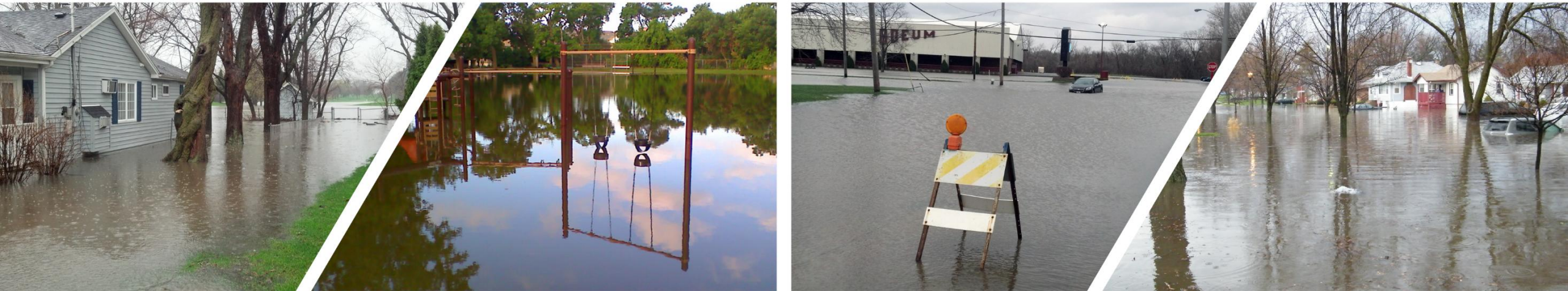




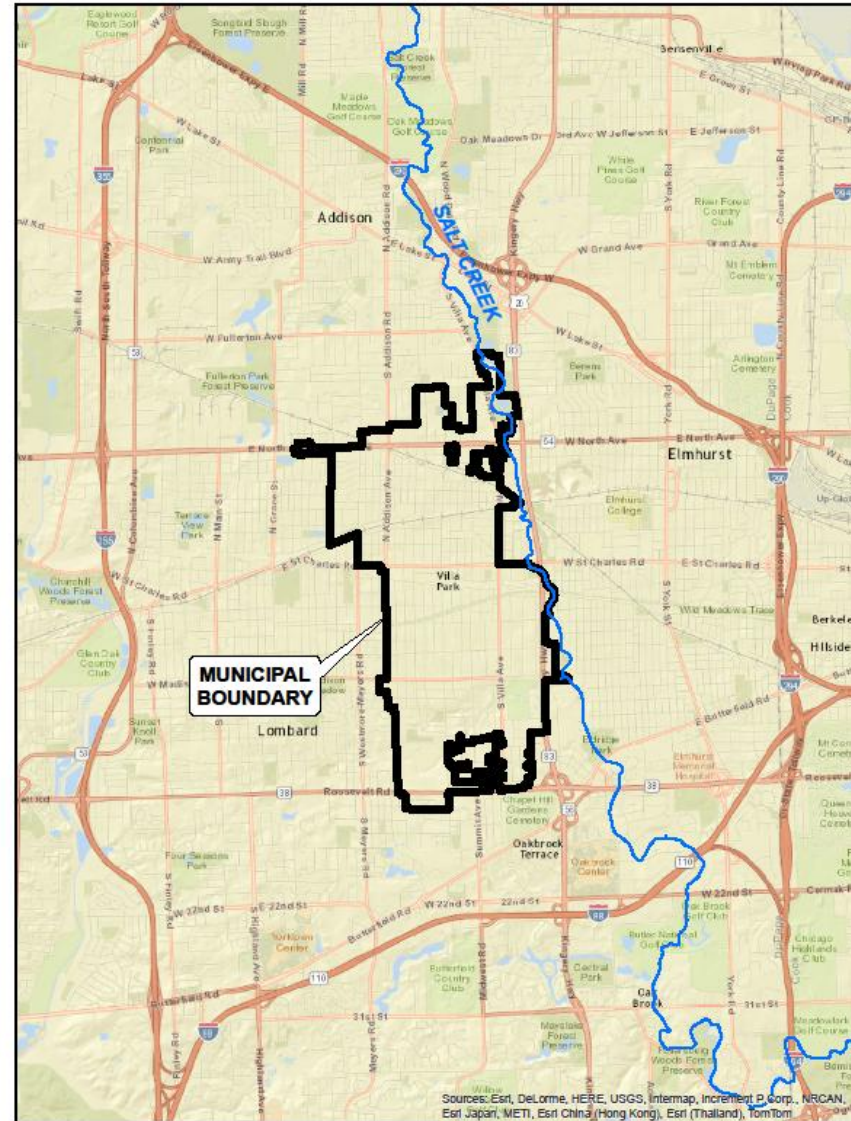
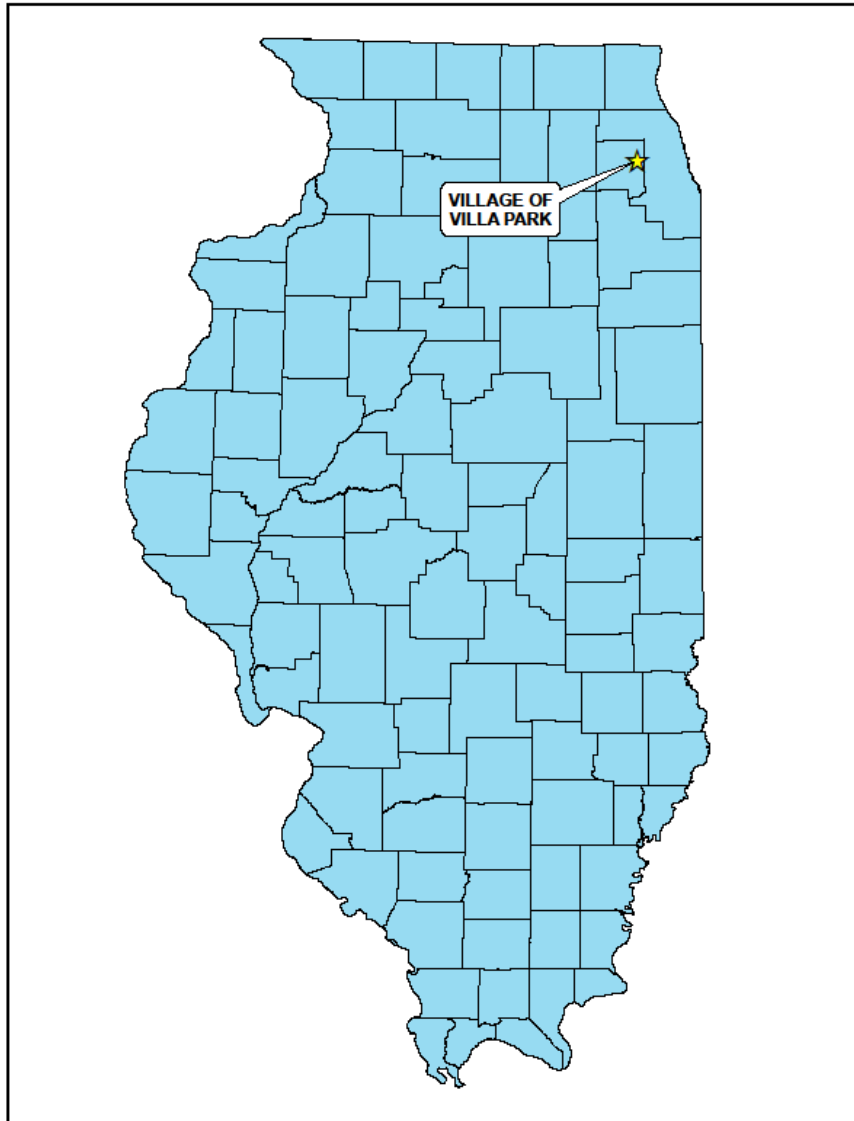
Village of Villa Park



