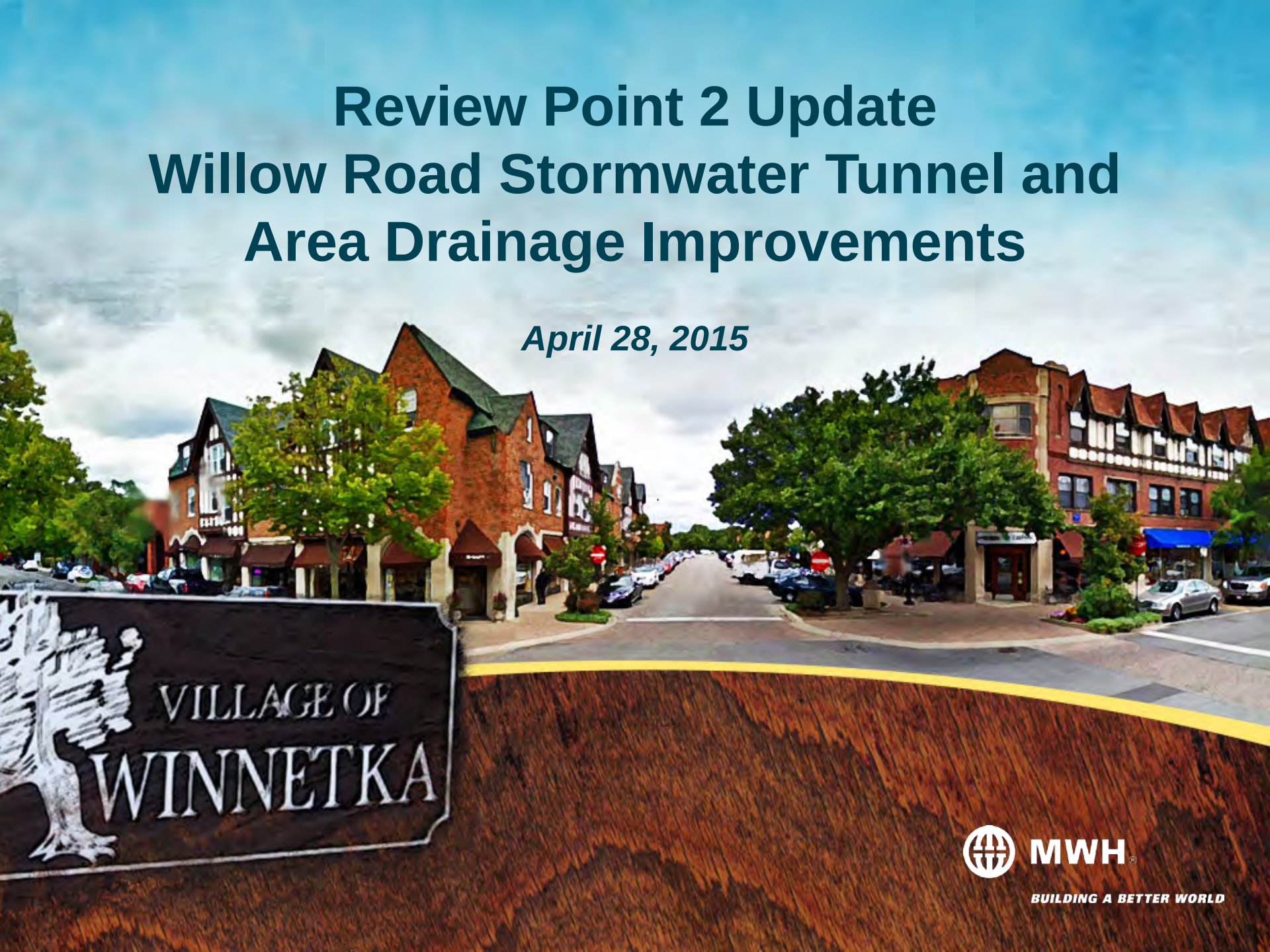
Review Point 2 Update
Willow Road Stormwater Tunnel and Area Drainage Improvements

April 28, 2015



MWH®

BUILDING A BETTER WORLD

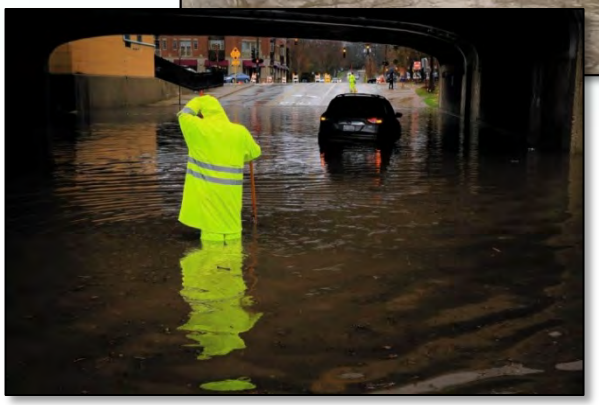
Presentation Agenda

- Progress – What has been accomplished?
- Findings – What has been learned?
- Possible Next Steps – How do we proceed?

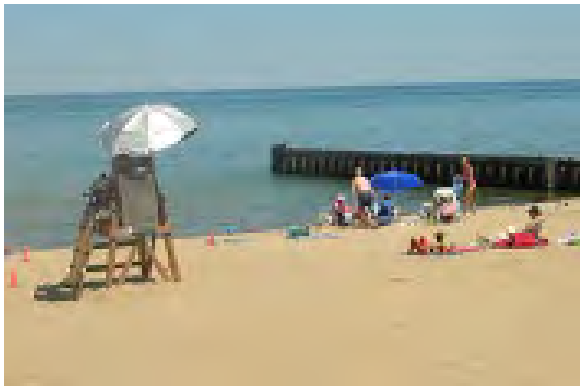
Project Objectives

- Structural flood protection for events up to the 1% annual chance storm

- Protection of water quality in Lake Michigan and the Skokie River

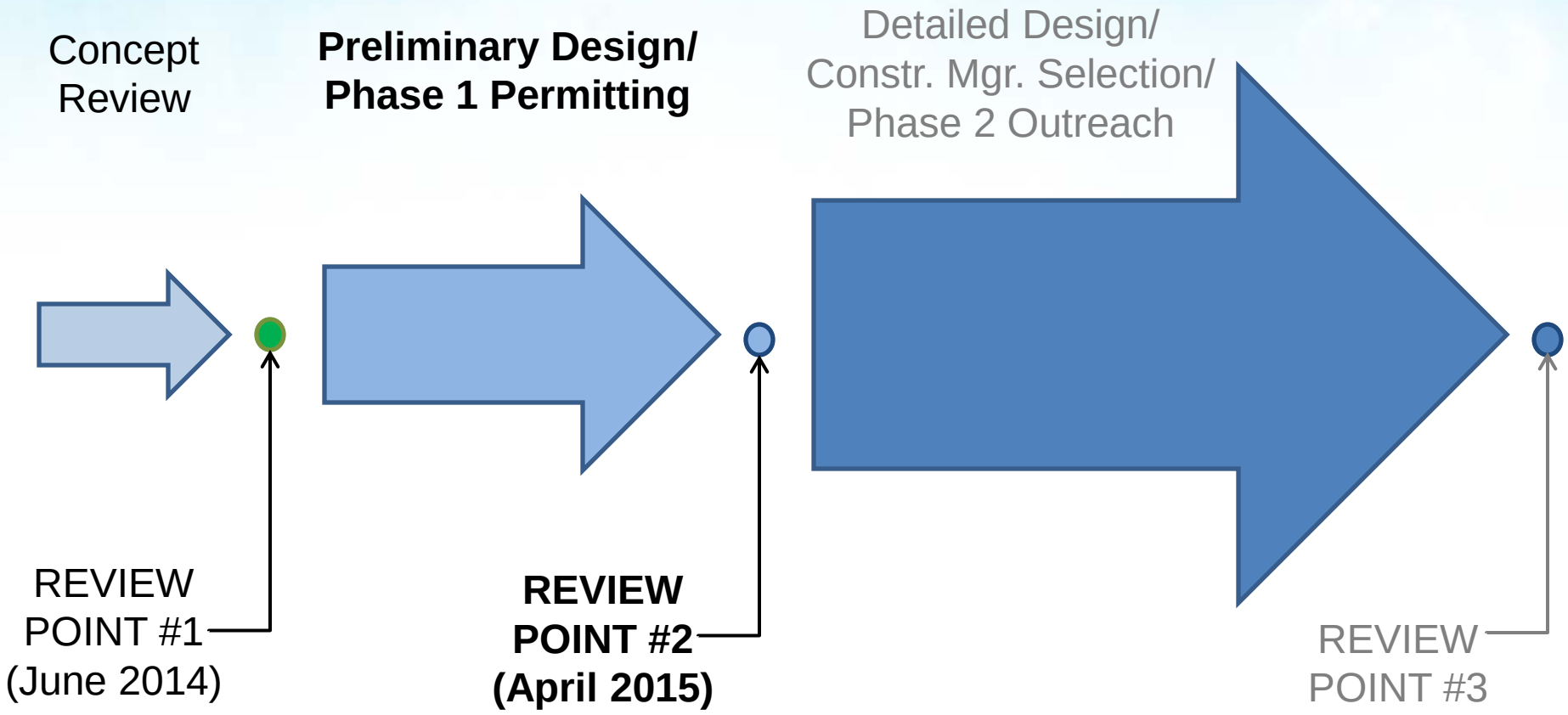


Source: Chicago Tribune, Walker, 4/18/13



Source: www.flickrhivemind.net

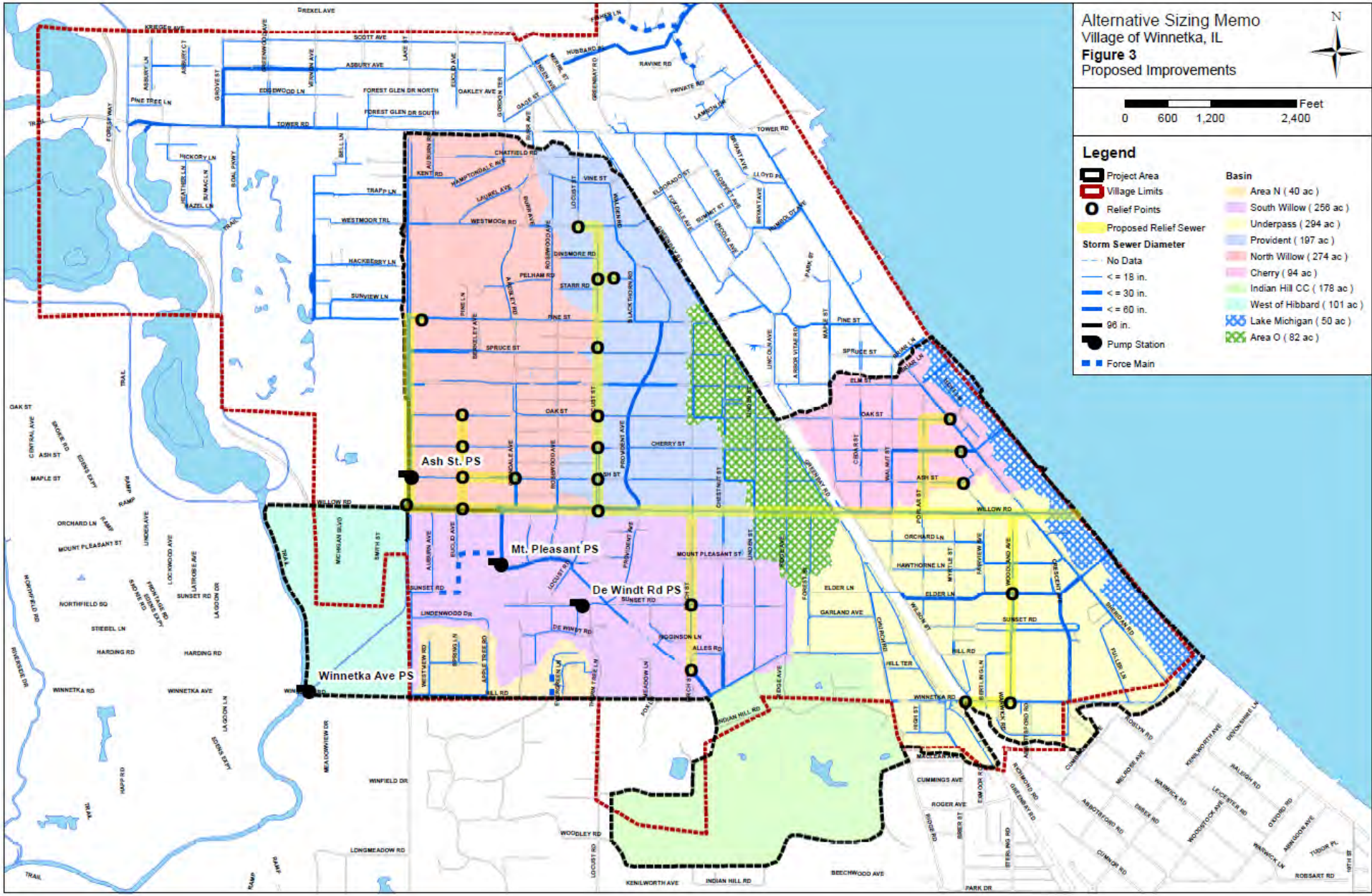
Project Plan/Status



Review Point #1 Results

- Project can achieve target reduction in risk of structure flooding during severe storm events
- Western discharge and/or storage project cannot provide the desired level of risk reduction for a 1% annual chance storm
- Meeting water quality management objectives will be a major challenge for the project
- Preliminary design tasks will provide opportunity for development of additional project details

Review Point #1 Concept

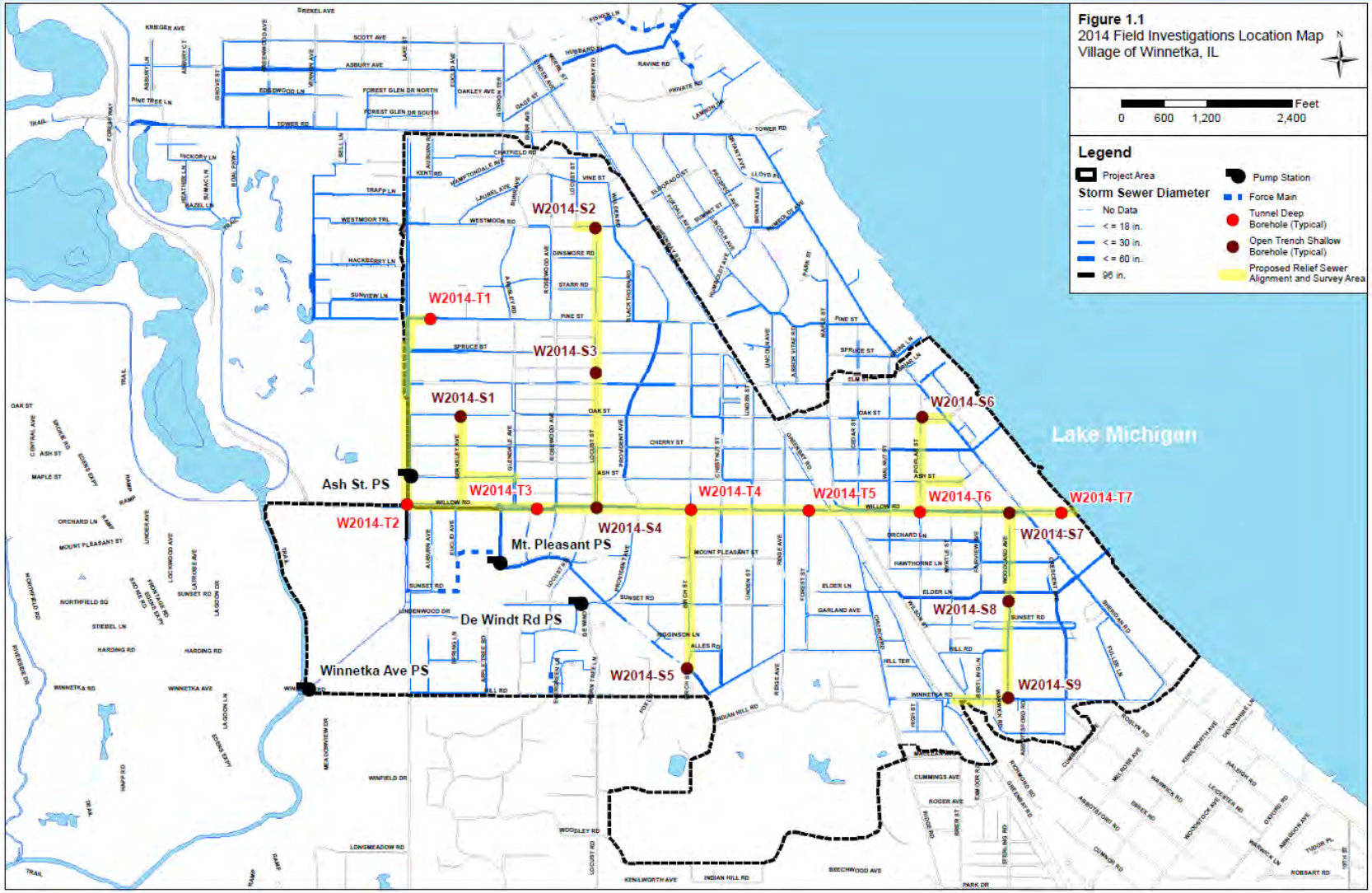


Review Point #2
Preliminary Design Tasks

- Site-Specific Data Collection
  - Surveys and Geotechnical Investigations
  - Stormwater Quality Monitoring
- Preliminary Design
  - 30% Design Development
  - Water Quality Management Plan
- Preliminary Opinion of Probable Construction Costs
- Preliminary Permitting
  - Permit Applications

