

WATERSHED MANAGEMENT ORDINANCE

Public Training Session #2

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SEMINAR OUTLINE

- Recap of Public Training Workshop #1
- Common questions and issues from first round of public trainings
- Example projects and WMO permitting requirements
- Redevelopment example with unpermitted detention facility
- Question and answer session
- Help desk for projects from audience

WATERSHED MANAGEMENT ORDINANCE (WMO)

- Replaces the Sewer Permit Ordinance (SPO), which was adopted in 1972
- WMO became effective on May 1, 2014
- WMO applies to all development within Cook County, except for the City of Chicago (some City of Chicago developments will require District approval)

SPO VS WMO

Sewer Permit Ordinance (SPO)

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

Watershed Management Ordinance (WMO)

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

Do I need a WMO Permit..... Even Here?

Permit
Applicability
§201, Table 1



WATERSHED MANAGEMENT PERMIT

Permit is required when one of the following is triggered:

- 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.

OLD AND NEW PERMIT FORMS

- **Current Permit Schedules**

- Schedule A – Project Summary
- Schedule B – Sewer Summary
- Schedule C – Sewer Connections
- Schedule D – Detention
- Schedule E – Lift Station / Force Main
- Schedule F – Characteristics of Waste Discharge
- Schedule G – Treatment / Pretreatment Facilities
- Schedule K – Affidavit of Disclosure of Property Interests
- Schedule L – Notice of Requirements for Stormwater Detention
- Exhibit A – Current Survey of Property Interests

- **New/Revised Permit Schedules**

- Schedule D – WMO and Schedule D-Legacy - Detention
- Schedule H – Hazard Areas (Floodplain/Floodway/Riparian)
- Schedule O – Outfalls, Direct Connections, District Property
- Schedule P – Erosion Control
- Schedule R – Recording and Maintenance
- Schedule W – Wetlands and Buffer Areas

DEVELOPMENT/REDEVELOPMENT

Development:

“Any human-induced activity or change to real estate (including, but not limited to, grading, paving, excavation, dredging, fill, or mining; alteration, subdivision, change in land use or practice; building; or storage of equipment or materials) undertaken by private or public entities that affects the volume, flow rate, drainage pattern or composition of stormwater, or the substantial improvement of an existing building in a Special Flood Hazard Area. The term development shall include redevelopment and shall be understood to not include maintenance.”

Redevelopment:

“Any human-induced activity or change to an existing developed property (including but not limited to, grading, paving, excavation, dredging, fill, or mining; alteration, subdivision, change in land use or practice; building; or storage of equipment or materials) undertaken by private or public entities that affects the volume, flow rate, drainage pattern, or composition of the site stormwater runoff on the previously developed land. The term shall not be understood to include maintenance.”

WMO FEE SCHEDULE

TABLE 1 - WATERSHED MANAGEMENT PERMIT FEE SCHEDULE	Total Fee \$
SECTION I. BASE PERMIT FEES (Does not include Section II, III, IV, and V of this form)	
(A) Watershed Management Permit	\$ 1,100
(B) Notification and Request For Inspection (NRI)	\$ 250
(C) Facility Connection Authorization (within City of Chicago)	\$ 1,000
(D) Permit Revision	\$ 500
SECTION II. STORMWATER DETENTION	
(A) Small Development - Residential ≤ 10 acres & Non-Residential ≤ 5 acres (Nomograph)	\$ 500
(B) Small Development - Residential ≤ 10 acres & Non-Residential ≤ 5 acres (Model)	\$ 1,500
(C) Large Development - Residential > 10 acres & Non-Residential > 5 acres (Nomograph)	\$ 1,000
(D) Large Development - Residential > 10 acres & Non-Residential > 5 acres (Model)	\$ 3,000
SECTION III. ISOLATED WETLANDS/RIPARIAN ENVIRONMENTS	
(A) Verification of Isolated Wetland Boundary, Classification and Buffer	\$ 250
(B) Isolated Wetland Impact < 0.10 Acre or Riparian Environment without Mitigation	\$ 500
(C) Isolated Wetland Impact ≥ 0.10 Acre or Riparian Environment with Mitigation Plan	\$ 2,500
SECTION IV. SANITARY SEWER CONSTRUCTION	
(A) Sewer Installation Fee	\$5 Per Linear Foot of Sewer
(B) Lift Station and/or Forcemain (Schedule E)	\$ 250
(C) Connection Impact Fee	
(1) Low Density and/or Medium Density Residential (20 Units/Acre or Less)	\$3,750/Acre
(2) High Density Residential (21 Units/Acre or More)	\$6,000/Acre
(3) Commercial or Industrial	\$7,500/Acre
SECTION V. OTHER FEES	
(A) Recordation Deposit	\$ 500
(B) Inspections for Violations	\$250 Per Inspection
(C) Hazard Areas (Floodplain/Floodway/Riparian Environment - Schedule H)	\$ 250
(D) Outfalls/Direct Connections to District Facilities/Impacts to District Property (Schedule O)	\$ 250
(E) Notice of Requirements of Stormwater Detention (Schedule L)	\$ 250
(F) Resubmittals	\$ 0
(G) Variances (Filing and Review Fee)	\$ 2,000

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

WMO 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

DEVELOPMENTS EXEMPT FROM WMO PROVISIONS

- 1) Proposed development was issued Sewerage System Permit before May 1, 2014*
- 2) A complete Sewerage System Permit application for the proposed development has been accepted by the District prior to May 1, 2014*
- 3) Development with active Sewerage System Permit issued prior to May 1, 2014, but has not been fully constructed by May 1, 2014*
- 4) Development is on existing development plans list*
- 5) Development is located within a multi-county municipality that has adopted the other county's ordinance**

*Must meet standards of Sewer Permit Ordinance (SPO)

**Some permits will still be issued by District

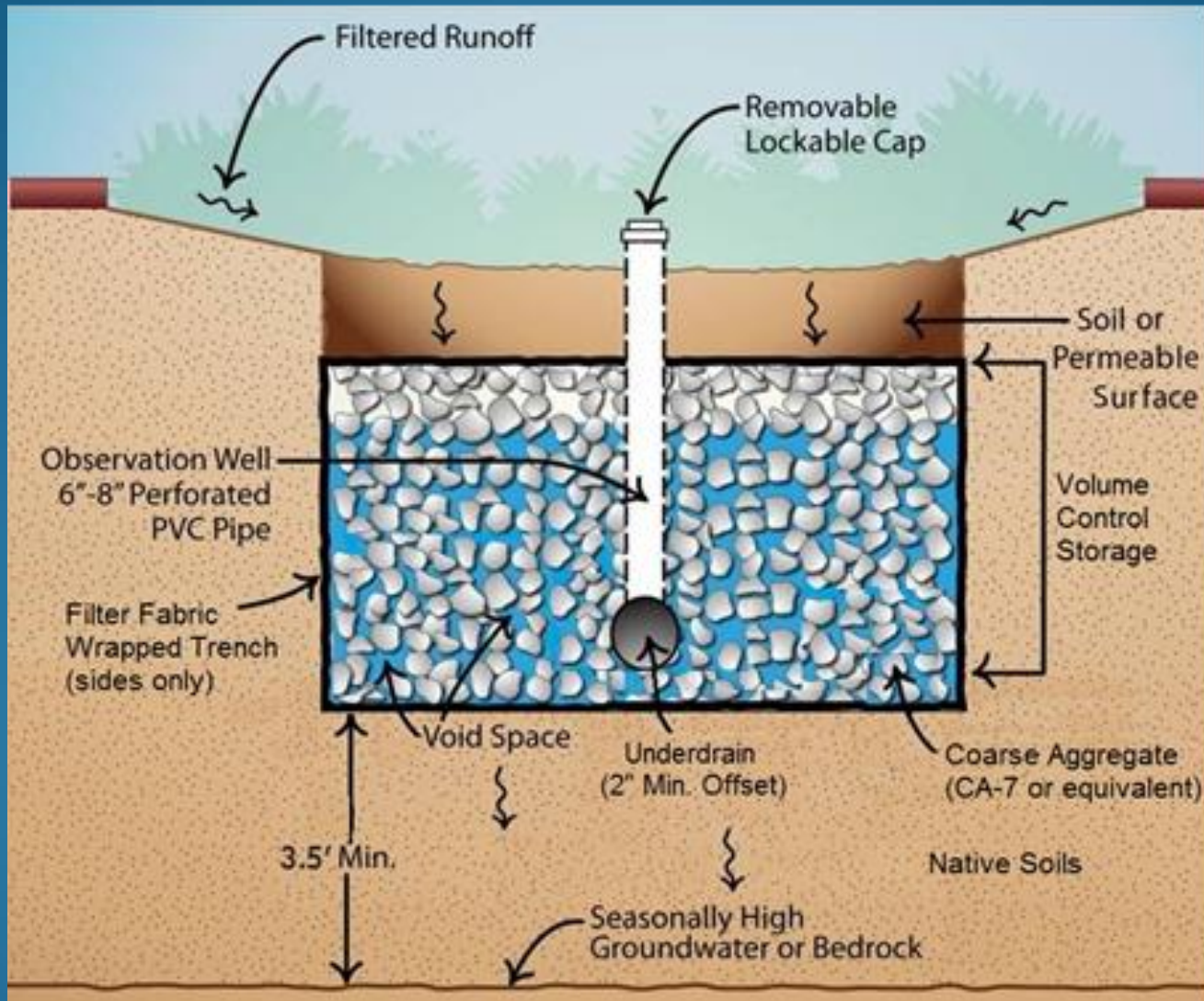
DEVELOPMENTS EXEMPT FROM WMO PROVISIONS

- 6) Agricultural, maintenance, and public utility activities that meet conditions of §201.1.D of the WMO
- 7) Development involves the modification of a septic system, potable water service line, or utility that serves an existing structure
- 8) 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
- 9) Development undertaken solely by state or federal agencies (the District, IDOT, Corps, Illinois Tollway Authority, etc.)
- 10) Public flood control projects

DEVELOPMENT IN COMBINED SEWER AREA

- Developments permitted under the Sewer Permit Ordinance (SPO) are not required to provide stormwater detention
- Developments permitted under the WMO must provide both volume control and stormwater detention
 - For volume control practices, underdrains must be 3.5 ft above seasonal groundwater level
 - Detention facilities must be constructed with backflow prevention device