Comprehensive Flood Study

Jeana Gowin, PE & Michael Burke, PE
IAFSM Conference
March 9, 2016





- Incorporated in 1914
- 22,000 people
- Approximately 5 square miles
- Located 20 miles west of Chicago in DuPage County



Study Background

- In response repetitive flooding, CBBEL was hired to study the entire Salt Creek portion of the Village and identify flood problem areas
- The study focuses on 13 areas that include:
 - Existing developed areas that are drained by:
 - Combined sewers
 - Storm sewers
 - Roadside ditches
 - Areas of potential future development
 - Areas within the floodplain of Salt Creek



Study Objectives

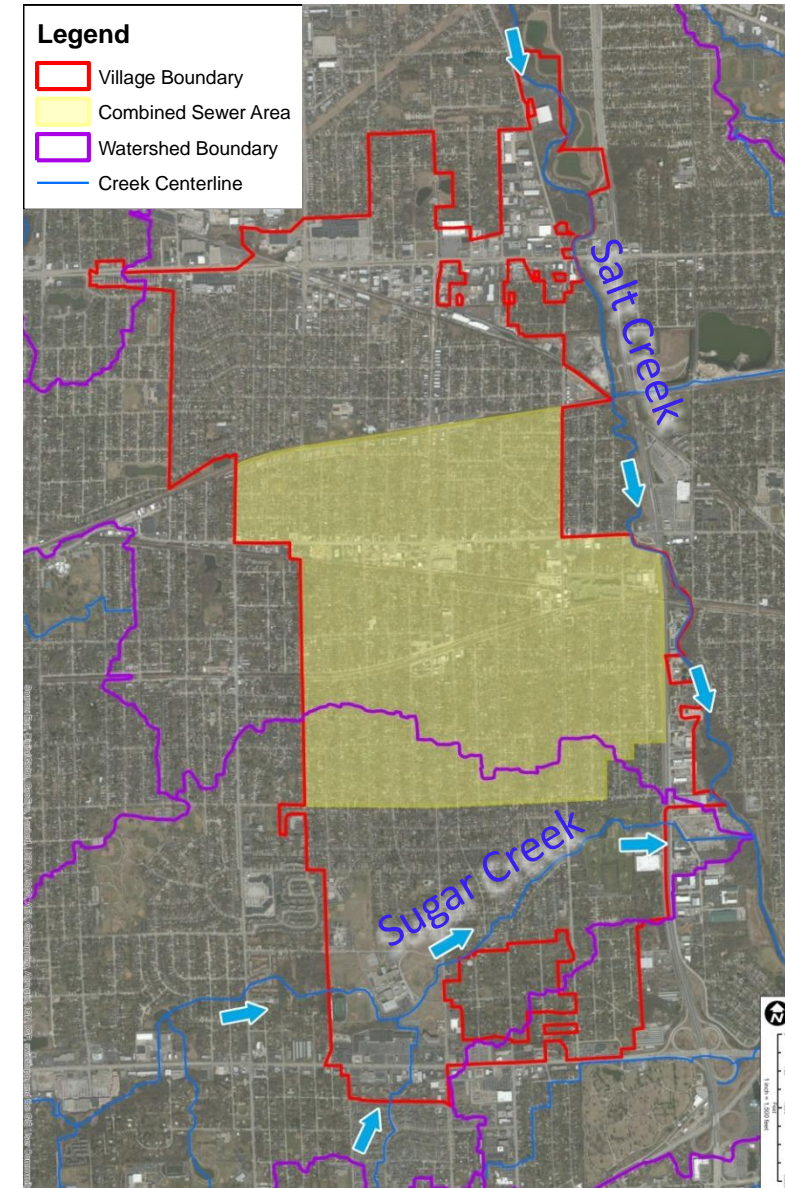
- Identify the existing level of flood protection for 13 study areas
- Determine drainage improvements that would:
 - Provide a 100-year level of flood protection for the homes in these locations
 - Eliminate potential combined sewer overflows (CSOs) for 100-year storm event where feasible
 - Projects are compatible with RJN proposed separation projects presented in June 2014
 - Coordination with V3 for overlapping areas with Sugar Creek



Village Drainage Overview

Village Area = 3,000 acres (ac)

- Southern portion of the Village drains to Sugar Creek (870 ac)
- Northern portion of the Village drains directly to Salt Creek (2,130 ac)
- Combined Sewer Area = 900 ac
- Separate Sewer Area = 2,100 ac



Village Sewer System Background

- Significantly developed in the 1920-50's, Villa Park was originally built with a combined sewer system
- In the late 1970's, the Village began to separate the sanitary and storm sewers systems
- The Village is still separating the sanitary and storm sewer systems



Village Sewer Operation Plan (Combined Area Only)