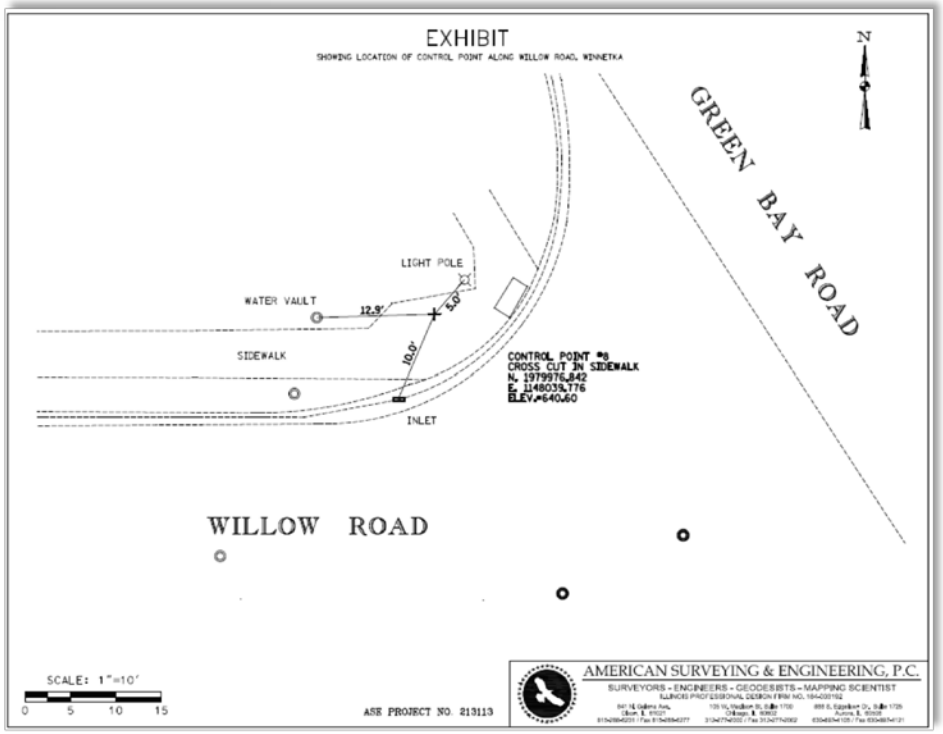
SITE-SPECIFIC DATA COLLECTION

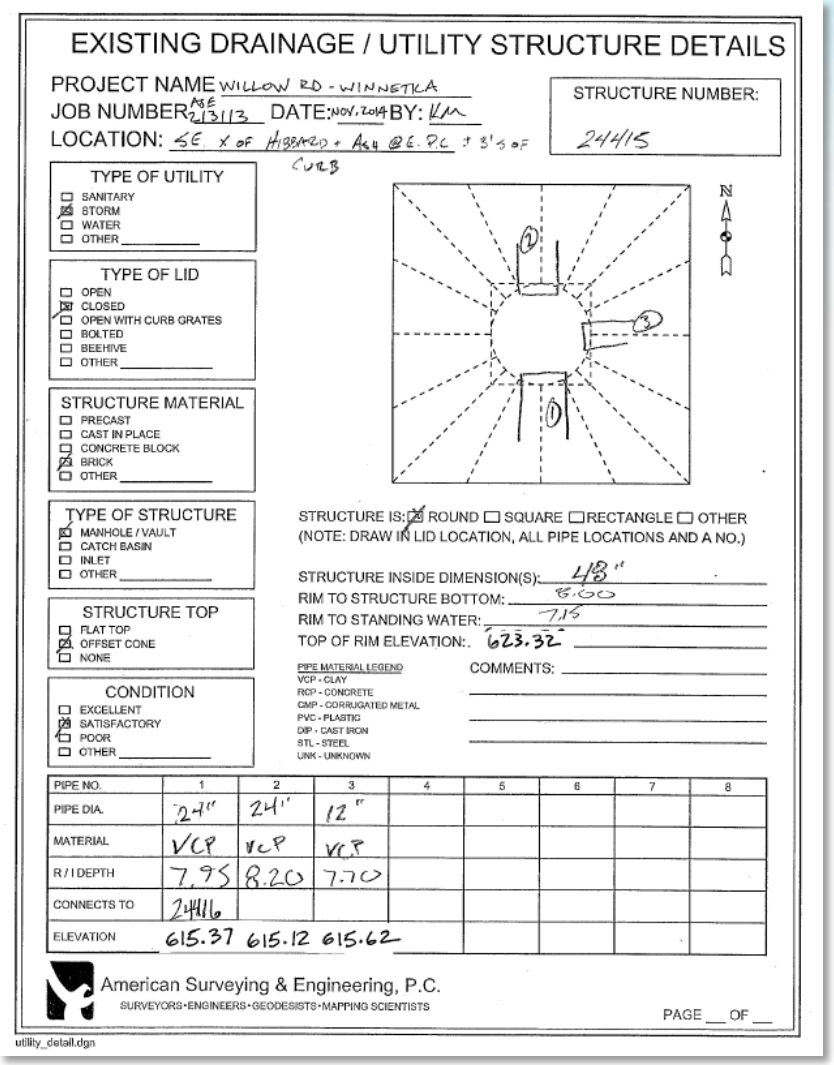
Survey and Geotechnical Investigations



Survey Output

- Base sheet mapping
- Control Points (50)
- Utility Structure Data (540)





EXISTING DRAINAGE / UTILITY STRUCTURE DETAILS

PROJECT NAME: WILLOW RD - WINNETKA
JOB NUMBER: ASE 213113 DATE: NOV. 2014 BY: KM
LOCATION: SE X OF HIBBARD + ASH @ E. P.C + 3' S OF CURB

STRUCTURE NUMBER: 24/15

TYPE OF UTILITY
- ☐ SANITARY
- ☒ STORM
- ☐ WATER
- ☐ OTHER

TYPE OF LID
- ☐ OPEN
- ☒ CLOSED
- ☐ OPEN WITH CURB GRATES
- ☐ BOLTED
- ☐ BEEHIVE
- ☐ OTHER

STRUCTURE MATERIAL
- ☐ PRECAST
- ☐ CAST IN PLACE
- ☐ CONCRETE BLOCK
- ☒ BRICK
- ☐ OTHER

TYPE OF STRUCTURE
- ☒ MANHOLE / VAULT
- ☐ CATCH BASIN
- ☐ INLET
- ☐ OTHER

STRUCTURE TOP
- ☐ FLAT TOP
- ☒ OFFSET CONE
- ☐ NONE

CONDITION
- ☐ EXCELLENT
- ☒ SATISFACTORY
- ☐ POOR
- ☐ OTHER

STRUCTURE IS: ☒ ROUND ☐ SQUARE ☐ RECTANGLE ☐ OTHER
(NOTE: DRAW IN LID LOCATION, ALL PIPE LOCATIONS AND A NO.)

STRUCTURE INSIDE DIMENSION(S): 48"
RIM TO STRUCTURE BOTTOM: 8.00
RIM TO STANDING WATER: 7.15
TOP OF RIM ELEVATION: 623.32

PIPE MATERIAL LEGEND
VCP - CLAY
RCP - CONCRETE
CMP - CORRUGATED METAL
PVC - PLASTIC
DIP - CAST IRON
STL - STEEL
UNK - UNKNOWN

COMMENTS:

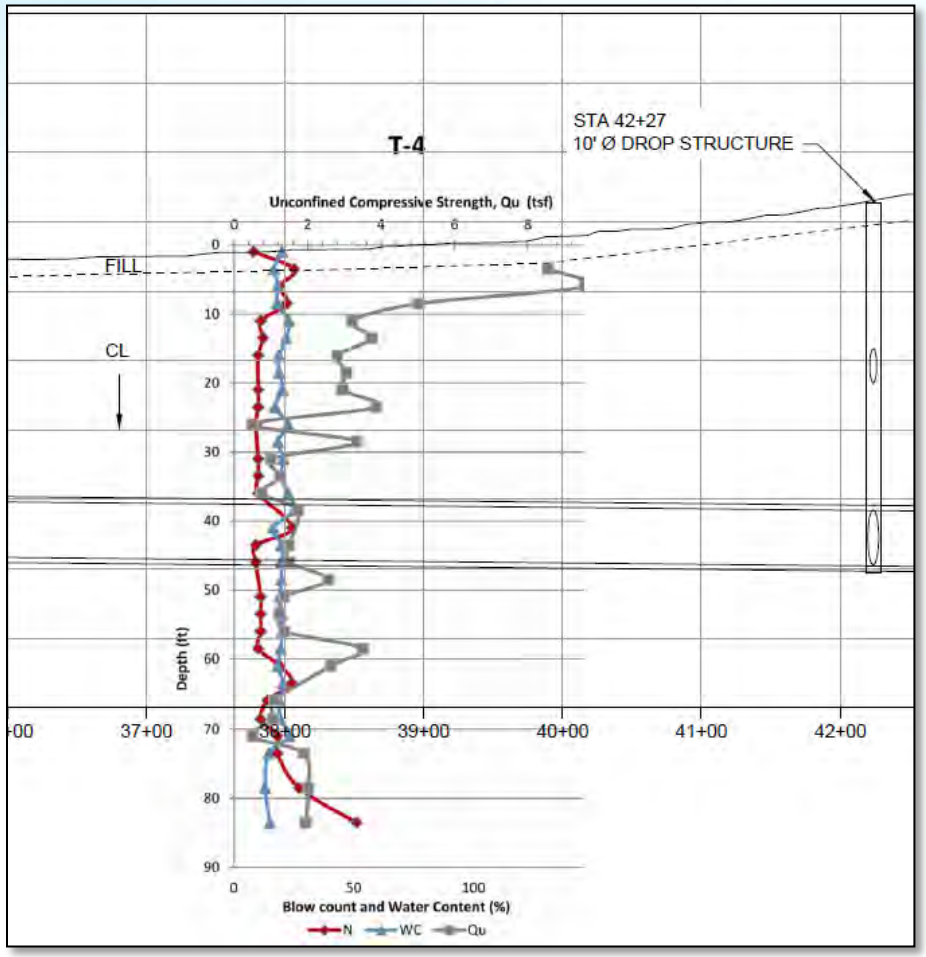
PIPE NO.	1	2	3	4	5	6	7	8
PIPE DIA.	24"	24"	12"					
MATERIAL	VCP	VCP	VCP					
R/I DEPTH	7.95	8.20	7.70					
CONNECTS TO	24/16							
ELEVATION	615.37	615.12	615.62					

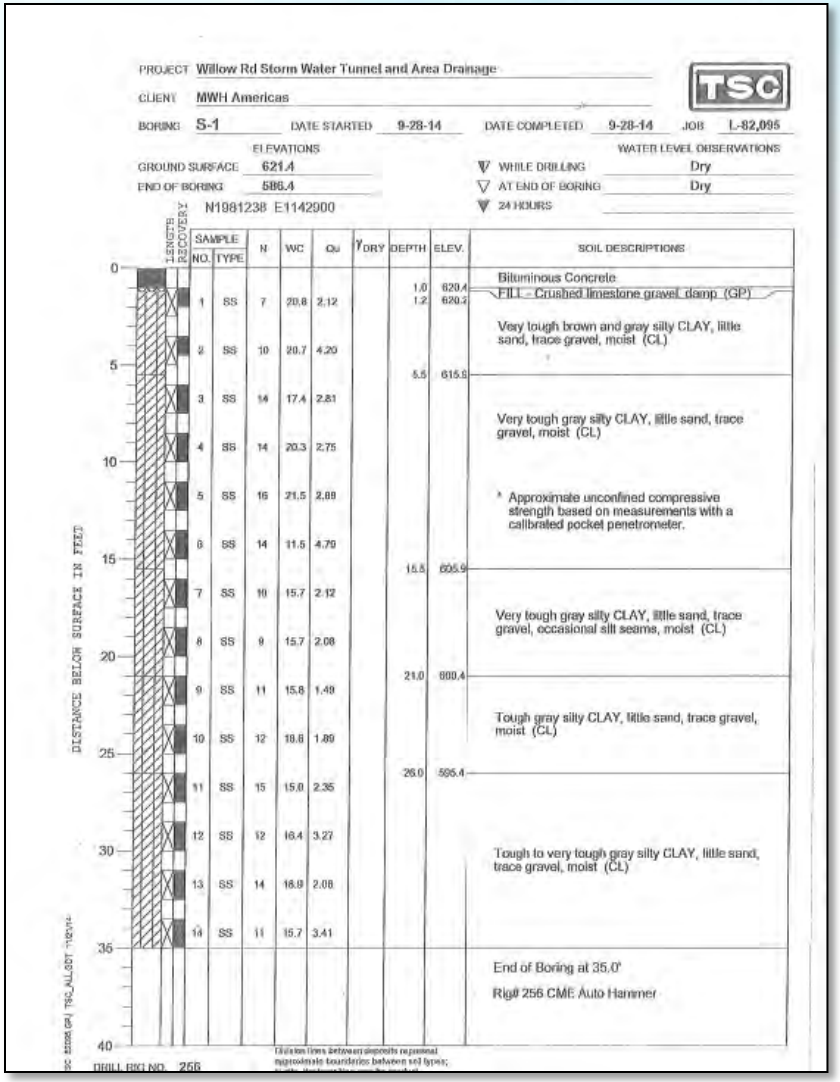
American Surveying & Engineering, P.C.
SURVEYORS • ENGINEERS • GEODESISTS • MAPPING SCIENTISTS