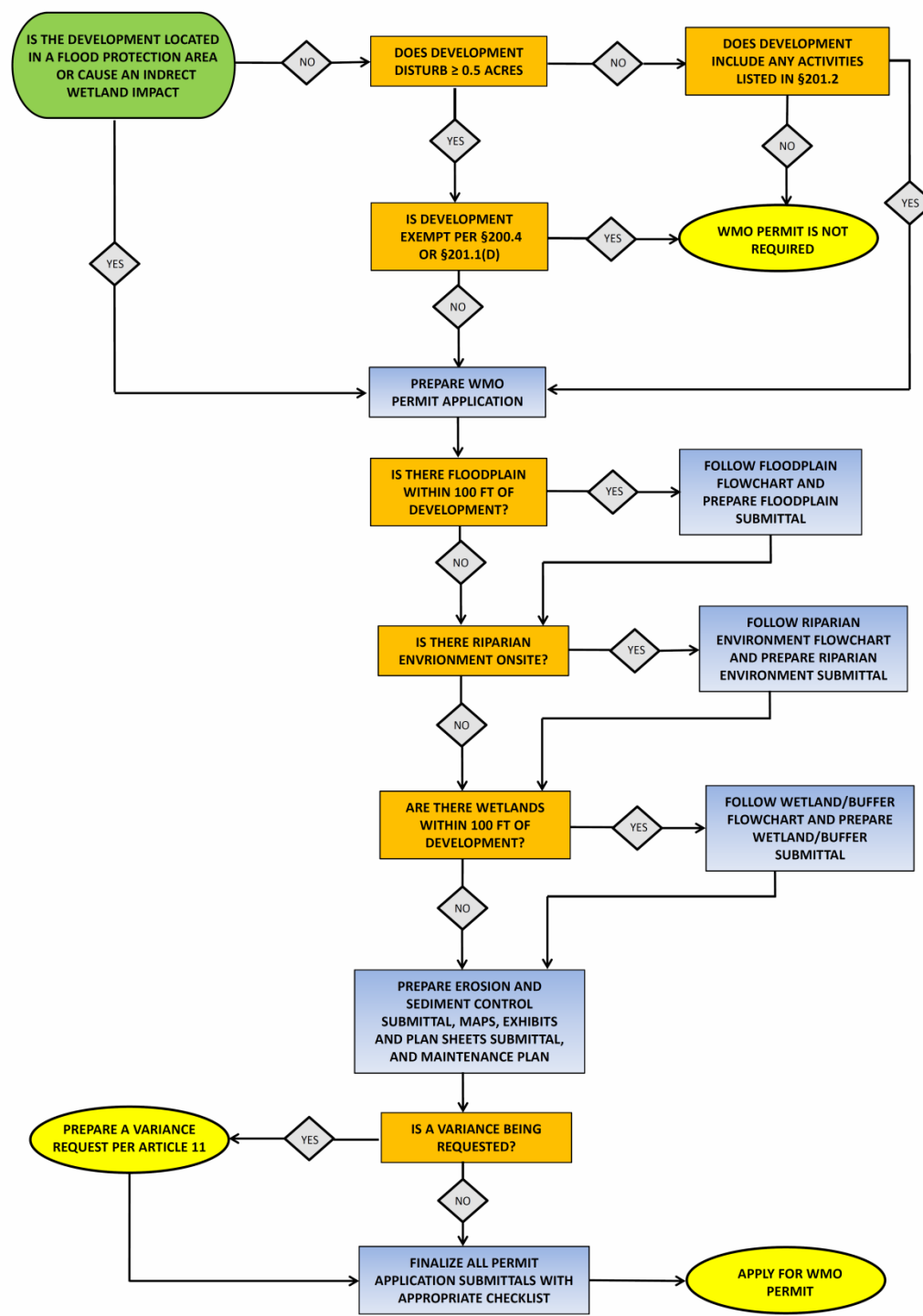
DEVELOPMENT IN COMBINED SEWER AREA



FLOODPLAIN AND FLOODWAY

- Compensatory storage required at 1.1:1 ratio
 - Must use average end method
 - 0-10 Year Increment may be provided at 1:1
 - 10-100 Year Increment may be provided at 1:1
 - 0-100 Year Increment must be provided at 1.1:1
- Flood Protection Elevation (FPE)
 - Two feet above BFE (from FIS or project-specific study)
- Approval from IDNR-OWR for all floodway development
- Substantial improvements regulated by municipality

WMO PERMIT SUBMITTAL FLOW CHART



**Table 2.
Summary of Site Stormwater Management Requirements***

	§502	§503	§504
Development Type (See Appendix A for definitions)	Runoff Requirements	Volume Control Requirements	Storage Requirements
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

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

† Where practicable.

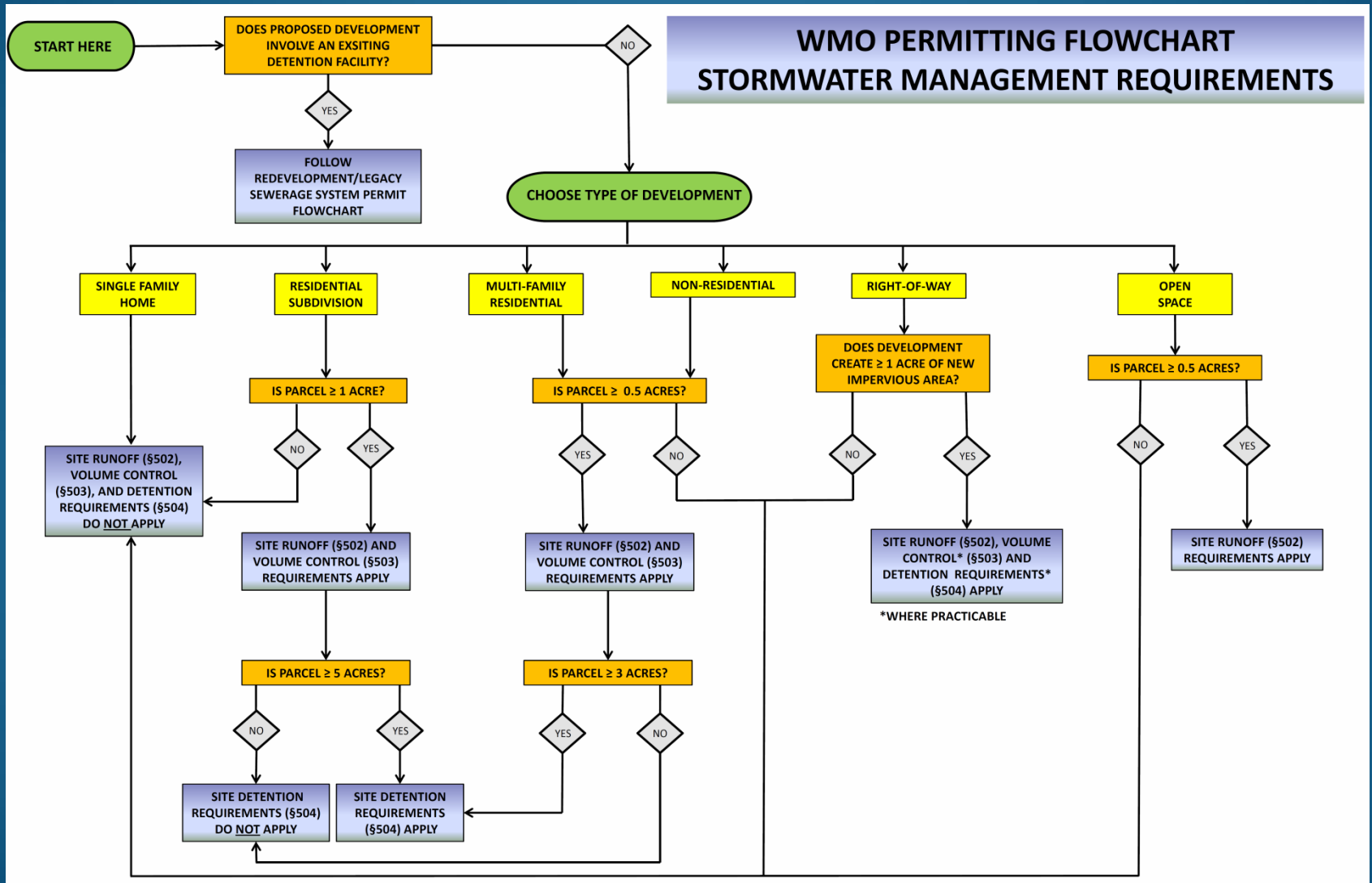
‡ Starting the effective date of this **ordinance**, any new **development** on the **parcel** that totals either individually or in the aggregate to more than one-half (0.5) of an acre.

WHEN IS VOLUME CONTROL REQUIRED?

WHEN IS DETENTION REQUIRED?