- 4 Storm Sewer Outfalls
- 4 CSO Outfalls
- 2 Sanitary Treatment Facilities






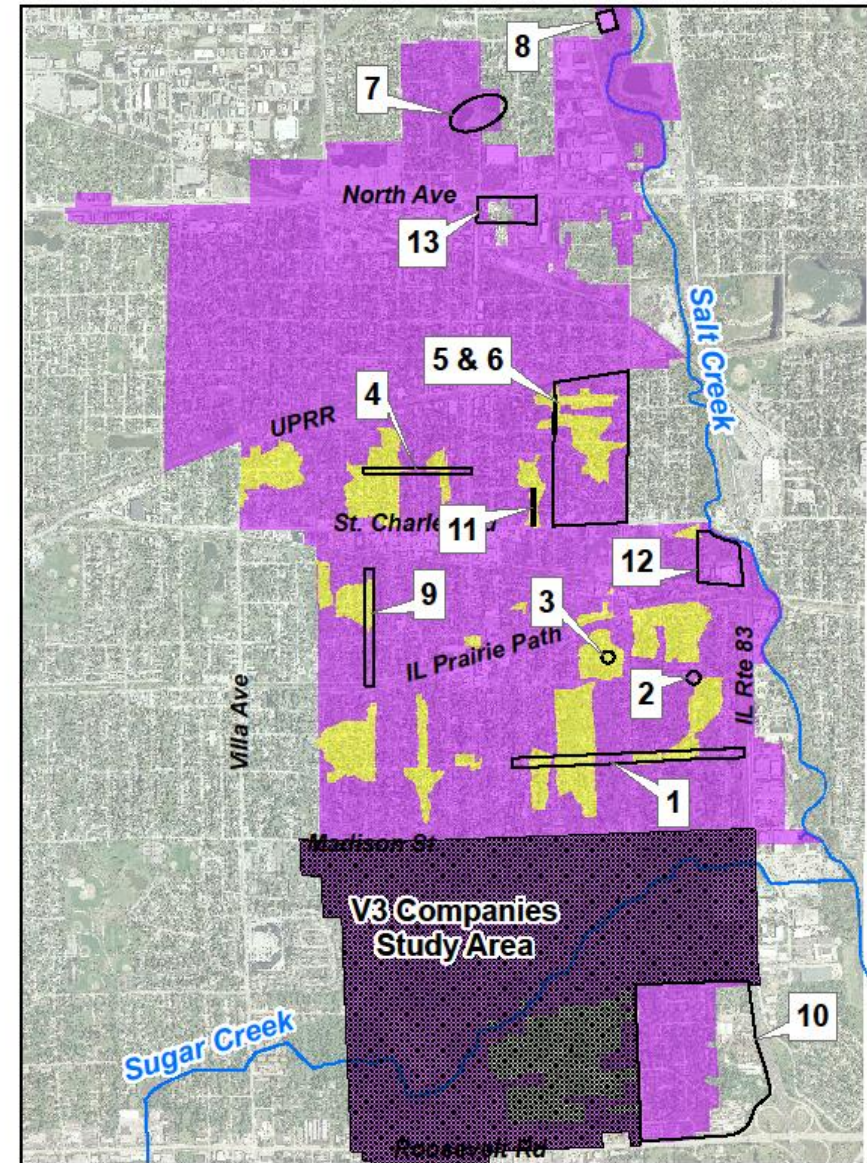
Overview of Study Areas

Hydrologic and hydraulic modeling was developed for the following thirteen study areas:

1. Washington St
2. 400 S Monterey
3. Astor Ct & Myrtle Ave
4. Elm St
5. Summit Ave
6. Villa Ave & Summit Ave
7. Twin Lakes
8. Odeum
9. Michigan Ave
10. Riordan Rd
11. Charles Ave
12. Rotary Park
13. Brer Rabbit Motel

