

MWRD - WMO

Watershed Management Ordinance BMP and Ordinance Updates



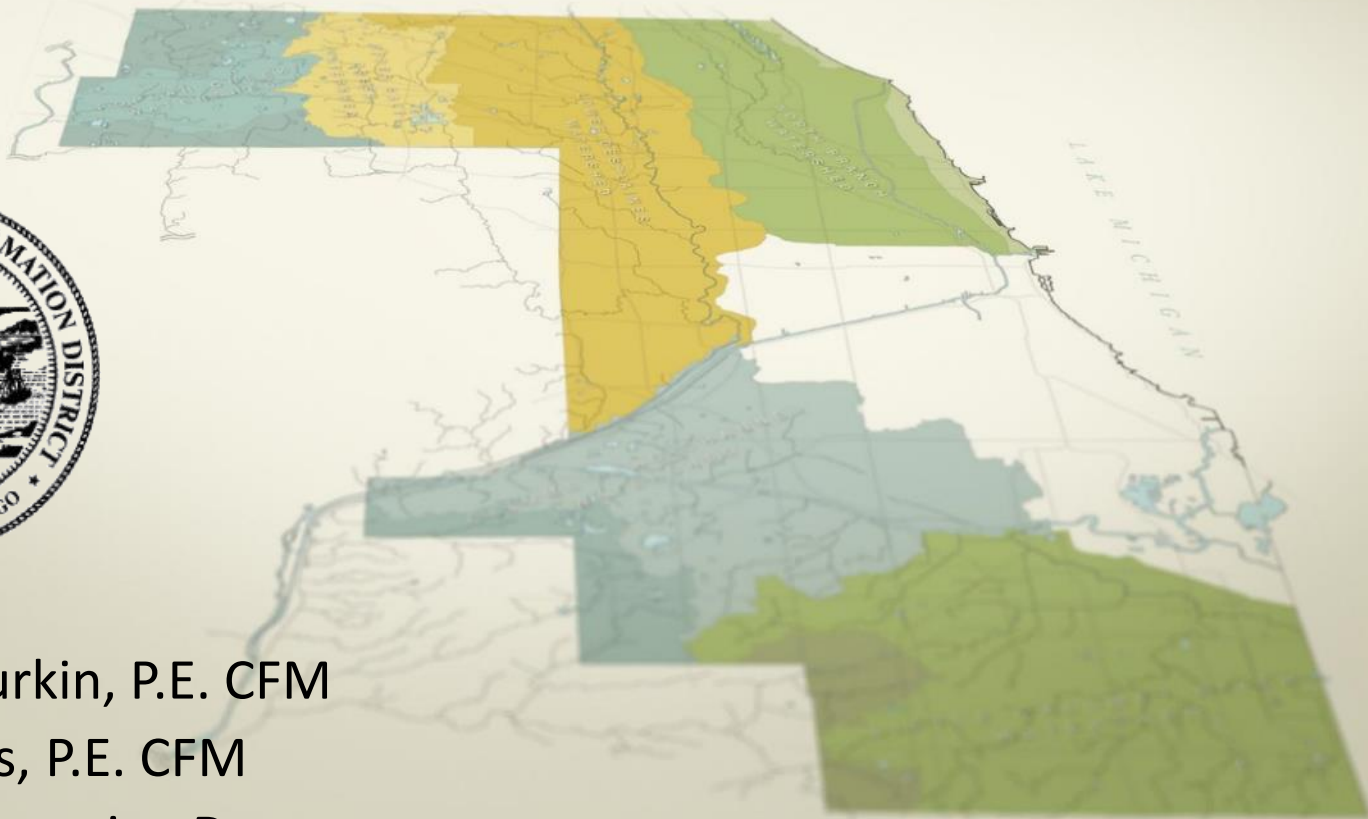
IAFSM

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MWRD Engineering Department

March 12, 2020





Agenda

- Brief MWRD/WMO Background
- Timeline and Ordinance Updates
- Permit Applicability
- Detention Update
- Volume Control / BMP Updates
- New Volume Control / BMP Details
- WMO : Next Steps
- WMO: Results
- Questions



MWRD (District) Overview

- Independent Unit of Gov.

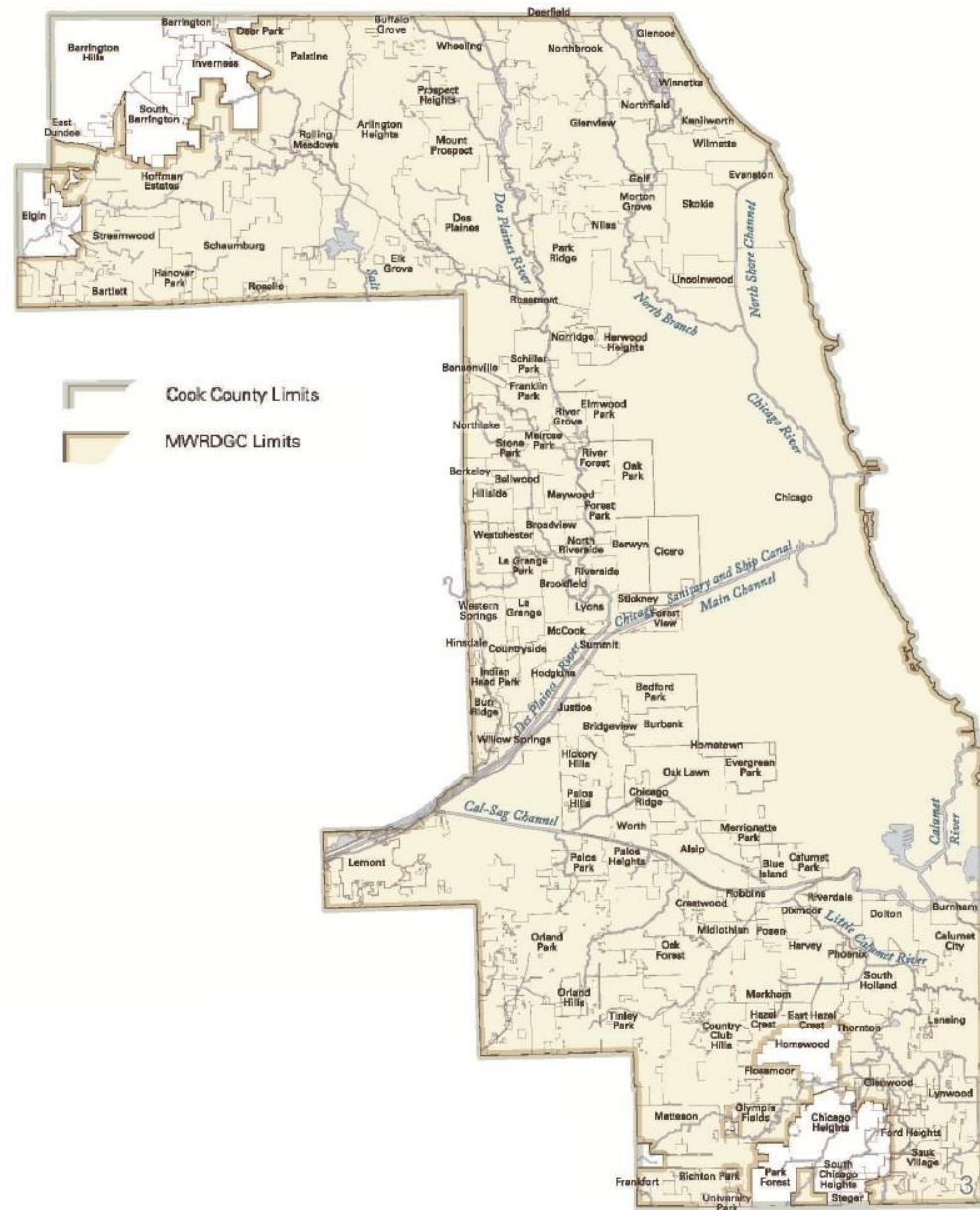
- Established in 1889
- Special-purpose district
- Taxing body
- Not part of City of Chicago

- Statutory Responsibilities

- Wastewater Reclamation
- Stormwater Management

- Demographics

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





WMO Objective

Establish uniform, minimum, and comprehensive countywide stormwater management regulations

Enabling Legislation

Watershed Management Ordinance

“Stormwater management in Cook County shall be under the general supervision of the Metropolitan Water Reclamation District of Greater Chicago.”

“The District may prescribe by ordinance reasonable rules and regulations for floodplain and stormwater management . . . in Cook County.”

Public Act 093-1049



WMO Background

- 2004: Public Act 093-1049
 - *MWRDGC (the District) is the stormwater authority for Cook County*
- 2007-2013: Development and Public Review
 - *Technical Advisory Committee*
 - *Public Comments*
 - *Economic Impact Study*
- October 2013: Adoption
- May 1, 2014: Effective Date
- Begin Watershed Specific Release Rate Study
- July 10, 2014: Amendment
 - *Infiltration/Inflow Control Program (Article 8) is added*
- 2016-2017: Development of Proposed Amendment
- January 2019: Results of Watershed Specific Release Rate Study
- May 16, 2019:
 - *Amendment Approved by MWRD Board of Commissioners*
- January 1, 2020:
 - *New Stormwater Regulations become Effective*



WMO Resources

- New Website!
 - **MWRD.ORG** or **MWRD.ORG/WMO**
- New Details
- New Permit Forms
- Compliance Info
- Keep up to date
- Flow Charts
- Latest Information
- Permit Inquiry Link
- Ordinance Updates



The Watershed Management Ordinance (WMO)

The Watershed Management Ordinance (WMO) applies to all development within the boundaries of Cook County, Illinois, and qualified sewer construction within the MWRD's corporate boundaries or service agreement areas. Components which are regulated under the WMO include qualified sewer construction, drainage and detention, volume control, floodplain management, isolated wetland protection, riparian environment protection, and soil erosion and sediment control. The WMO went into effect on May 1, 2014.

On May 16, 2019, the MWRD's Board of Commissioners adopted an amendment to the WMO including new Watershed Specific Release Rates, incorporation of Updated Bulletin 70 rainfall data, updates to the redevelopment provisions relating to detention, and several clarifications. The amended version of the WMO and the redline changes are accessible through the General Information link below.

[General Information](#)

[Technical Information](#)

As a reminder, starting on January 1, 2020, all permit application submittals must comply with the new Watershed Specific Release Rates, Updated Bulletin 70, and redevelopment changes. Slides from our training October 2019 training sessions are accessible through the link below.