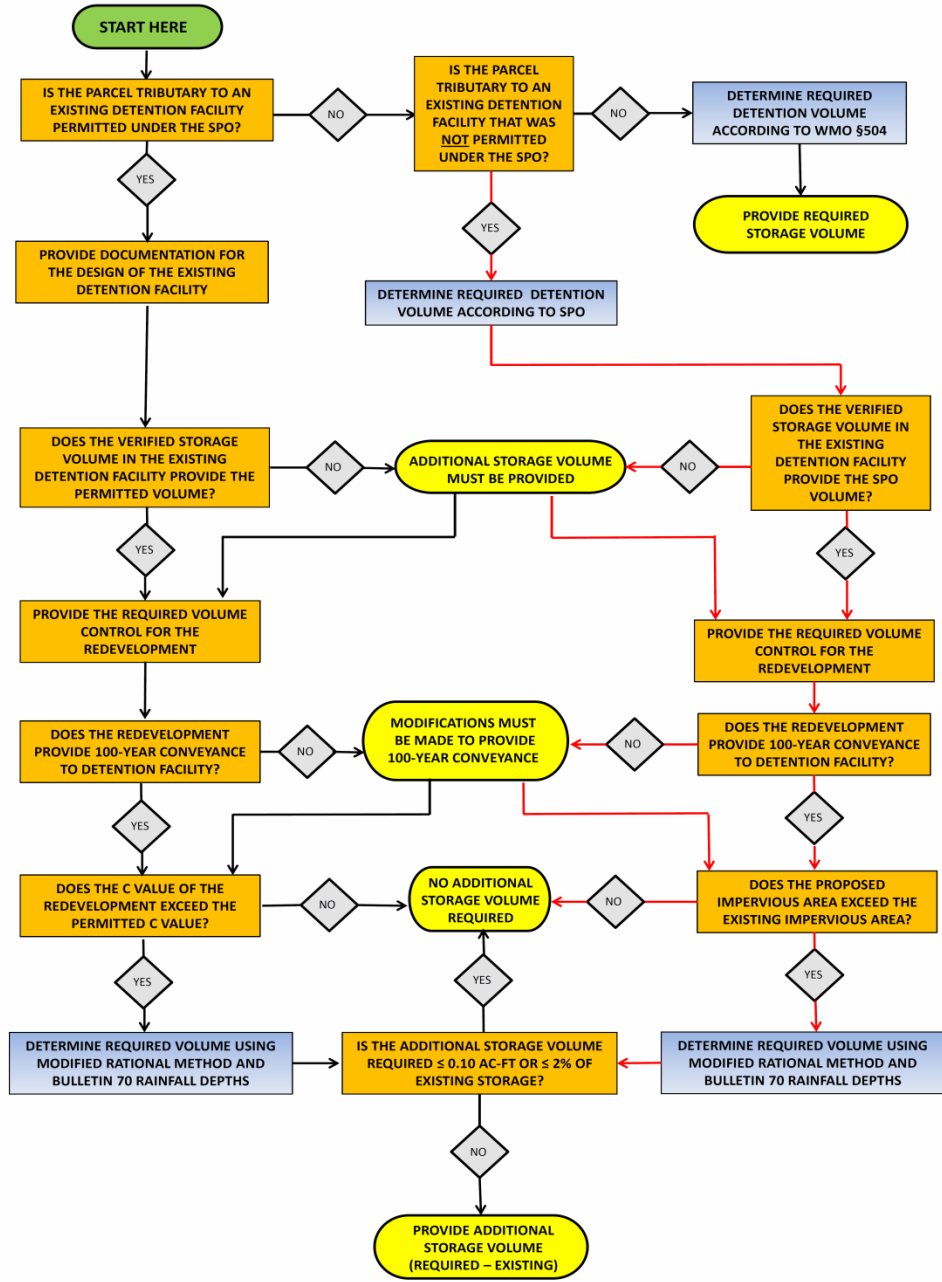
CHECK TABLE 2 IN WMO...OWNERSHIP AREA STILL USED AS DETERMINING FACTOR

ARTICLE 3 – STORMWATER MANAGEMENT REQUIREMENTS FLOWCHART



STORMWATER MANAGEMENT REQUIREMENTS FOR REDEVELOPMENT FLOW CHART

WMO PERMITTING FLOWCHART DETENTION ALLOWANCES FOR REDEVELOPMENTS



AUTHORIZED MUNICIPALITIES

How to become authorized:

- 1) Submit a letter of intent (with supporting documentation) to the District to become an authorized municipality

Template available at:

<http://www.mwrd.org/irj/portal/anonymous/managementordinance>

- 2) Enter into intergovernmental agreement with the District

Template available at:

<http://www.mwrd.org/irj/portal/anonymous/managementordinance>

- 3) Provide contact information for enforcement officer, Professional Engineer, and wetland specialist for the municipality

AUTHORIZED MUNICIPALITIES

Supporting documentation with letter of intent:

- A statement of intent to adopt the WMO by reference
- A legal opinion indicating the authorized municipality has legal authority to perform all obligations required by the WMO including:
 - 1) The regulation of erosion and sediment control, stormwater management, floodplains, isolated wetlands, and riparian environments
 - 2) The ability to conduct inspections
 - 3) The issuance of Watershed Management Permits
 - 4) The enforcement of the WMO
 - 5) The ability to enter into an intergovernmental agreement with the District
- A verified statement of financial capability to perform and adequately fund the obligations of the authorized municipality
- Designation of an enforcement officer
- An implementation plan
- Proposed staffing (enforcement officer, PE, wetland specialist)

WETLAND SPECIALIST

For a person to qualify as a wetland specialist, he/she must meet the requirements of a), b), c), or d) below:

- a) Certified as an Environmental Scientist in DuPage County or a Certified Wetland Specialist (CWS) in Lake County;
- b) Professional Wetland Scientist certification by the Society of Wetland Scientists (SWS);
- c) Minimum of a bachelor's degree in a biologic science or earth science and at least one of the following:
 - i. Three (3) years cumulative (full-time) wetlands experience in the Upper Midwest Region on wetland-related projects; or
 - ii. Completion of at least 100 wetland delineation projects in the Upper Midwest Region;
- d) Six (6) years cumulative (full-time) wetlands experience in the Upper Midwest Region on wetland-related projects without a degree type noted above.

ARTICLE 14 – AUTHORIZED MUNICIPALITIES

Authorized municipalities do not have the authority to issue permits for certain types of projects. The permits must be issued by the District, and the developments include:

- Development that is located within a combined sewer area
- Development that involves modification to the drainage system of a previously permitted detention facility
- Any development that is considered qualified sewer construction
- Development that involves a sewer or connection to District sewer, interceptor, or TARP structure
- Development that involves new or reconstructed outfalls to a waterway* or Lake Michigan

*WMO defines waterway as a “navigable body of water such as a stream, creek, canal, or river”

AUTHORIZED MUNICIPALITIES PERMIT NUMBERING SYSTEM

- When a new application is submitted, the authorized municipality should contact the District to obtain an MWRD permit number for the project. The authorized municipality may adopt its own separate permit numbering system, but the MWRD permit number must be included on all documentation associated with the project
- The MWRD permit number should not be reassigned or consolidated by the Authorized Municipality

ANNUAL PROJECT STATUS FORM

- The enforcement officer of an authorized municipality must complete an annual project status form for each development permitted by the community.
- The purpose of this form is to provide an inventory of all developments permitted within the authorized municipality, the status of the projects (pre-construction, during construction, and post-construction), as well as the permitting components of the project (stormwater, floodplain, wetland/buffers, and riparian environments).
- The municipalities will be required to perform periodic inspections of all volume control practices.
- The form will be available on-line through the District's website.

ARTICLE 14 – DISTRICT OVERSIGHT

The District can inspect any development within an authorized municipality, and can, at any time, audit an authorized municipality. During an audit, the District may:

- Inspect and copy pertinent records kept by an authorized municipality
- Inspect Watershed Management Permits issued by an authorized municipality
- Meet with staff of an authorized municipality
- Conduct field inspections of developments permitted by an authorized municipality
- Verify that an authorized municipality complies with all requirements listed in the WMO

MULTI-COUNTY MUNICIPALITIES

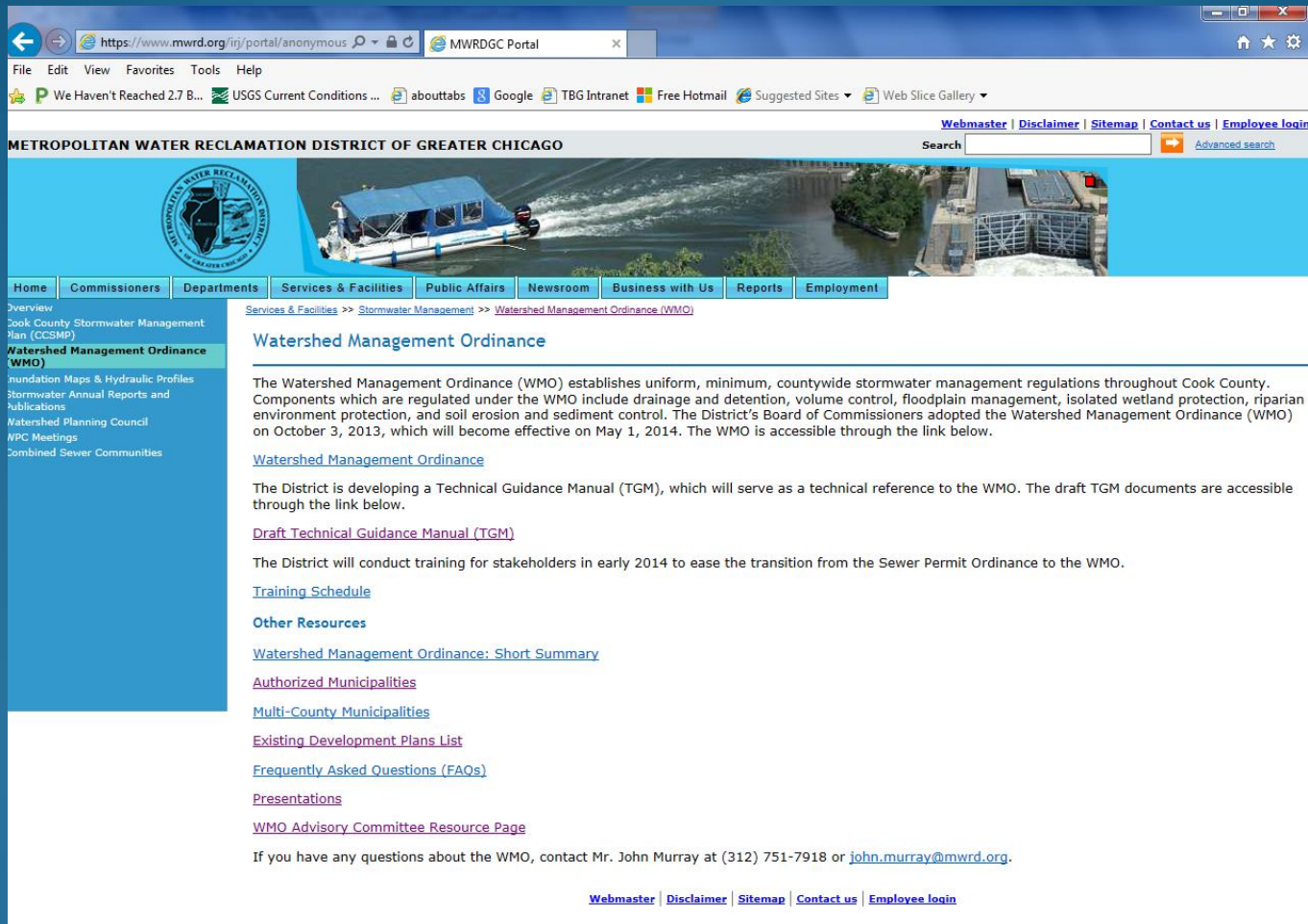
- The WMO provides the option for multi-county municipalities to adopt and enforce the adjacent county's stormwater ordinance
- Municipality must enter into IGA with the District
- Certain development activities would still require a Watershed Management Permit from the District (same as authorized municipalities)

MWRD WMO WEBSITE

On-line resources include:

- Answers to FAQs
- Authorized Municipalities Documents
- Technical Guidance Manual (TGM)
- Presentations from WMO Advisory Committee meetings and public trainings
- Stormwater calculation spreadsheets
- Template hydrologic models (TR-20, Win TR-20, and HEC-HMS)