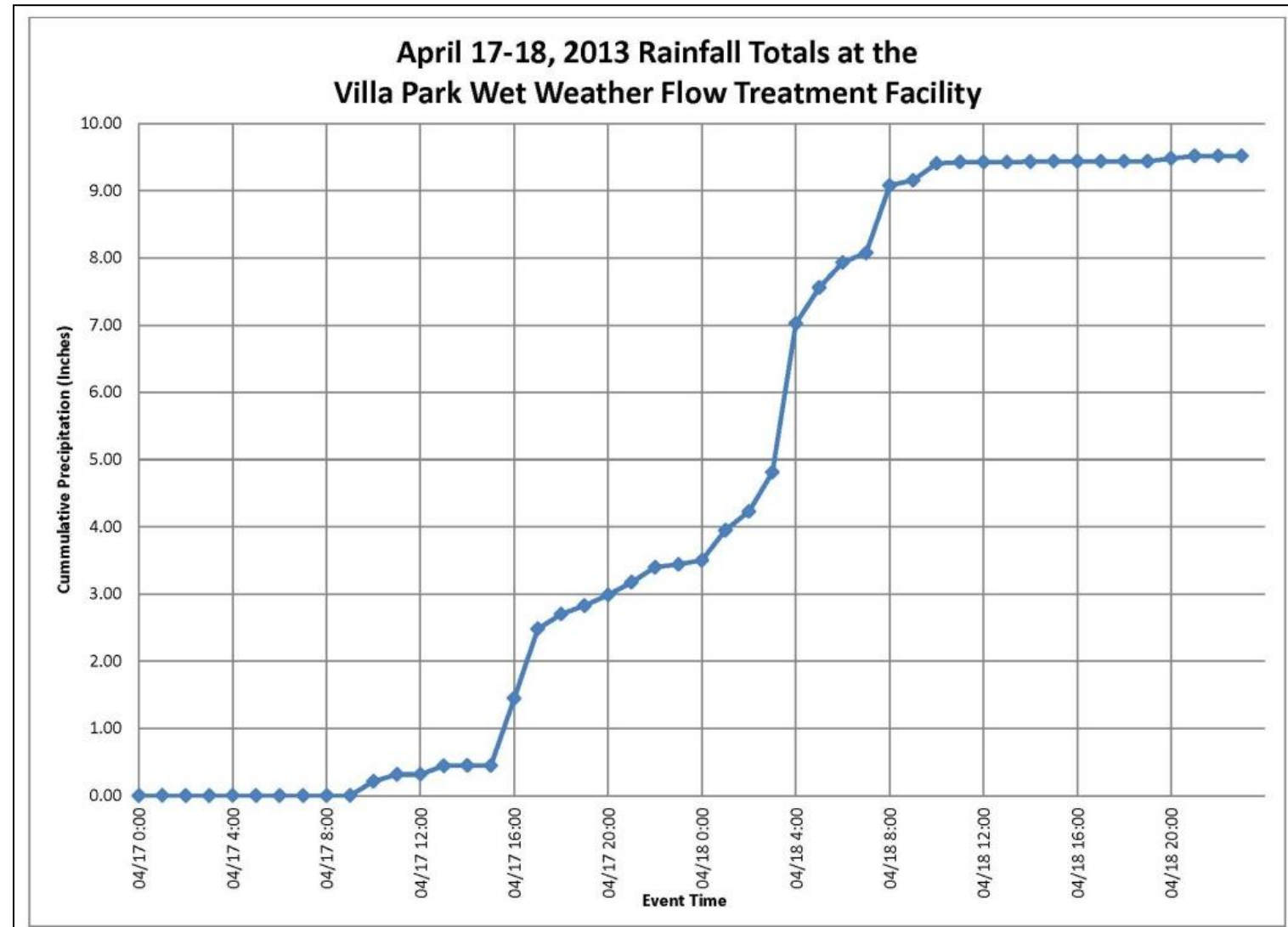
Legend

-  Study Areas
-  Storm Sewer Area = 4.5 sq. mi.
-  Combined Sewer Area = 0.4 sq. mi.



April 17-18, 2013 Storm Event

- All 13 study areas affected by this storm
- Multiple XP-SWMM models developed