WMO Resources

- Permit Applicability
 - Development within Flood Protection Area
 - Development greater than 0.5 acre
 - Qualified sewer
 - Modifications to detention facility
 - Direct connections to District facilities
 - New or reconstructed outfalls



Article 5 – Stormwater Management

Summary of Stormwater Management Requirements

| Development Type (See Appendix A for definitions) | §502 | §503 | §504 |
|--|------------------------------------|--|---------------------------------------|
| | Runoff Requirements _{1,2} | Volume Control Requirements _{1,2} | Detention Requirements _{1,2} |
| Single-Family Home | Exempt | Exempt | Exempt |
| Residential Subdivision on property holdings | ≥ 1 acre | ≥ 1 acre | ≥ 5 acres |
| Multi-Family Residential on property holdings | ≥ 0.5 acre | ≥ 0.5 acre | ≥ 3 acres [‡] |
| Non-Residential on property holdings | ≥ 0.5 acre | ≥ 0.5 acre | ≥ 3 acres [‡] |
| Open Space on property holdings | ≥ 0.5 acre | Not Applicable | Not Applicable |
| Right-of-Way when new impervious area | ≥ 1 acre | ≥ 1 acre [†] | ≥ 1 acre [†] |

¹ **Stormwater** management requirements do not apply to **demolition** or **maintenance activities**.

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

[†] Where practicable.

[‡] Starting the effective date of the **WMO**, any new **development** within the **property holdings** that totals either individually or in the aggregate to greater than or equal to one-half (0.5) of an acre.



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Article 5

Article 5 – Stormwater Management

- New rainfall data
- New Runoff methodology
- New Volume Control requirements
- Watershed Specific Release Rates
- Non-qualified development (GI)
- New Detention requirements
- New Redevelopment requirement
- New Calculators



Article 5 – Watershed Specific Release Rates

Calumet Sag Channel: 0.30 cfs/acre

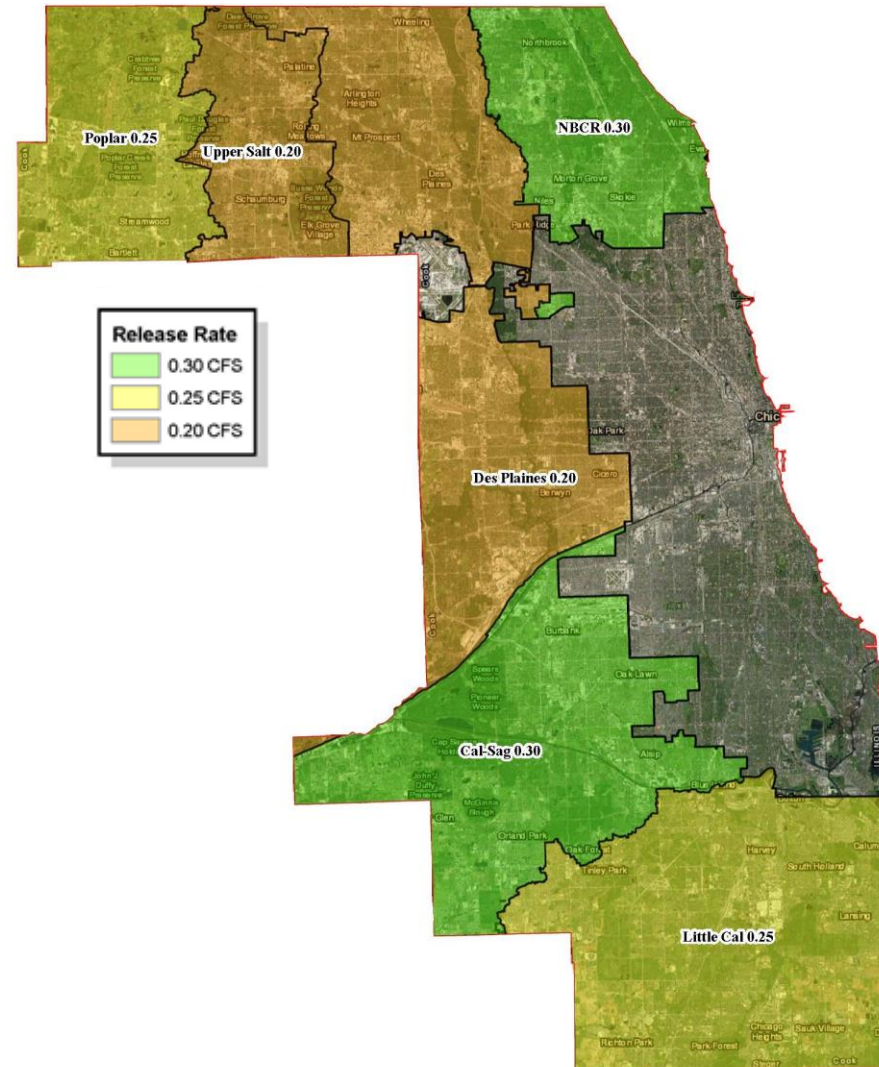
Little Calumet River: 0.25 cfs/acre

Lower Des Plaines: 0.20 cfs/acre

North Branch: 0.30 cfs/acre

Poplar Creek: 0.25 cfs/acre

Upper Salt Creek: 0.20 cfs/acre





Article 5 – Detention

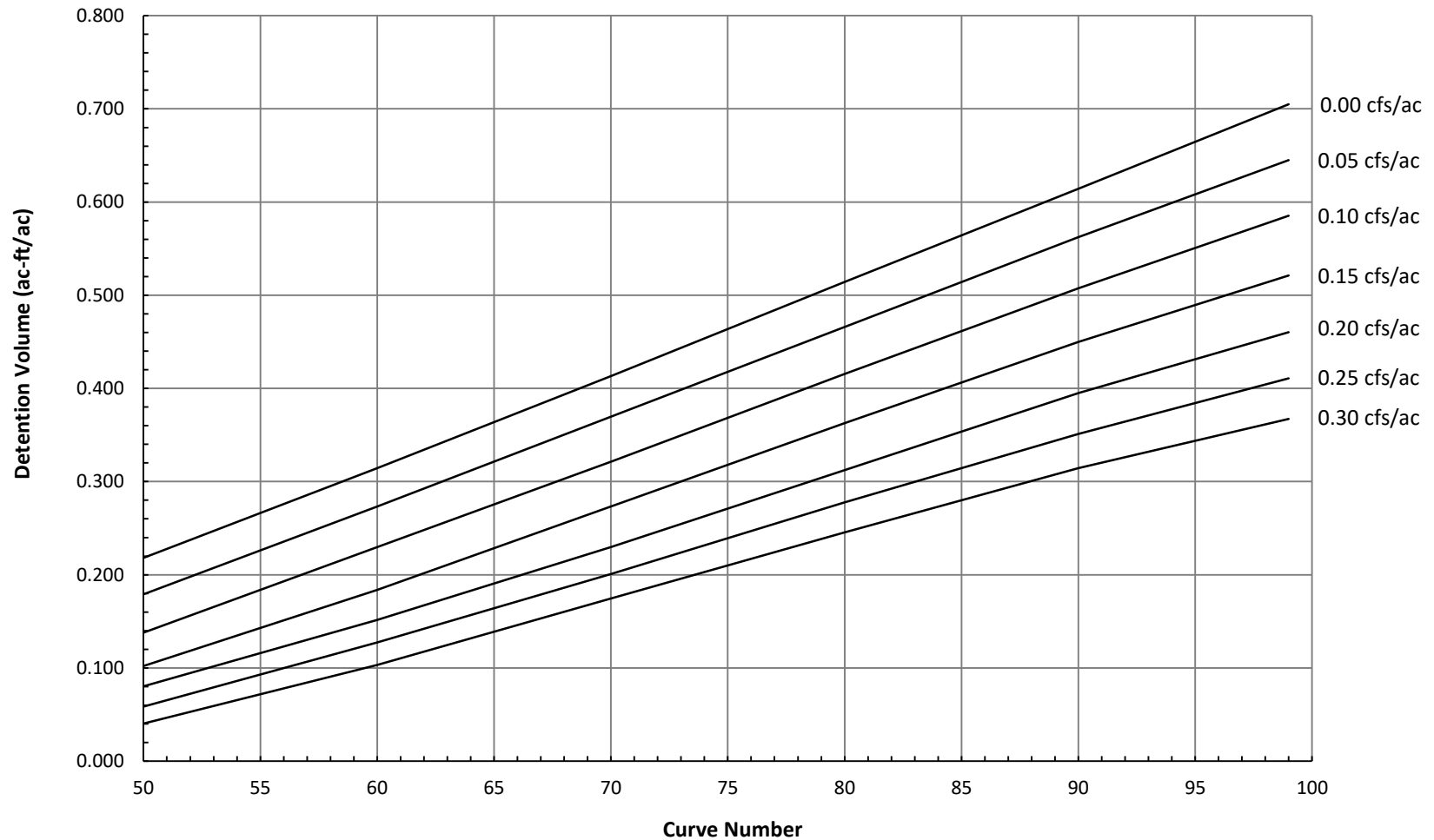
Methodology: Nomograph

- Newly Developed Nomograph
 - Updated Bulletin 70 Rainfall Data
 - Release rates ranging from 0.00 to 0.30 cfs/acre
- May be used, instead of hydrologic model, when:
 - Development < 20 acres
 - No Depressional Storage
 - No Tailwater conditions (BFE, ponds in series)
 - Not meant to address complex hydrology or hydraulics



Article 5 – Detention

NOMOGRAPH: BULLETIN 70 (2019)





Article 5 – Detention

DEVELOPMENT INFORMATION

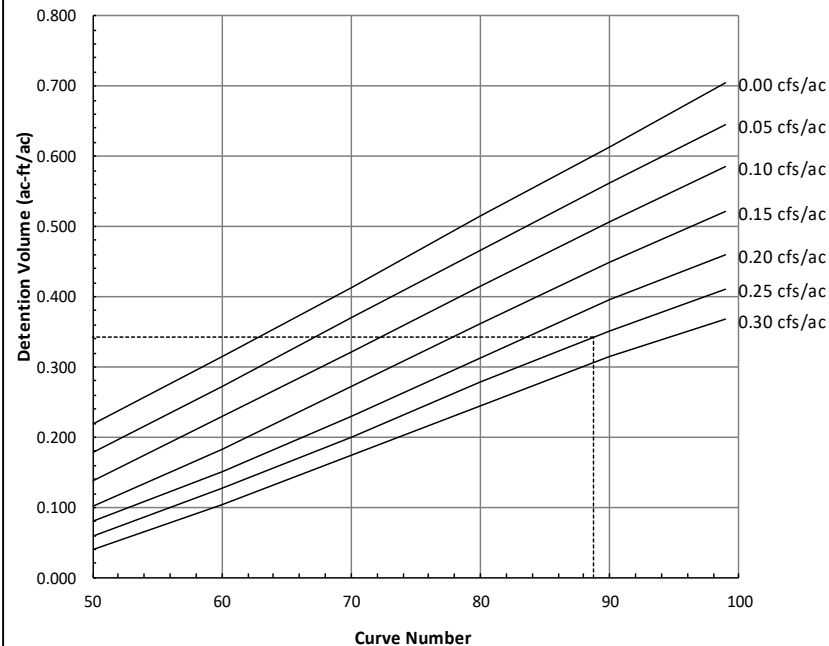
| | | |
|------------------------|-------|-------|
| 1. Detained Area | 3.000 | acres |
| 2. Curve Number | 88.77 | |
| 3. Actual Release Rate | 0.750 | cfs |