MWRD WMO WEBSITE



The screenshot shows a web browser window displaying the MWRD website. The address bar shows the URL: <https://www.mwrdd.org/iri/portal/anonymous/>. The page title is "MWRDGC Portal". The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The address bar also shows several search engines and services like Google, TBG Intranet, Free Hotmail, Suggested Sites, and Web Slice Gallery. The website header includes the MWRD logo, the text "METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO", and a search bar. The main navigation menu includes Home, Commissioners, Departments, Services & Facilities, Public Affairs, Newsroom, Business with Us, Reports, and Employment. The left sidebar contains a list of links: Overview, Cook County Stormwater Management Plan (CCSMP), Watershed Management Ordinance (WMO), Floodation Maps & Hydraulic Profiles, Stormwater Annual Reports and Publications, Watershed Planning Council, WPC Meetings, and Combined Sewer Communities. The main content area is titled "Watershed Management Ordinance" and contains the following text: "The Watershed Management Ordinance (WMO) establishes uniform, minimum, countywide stormwater management regulations throughout Cook County. Components which are regulated under the WMO include drainage and detention, volume control, floodplain management, isolated wetland protection, riparian environment protection, and soil erosion and sediment control. The District's Board of Commissioners adopted the Watershed Management Ordinance (WMO) on October 3, 2013, which will become effective on May 1, 2014. The WMO is accessible through the link below." Below this text are several links: "Watershed Management Ordinance", "Draft Technical Guidance Manual (TGM)", "Training Schedule", "Other Resources", "Watershed Management Ordinance: Short Summary", "Authorized Municipalities", "Multi-County Municipalities", "Existing Development Plans List", "Frequently Asked Questions (FAQs)", "Presentations", and "WMO Advisory Committee Resource Page". At the bottom of the page, there is a contact information for Mr. John Murray: "If you have any questions about the WMO, contact Mr. John Murray at (312) 751-7918 or john.murray@mwrdd.org." The footer of the page includes links for "Webmaster", "Disclaimer", "Sitemap", "Contact us", and "Employee login".

<https://www.mwrdd.org/iri/portal/anonymous/managementordinance>

Questions from Round 1 of Public Trainings

Can a municipality become authorized at any time?

Yes, there is no deadline for when communities can become authorized.

Questions from Round 1 of Public Trainings

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

There are sites, such as gas stations with contaminated soils, 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.

Questions from Round 1 of Public Trainings

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 required detention for the redevelopment?

SPO vs WMO – C Values

Surface Type	Runoff Coefficient, C	
	SPO	WMO
Pervious Area	0.20 – 0.45	0.45
Gravel	0.7 -0.9	0.75
Impervious area (Roads, roofs, sidewalks, etc.)	0.8 – 1.00	0.90

Questions from Round 1 of Public Trainings

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 required detention for the redevelopment?

No, the applicant will not be penalized for this. The applicant must revise 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.

Questions from Round 1 of Public Trainings

Does the WMO allow wetland banking for mitigation?

Yes, the WMO allows isolated wetland mitigation to be provided through a wetland mitigation bank, but it must be Corps-approved and within the same watershed planning area (if available).

Questions from Round 1 of Public Trainings

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 double-ring infiltrometer and meet the requirements of ASTM D3385.

Questions from Round 1 of Public Trainings

The curve number table in the TGM only provides curve numbers for C and D type soils. What if I have A or B type soils on my site?

The use of A and B soils in calculating CNs would only be allowed for those sites where native soils are currently intact and a soil test is performed to verify the infiltration capacity.

Questions from Round 1 of Public Trainings

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 (through the CN reduction spreadsheet).

For redevelopments, the provided volume control storage is credited toward the required detention volume.

CN Reduction Calculator

RUNOFF CURVE NUMBER ADJUSTMENT CALCULATOR

Site Information:

Total Site Area, A_w (ac) =

Total Impervious Area, A_i (ac) =

Runoff, R (in) =

P = rainfall depth (in) =

CN =

S =

Runoff Volume Over Watershed, V_w (ac-ft) =

Volume of GI Provided:

Control Volume, V_R = ac-ft

1" of volume over impervious area

Additional Volume, V_{GI} = ac-ft

Additional volume over the required 1"

Adjusted Volume Over Watershed, $V_{ADJ} = V_w - V_R - V_{GI}$

V_{ADJ} (ac-ft) =

Adjusted Runoff Over Watershed, $R_{ADJ} = \frac{V_{ADJ}}{A_w}$

R_{ADJ} (in) =

S_{ADJ} =

Adjusted CN for detention calcs, CN_{ADJ} =

*Blue values are entered by user

Example #1A – Repaving Existing Parking Lot



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

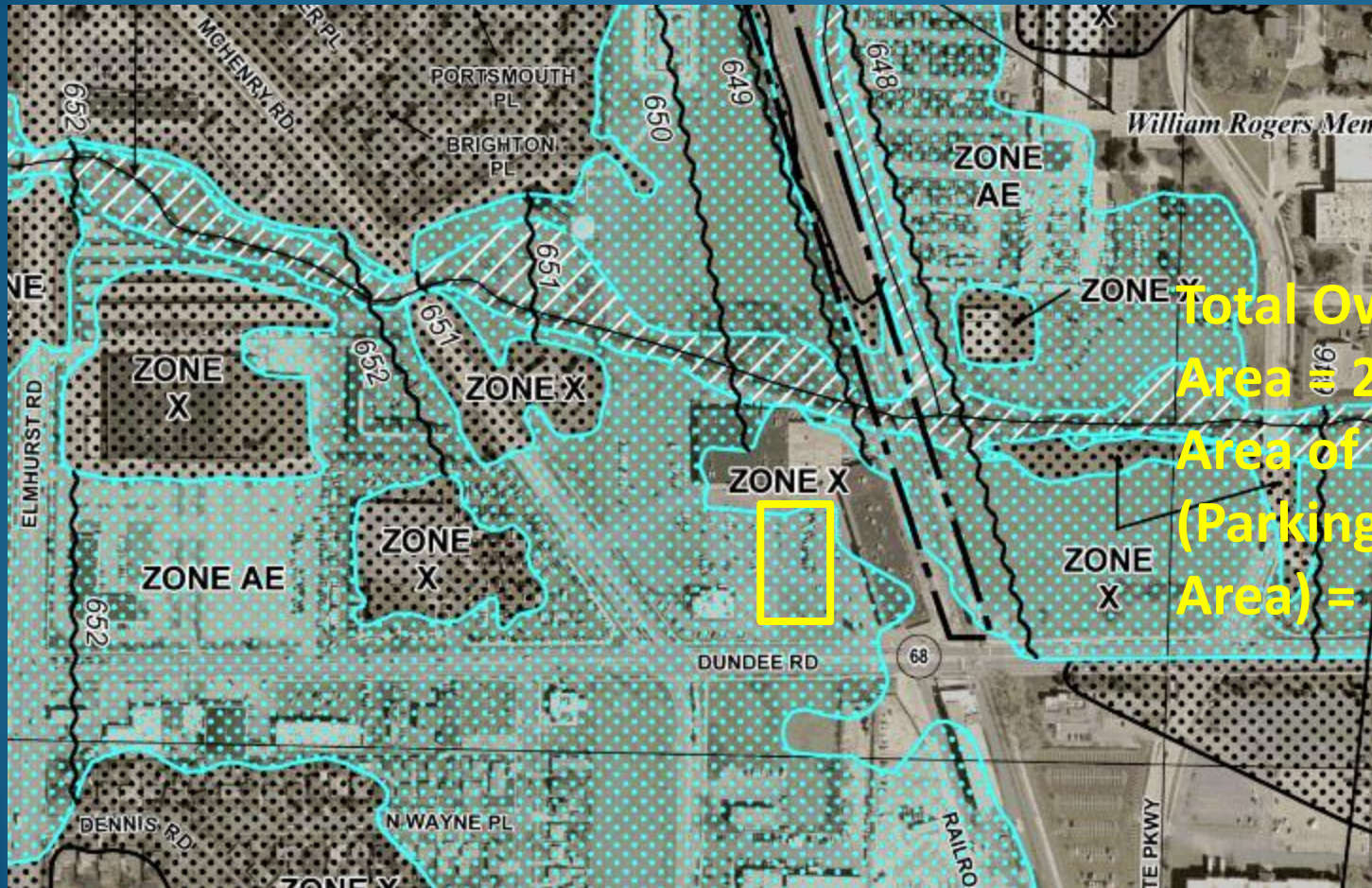
Is a Watershed Management Permit Required?

Example #1A – 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
- 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

Example #1B

Repaving Existing Parking Lot in a Floodplain



Total Ownership Area = 20 Acres
Area of Disturbance (Parking Lot Repaving Area) = 5 Acres

Is a Watershed Management Permit Required?

Example #1B

Repaving Existing Parking Lot in a Floodplain

- 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, even if it is located in a floodplain
- The District will rely on the municipality to ensure the applicant is not filling in the floodplain or doing something beyond original footprint