- Approximately 9 inches of rainfall occurred over a 24-hour duration
- Calibrated to April 2013 Storm Event Surveyed high water marks



Comprehensive Flood Study



April 2013 Flood



Existing Conditions Conclusion

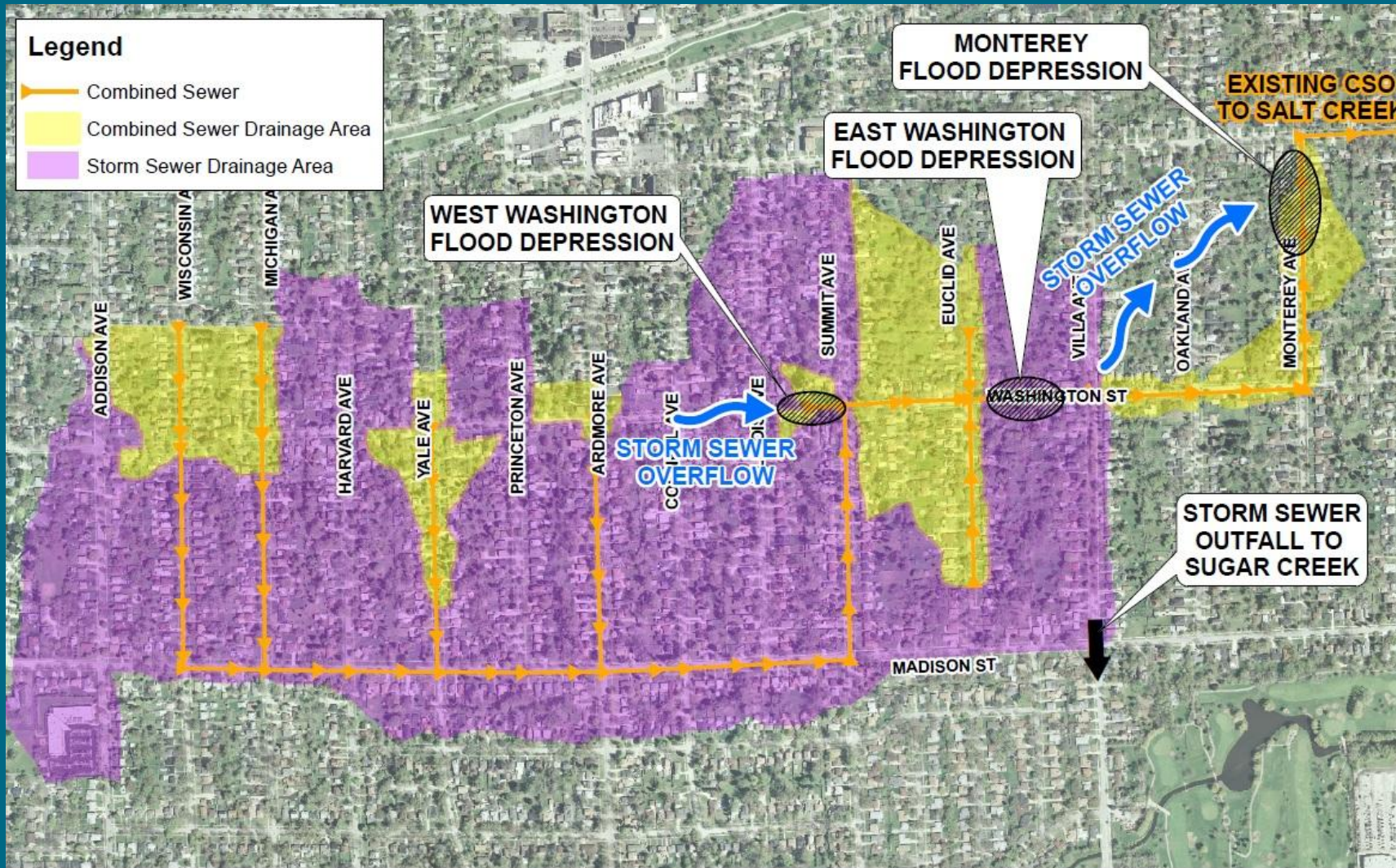
Sewer system has between a 2- and 5-year capacity