REQUIRED DETENTION VOLUME

| | | |
|------------------------------|-------|-------|
| 4. Required Detention Volume | 1.027 | ac-ft |
|------------------------------|-------|-------|

NOMOGRAPH

NOMOGRAPH: BULLETIN 70 (2019)





Rain Barrel

Disconnected Downspout

Bioswale

Dry Well

Permeable Pavement



Volume Control

- One inch of volume over total proposed impervious area
- Can be provided in several ways:
 - Infiltration Trenches
 - Infiltration Basins
 - Porous Pavement (storage in the voids below the pavement)
 - Bio-Retention Systems
 - Dry Wells
 - Cisterns / Water Reuse
 - Green Roofs
 - Open Channel Practices Fitted With Check Dams
 - Storage Below the Outlet of a Site Detention Facility
- Credit toward required detention volume (CN reduction)
- Offsite volume control facilities to be utilized in cases of site constraints



Volume Control Examples (from EPA)

Bioswales



Permeable Pavements

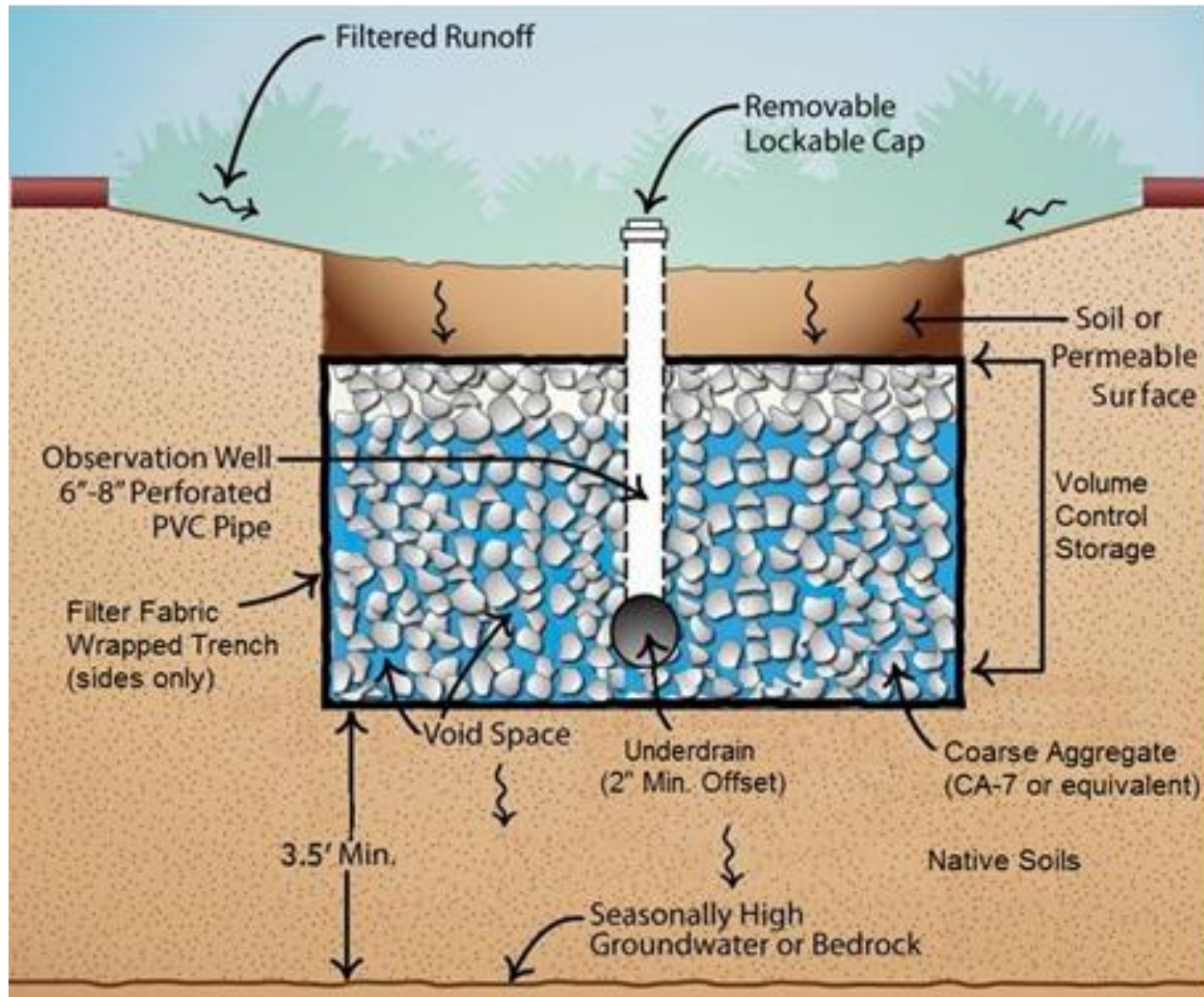