PAGE ___ OF ___

utility_detail.dgn

Geotechnical Investigations





PROJECT Willow Rd Storm Water Tunnel and Area Drainage

CLIENT MWH Americas

BORING S-1 DATE STARTED 9-28-14 DATE COMPLETED 9-28-14 JOB L-82,095

ELEVATIONS

GROUND SURFACE 621.4

END OF BORING 586.4

N1981238 E1142900

WATER LEVEL OBSERVATIONS

WHILE DRILLING Dry

AT END OF BORING Dry

24 HOURS

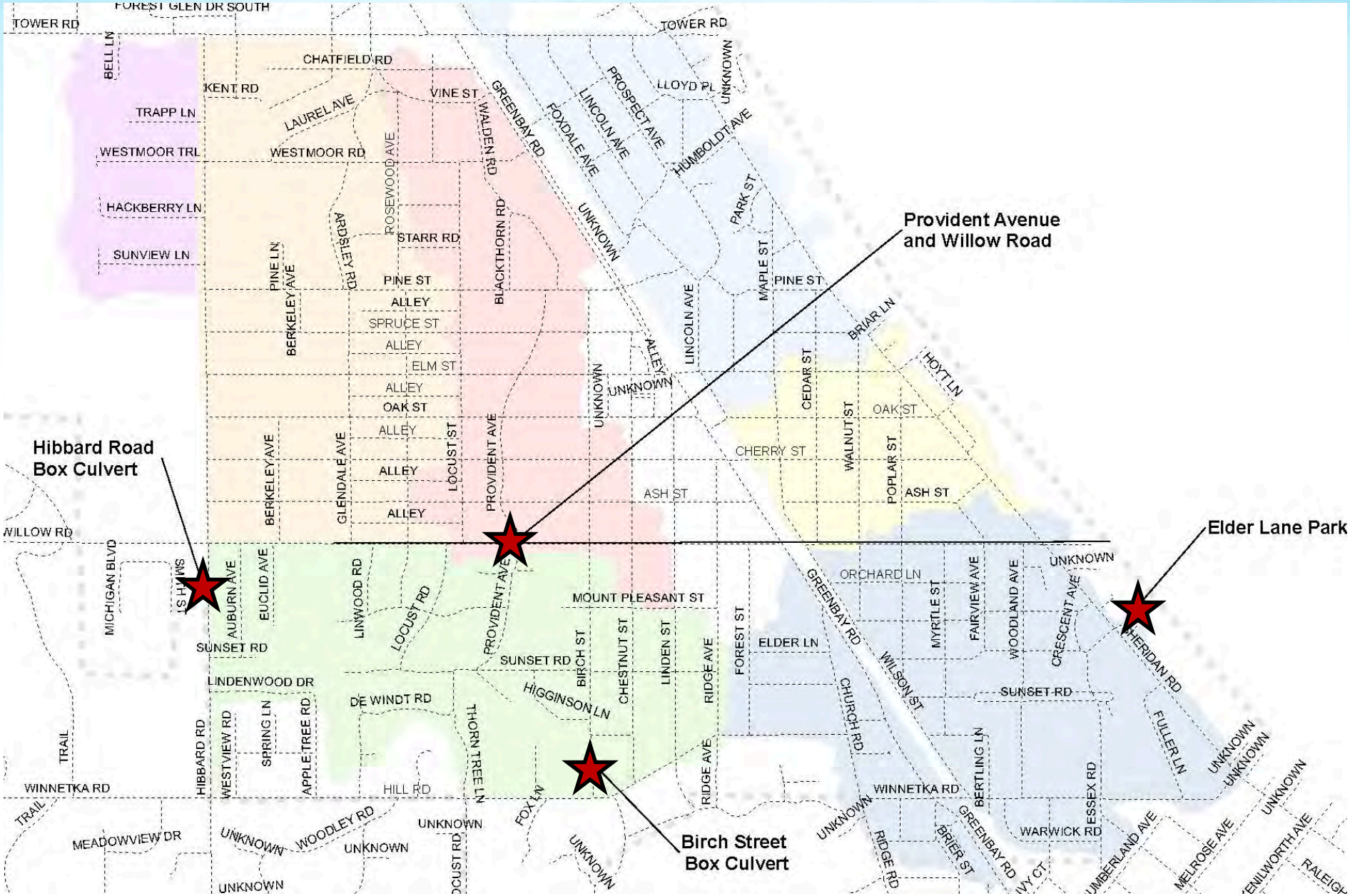
SAMPLE NO.	TYPE	N	WC	Qu	γDRY	DEPTH	ELEV.	SOIL DESCRIPTIONS
						1.0	620.4	Bituminous Concrete
						1.2	620.2	FILL - Crushed limestone gravel, damp (GP)
1	SS	7	20.8	2.12				Very tough brown and gray silty CLAY, little sand, trace gravel, moist (CL)
2	SS	10	20.7	4.20				
						5.5	615.9	
3	SS	14	17.4	2.81				Very tough gray silty CLAY, little sand, trace gravel, moist (CL)
4	SS	14	20.3	2.75				
5	SS	16	21.5	2.89				* Approximate unconfined compressive strength based on measurements with a calibrated pocket penetrometer.
6	SS	14	11.5	4.79				
						15.5	605.9	
7	SS	10	15.7	2.12				Very tough gray silty CLAY, little sand, trace gravel, occasional silt seams, moist (CL)
8	SS	9	15.7	2.08				
						21.0	600.4	
9	SS	11	15.8	1.49				Tough gray silty CLAY, little sand, trace gravel, moist (CL)
10	SS	12	18.8	1.89				
						26.0	595.4	
11	SS	15	15.0	2.35				
12	SS	12	16.4	3.27				Tough to very tough gray silty CLAY, little sand, trace gravel, moist (CL)
13	SS	14	16.9	2.08				
14	SS	11	15.7	3.41				
								End of Boring at 35.0'
								Rig# 256 CME Auto Hammer

DISTANCE BELOW SURFACE IN FEET

DRILL RIG NO. 256

Stormwater Quality Monitoring

Monitoring Locations



WQ Parameters - Composite

Description	Maximum MRL* per IEPA**	Method	Lab MRL*
Sulfate (as S) Whole Water	-	SM 4500 SO4-E	5.0 mg/L
BOD, 5-day, 20 deg	-	SM 5210-B	2.0 mg/L
Nitrogen, Ammonia, Total (as N)	-	SM 4500-NH3-G	0.2 mg/L
Nitrate Nitrogen Total (as N)	-	SM 4500 NO3-F	0.1 mg/L
Phosphorus, Total (as P)	-	SM 4500 P E	0.05 mg/L
Hardness, Total (as CaCO3)	-	SM 2340-B	1.32 mg/L
Chloride, Total in Water	-	SM 4500 CL-E	2.0 mg/L
Fluoride, Total (as F)	0.1 mg/L	SM 4500 F C	0.1 mg/L
Arsenic, Total (as As)	0.05 mg/L	SM 200.8	0.001 mg/L
Barium, Total (as Ba)	0.5 mg/L	SM 200.8	0.0025 mg/L
Cadmium, Total (as Cd)	0.001 mg/L	SM 200.8	0.0005 mg/L
Chromium, Total (as Cr)	0.05 mg/L	SM 200.8	0.005 mg/L
Copper, Total (as Cu)	0.005 mg/L	SM 200.8	0.002 mg/L
Iron, Total (as Fe)	0.5 mg/L	SM 200.8	0.1 mg/L
Iron, Dissolved (as Fe)	0.5 mg/L	SM 200.8	0.1 mg/L
Lead, Total (as Pb)	0.05 mg/L	SM 200.8	0.0005 mg/L
Manganese, Total (as Mn)	0.5 mg/L	SM 200.8	0.0025 mg/L
Nickel, Total (as Ni)	0.005 mg/L	SM 200.8	0.002 mg/L
Silver, Total (as Ag)	0.003 mg/L	SM 200.8	0.0005 mg/L
Zinc, Total (as Zn)	0.025 mg/L	SM 200.8	0.020 mg/L
Selenium, Total (as Se)	0.005 mg/L	SM 200.8	0.0025 mg/L
TSS, Total Suspended Solids in Water	-	SM 2540-D	5.0 mg/L
Chemical Oxygen Demand	-	SM 5220C	10.0 mg/L
Total Dissolved Solids	-	SM 2540C	10.0 mg/L

WQ Parameters Grab and *In situ*

Description	Maximum MRL* per IEPA**	Method	Lab MRL*	Sample Type
Oil & Grease	5.0 mg/L	EPA 1664-B	5.0 mg/L	Grab
Cyanide, Weak Acid Dissociable	0.005 mg/L	SM 4500 CN I	0.005 mg/L	Grab
Cyanide, Free	0.005 mg/L	SM 4500 CN-G	0.005 mg/L	Grab
Chromium, Hexavalent	0.01 mg/L	SM 3500 Cr-B	0.01 mg/L	Grab
Fecal Coliform	-	Colilert-18	1 MPN/100mL	Grab
Phenolics	0.005 mg/L	EPA 420.4	0.005 mg/L	Grab
Mercury, Total	1.0 ng/L	EPA 1631E	0.5 ng/L	Grab
Escherichia Coliform	-	Colilert-18	1 MPN/100mL	Grab
Flow, Stream, Instantaneous	-	NA	NA	In situ
pH	-	multimeter	-	In situ
Specific Conductance	-	multimeter	TBD	In situ
Temperature	-	multimeter	-	In situ

2014/15 Sampling Events

Wet Weather

Composite and grab samples triggered by rain, flow

- October 3, 2014 – 1.41 inches of rain over 8.25 hours
- October 13, 2014 – 1.74 inches of rain over 8.0 hours
- November 24, 2014 – 0.64 inches of rain over 10.8 hours

Dry Weather

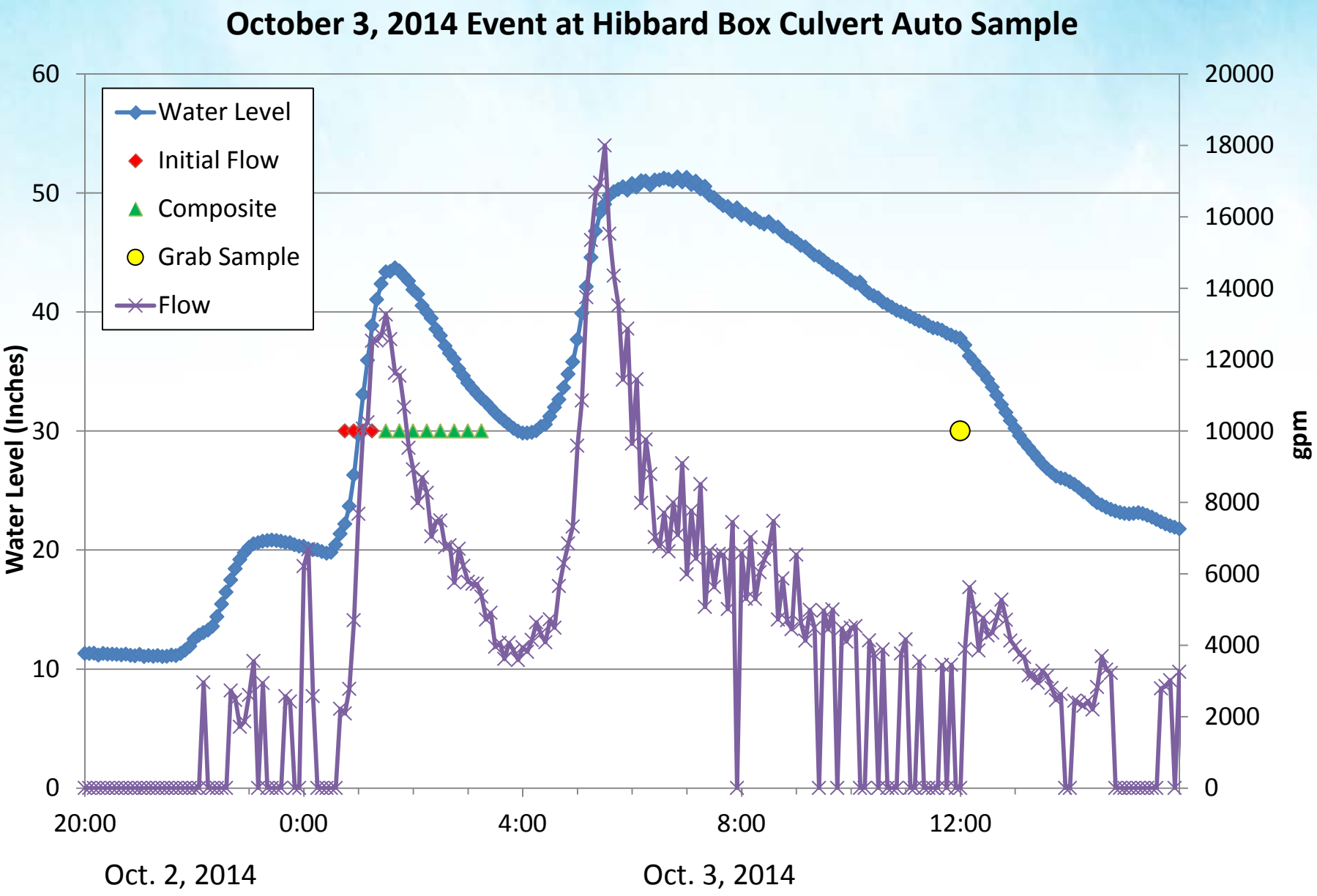
Grab samples after 48 hours with no rain

- September 25, 2014
- October 23, 2014
- November 6, 2014

Snowmelt

Grab samples taken during snow melt

- March 7, 2015


October 3, 2014 Event at Hibbard Box Culvert Auto Sample
Water Level
Initial Flow
Composite
Grab Sample
Flow
Water Level (Inches)
gpm
60
50
40
30
20
10
0
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
20:00
0:00
4:00
8:00
12:00
Oct. 2, 2014
Oct. 3, 2014

Parameters with No Exceedances

- Arsenic
- Barium
- Cadmium
- Cyanide (Amenable)
- Fluoride
- Hexavalent Chromium
- Iron, Dissolved
- Nickel
- Nitrate Nitrogen
- Selenium
- Silver
- Zinc

No water quality standards currently exist for biological oxygen demand, chemical oxygen demand, chromium (total), cyanide (dissociable), hardness, iron (total), and total suspended solids.

Parameters with Exceedances

Parameter	Most Stringent Water Quality Standard	Number of Samples Exceeding Standard	Range of Results Exceeding Standard (mg/L)
Sulfate	24.0 mg/L	8 of 15	30 - 82 mg/L
Total Dissolved Solids	180.0 mg/L	12 of 20	190 – 3,100 mg/L
Total Dissolved Solids (snowmelt)	180.0 mg/L	4 of 4	1,400 – 2,500 mg/L
Chloride	12.0 mg/L	17 of 20	13 – 1,800 mg/L
Chloride (snowmelt)	12.0 mg/L	4 of 4	760 – 1,400 mg/L
Total Phosphorus	0.007 mg/L	20 of 20	0.24 – 1.4 mg/L
Lead	0.050 mg/L	3 of 20	0.054 – 0.055 mg/L
Ammonia	0.02 mg/L	16 of 20	0.17 (TR) – 1.6 mg/L
Low-Level Mercury	1.3 ng/L	14 of 14	1.7 – 340 ng/L
Oil and Grease	0.1 mg/L	13 of 13	0.95 (TR) – 2.9 (TR) mg/L
Copper	Hardness-based	17 of 20	0.017 – 0.17 mg/L
Manganese	0.15 mg/L	2 of 20	0.16 mg/L
Phenolics	0.001 mg/L	7 of 13	0.0030 (TR) – 0.0056 mg/L
Fecal Coliform	20 CFU/100mL	15 of 15	43 – 103,000 CFU/100 mL
E. coli	126 CFU/100mL	14 of 15	1,730 – 45,000 CFU/100 mL