Significant volume of overland flow from upstream areas causing the sewer systems to surcharge

Significant street ponding and residential flooding



Overview of Washington & Monterey Study Area



The combined sewer system drains 66 acres of tributary area and storm sewer surcharge contributes additional overland flow to the flood depressions

Overview of Washington Street Study Area

Two main flood problem areas located along Washington Street:

- (1) West Flood Area** – Roadway depression between Illinois Avenue and Summit Avenue
- (2) East Flood Area** – Roadway depression between Euclid Avenue and Villa Avenue

During intense rain events, storm sewers to the west surcharge and contribute overland flow to the flood depressions

The existing combined sewers draining the flood depressions do not have adequate capacity at the 2 depressional locations

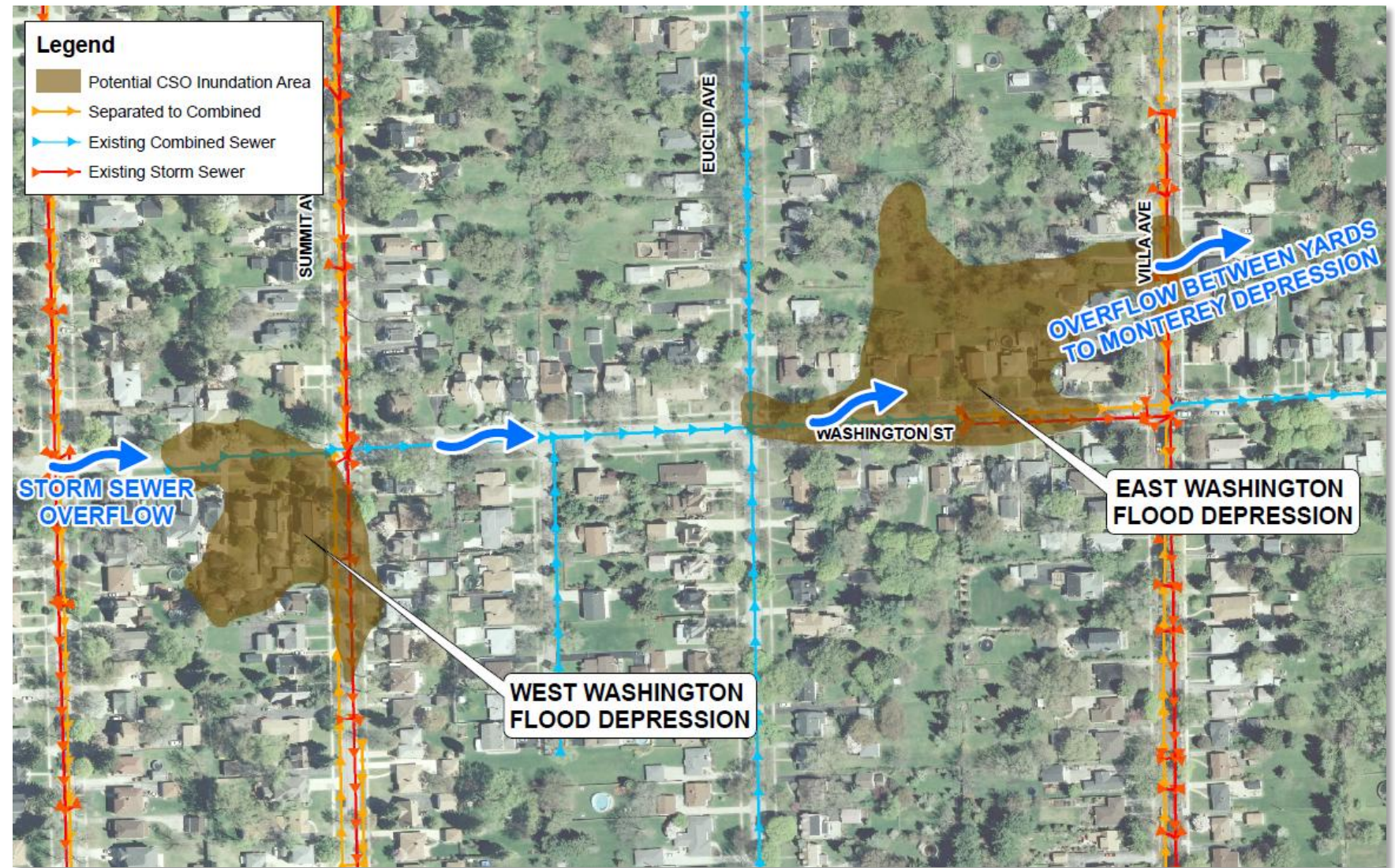
Excessive street ponding eventually leads to structural flooding for the houses located within these low-lying areas