Green Roofs



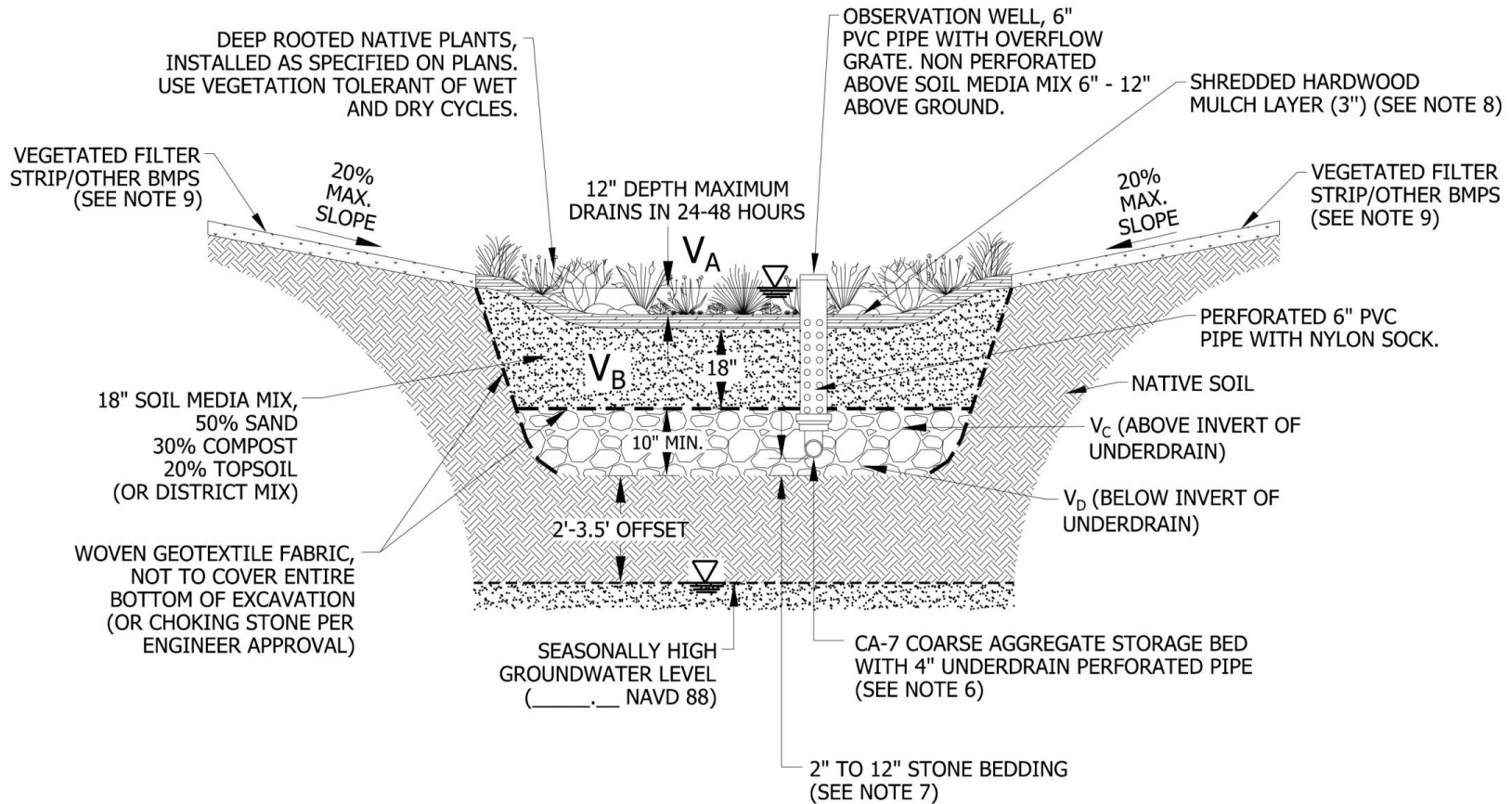
Water Harvesting



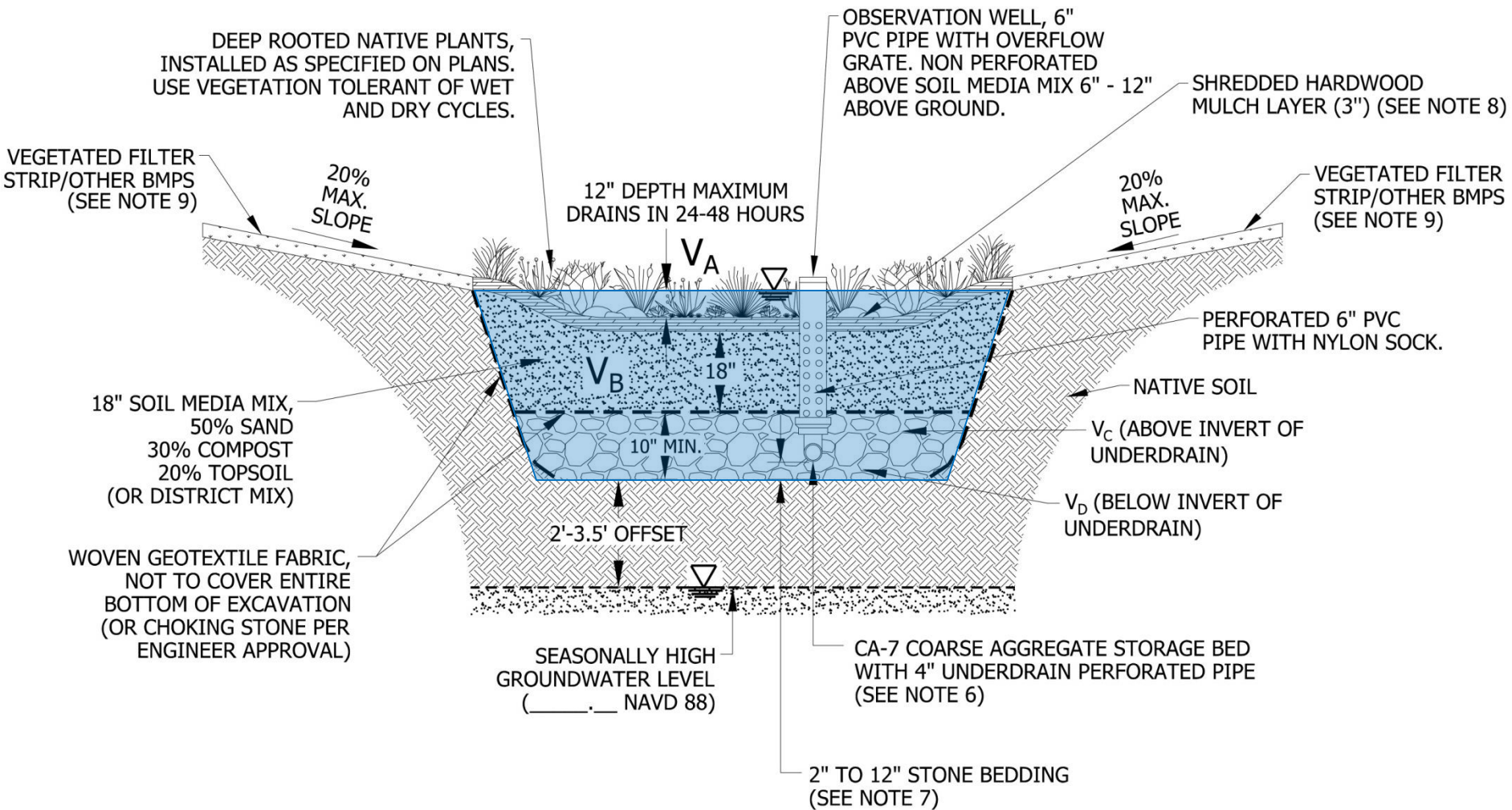




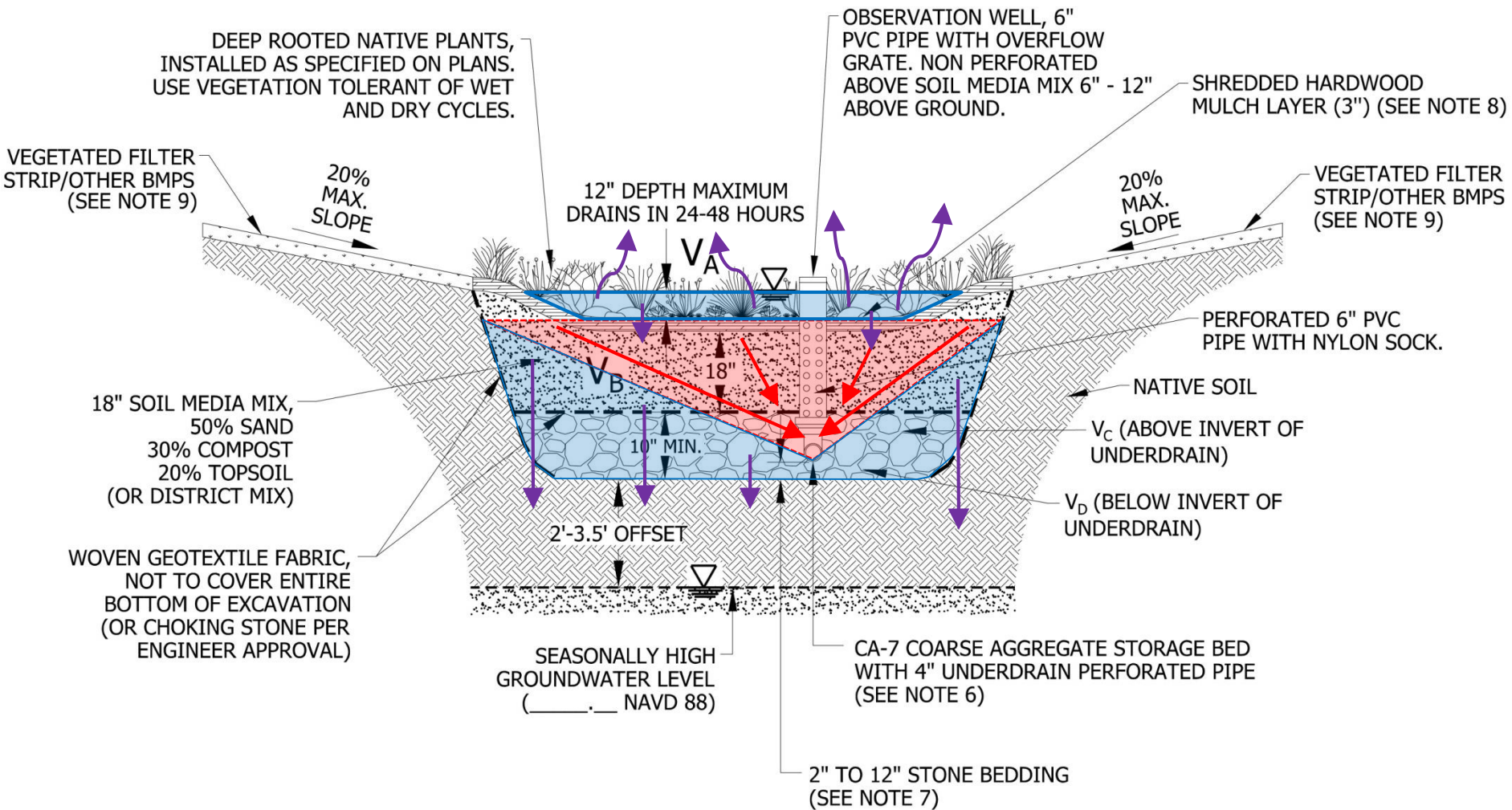
Volume Control



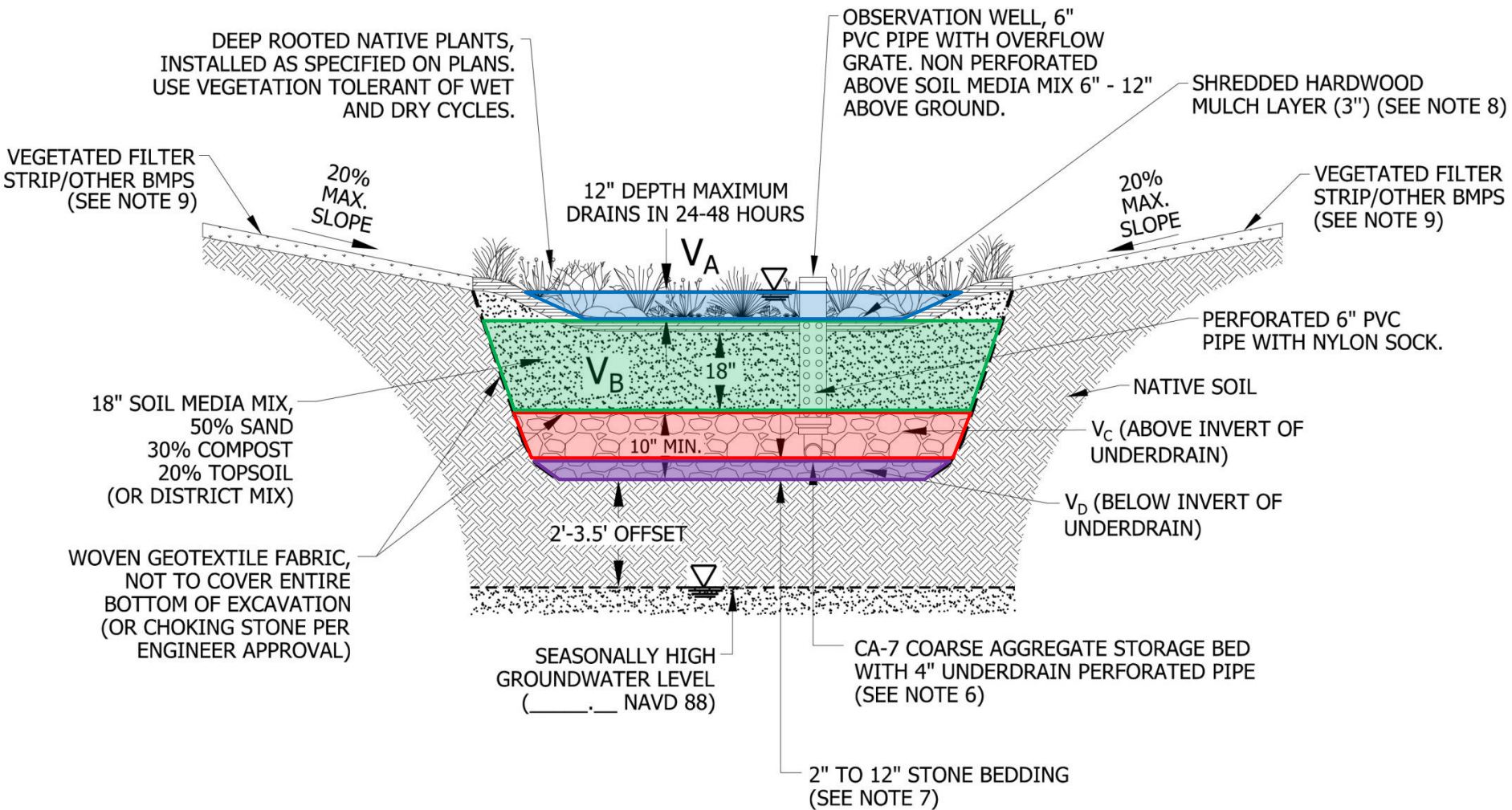
| VOLUME TYPE | POROSITY | MEDIA VOLUME | STORAGE VOLUME | VOLUME PROVIDED |
|----------------------------|----------|--------------|------------------------------|-----------------|
| SURFACE STORAGE | 1.00 | V_A | $1.00 \times V_A$ | |
| SOIL MEDIA MIX | 0.25 | V_B | $0.5 \times 0.25 \times V_B$ |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



| VOLUME TYPE | POROSITY | MEDIA VOLUME | STORAGE VOLUME | VOLUME PROVIDED |
|----------------------------|----------|----------------|-----------------------------|-----------------|
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| 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 | |
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| TOTAL | | | | |