Example #2 – Underground Utility Project



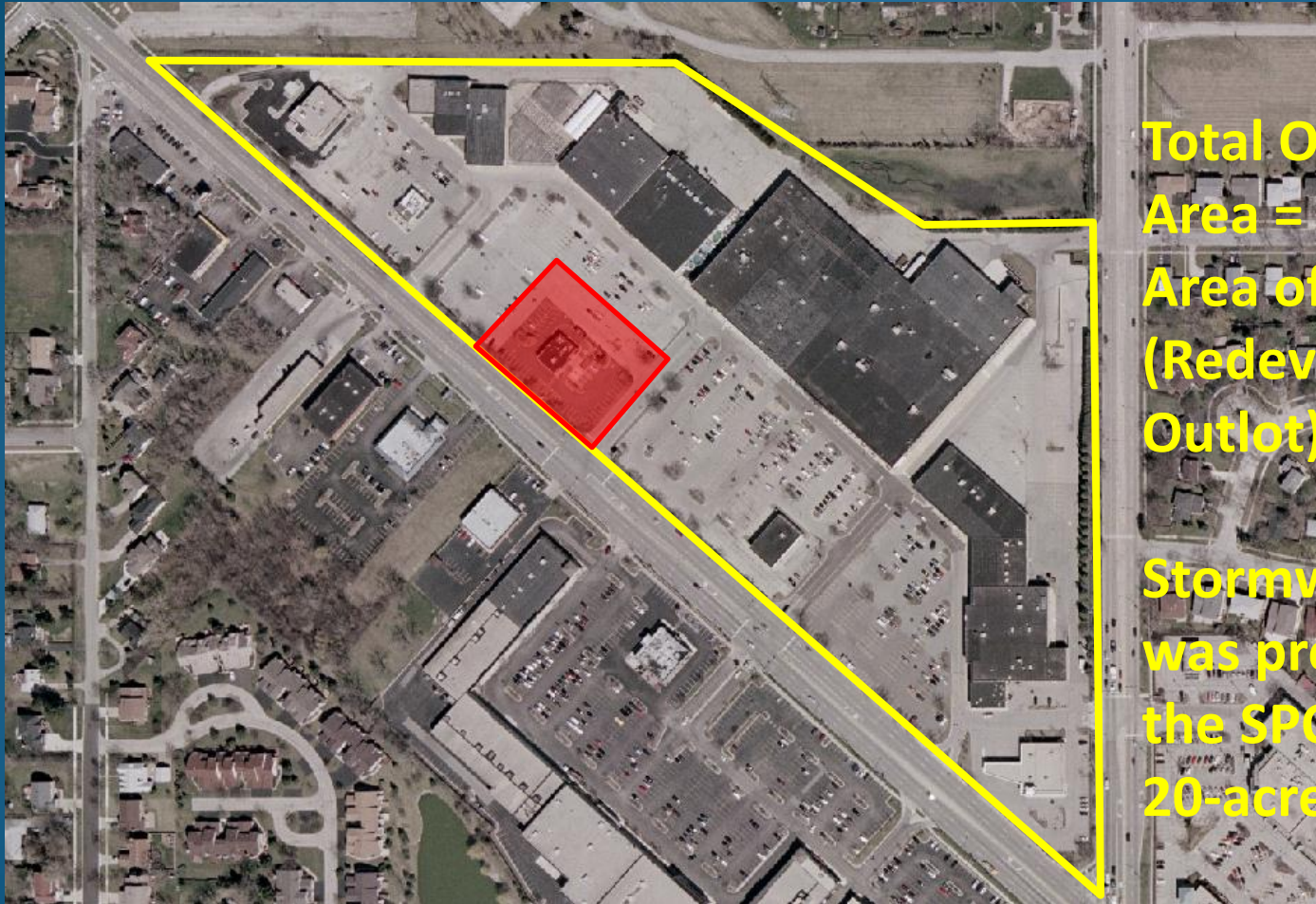
Area of Disturbance = 1.5 Acres

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 requirements
 - If Watershed Management Permit is required, then Schedule P (Erosion and Sediment Control) must be included with the submittal

Example #3– Redevelopment of 2-Acre Outlot



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

Stormwater detention
was provided based on
the SPO 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

**Table 2.
Summary of Site Stormwater Management Requirements***

	§502	§503	§504
Development Type (See Appendix A for definitions)	Runoff Requirements	Volume Control Requirements	Storage Requirements
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

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

† 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.

Non-Residential
Development

Disturbance ≥ 0.5 acres

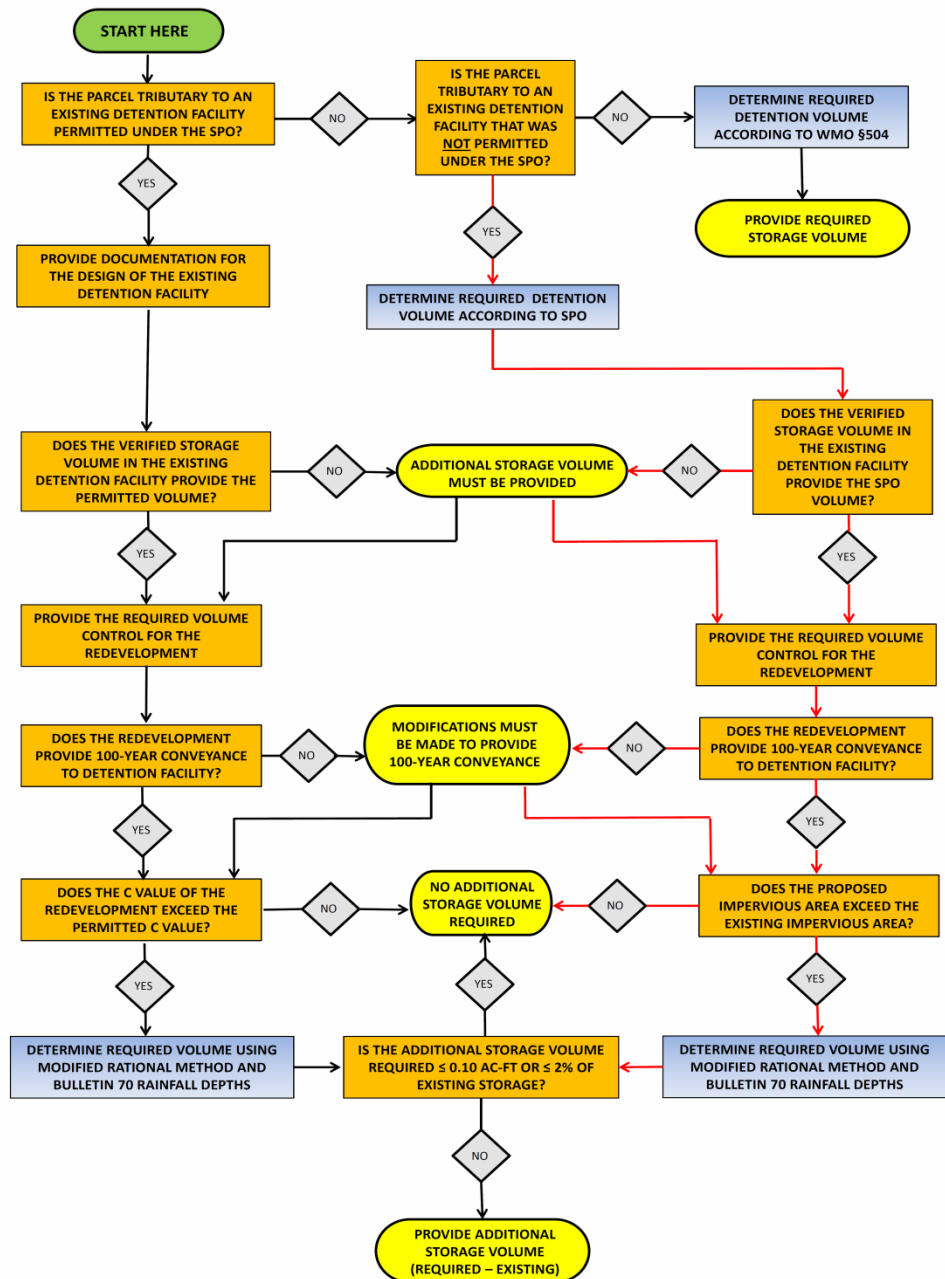
Parcel Size ≥ 3 acres

Runoff, Volume Control, and
Storage Requirements Apply

Redevelopment/ Legacy Sewerage System Permit Flowchart

Navigate left-hand side since redevelopment involves detention facility permitted under the Sewer Permit Ordinance (SPO)

WMO PERMITTING FLOWCHART DETENTION ALLOWANCES FOR REDEVELOPMENTS



Example #3 – Redevelopment of 2-Acre Outlot

Stormwater Detention Methodology:

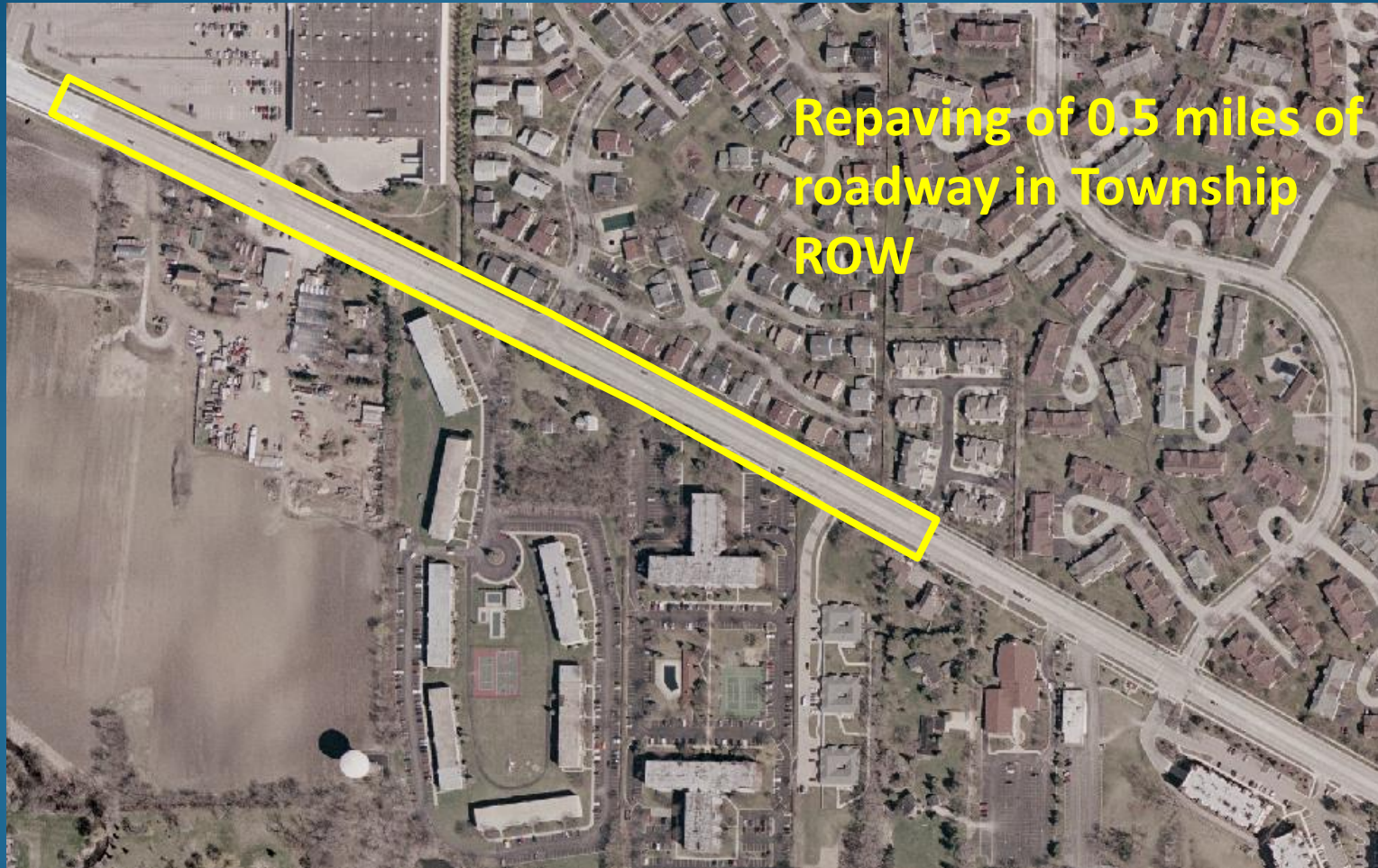
- Calculate the proposed C value of entire 20-acre development, C_{REDEV} , which includes redeveloped parcel.
 - If $C_{REDEV} \leq$ permitted C value for the development, C_{PERMIT} , no additional storage volume is required.
 - If $C_{REDEV} >$ permitted C value for the development, C_{PERMIT} , additional storage volume is required.
- If additional detention volume is required, the required detention volume is calculated using Modified Rational Method with Bulletin 70 rainfall depths.
- Required detention volume is difference between pro-rated proposed volume and pro-rated permitted volume.