Area listed as a Capital Improvement Plan for future separation of the combined sewer



Washington Street Study Area

Existing Conditions
Potential CSO
Inundation Area



West Washington Depression – April 2013 Storm

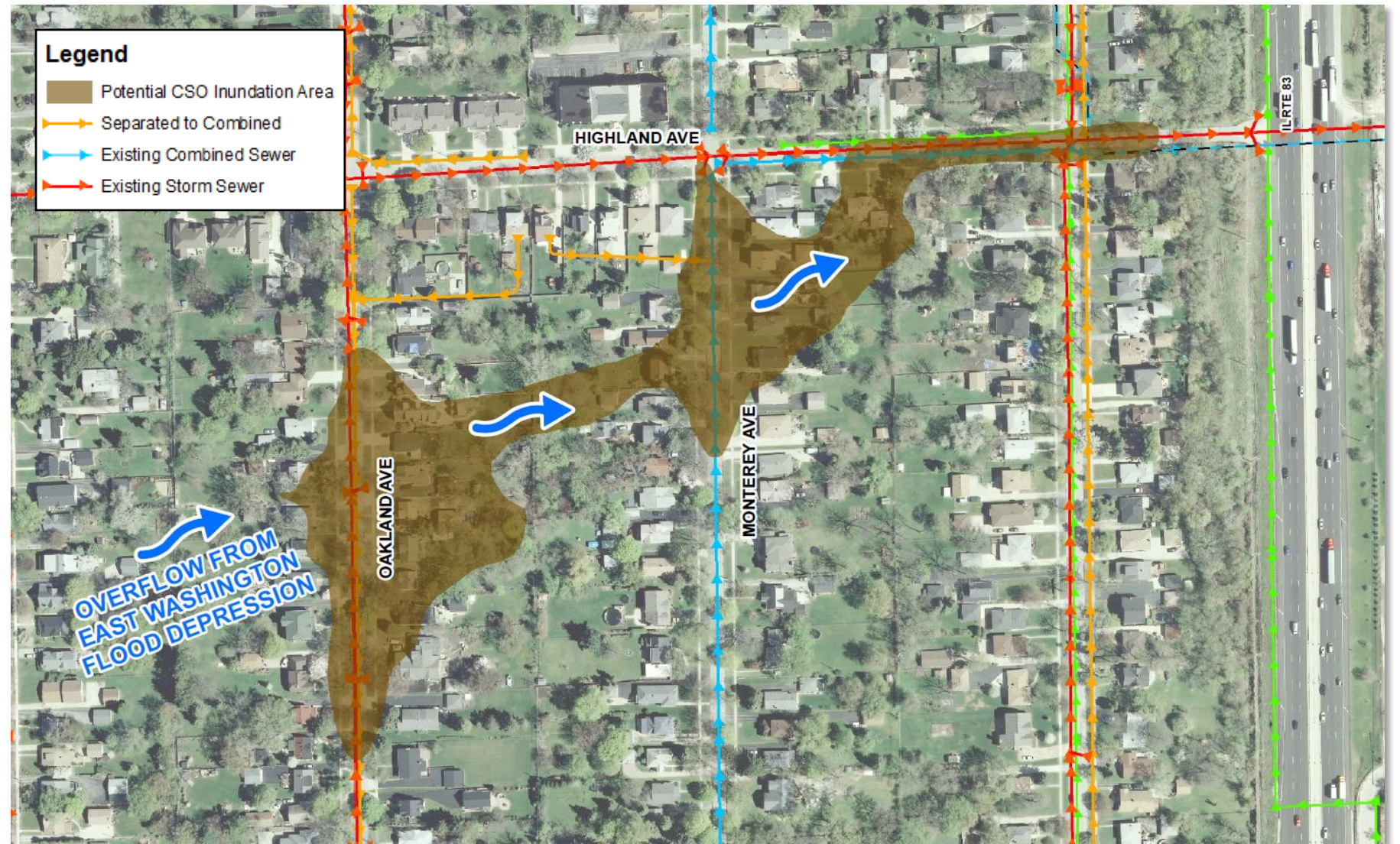


Comprehensive Flood Study



400 S Monterey Ave Study Area

Existing Conditions
Potential CSO
Inundation Area



Washington & Monterey Sewer Separation

Potential upstream CSOs contribute flow to the flood depressions on Washington and Monterey