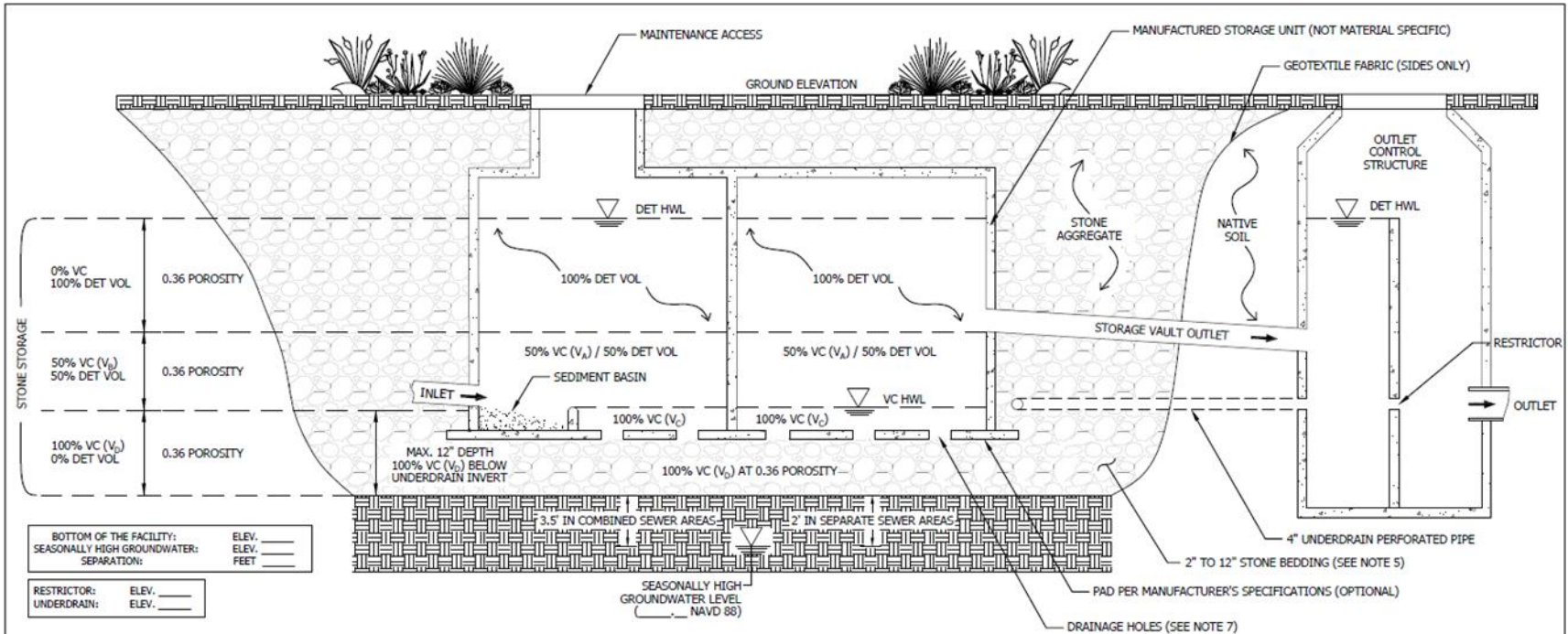
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| TOTAL | | | | |



New Detail: Underground Vault Volume Control/Detention Detail



NOTES:

1. THE PERIMETER OF THE VOLUME CONTROL FACILITY SHALL MAINTAIN THE MINIMUM HORIZONTAL SEPARATION DISTANCE OF: 10- FEET FROM FOUNDATIONS, UNLESS WATERPROOFED; 20- FEET FROM ROADWAY GRAVEL SHOULDER; AND 100- FEET FROM POTABLE WATER WELLS, SEPTIC TANKS/FIELDS, OR OTHER UNDERGROUND TANKS.
2. SANITARY OR COMBINED SEWERS SHALL NOT BE LOCATED WITHIN THE VOLUME CONTROL FACILITY. SANITARY OR COMBINED SEWERS SHALL NOT BE LOCATED BELOW THE FOOTPRINT OF THE VOLUME CONTROL FACILITY. WHEN LOCAL CONDITIONS PREVENT THE SEWER FROM BEING LOCATED OUTSIDE THE FOOTPRINT OF THE FACILITY THE SEWER SHALL BE CONSTRUCTED TO WATER MAIN QUALITY STANDARDS, AND IT SHALL BE ENCASED WITH A WATER MAIN QUALITY CARRIER PIPE WITH THE ENDS SEALED.
3. MINIMUM DISTANCE OF 2 FEET (3.5 FEET IN COMBINED SEWER AREAS) BETWEEN BOTTOM OF THE VOLUME CONTROL FACILITY AND SEASONALLY HIGH GROUNDWATER LEVEL.
4. STONE STORAGE OPTIONS ARE IDOT CA-1, IDOT CA-3, IDOT CA-7, OR APPROVED ALTERNATE. NO RECYCLED MATERIALS.
5. UNDERDRAINS ARE REQUIRED IN TYPICAL CLAYEY SOILS WHERE INFILTRATION RATES ARE LESS THAN 0.5 INCH/HOUR. NO MORE THAN 1 UNDERDRAIN EVERY 30 FEET ON CENTER. MINIMUM UNDERDRAIN BEDDING OF 2 INCHES, MAXIMUM OF 12 INCHES.
6. APPROPRIATE MAINTENANCE ACCESS SHALL BE PROVIDED TO ENSURE THAT EACH SEGMENT OF THE SYSTEM IS ACCESSIBLE BY A VACUUM, JET HOSE, OR A TELEVISION DEVICE. ACCESS IS RECOMMENDED NEAR ALL ENTRY/EXIT POINT FOR SEDIMENT REMOVAL. EGRESS RUNGS SHALL BE PROVIDED FOR SYSTEMS DEEPER THAN 42-INCHES.
7. DRAINAGE OPENINGS SHOULD COVER AT LEAST 3% OF THE PAD'S FOOTPRINT. DESIGNER / MANUFACTURER RESPONSIBLE FOR THE STRUCTURAL INTEGRITY OF THE MANUFACTURED STORAGE UNIT.

VOLUME CONTROL SUMMARY

| VOLUME TYPE | DEPTH | POROSITY | STORAGE VOLUME | VOLUME PROVIDED |
|--|-------|----------|-------------------------------|-----------------|
| V_d : VAULT STORAGE (BELOW THE OUTLET) | | 1.00 | $1.00 \times 0.50 \times V_d$ | |
| V_b : COARSE AGGREGATE (ABOVE U.D. INVERT) | | 0.36 | $0.50 \times 0.36 \times V_b$ | |
| V_c : VAULT STORAGE (BELOW U.D. INVERT) | | 1.00 | $1.00 \times V_c$ | |
| V_o : COARSE AGGREGATE (BELOW U.D. INVERT) | | 0.36 | $0.36 \times V_o$ | |
| * VOLUME INTENDED FOR DETENTION NOT INCLUDED * | | | | TOTAL |

NOT TO SCALE



TECHNICAL GUIDANCE MANUAL

UNDERGROUND VAULT VOLUME CONTROL/DETENTION TYPICAL DETAIL

10/2/2018

STD. DWG. NO.XX

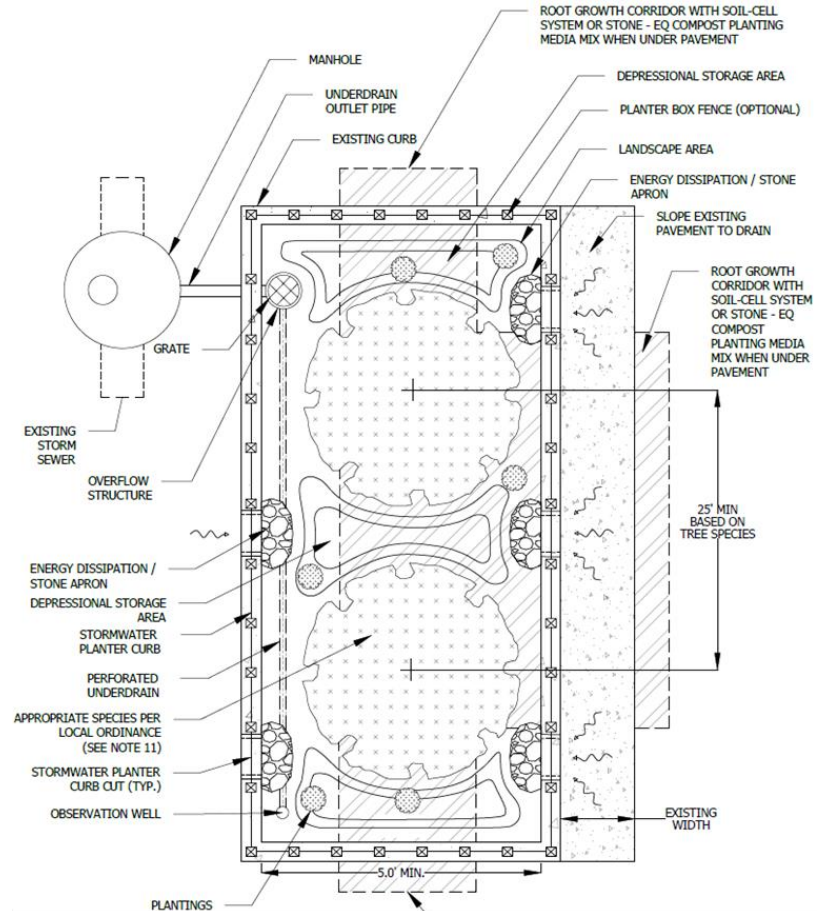
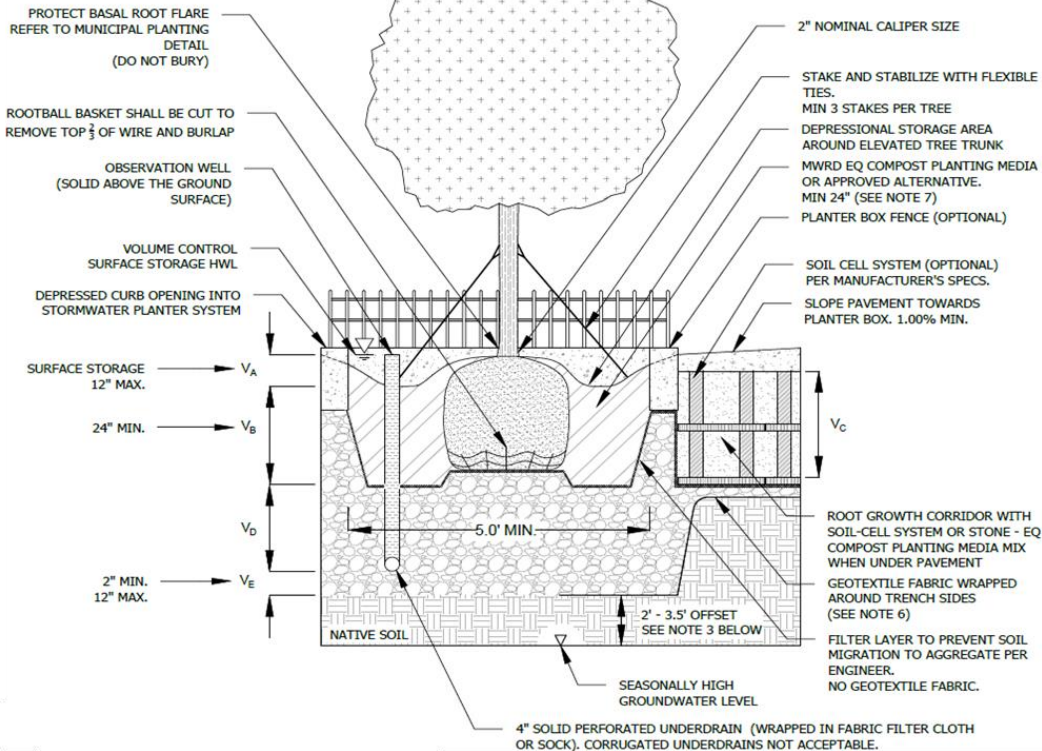
PAGE NO.XX