Example #3 – Redevelopment of 2-Acre Outlot

Required forms (in addition to Watershed Management Permit application):

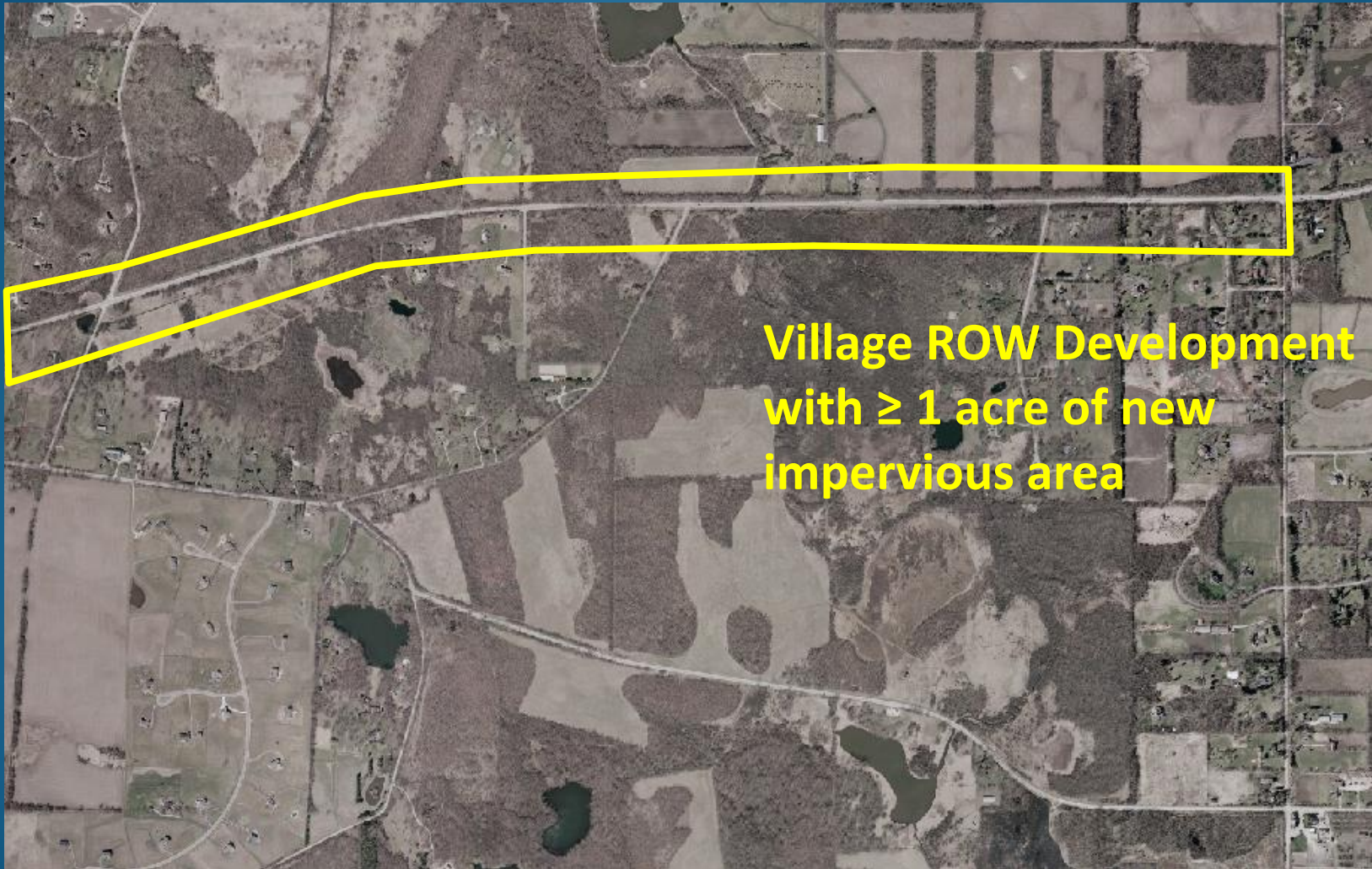
- Schedule D-Legacy – Watershed Management Facilities
- Schedule K – Affidavit of Disclosure of Property Interest
- Schedule P – Erosion and Sediment Control
- Schedule R – Recording and Maintenance

Example #4a – Right-of-Way (ROW) Development



No Watershed Management Permit required for maintenance activities

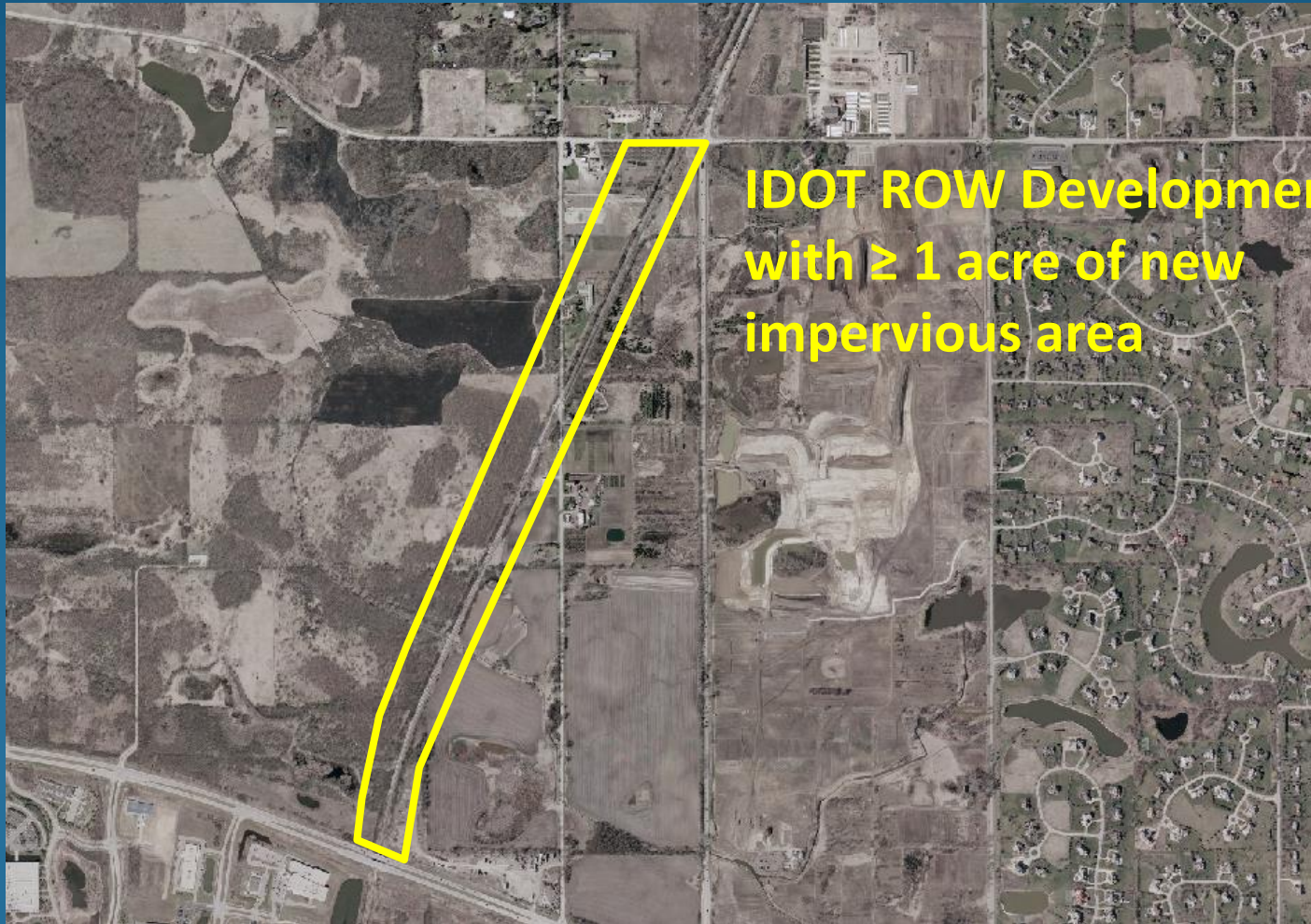
Example #4b – Right-of-Way (ROW) Development



Example #4b – Right-of-Way (ROW) Development

- Since the project creates more than one acre of new impervious area, the WMO runoff, volume control, and storage requirements apply (Table 2 of the WMO)
- Volume control and storage requirements must be provided to the “maximum extent practicable”
- Applicant must demonstrate that certain hardships or constraints prevent meeting the full stormwater requirements
 - For example, additional ROW would be needed to meet the full requirements, but 75% of the volume control and stormwater detention requirements are met using vegetated swales and oversized storm sewers

Example #4c – Right-of-Way (ROW) Development



**IDOT ROW Development
with ≥ 1 acre of new
impervious area**

No Watershed Management Permit is required for projects undertaken solely by state or federal agencies

Example 5 – Redevelopment of Site Without Detention



An existing 10-acre site will be converted from a building/parking lot to an apartment complex

No existing detention provided

What are the WMO stormwater requirements?

Example #5 – Redevelopment of Site Without Detention

- 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 10 acres
 - Runoff required
 - Volume control required
 - Stormwater detention required
- Follow redevelopment/legacy sewerage system permit flowchart to determine methodology for stormwater detention requirements

**Table 2.
Summary of Site Stormwater Management Requirements***

	§502	§503	§504
Development Type (See Appendix A for definitions)	Runoff Requirements	Volume Control Requirements	Storage Requirements
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

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

† 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.