Potential Pollutant Sources

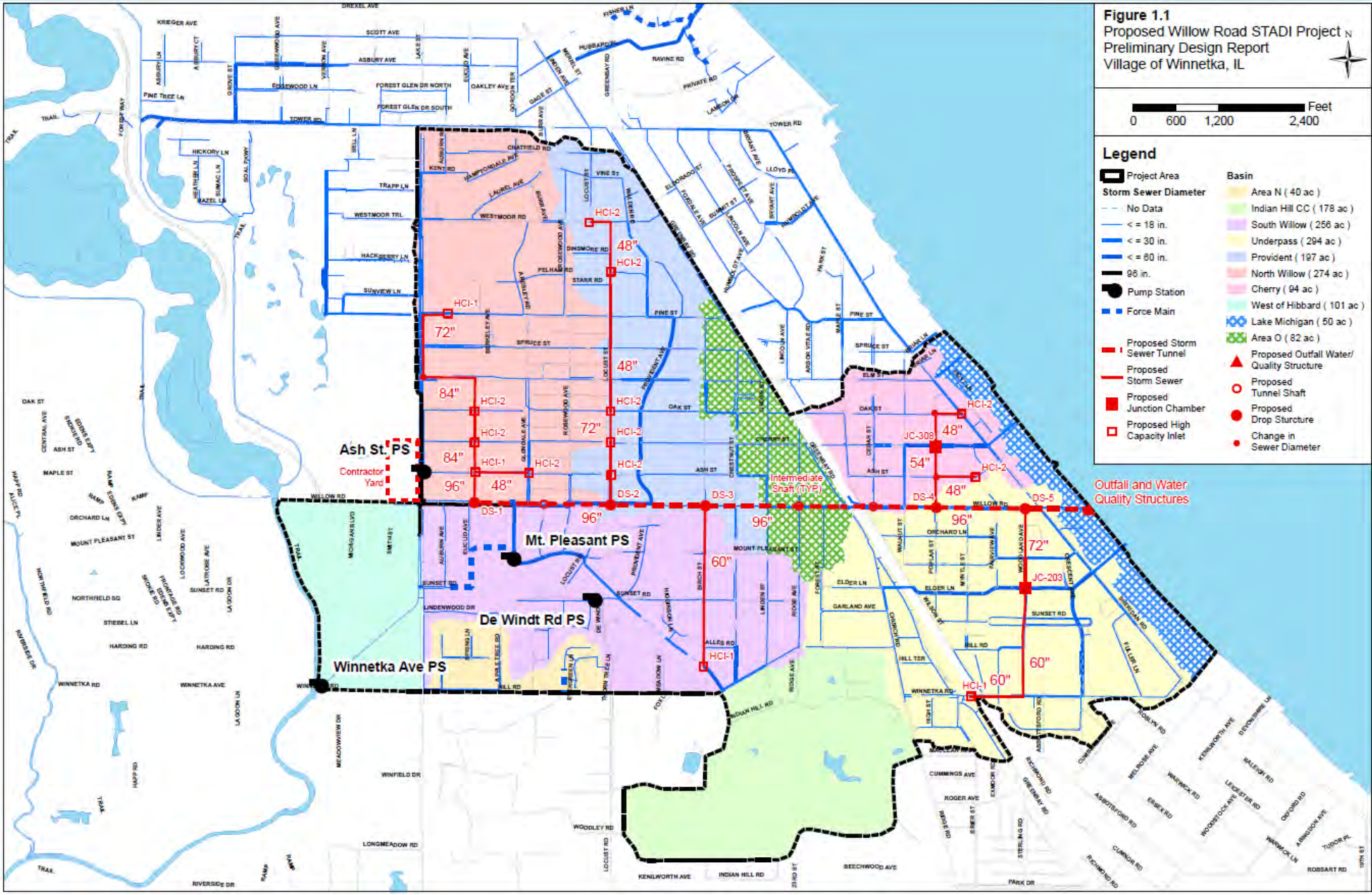
Pollutant Categories	Common Pollutant Sources
Dissolved Solids/ Inorganic Compounds	Wash-off from streets, parking areas Runoff from disturbed soils De-icing salts
Nutrients	Fertilizers Leakage from aging sanitary sewers
Metals	Wash-off from streets, parking areas Atmospheric deposition
Oil & Grease	Wash-off from streets, parking areas, vehicle service areas Illegal dumping
Bacteria	Leakage from aging sanitary sewers Pet waste Wildlife waste

Field Investigation Findings

- Alignments for proposed sewers include narrow, tree-lined streets with significant existing utilities.
- Subsurface conditions are well-suited to either open cut construction or soft-ground tunneling.
- Stormwater quality in Winnetka is generally consistent with runoff from other suburban areas.
- Observed levels for 11 pollutants and bacteria exceeded current Lake Michigan water quality standards. Management measures needed.

PRELIMINARY DESIGN

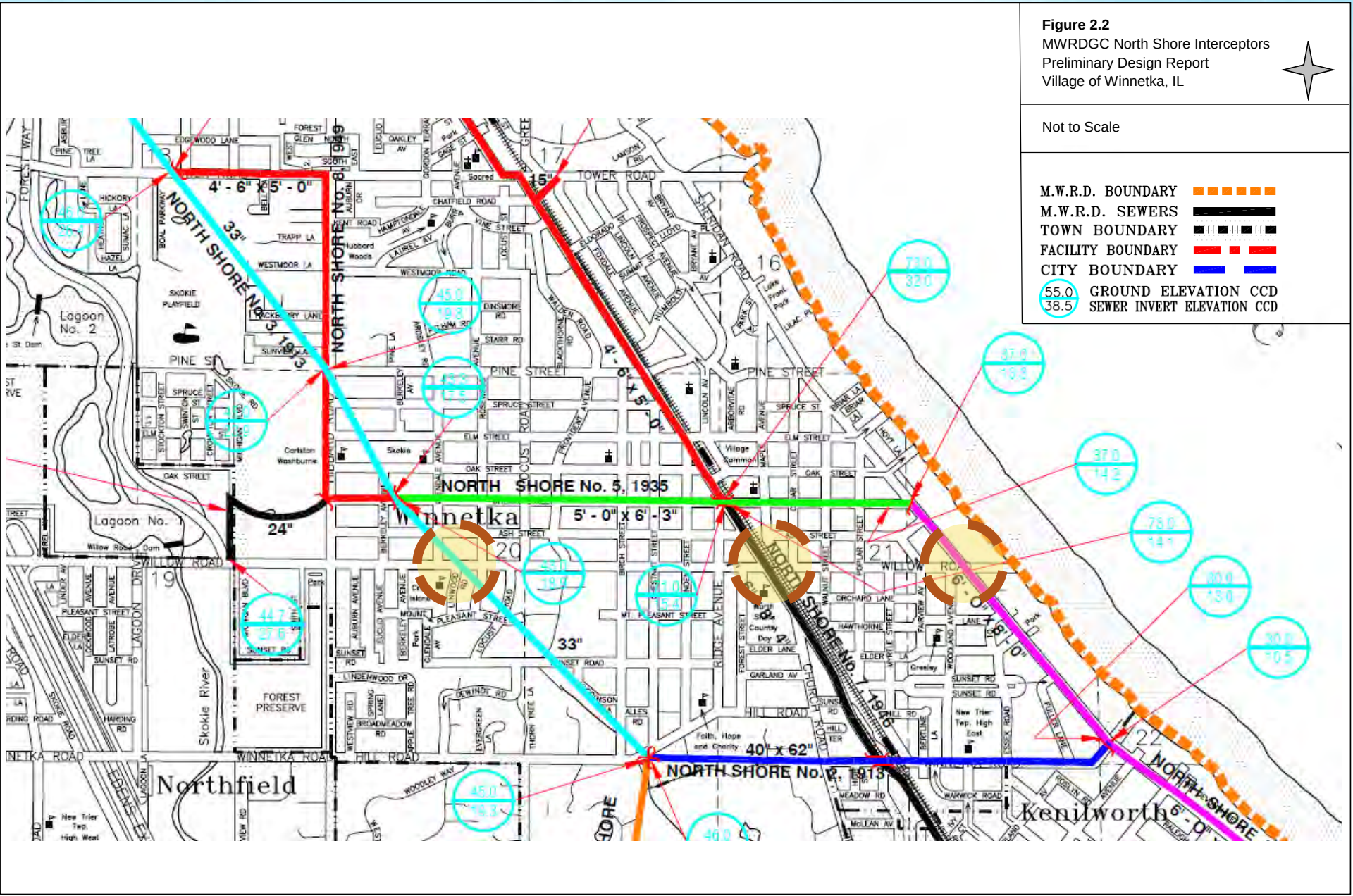
Project Concept



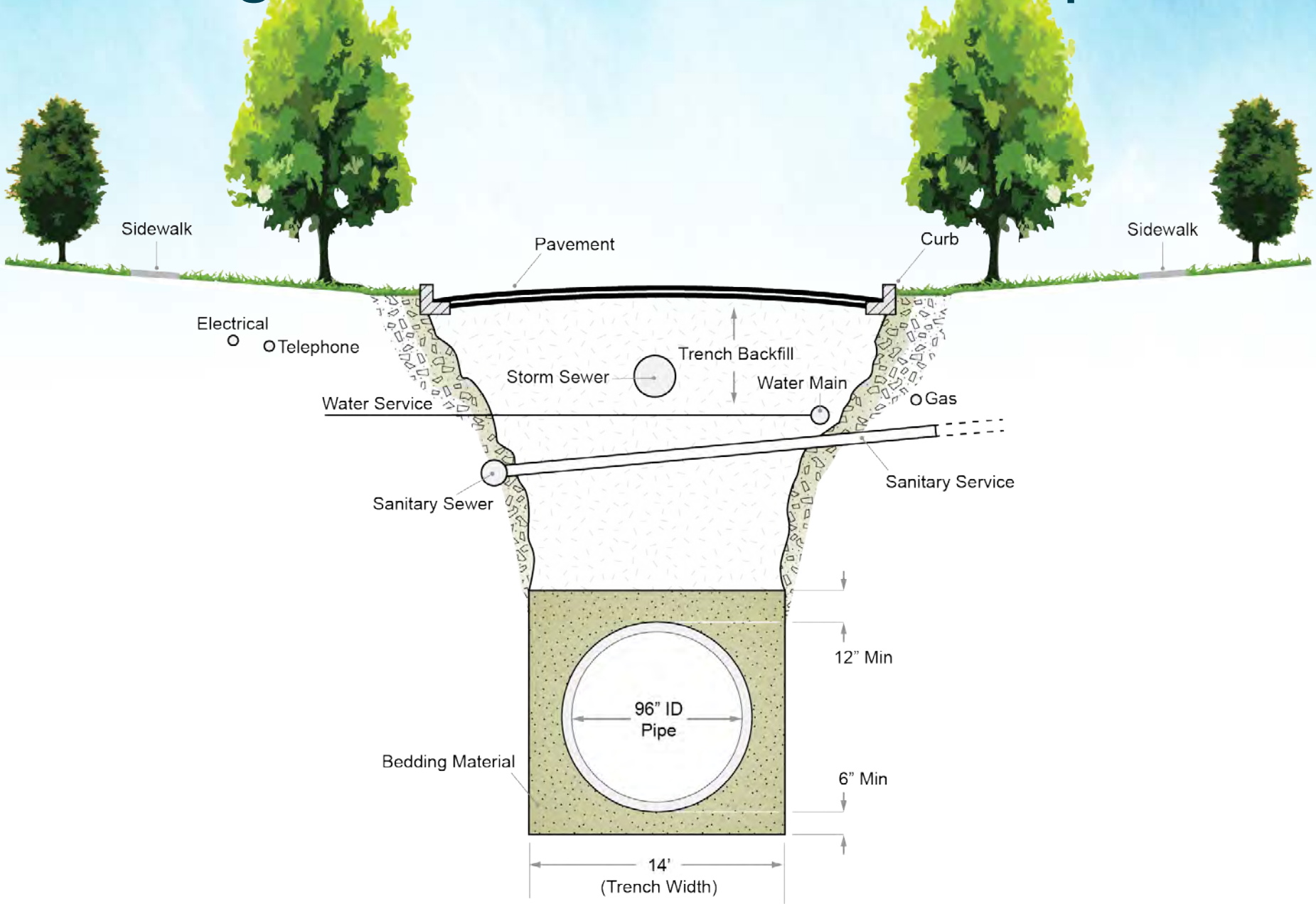
Preliminary Design Elements

- Storm Sewer (Tunnel)
  - Alignment, Depth, Construction Options
- Storm Sewer (Open Cut)
  - Alignment, Depth, Structures
- Inlet Structures
  - Capacity, Configuration
- Outfall/Treatment Structure
  - Capacity, Configuration

Design Constraint: MWRD



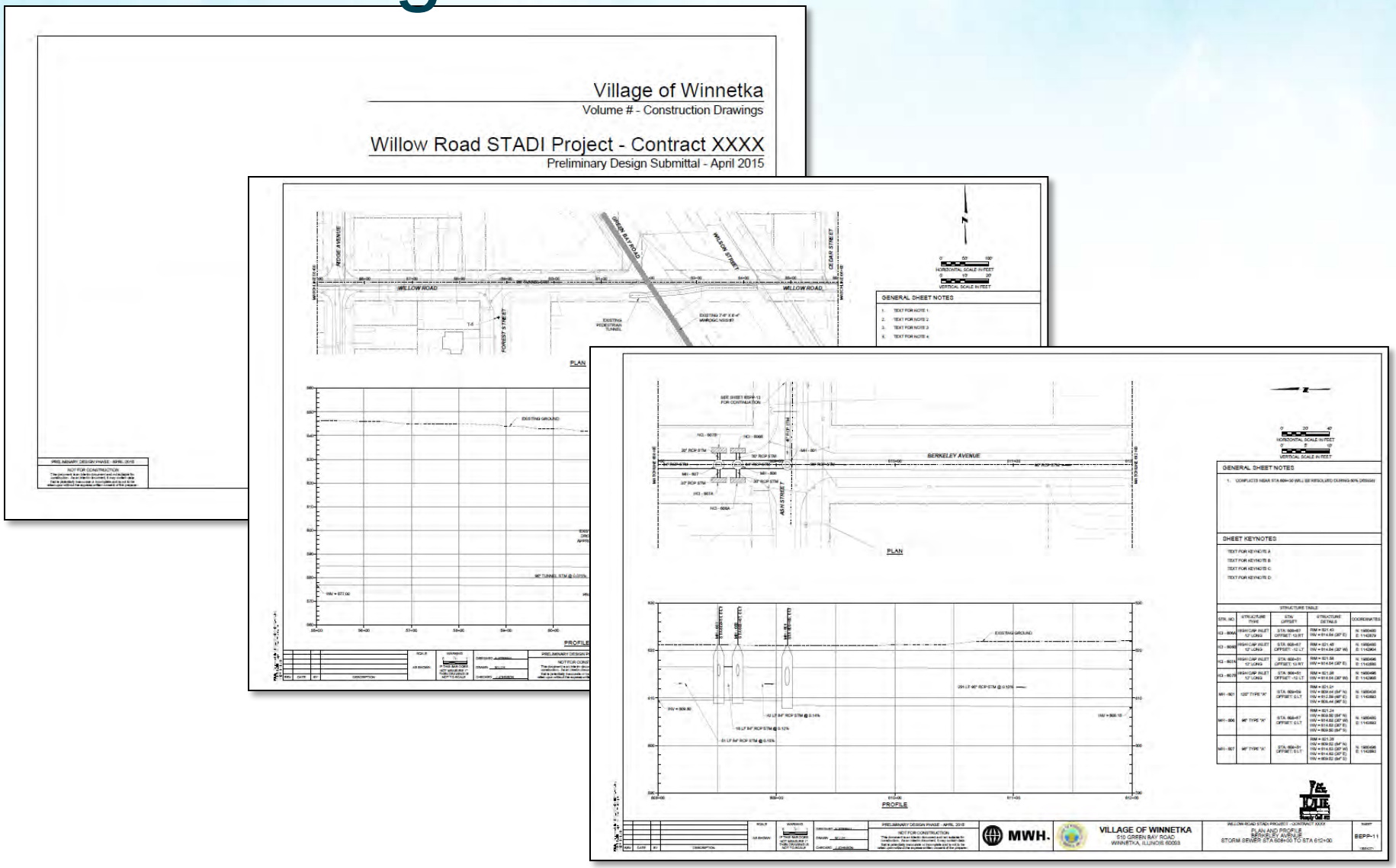
Design Constraint: Disruption



Design Constraints: Outfall Structure

- Capacity
- Safety
- Energy Dissipation
- Water Quality
- Aesthetics
- Constructability

Preliminary (30%) Design Drawings



Water Quality Management Strategy

Source Control

- Public Education
- Ordinances/Controls
- Localized Best Management Practices/Green Infrastructure