New Detail: Urban Tree Stormwater Planter Box

MAINTENANCE NOTES:

1. STAKE WITH FLEXIBLE TIES FOR THE FIRST YEAR OR UNTIL TREE ESTABLISHED.
2. IRRIGATE TO ESTABLISH PLANTINGS PER LANDSCAPE DESIGNER. AT LEAST 1 INCH OF WATER PER WEEK FOR THE FIRST 3 YEARS.
3. CLEAN/REPLACE MULCH/ROCK ANNUALLY.
4. CLEAN/REPLACE CURB DRAINS ANNUALLY AND REMOVE DEBRIS AS NECESSARY.
5. INSPECT UNDERDRAIN ANNUALLY, CLEAN AS NECESSARY.





Lessons learned Volume Control

Wet-bottomed ponds with level spreaders as opposed to freely draining underdrains do not dewater within 72 hrs

This problem is exacerbated with tailwater conditions

- Right photo shows volume control shelf underwater after 65 hour dry period





Lessons learned Volume Control

Wet-bottomed ponds with level spreaders as opposed to freely draining underdrains do not dewater within 72 hrs

This problem is exacerbated with tailwater conditions

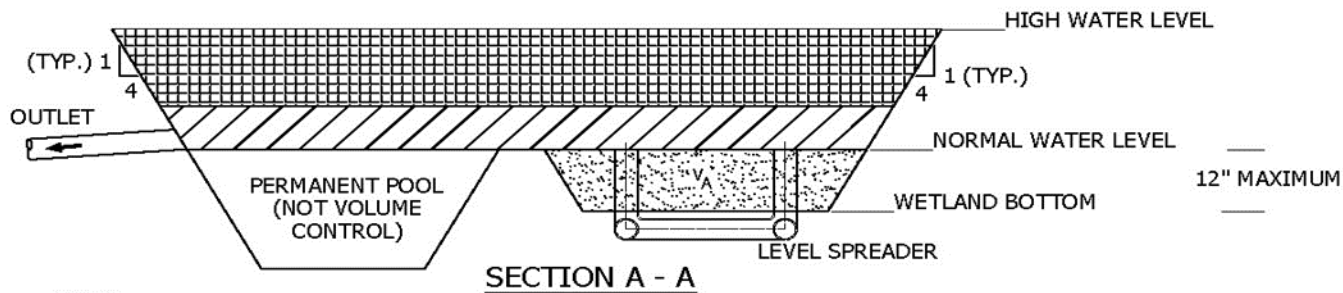
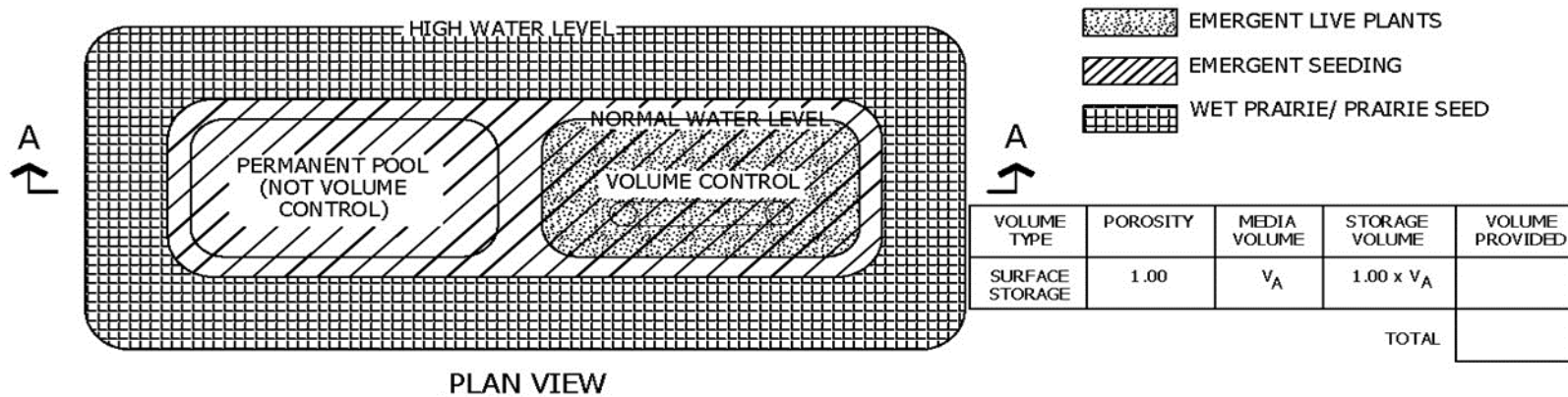
- Right photo shows volume control shelf underwater after 65 hour dry period





Volume Control Detail Update

- Prior MWRD typical storage below detention basin outlet detail drawing illustrated a level spreader with no gravity outlet to the restrictor. This details has recently been updated.



- NOTES:
- 1) BOTTOM OF VOLUME CONTROL FACILITY SHALL BE AS FLAT AS POSSIBLE. BOTTOM SLOPES SHALL NOT EXCEED 20:1
 - 2) LEVEL SPREADER PERFORATED 4-INCH DIAMETER PIPE MUST BE INSTALLED TO DISTRIBUTE STORMWATER OVER THE ENTIRE VOLUME CONTROL FACILITY.
 - 3) DEPTH BELOW OUTLET SHALL NOT EXCEED 12 INCHES.
 - 4) DETENTION BASIN SIDE SLOPES SHALL BE 3:1 MINIMUM.
 - 5) FOLLOW THE REQUIRED PRETREATMENT MEASURES LISTED ON THE VOLUME CONTROL PRETREATMENT MEASURES DETAIL (PAGE 17).

NOT TO SCALE



Volume Control

Revised wet-bottomed pond policy:

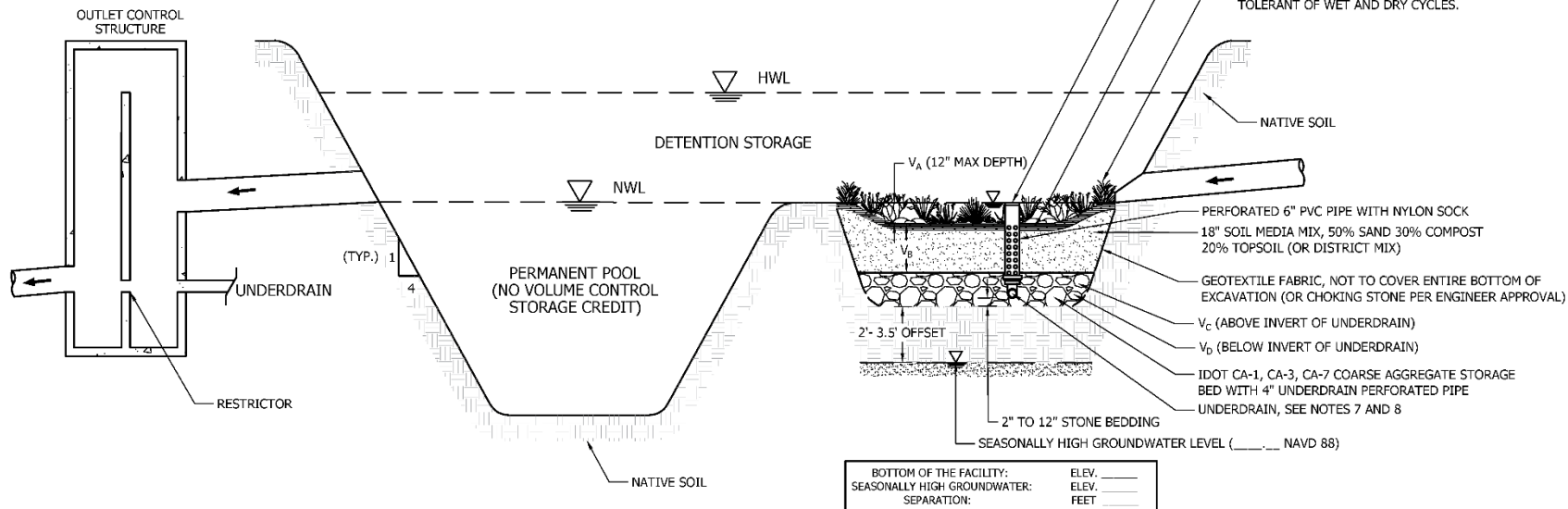
- **Volume below the pond outlet can only be credited towards required volume control storage if the pond includes an underdrain connected and freely draining to a storm sewer, OR**
- If no underdrain is provided, the infiltration rate must be measured with an in situ percolation test, with result provided to demonstrate the infiltration rate of the soil is at least 0.50 inches per hour.
- If neither of the requirements above are met, no volume control storage may be credited.
- If an underdrain is provided, 100% of the void volume below the underdrain may be credited towards the required volume control storage. However, 50% of the void volume above the invert of the underdrain may be credited towards the required volume control storage.
- 100% of the surface storage volume may be credited towards the required volume control storage **provided that surface is planted with a soil mixture, rather than simply a freely draining gravel or stone aggregate surface.**