Non-Residential
Development

Disturbance ≥ 0.5 acres

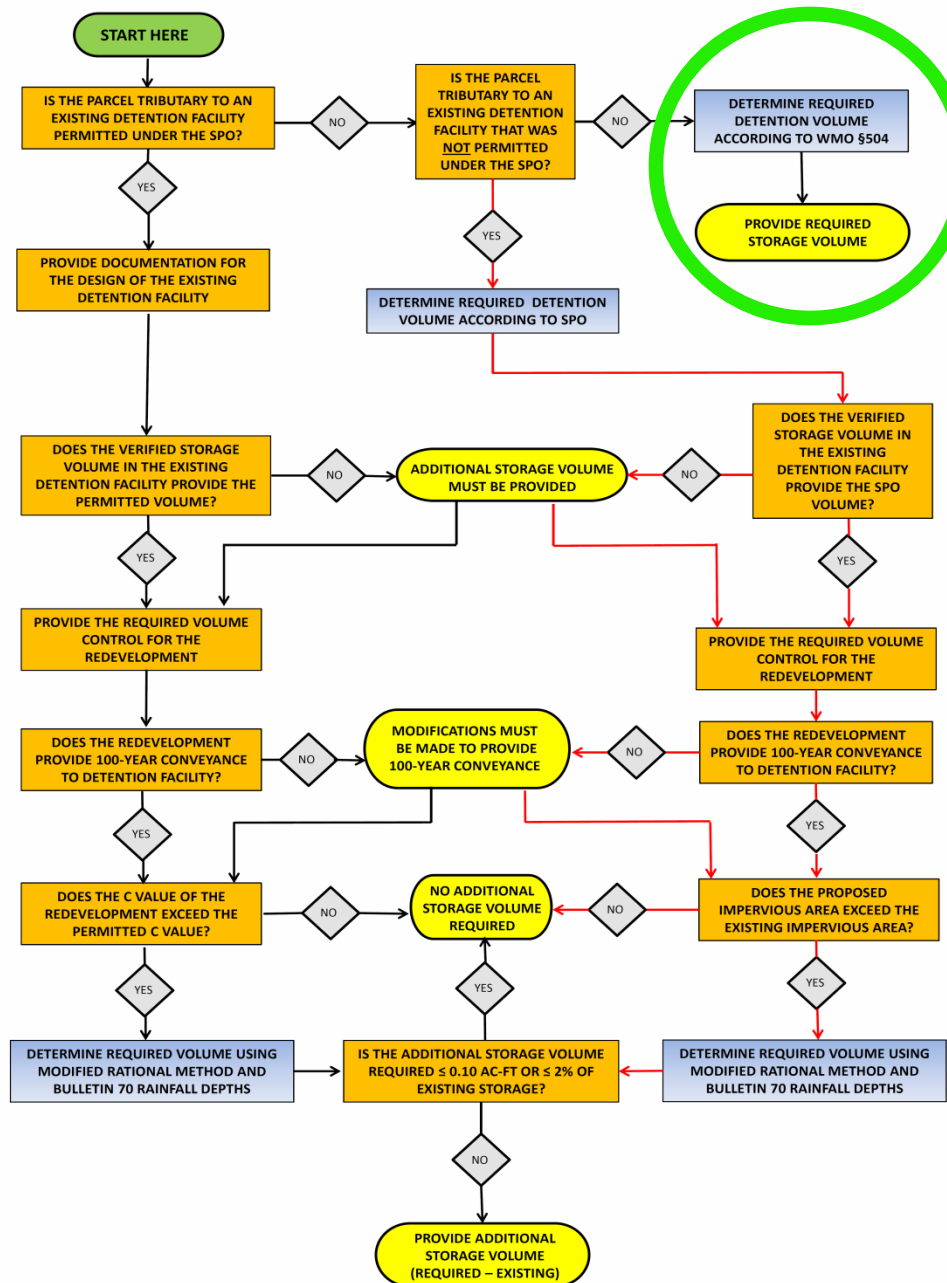
Parcel Size ≥ 3 acres

Runoff, Volume Control, and
Storage Requirements Apply

Redevelopment/ Legacy Sewerage System Permit Flowchart

Since no existing detention facilities, the WMO detention requirements of Article 5 apply to the redevelopment

WMO PERMITTING FLOWCHART DETENTION ALLOWANCES FOR REDEVELOPMENTS



Example #5 – Stormwater Requirements

- Volume control practices are required
- Required stormwater detention determined using:
 - Event hydrograph method
 - NRCS methodology
 - Allowable release rate of 0.30 cfs/acre
 - 100-Year, 24-Hour Rainfall Depth of 7.58” (Bulletin 70)
 - Antecedent Moisture Condition (AMC) of II

Example #5 – Redevelopment of Site Without Detention

Required forms (in addition to Watershed Management Permit application):

- Schedule D – Watershed Management Facilities
- Schedule K – Affidavit of Disclosure of Property Interest
- Schedule P – Erosion and Sediment Control
- Schedule R – Recording and Maintenance

Example 6 – Redevelopment of Site with Complete Replacement of Existing Detention System



An existing 15-acre commercial site will be redeveloped into a condo/retail development

The existing wet-bottom detention facility will be converted to underground detention

What are the WMO stormwater requirements?

**Table 2.
Summary of Site Stormwater Management Requirements***

	§502	§503	§504
Development Type (See Appendix A for definitions)	Runoff Requirements	Volume Control Requirements	Storage Requirements
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

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

† 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.

Non-Residential
Development

Disturbance ≥ 0.5 acres

Parcel Size ≥ 3 acres

Runoff, Volume Control, and
Storage Requirements Apply

Example 6 – Redevelopment of Site with Complete Replacement of Existing Detention System

- The redevelopment allowances in the WMO only apply to sites that utilize existing detention facilities
- Redevelopments that relocate/reconfigure 75% or more of the existing detention volume are not granted the detention allowances and must provide detention in accordance with Article 5 of the WMO
- Required stormwater detention determined using:
 - Event hydrograph method
 - NRCS methodology
 - Allowable release rate of 0.30 cfs/acre
 - 100-Year, 24-Hour Rainfall Depth of 7.58” (Bulletin 70)
 - Antecedent Moisture Condition (AMC) of II

Example 6 – Redevelopment of Site with Complete Replacement of Existing Detention System

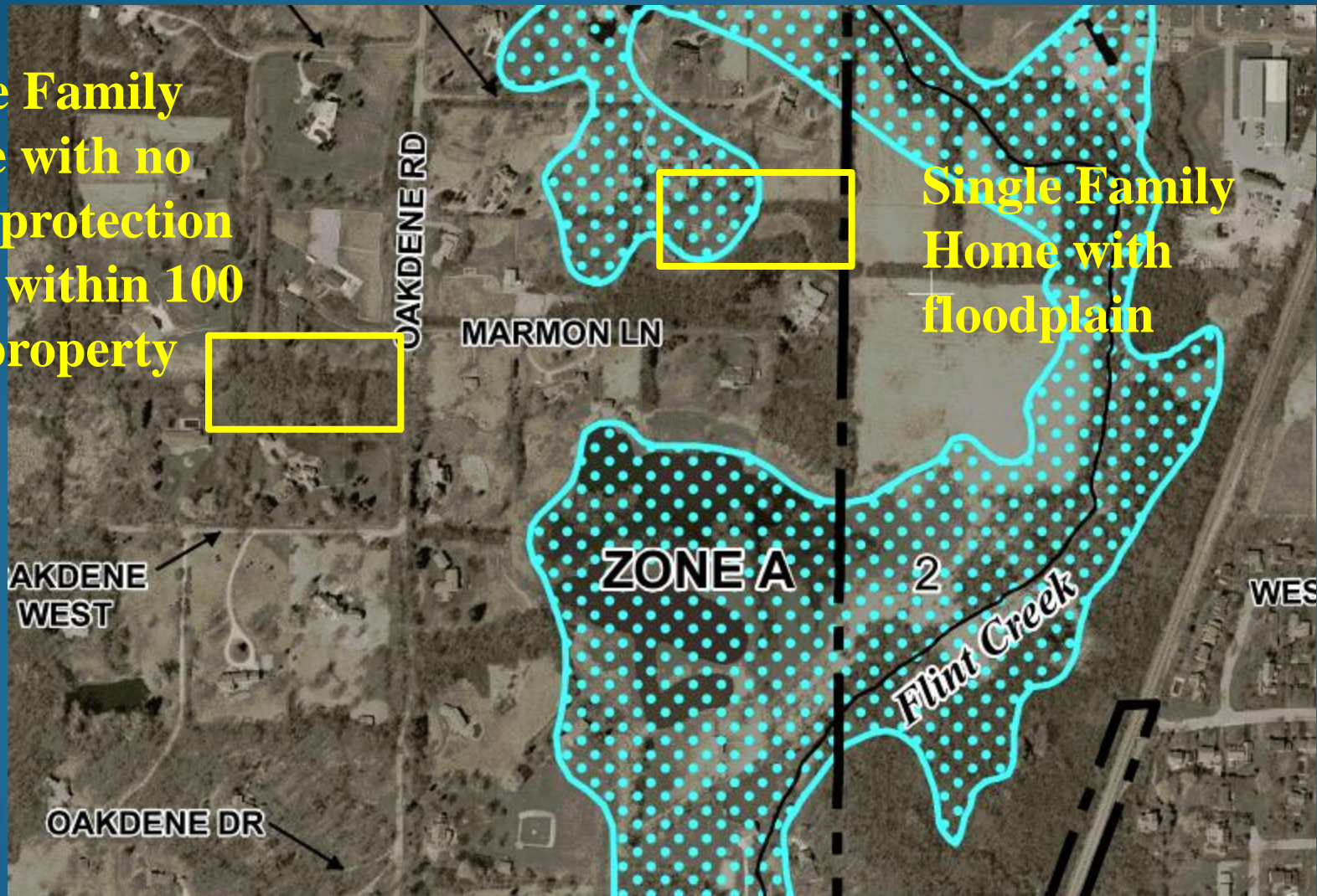
Required forms (in addition to Watershed Management Permit application):

- Schedule D – Watershed Management Facilities
- Schedule K – Affidavit of Disclosure of Property Interest
- Schedule P – Erosion and Sediment Control
- Schedule R – Recording and Maintenance

Example 7 – Single Family Home Development

Single Family Home with no flood protection areas within 100 ft of property

Single Family Home with floodplain



Do these need a Watershed Management Permit?

Example 7 – Single Family Home Development

- WMO only regulates single family homes that impact a flood protection area (floodplain, floodway, wetland, riparian area)
- Development in flood protection areas can have significant impact on public quality of life
- Requiring a Watershed Management Permit also protects homeowner (home is properly elevated to the Flood Protection Elevation)
- No permit review fees for single family home developments

Example 8 – Development in City of Chicago



10-Acre Development with
new outfall to waterway

Is a Watershed Management Permit required?