Distributed Treatment

- Bioswales
- Catch Basin Inserts
- Bioretention Systems
- Stormwater Filters

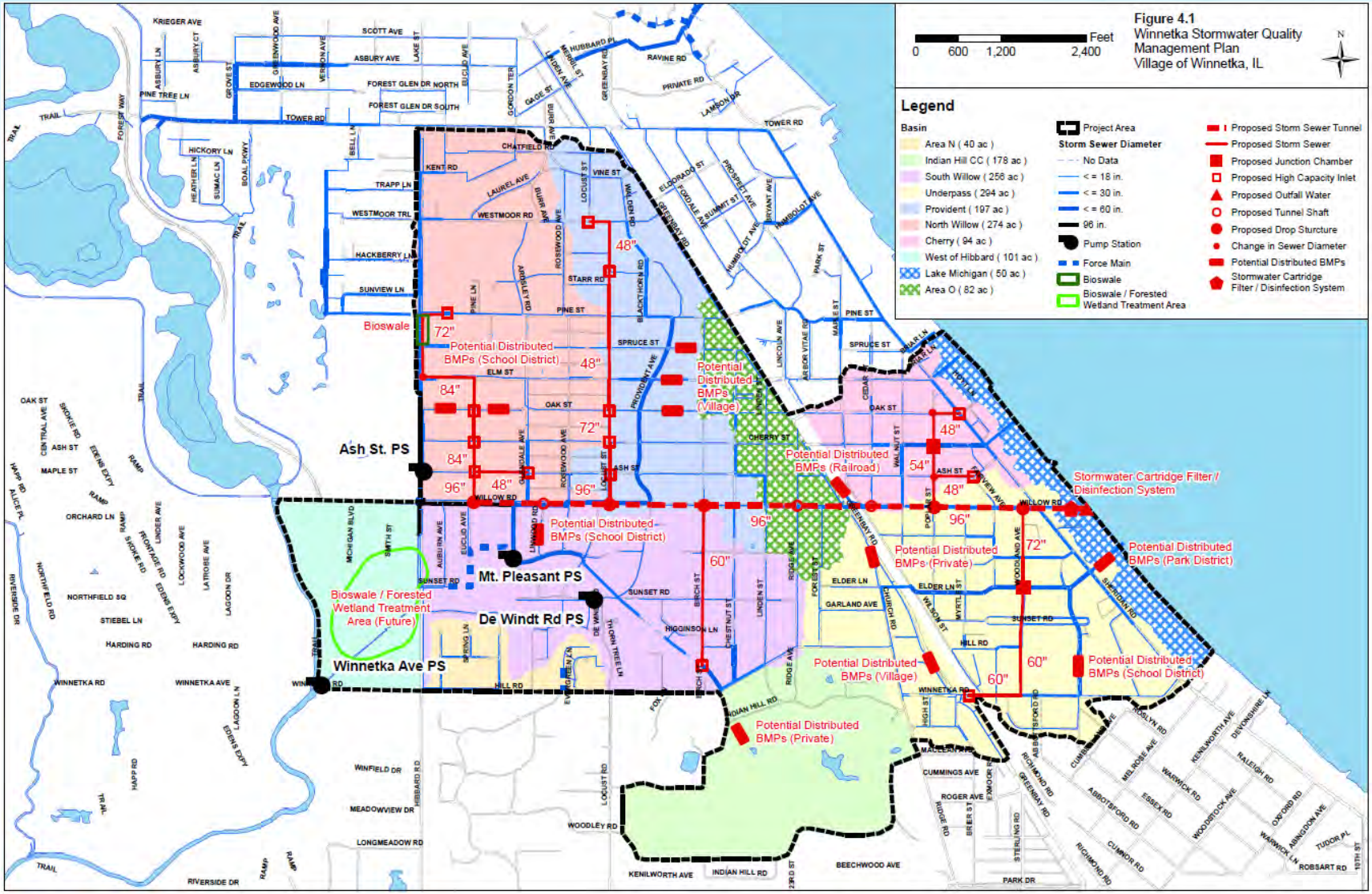
Flow Management

- Maintenance of Existing Flow Paths
- Design of Flow Diversions

Discharge Management

- Low Flow Treatment
- Energy Dissipation

Water Quality Management Plan



Source Control Measures

Source Control

- Sanitary Sewer System Rehabilitation
  - Sanitary Sewer System Evaluation Completed
  - Manhole Repair/Sewer Lining: 2015
  - Ongoing inspection and repairs
  - MWRD Cleaning and Lining Projects (2014 – 2015)
- Ordinances
  - No dumping to sewers
  - Coal Tar Sealer ban
  - Potential others?

Source Control Measures

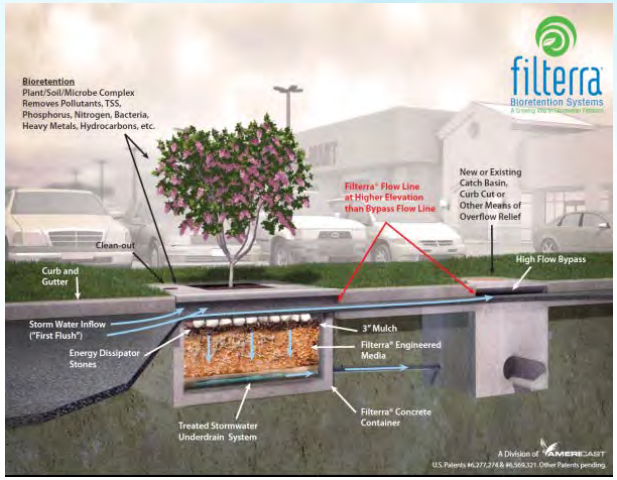
Source Control

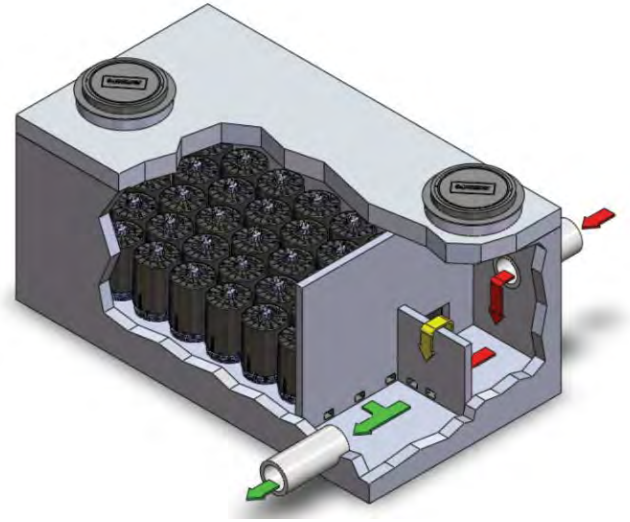
- Good Housekeeping
  - Street Sweeping, Catch Basin Cleaning
  - Sustainable Snow/Ice Control
- Public Education Programs
  - Fertilizer Application Management
  - Private Sector Best Management Practices
  - Pet Waste Management

Distributed Treatment

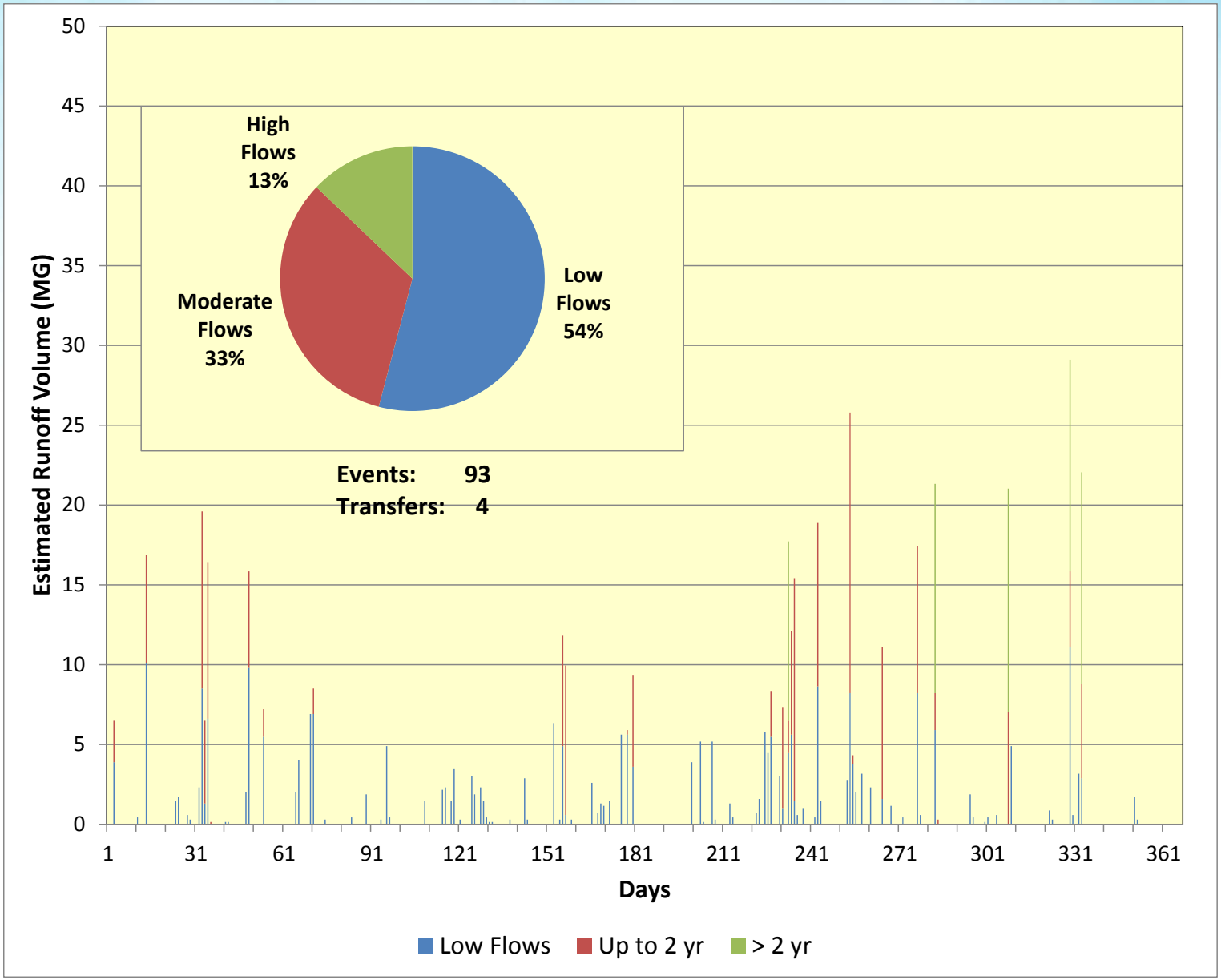
Distributed Treatment

- Bioswales, Rain Gardens
- Catch Basin Inserts
- Bioretention Systems
- Stormwater Filters