Article 5 – Volume Control

New Detail:

| VOLUME TYPE | DEPTH | POROSITY | STORAGE VOLUME | VOLUME PROVIDED |
|---|-------|----------|-------------------------------|-----------------|
| V_A : SURFACE STORAGE | | | $1.00 \times V_A$ | |
| V_B : SURFACE STORAGE | | | $0.50 \times 0.25 \times V_B$ | |
| V_C : COARSE AGGREGATE (ABOVE INVERT) | | | $0.50 \times 0.36 \times V_C$ | |
| V_D : COARSE AGGREGATE (BELOW INVERT) | | | $0.36 \times V_D$ | |
| TOTAL | | | | |



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- BOTTOM OF VOLUME CONTROL FACILITY SHALL BE AS FLAT AS POSSIBLE. BOTTOM SLOPES SHALL NOT EXCEED 20:1. DETENTION BASIN SIDE SLOPES SHALL BE 3:1 MINIMUM.
- THE DEPTH BELOW OUTLET SHALL NOT EXCEED 12 INCHES AND SHALL BE DEWATERED IN 72 HOURS OR LESS.
- UNDERDRAINS ARE REQUIRED IN TYPICAL CLAYEY SOILS WHERE INFILTRATION RATES ARE LESS THAN 0.5 INCH/HOUR. UNDERDRAIN SHOULD BE NO LARGER THAN 4 INCHES IN DIAMETER TO ENCOURAGE RETENTION, HAVE AN OBSERVATION WELL INSTALLED AT THE TERMINAL END AND BE SPACED NO MORE THAN 30 FEET ON CENTER ACROSS A RETENTION FIELD. ONE OBSERVATION WELL REQUIRED PER 6,000 SQUARE FEET OF SURFACE AREA.
- VOLUME CONTROL FACILITY UNDERDRAIN SYSTEM SHALL BE CONNECTED TO A DOWNSTREAM STRUCTURE, UPSTREAM OF THE RESTRICTOR.



● New Form:

SCHEDULE P SOIL EROSION AND SEDIMENT CONTROL

WMO Permit Number: _____

NAME OF PROJECT: _____

1. PROJECT INFORMATION:

- A. Project Area (include all disturbed area) _____ acres
- B. Stormwater discharges directly to:
- ☐ Storm Sewer
 - ☐ Combined Sewer
 - ☐ Overland Flow Route
 - ☐ Waters of the State → Name of water body: _____
 - ☐ Other → Explain: _____
- C. Indicate if any of the following special circumstances apply (check all that apply):
- ☐ Volume Control Facility
 - ☐ Wetland / Buffer
 - ☐ Outfall to Waterway
 - ☐ Floodplain / Floodway
 - ☐ Riparian Environment
 - ☐ Tributary to Lake Michigan
- D. Explain how special circumstances indicated in Item 1.C will be protected from erosion and sedimentation:
- _____
- _____

2. SOIL EROSION AND SEDIMENT CONTROL PRACTICES: Submit a soil erosion and sediment control plan indicating type, location, and detail for all practices. Include a sequence for all major construction activities. All practices must be constructed in accordance with the Illinois Urban Manual.

- A. Indicate all temporary soil erosion and sediment control practices installed as part of the project:
- ☐ Entrance / Exit Control
 - ☐ Vegetative Control
 - ☐ Filtration for Dewatering
 - ☐ Concrete Washout
 - ☐ Matting / Mulching
 - ☐ Conveyance Channel
 - ☐ Silt Fence
 - ☐ Coir Roll
 - ☐ Velocity Dissipation
 - ☐ Double-Row Silt Fence
 - ☐ Sediment Trap
 - ☐ Cofferdam / Silt Curtain
 - ☐ Inlet Control
 - ☐ Sediment Basin
 - ☐ Other: _____
 - ☐ Other: _____
- B. Indicate all permanent soil erosion control practices installed as part of the project:
- ☐ Vegetative Control
 - ☐ Velocity Dissipation
 - ☐ Other: _____
 - ☐ Other: _____



What is next for WMO?

- Recently Released:
 - Updated Permit Forms – Check Website
 - Updated TGM with examples
- Substantial Changes in Stormwater Detention for January 1, 2020
 - New Updated Bulletin 70 (2019) Data Effective
 - New Watershed Specific Release Rates
 - New Redevelopment Provisions
 - Expect Significant Increase in Detention Volume Required
 - **Expectation Changes**
Many Existing Basins are Likely Insufficient and Will Require Additional Volume
- New Schedule P Form
- New § 208.1: Pilot study for Detention and Volume Control Credit Trading Program



Questions?

Thank you

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&

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Metropolitan Water Reclamation District of Greater Chicago

100 E. Erie Street

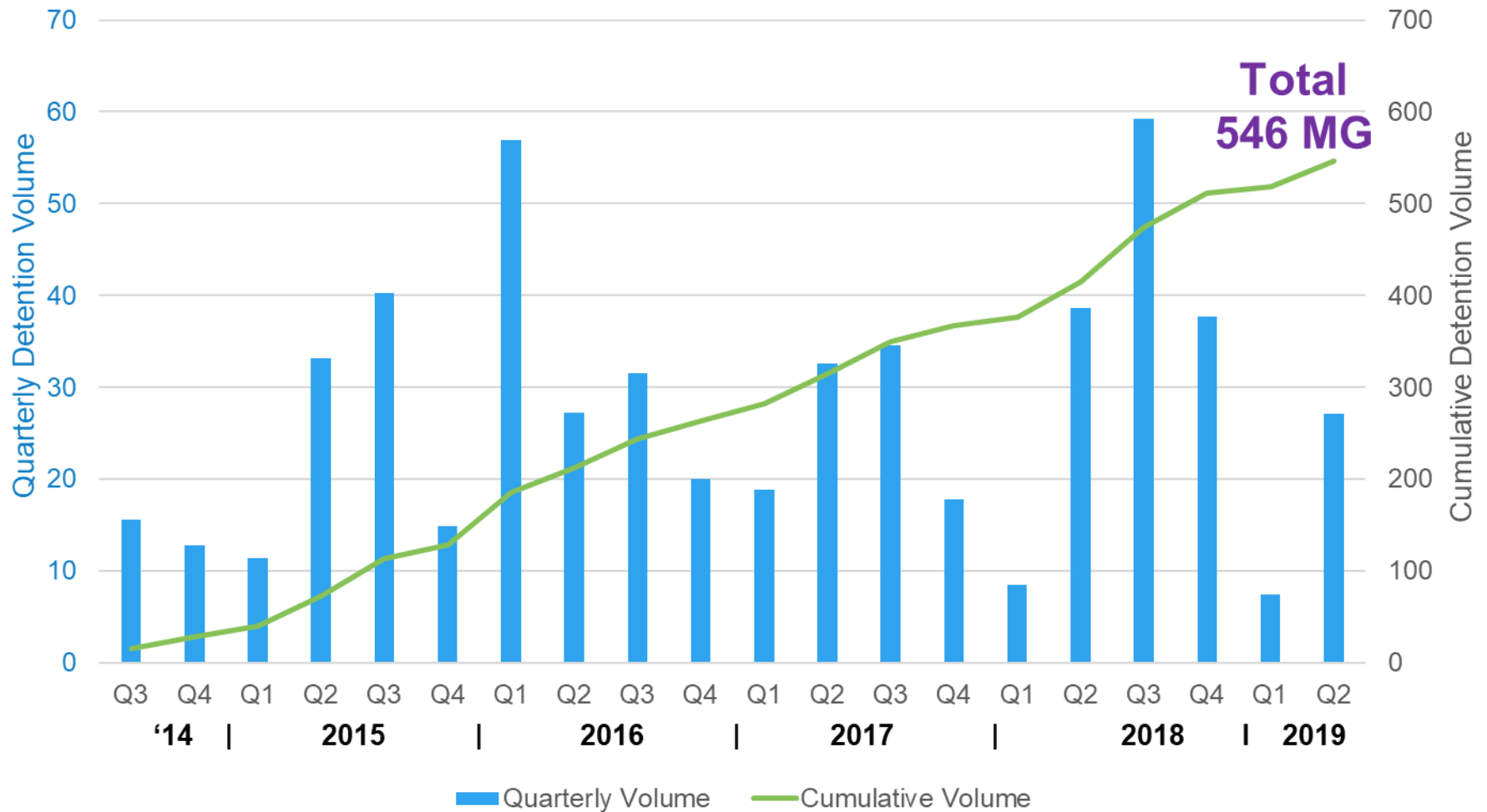
Chicago, Illinois



WMO Summary

Total Detention Volume Mitigated

WMO Quarterly Reporting
Total Detention Volume [million gallons]