Example 8 – Development in City of Chicago

- Since it involves a new or reconstructed outfall to Lake Michigan or waterway, District approval is needed
- Applicant needs to submit a *Facility Connection Authorization* form (not a full WMO submittal)
- *Facility Connection Authorization* form is also required for those developments in Chicago that connect to one of their facilities or impacts District property

WMO Project Applicability

- If an applicant has reviewed all available WMO resources and still has questions on whether or not a Watershed Management Permit is required for a particular project, the applicant may petition the District (in writing) for a determination.
- A letter describing the project, with any supporting exhibits and documentation, should be sent to:

Dan Feltes

Engineering Department

Metropolitan Water Reclamation District of Greater Chicago

111 East Erie Street

Chicago, IL 60611

Detailed Example Problem #1

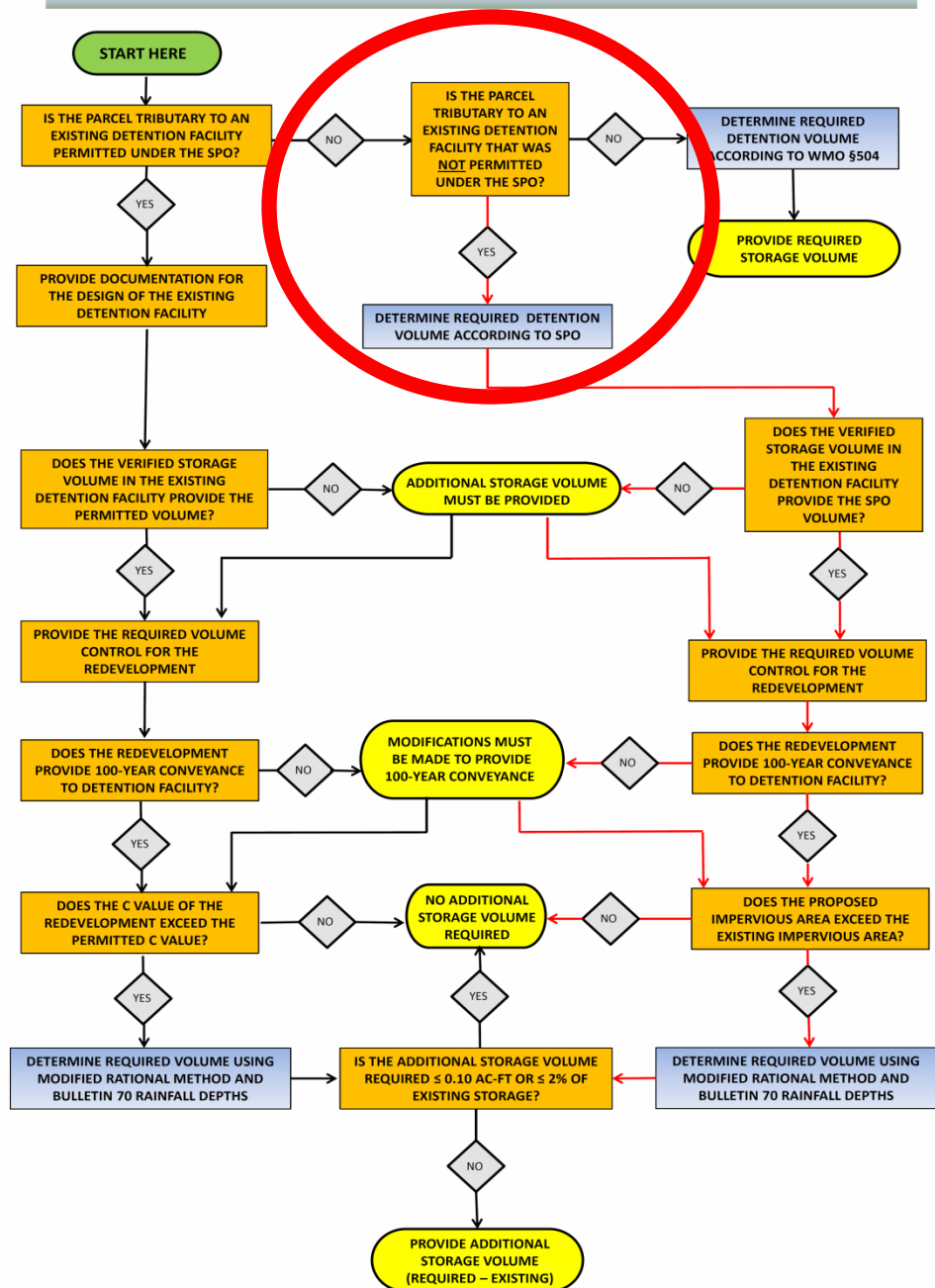
An existing 5-acre industrial site located in a combined sewer area is to be redeveloped into a strip mall. The local ordinance required stormwater detention for the original development, but was never approved by MWRD since the SPO did not require detention in combined sewer areas.

Determine the required stormwater detention volume for the redevelopment.

Redevelopment/ Legacy Sewerage System Permit Flowchart

Navigate the middle column since the redevelopment involves a detention facility that was not permitted under the Sewer Permit Ordinance (SPO).

WMO PERMITTING FLOWCHART DETENTION ALLOWANCES FOR REDEVELOPMENTS



Detailed Example #1 – Step 1

Step 1: Calculate the detention volume that would have been required for the original development under the SPO.

Using the Legacy Schedule D form, the following parameters are determined:

$C_{\text{PERMIT}} = 0.83$ (taken from aerial photography for the existing site)

Time of concentration = 15 minutes (from pre-development topography)

The allowable release rate is calculated by:

$$Q_{\text{ALLOW}} = 0.15 * I * A$$

$$Q_{\text{ALLOW}} = 0.15 * 3.65 * 5 = 2.74 \text{ cfs}$$

Detailed Example #1 – Step 1

Using the Modified Rational Method with TP-40 rainfall depths, the SPO required detention volume is 0.74 acre-feet.

MWRD METHOD - DETENTION STORAGE CALCULATIONS (TP-40 Rainfall Intensities)					
PROJECT:	Example 5.10				
JOB NO.:	Technical Guidance Manual				
FILENAME:	ModRatB70.xlsx				
DATE :	5-Feb-14				
	TRIBUTARY AREA =				5.00 acres
	COMPOSITE RUNOFF COEFFICIENT =				0.83
	ALLOWABLE RELEASE RATE =				2.74 cfs
	COMPUTED DETENTION STORAGE =				<u>0.741 acre-ft</u>
DURATION (hours)	TIME (min.)	RAINFALL INTENSITY (in/hr)	INFLOW RATE (cfs)	STORED RATE (cfs)	RESERVOIR SIZE (ac-ft)
0.17	10	7.60	31.54	28.80	0.397
0.33	20	5.50	22.83	20.09	0.553
0.50	30	4.40	18.26	15.52	0.641
0.67	40	3.70	15.36	12.62	0.695
0.83	50	3.20	13.28	10.54	0.726
1	60	2.80	11.62	8.88	0.734
1.5	90	2.10	8.72	5.98	0.741 ←
2	120	1.70	7.06	4.32	0.714
3	180	1.20	4.98	2.24	0.555
4	240	1.00	4.15	1.41	0.466
5	300	0.84	3.49	0.75	0.310
6	360	0.73	3.03	0.29	0.144
7	420	0.65	2.70	-0.04	-0.023
8	480	0.58	2.41	-0.33	-0.218
9	540	0.53	2.20	-0.54	-0.402
10	600	0.49	2.03	-0.71	-0.587
11	660	0.46	1.91	-0.83	-0.755
12	720	0.43	1.78	-0.96	-0.952
13	780	0.40	1.66	-1.08	-1.160
14	840	0.38	1.58	-1.16	-1.342
15	900	0.36	1.49	-1.25	-1.550
16	960	0.34	1.41	-1.33	-1.759
17	1020	0.33	1.37	-1.37	-1.925
18	1080	0.31	1.29	-1.45	-2.157
19	1140	0.30	1.25	-1.49	-2.340
20	1200	0.29	1.20	-1.54	-2.545
21	1260	0.28	1.16	-1.58	-2.742
22	1320	0.27	1.12	-1.62	-2.945
23	1380	0.26	1.08	-1.66	-3.155
24	1440	0.25	1.04	-1.70	-3.372

Detailed Example #1 – Step 2

Step 2: Verify that the existing detention facility provides the volume required under the SPO.

From a survey of the existing detention facility, the following stage-storage relationship is determined:

POND:	Detailed Example #1				
JOB NO.	Public Training		Side Slopes		
PROJECT:	Example 1		1		
FILE:	Storage.xls		4		
DATE:	5/15/2014				
	Area		Average	Incremental	Cummulative
Elevation			Area	Storage	Storage
(ft)	(ft ²)	(ac)	(ac)	(ac-ft)	(ac-ft)
704.00	4,322	0.099			0.000
			0.112	0.11	
705.00	5,438	0.125			0.11
			0.139	0.14	
706.00	6,682	0.153			0.25
			0.169	0.17	
707.00	8,054	0.185			0.42
			0.202	0.20	
708.00	9,553	0.219			0.62
			0.229	0.12	
708.51	10,368	0.238			0.74

At HWL of 708.51 ft, the required SPO volume of 0.74 ac-ft is provided (also check existing release @ HWL)



Detailed Example #1 – Step 3

Step 3: Provide the required volume control for the proposed development.

The proposed impervious area is 3 acres, which will be provided in the void space of aggregate under a permeable pavement parking lot.

(Note: permeable pavement is not considered impervious)

$$V_c = 1'' \times \frac{1 \text{ foot}}{12 \text{ inches}} \times 3 \text{ acres} = 0.25 \text{ acre-feet}$$

Detailed Example #1 – Step 4

Step 4: Verify that the site can convey the 100-year peak flowrate to the detention facility.

In this example, it is assumed that overland flow paths to the detention facility have 100-year capacity.

Detailed Example #1 – Step 5

Step 5: Compare the existing impervious area to the proposed (redeveloped) impervious area for the site.

Existing impervious area = 4.25 acres > Proposed impervious area = 3 acres

Since the proposed impervious area does not exceed the existing impervious area, no additional stormwater detention is required.

If the proposed impervious area exceeded the existing, then the additional detention volume would be determined using the Modified Rational Method with Bulletin 70 rainfall depths. Marginal increases in detention volume would be waived, and volume control storage is credited toward the additional required amount.

QUESTIONS?