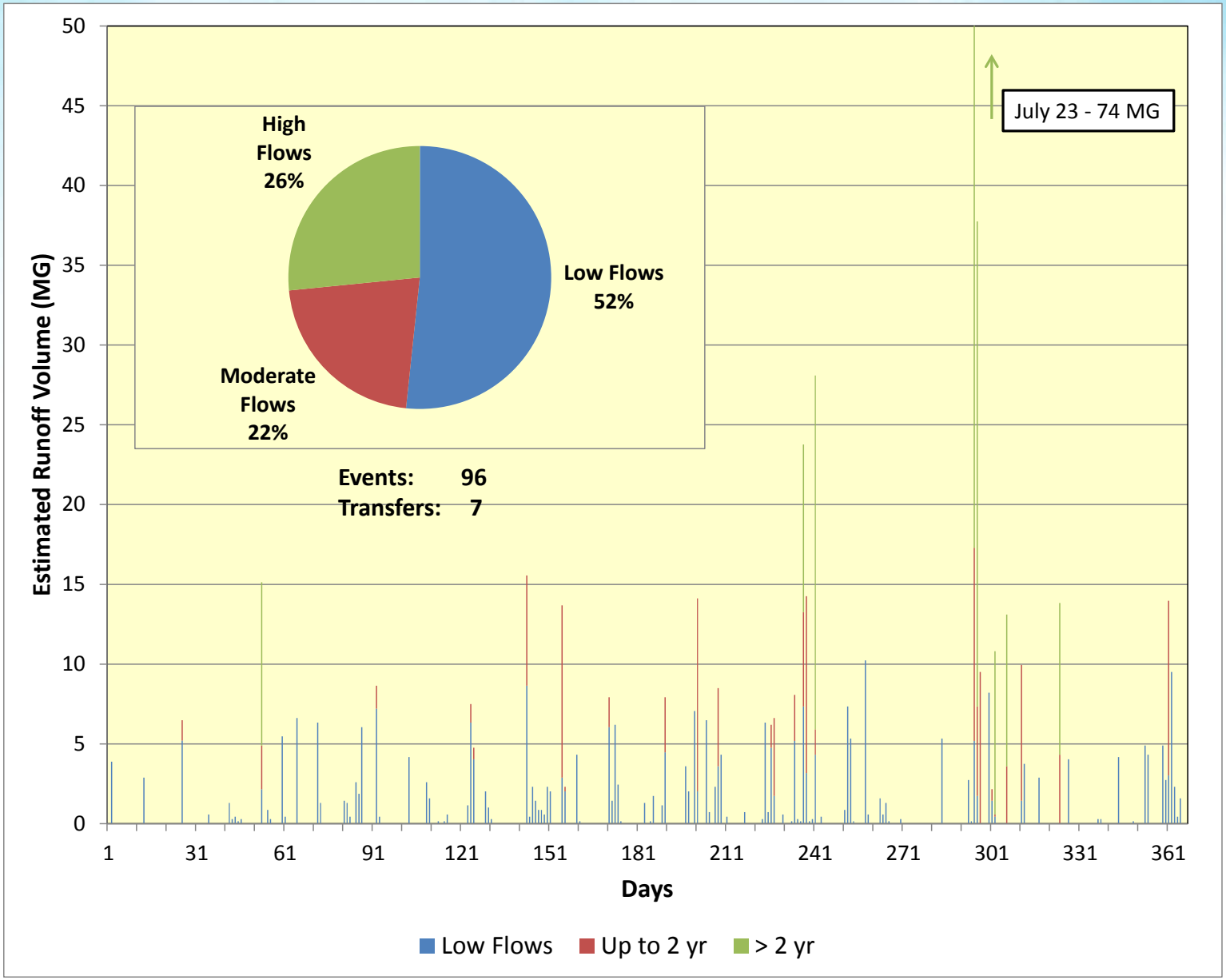




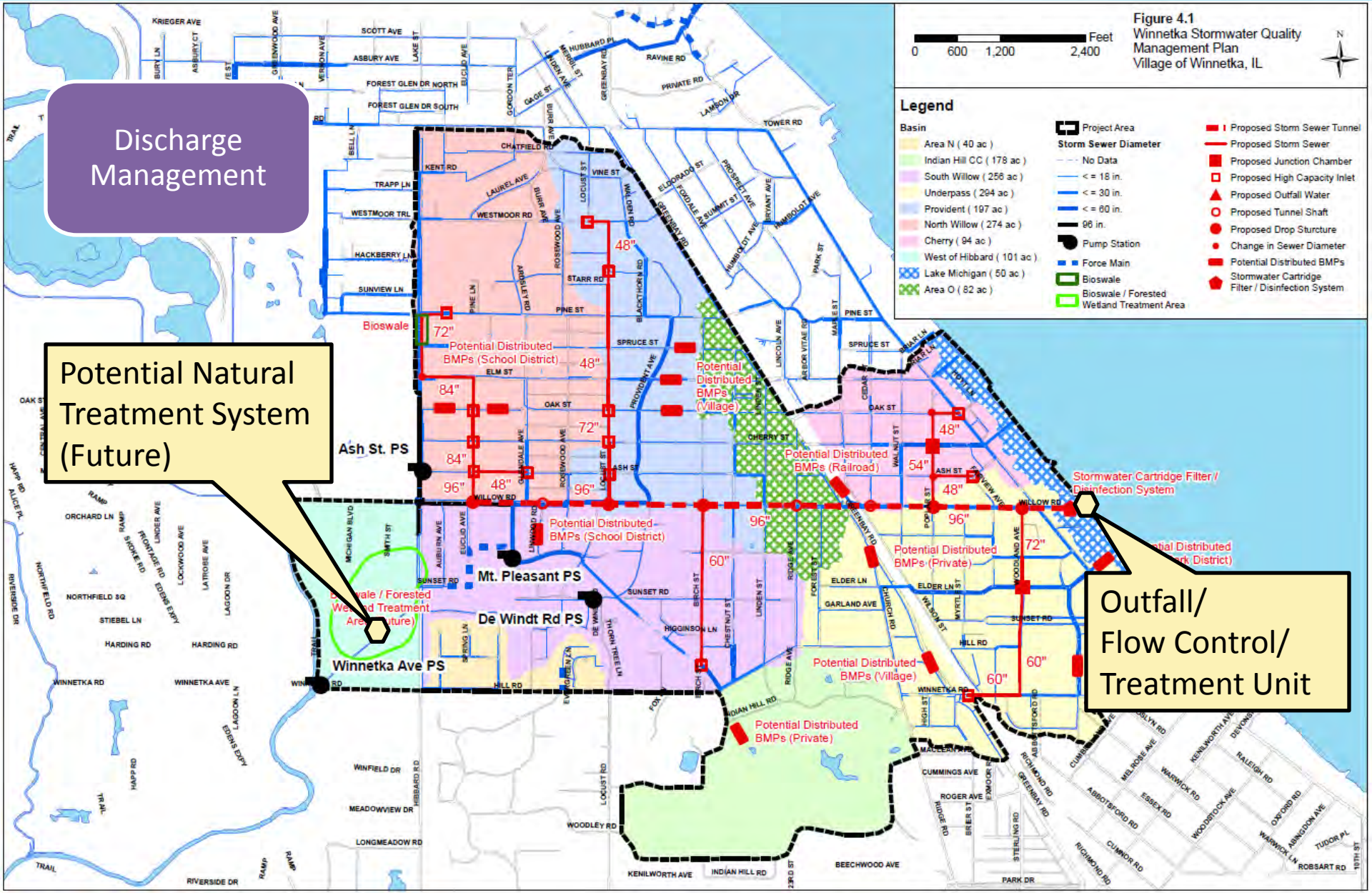
STADI Area Runoff: 2004



STADI Area Runoff: 2011

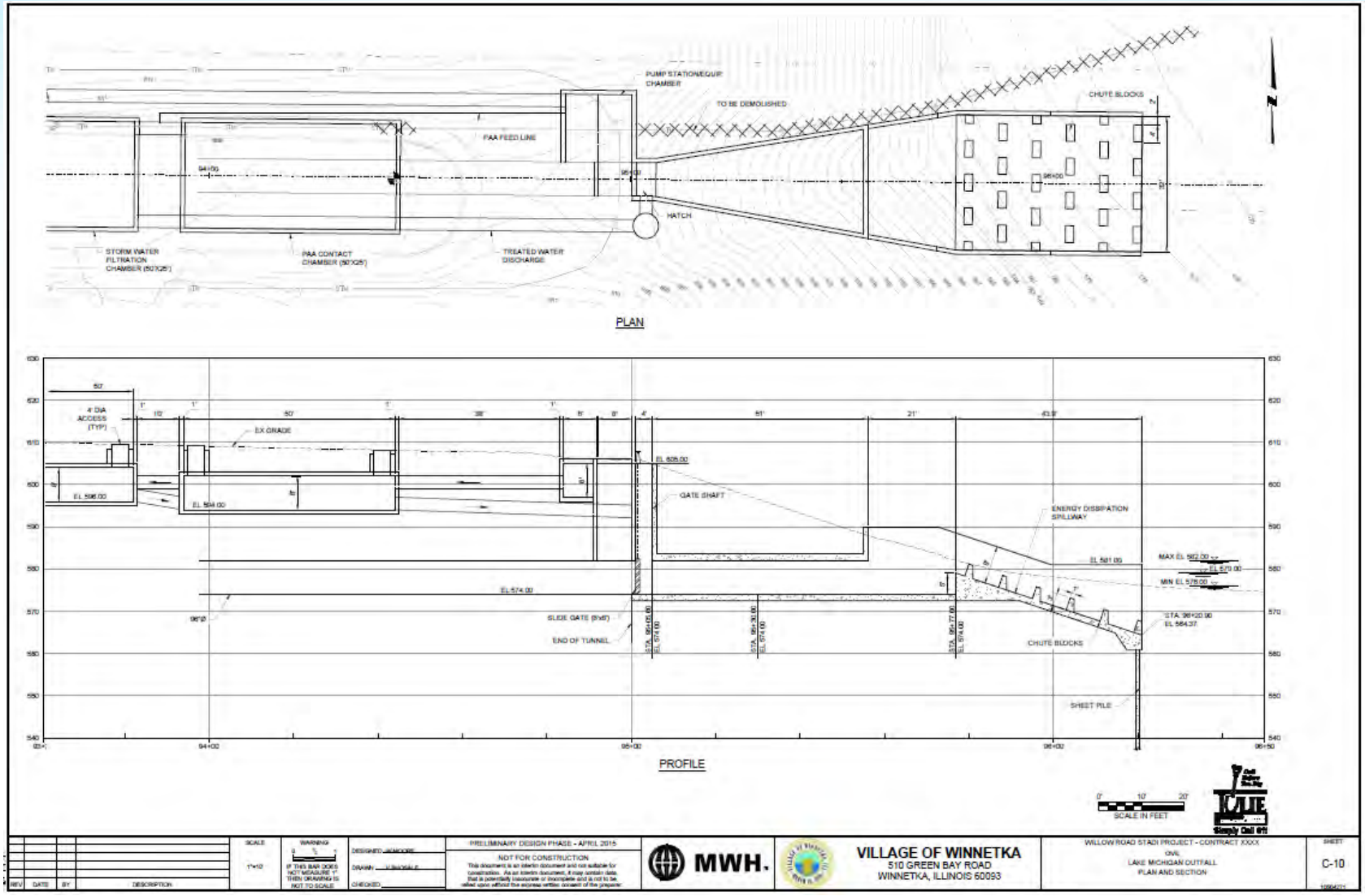


Water Quality Management

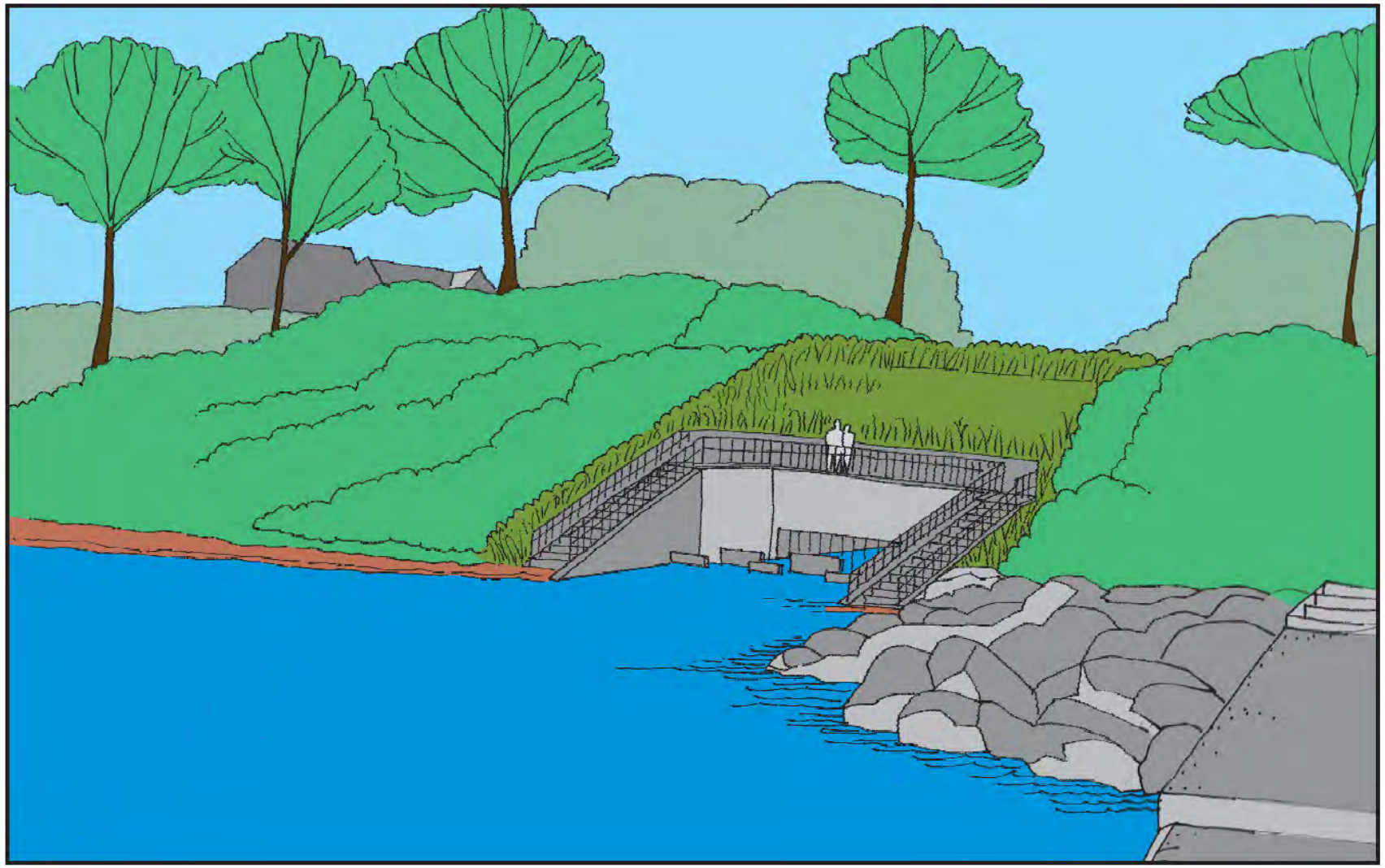


Outfall/Flow Control/ Treatment Unit

Outfall/Flow Control/ Treatment Unit



Outfall/Flow Control/ Treatment Unit

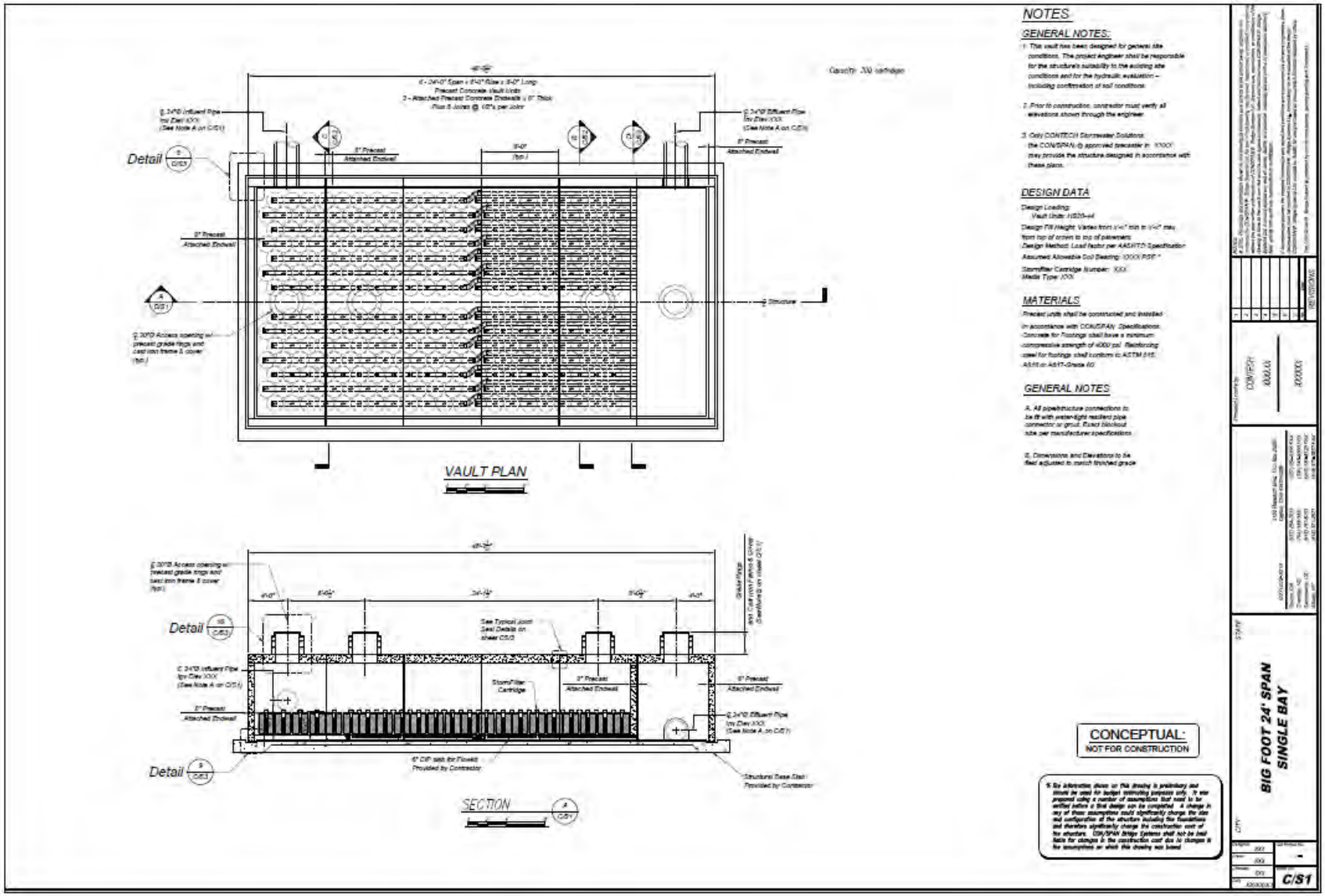


Stormwater Filtration

- Filtration Units for removal of fine solids, metals, oil and grease
- Specific media to provide for removal of phosphorus
- Limited field trials have achieved effluent P $\leq$ 0.1 mg/l

Source: CONTECH.
http://www.conteches.com/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=2823&PortalId=0&TabId=144

Stormwater Filtration



Stormwater Disinfection Option

- Option: Peracetic Acid
- Equilibrium mixture of hydrogen peroxide, acetic acid, water
- Effective disinfectant
- Reduced potential for harmful by-products
- No need for neutralization

United States Environmental Protection Agency
September 2012

Alternative Disinfection Methods Fact Sheet:
Peracetic Acid

DESCRIPTION

Disinfection is considered to be the primary mechanism for the inactivation/destruction of pathogenic organisms to prevent the spread of waterborne diseases to downstream users and the environment. It is important that wastewater be adequately treated prior to disinfection in order for any disinfectant to be effective. Table 1 lists some common microorganisms found in domestic wastewater and the diseases associated with them.