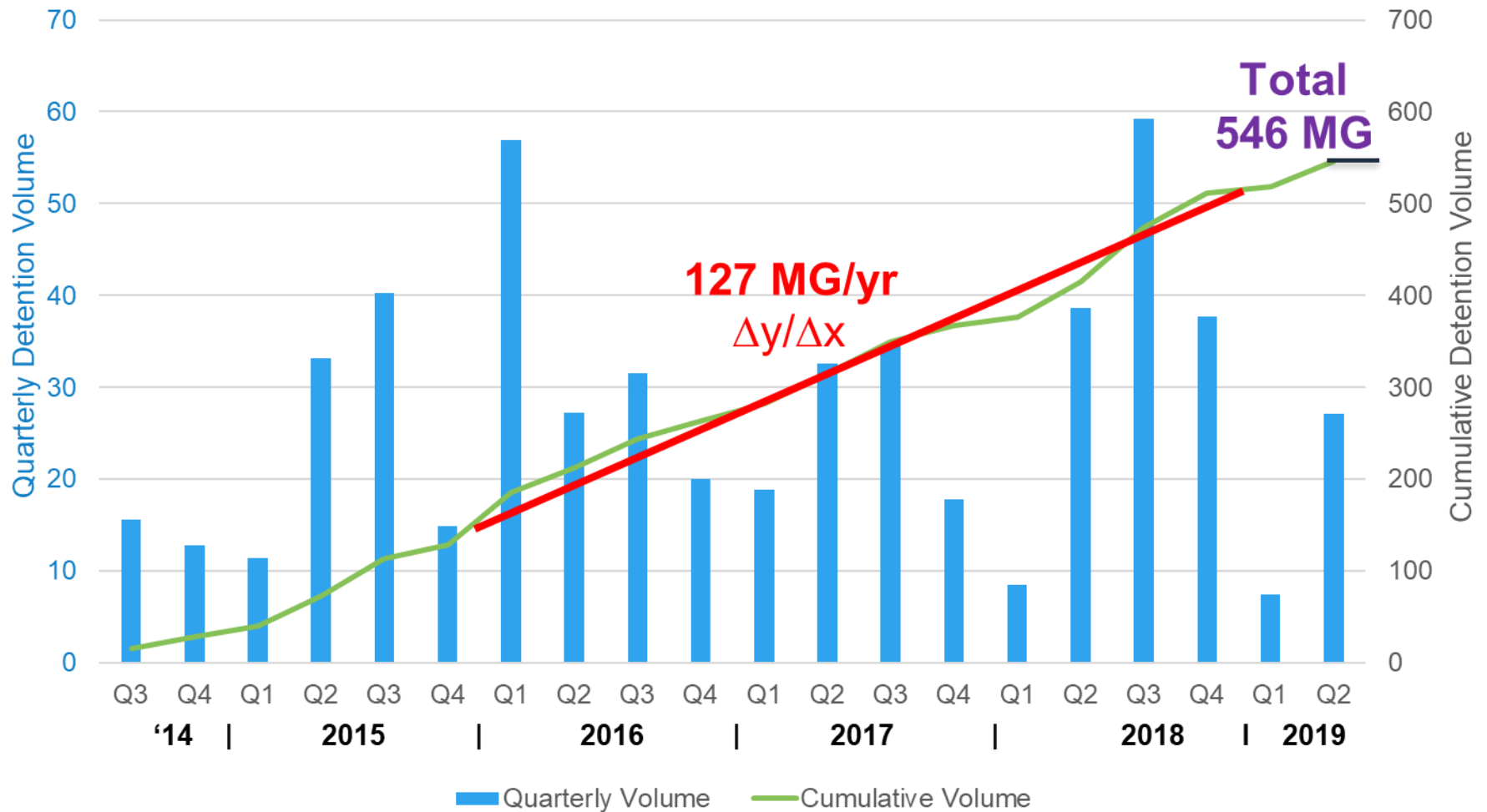




WMO Summary

Total Detention Volume Mitigated

WMO Quarterly Reporting
Total Detention Volume [million gallons]

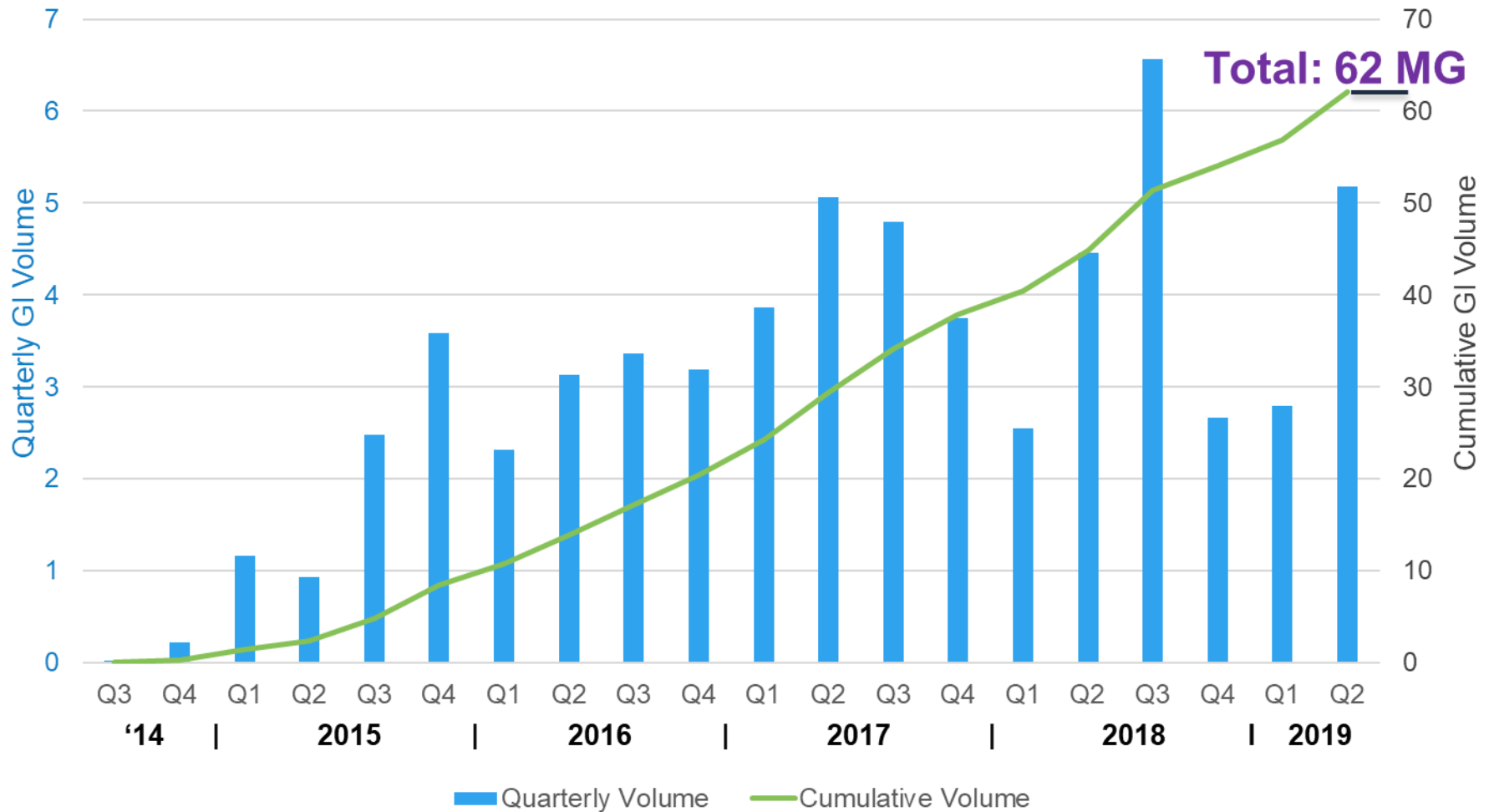




WMO Summary

Total Volume Control Captured

WMO Quarterly Reporting
Total Volume Control (GI) [million gallons]

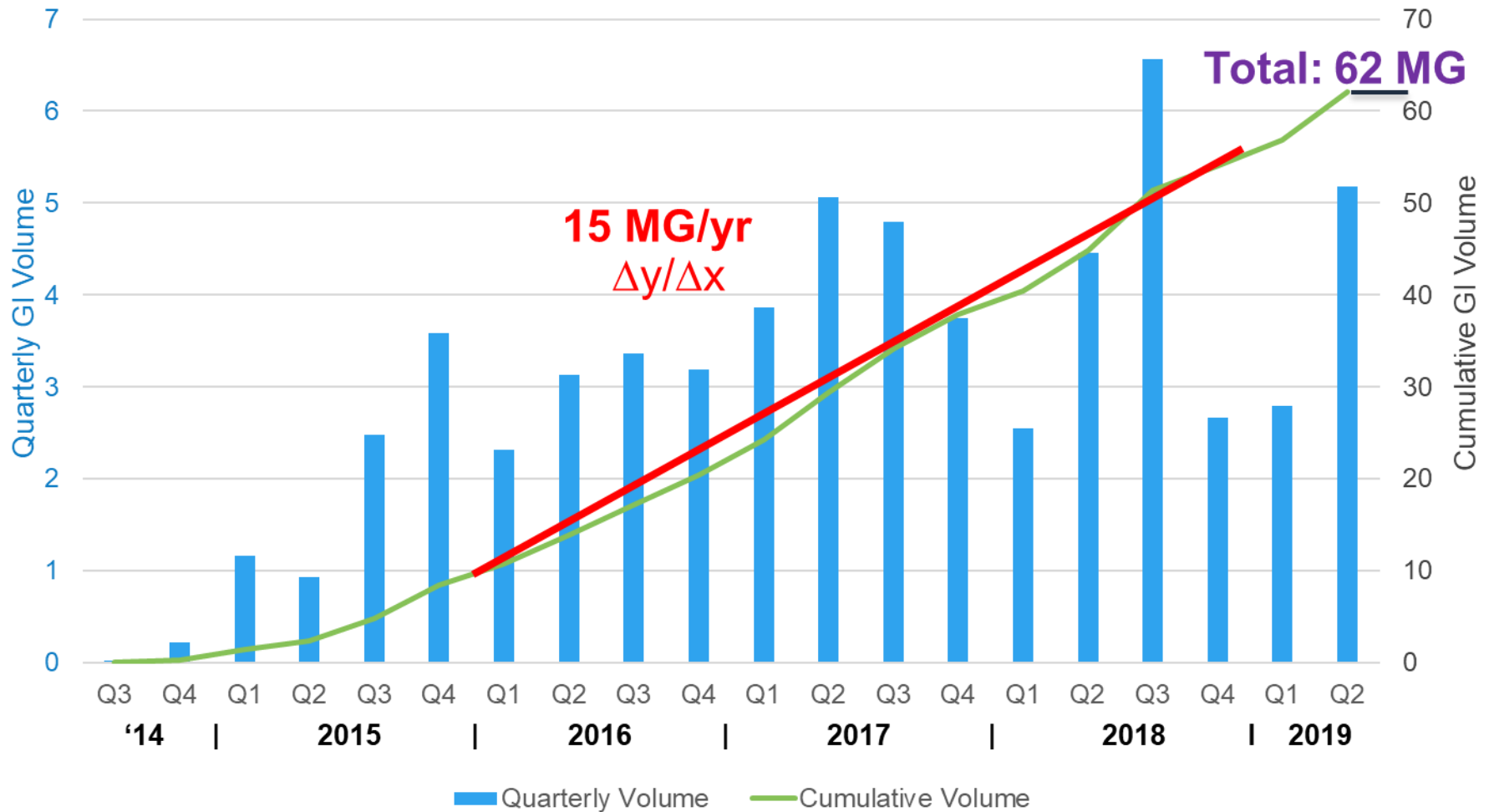




WMO Summary

Total Volume Control Captured

WMO Quarterly Reporting
Total Volume Control (GI) [million gallons]





Article 5 – Detention

Methodology: Hydrologic Model

- No major changes
- Types:
 - HEC-HMS (used for District reviews)
 - HEC-1
 - TR-20
 - Other equivalent model
- Must be used when:
 - Development > 20 acres
 - Depressional Storage
 - Tailwater conditions (BFE, ponds in series)



Article 5 - Updated Rainfall Data

Updated Bulletin 70 Rainfall Data

- Report published by Illinois State Water Survey March 2019
- Will result in more water detained throughout the County

| Rainfall Data | Published by | Year Published | 100-year 24-hour Rainfall Depth |
|---------------------|---------------------|----------------|---------------------------------|
| Technical Paper 40 | U.S. Weather Bureau | 1961 | 6.00-inch |
| Bulletin 70 | ISWS | 1989 | 7.58-inch |
| Updated Bulletin 70 | ISWS | 2019 | 8.57-inch |

- Effective date: **January 1, 2020**
- Updated time distribution tables will be incorporated when available
- See TGM 5.6.8 for rainfall data, 5-min to 240-hour, Note short-duration rainfall data is based on ratios published under Bulletin 70, 1989