WMO replaces the MWRD's repealed Sewer Permit Ordinance (SPO). WMO permit requirements are more comprehensive than those of the SPO. Please see inside or visit wmo.mwrd.org for more details.

Single Family Homes

The WMO is not intended to regulate most single family homes. A permit is generally only required for single family home development that involves a Flood Protection Area or requires an extension of a public sewer to serve the parcel. These types of development are regulated under the WMO because they can have a significant potential for loss of property from flood drainage. Unlike residential subdivisions, single family home developments are exempt from the stormwater provisions of the WMO.

The WMO defines a "single family home" as a residential parcel containing less than 3 dwelling units. This does not include single family home parcels subdivided after May 1, 2014.

For More Information
please visit wmo.mwrd.org
or contact the MWRD at 312.751.3255
or WMOInbox@mwrd.org

WMO: A Quick Guide for Homeowners

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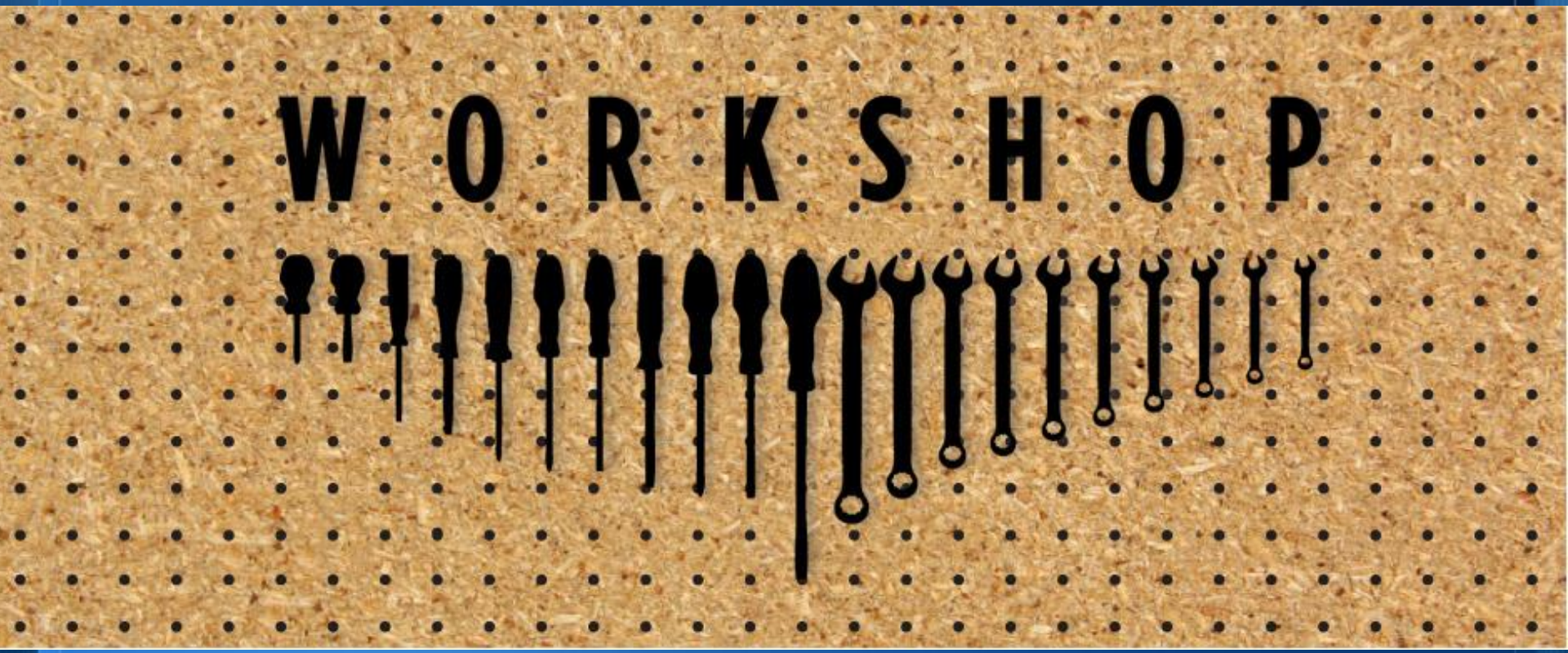
Metropolitan Water Reclamation District of Greater Chicago

A Quick Guide for Homeowners

Watershed Management Ordinance

WMO Informational Brochure


WORKSHOP

Thank You
Questions?

Metropolitan Water Reclamation District of Greater Chicago
100 E. Erie Street
Chicago, Illinois