Table 1: Infection Agents Potentially Present In Untreated Domestic Wastewater

ORGANISM	RELATED DISEASE
Bacteria:	
Escherchia coli	Gastroenteritis (enterotoxigenic)
Leptospira (spp.)	Leptospirosis
Salmonella (2,100 serotypes)	Salmonellosis
Salmonella typhi	Typhoid fever
Shigella (4Spp.)	Shigelloisis (bacillary dysentery)
Vibrio Cholerae	Cholera
Protozoa:	
Balantidium Coili	Balantidiasi
Cryptosporidium (Parvum)	Cryptosporidiosis
Entamoeba histolytica	Amebiasis (amoebic dysentery)

Table 1: Continued

Giardia Lamblia	Giardiasis
Helminthes:	
Ascaris lumbricoides	Ascariasis
T. Solium	Taeniasis
Trichiura trichiura	Taeniasis
Viruses:	
Enteroviruses (72 types) e.g. Polio, Echo, Coxsackie	Gastroenteritis, heart abnormalities, meningitis
Hepatitis A	Infectious Hepatitis
Norwalk Virus	Gastroenteritis
Rotavirus	Gastroenteritis

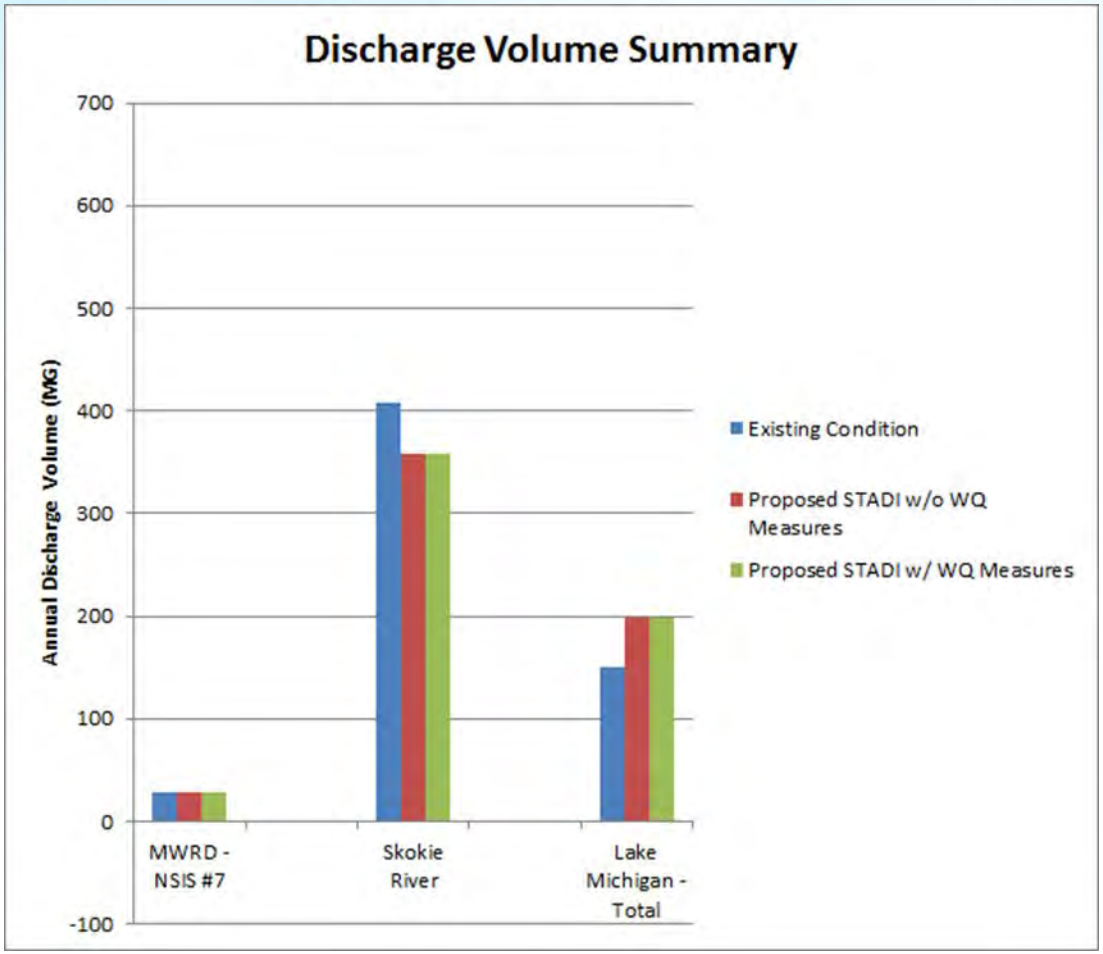
Source: Adapated from Crites and Tchobanoglous,1998

The effectiveness of a Peracetic Acid (PAA) disinfection system depends on the characteristics of the wastewater, the concentration of PAA, the amount of time the microorganisms are exposed to the PAA, and the reactor configuration. For any one treatment plant, disinfection success is directly related to the concentration of colloidal and particulate constituents in the wastewater. PAA is a strong oxidant and virucide.

The mechanisms of disinfection using PAA include:

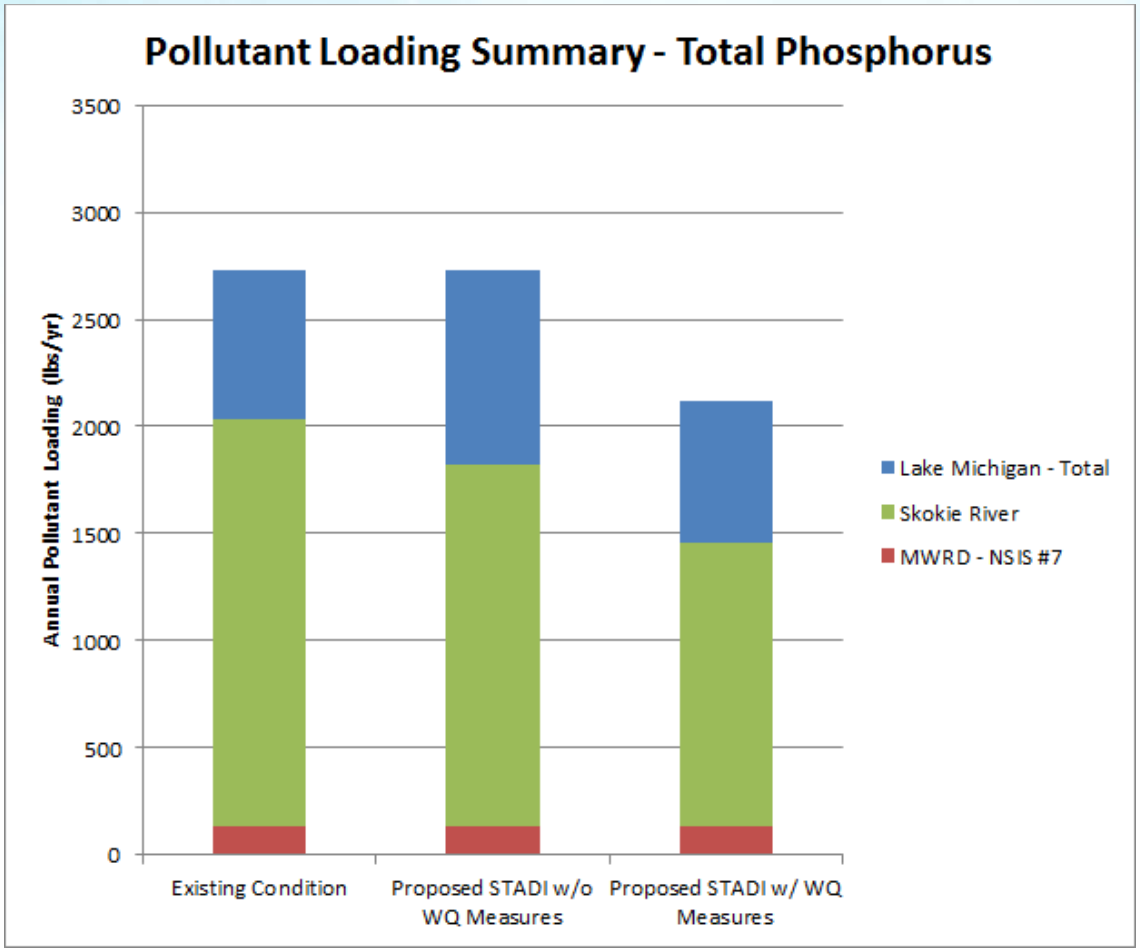
- Direct oxidation/destruction of the cell wall with leakage of cellular constituents outside of the cell.

Pollutant Load Analysis



- 2004 Water Year
- Estimated increase in discharge to Lake Michigan:
  - 50 million gallons
  - 33% increase

Pollutant Load Analysis



- 2004 Water Year
- Reduction in total phosphorus loading:
  - 23% overall loading reduction

OPINION OF PROBABLE CONSTRUCTION COSTS

OPCC Methodology

2011/2012 Estimates

- Conceptual Design
- Major Quantities
- Limited Field Data
- Typical Unit Costs
- Contingencies
  - 15% for tunnel
  - 20% for other

2015 OPCC

- Preliminary Design
- Major Quantities
- Preliminary Field Data
- Site-Specific Considerations
- Unit Cost Development
  - Material Quotes
  - Labor Rates
  - Productivity
- Contingencies
  - 10% for tunnel
  - 20% for other

	CBBEL Feasibility Study (Sept 2012)	CBBEL Feasibility Study (adj to 2015 dollars)	MWH Preliminary Design - Tunnel: Berkeley to Lake - Willow Road Shafts	Difference between MWH CBBEL Feasibility Study (Adj to 2015)	Percent of Total Difference in Costs
Mobilization Costs	**$1,515,000**	**$1,850,000**	**$2,568,595**	**$718,595**	**11%**
Sewer Construction Costs	**$18,595,870**	**$29,735,400**	**$33,931,286**	**$4,195,886**	**62%**
Total Storm Sewer Length	30,550	30,550	24,746		
Sewer Construction ($/Foot)	$609	$973	$1,371		
Restoration Costs	**$5,651,225**	**$6,620,969**	**$3,919,054**	**($2,701,915)**	**(40%)**
Restoration Length	27,250	27,250	16,244		
Restoration Costs/Foot	$207	$243	$241		
Outfall Structure Cost	**$239,000**	**$350,000**	**$4,030,100**	**$3,680,100**	**54%**
Utility Relocation Cost	**$200,000**	**$250,000**	**$1,587,660**	**$1,337,660**	**20%**
Subtotal Cost	**$26,201,095**	**$38,806,369**	**$46,036,695**		
Contingency	**$4,763,176**	**$7,535,274**	**$6,387,839**	**($1,147,435)**	**(17%)**
Total Estimated Cost	**$30,964,271**	**$46,341,643**	**$52,424,534**		
Engineering/Mgmt	**$3,633,641**	**$5,396,459**	**$6,047,467**	**$651,008**	**10%**
Estimated Project Cost	**$34,597,912**	**$51,738,102**	**$58,500,000**	**$6,761,898**	**100%**

Basis for Increased Costs

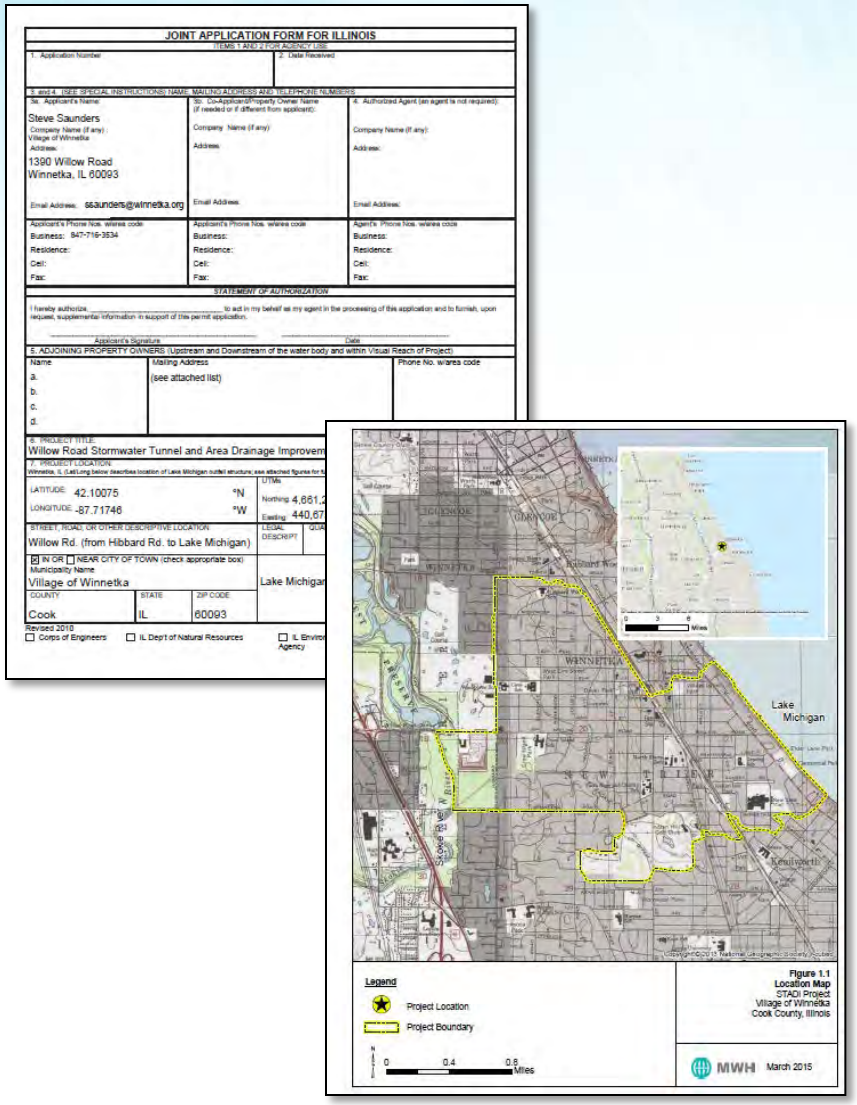
- More detailed information available for evaluation of cost factors
- Greater length of deep sewer tunnel due to MWRD interceptor conflict
- Increase in underground construction costs (materials, labor, trucking)
- Outfall/water quality management requirements (energy dissipation, flow control, treatment)

Potential Cost Reduction Options

- Reduction in Design Storm
  - 2% annual chance design storm requires same length of sewer, but at smaller diameters
- Increased Storage for Peak Reduction
  - Localized storage can reduce peak design flows, but lower sewer costs offset by cost of storage
- Project Scope Reduction or Phasing
  - Cost savings from reduction in total tributary area or deferral of select project elements

PRELIMINARY PERMIT APPLICATIONS

Joint Permit Application


JOINT APPLICATION FORM FOR ILLINOIS

ITEMS 1 AND 2 FOR AGENCY USE:

1. Application Number
2. Date Received

3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS

3a. Applicant's Name: Steve Saunders
Company Name (if any): Village of Winnetka
Address: 1390 Willow Road, Winnetka, IL 60093
Email Address: ssaunders@winnetka.org
Applicant's Phone Nos. w/area code: Business: 847-716-3534; Residence: ; Cell: ; Fax:

3b. Co-Applicant/Property Owner Name (if needed or if different from applicant):
Company Name (if any):
Address:
Email Address:
Applicant's Phone Nos. w/area code: Business: ; Residence: ; Cell: ; Fax:

4. Authorized Agent (an agent is not required):
Company Name (if any):
Address:
Email Address:
Agent's Phone Nos. w/area code: Business: ; Residence: ; Cell: ; Fax:

STATEMENT OF AUTHORIZATION

I hereby authorize _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Applicant's Signature _____ Date _____

5. ADJOINING PROPERTY OWNERS: (Upstream and Downstream of the water body and within Visual Reach of Project)

Name	Mailing Address	Phone No. w/area code
a.	(see attached list)	
b.		
c.		
d.		

6. PROJECT TITLE: Willow Road Stormwater Tunnel and Area Drainage Improvem

7. PROJECT LOCATION

Winnetka, IL (Lat/Long below describes location of Lake Michigan outfall structure; see attached figures for l

LATITUDE: 42.10075 °N
LONGITUDE: -87.71746 °W
UTMs: Northing 4,661,2; Easting 440,67

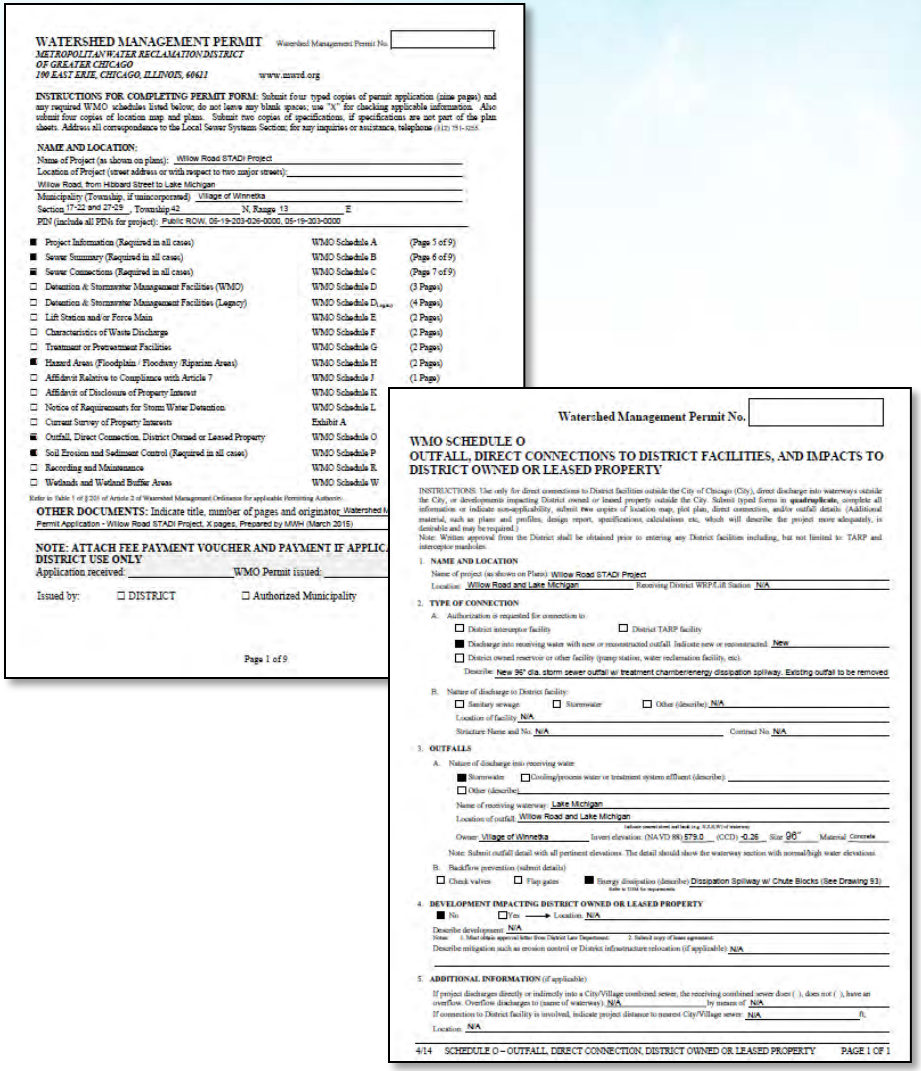
STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION: Willow Rd. (from Hibbard Rd. to Lake Michigan)
LEGAL DESCRIPT
☒ IN OR ☐ NEAR CITY OF TOWN (check appropriate box)
Municipality Name: Village of Winnetka
Lake Michigan
COUNTY: Cook; STATE: IL; ZIP CODE: 60093

Revised 2010
☐ Corps of Engineers ☐ IL Dep't of Natural Resources ☐ IL Environ Agency

- US Army Corps of Engineers
- Illinois EPA
- Illinois DNR
- Supporting Reviews
  - Historic Preservation
  - Threatened and Endangered Species
  - Coastal Management
  - Coast Guard

Watershed Mgmt Ordinance Permit Application

- MWRD
- Stormwater Mgmt
- Discharge to Lake
- Floodway/Floodplain



WATERSHED MANAGEMENT PERMIT Watershed Management Permit No.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
100 EAST ERIE, CHICAGO, ILLINOIS, 60611 www.mwrd.org

INSTRUCTIONS FOR COMPLETING PERMIT FORM: Submit four typed copies of permit application (nine pages) and any required WMO schedules listed below; do not leave any blank spaces; use "X" for checking applicable information. Also submit four copies of location map and plans. Submit two copies of specifications; if specifications are not part of the plan sheets. Address all correspondence to the Local Sewer Systems Section; for any inquiries or assistance, telephone (312) 751-5255.

NAME AND LOCATION:
Name of Project (as shown on plans): Willow Road STADI Project
Location of Project (street address or with respect to two major streets): Willow Road, from Hibbard Street to Lake Michigan
Municipality (Township, if unincorporated): Village of Winnetka
Section 17-22 and 27-29, Township 42 N, Range 13 E
PIN (include all PINs for project): Public ROW, 05-19-203-026-0000, 05-19-203-0000

■ Project Information (Required in all cases)	WMO Schedule A	(Page 5 of 9)
■ Sewer Summary (Required in all cases)	WMO Schedule B	(Page 6 of 9)
■ Sewer Connections (Required in all cases)	WMO Schedule C	(Page 7 of 9)
☐ Detention & Stormwater Management Facilities (WMO)	WMO Schedule D	(3 Pages)
☐ Detention & Stormwater Management Facilities (Legacy)	WMO Schedule D_{Legacy}	(4 Pages)
☐ Lift Station and/or Force Main	WMO Schedule E	(2 Pages)
☐ Characteristics of Waste Discharge	WMO Schedule F	(2 Pages)
☐ Treatment or Pretreatment Facilities	WMO Schedule G	(2 Pages)
■ Hazard Areas (Floodplain / Floodway /Riparian Areas)	WMO Schedule H	(2 Pages)
☐ Affidavit Relative to Compliance with Article 7	WMO Schedule J	(1 Page)
☐ Affidavit of Disclosure of Property Interest	WMO Schedule K	
☐ Notice of Requirements for Storm Water Detention	WMO Schedule L	
☐ Current Survey of Property Interests	Exhibit A	
■ Outfall, Direct Connection, District Owned or Leased Property	WMO Schedule O	
■ Soil Erosion and Sediment Control (Required in all cases)	WMO Schedule P	
☐ Recording and Maintenance	WMO Schedule R	
☐ Wetlands and Wetland Buffer Areas	WMO Schedule W	

Refer to Table 1 of §200 of Article 2 of Watershed Management Ordinance for applicable Permitting Authority.

OTHER DOCUMENTS: Indicate title, number of pages and originator: Watershed M
Permit Application - Willow Road STADI Project, X pages, Prepared by MWH (March 2015)

NOTE: ATTACH FEE PAYMENT VOUCHER AND PAYMENT IF APPLIC
DISTRICT USE ONLY
Application received: _____ WMO Permit issued: _____

Issued by: ☐ DISTRICT ☐ Authorized Municipality

Page 1 of 9

Watershed Management Permit No.

WMO SCHEDULE O
OUTFALL, DIRECT CONNECTIONS TO DISTRICT FACILITIES, AND IMPACTS TO DISTRICT OWNED OR LEASED PROPERTY

INSTRUCTIONS: Use only for direct connections to District facilities outside the City of Chicago (City), direct discharge into waterways outside the City, or developments impacting District owned or leased property outside the City. Submit typed forms in **quadruplicate**, complete all information or indicate non-applicability, submit two copies of location map, plot plan, direct connection, and/or outfall details. (Additional material, such as plans and profiles, design report, specifications, calculations etc., which will describe the project more adequately, is desirable and may be required.)
Note: Written approval from the District shall be obtained prior to entering any District facilities including, but not limited to: TARP and interceptor manholes.

1. **NAME AND LOCATION**
Name of project (as shown on Plans): Willow Road STADI Project
Location: Willow Road and Lake Michigan Receiving District WRP/Lift Station: N/A

2. **TYPE OF CONNECTION**
A. Authorization is requested for connection to:
☐ District interceptor facility ☐ District TARP facility
■ Discharge into receiving water with new or reconstructed outfall. Indicate new or reconstructed: New
☐ District owned reservoir or other facility (pump station, water reclamation facility, etc).
Describe: New 96" dia. storm sewer outfall w/ treatment chamber/energy dissipation spillway. Existing outfall to be removed
B. Nature of discharge to District facility:
☐ Sanitary sewage ☐ Stormwater ☐ Other (describe): N/A
Location of facility: N/A
Structure Name and No.: N/A Contract No.: N/A

3. **OUTFALLS**
A. Nature of discharge into receiving water:
■ Stormwater ☐ Cooling/process water or treatment system effluent (describe): _____
☐ Other (describe): _____
Name of receiving waterway: Lake Michigan
Location of outfall: Willow Road and Lake Michigan
(indicate nearest street and block (e.g. N.E.R.W.) of waterway)
Owner: Village of Winnetka Invert elevation: (NAVD 88) 579.0 (CCD) -0.26 Size 96" Material Concrete
Note: Submit outfall detail with all pertinent elevations. The detail should show the waterway section with normal/high water elevations.
B. Backflow prevention (submit details)
☐ Check valves ☐ Flap gates ■ Energy dissipation (describe) Dissipation Spillway w/ Chute Blocks (See Drawing 93)
Refer to DSM for requirements.

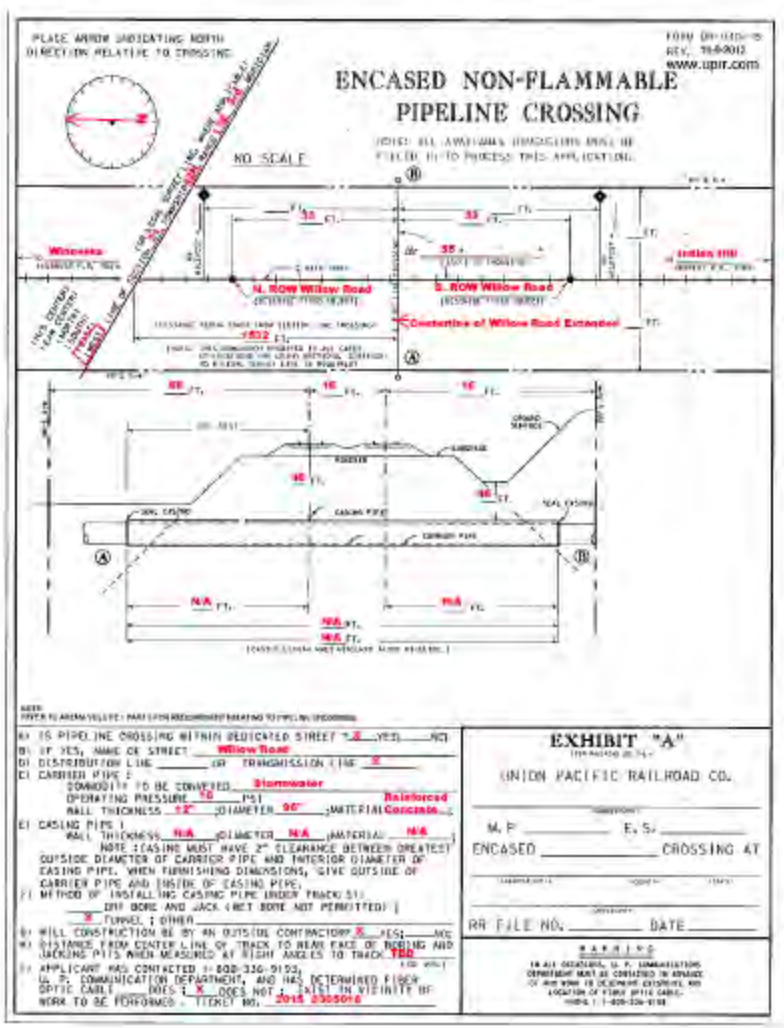
4. **DEVELOPMENT IMPACTING DISTRICT OWNED OR LEASED PROPERTY**
■ No ☐ Yes → Location: N/A
Describe development: N/A
Notes: 1. Must obtain approval letter from District Law Department. 2. Submit copy of lease agreement.
Describe mitigation such as erosion control or District infrastructure relocation (if applicable): N/A

5. **ADDITIONAL INFORMATION** (if applicable)
If project discharges directly or indirectly into a City/Village combined sewer, the receiving combined sewer does ( ), does not ( ), have an overflow. Overflow discharges to (name of waterway): N/A by means of: N/A
If connection to District facility is involved, indicate project distance to nearest City/Village sewer: N/A ft.
Location: N/A

4/14 SCHEDULE O – OUTFALL, DIRECT CONNECTION, DISTRICT OWNED OR LEASED PROPERTY PAGE 1 OF 1

UPRR Crossing Permit Application

- Union Pacific Railroad
- Railroad Crossing Details
- Sewer Tunnel Details
- Geotechnical Conditions



Review Point #2 Summary

- Preliminary Design efforts confirm that unique project is technically feasible
- Water Quality Management Plan has been developed, but must be evaluated, refined, and accepted by regulatory agencies
- Estimated project costs are higher than previously anticipated

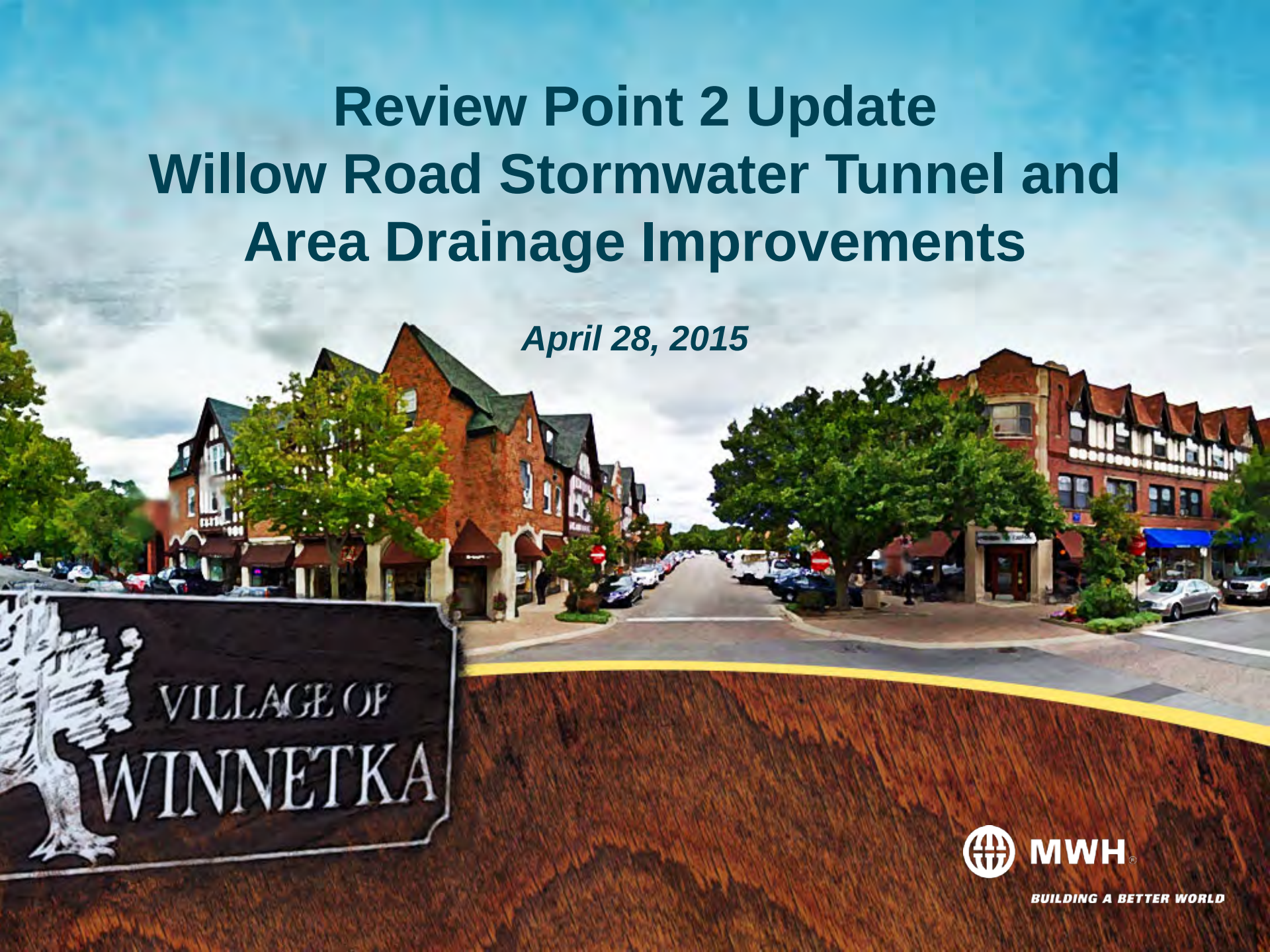
POTENTIAL NEXT STEPS

Potential Next Steps

- Authorize completion/submittal of environmental permits
- Direct staff to prepare further technical/financial analysis of phased implementation approach
- Direct staff to engage independent engineering firm to perform cost validation and value engineering

Review Point 2 Update
Willow Road Stormwater Tunnel and Area Drainage Improvements

April 28, 2015



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