Combined sewer separation required to convey “clean” stormwater to proposed above ground flood storage

Combined sewer separation provides significant water quality benefits to Salt Creek by eliminating the potential CSO

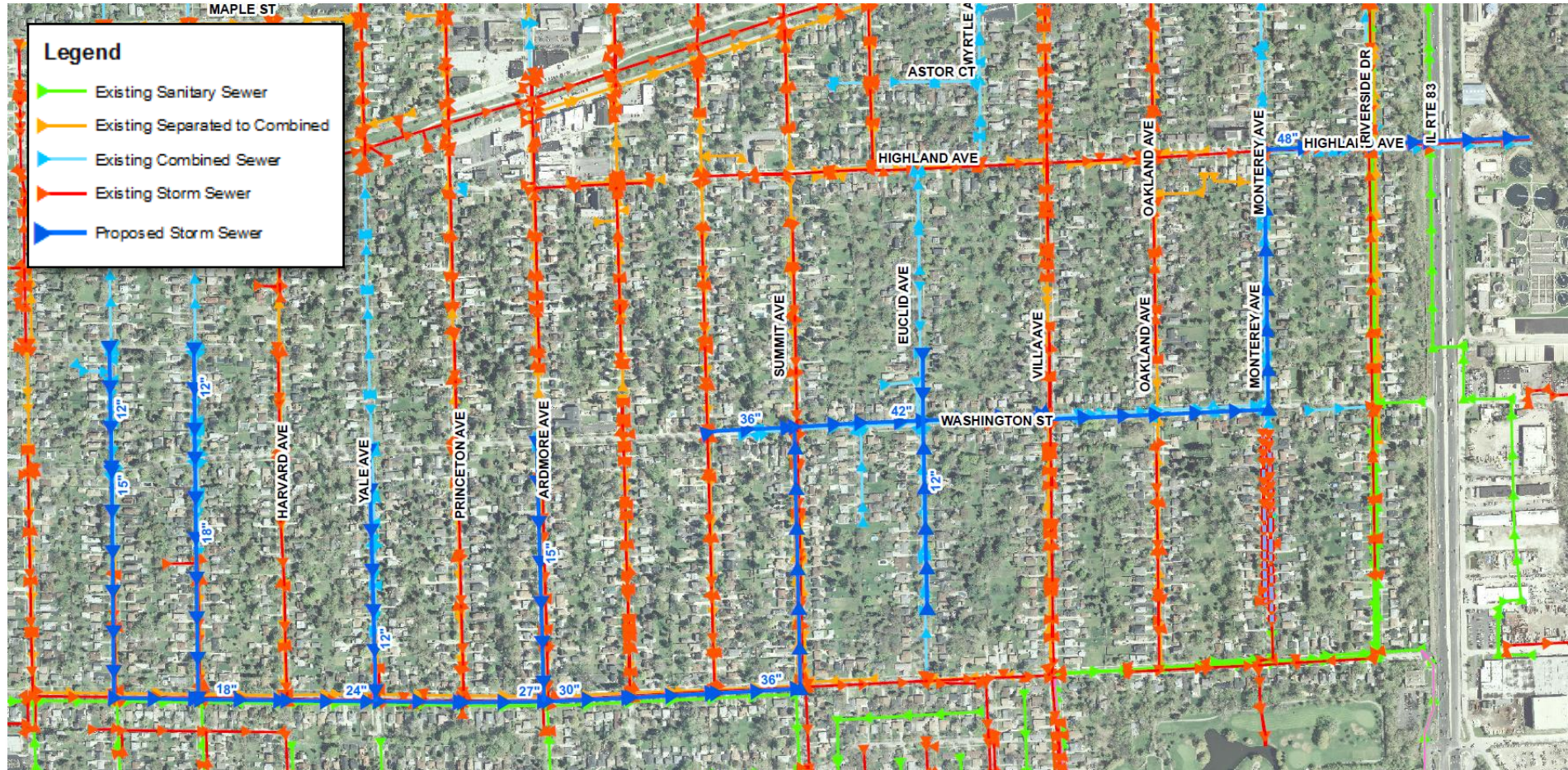
2 Combined sewer separation alternatives proposed:

- Alternative 1 – Convert existing combined sewer to storm sewer and install new replacement sanitary sewer
- Alternative 2 – Provide new storm sewer to drain areas previously drained by combined sewer and the existing combined sewer is converted to separate sanitary sewer



Washington & Monterey Sewer Separation

Improvement Alternative – Install New Storm Sewer



Eliminates entire potential CSO to Salt Creek, separates 66 acres of upstream combined sewer area

Comprehensive Flood Study



Washington Street & 400 S Monterey Study Area

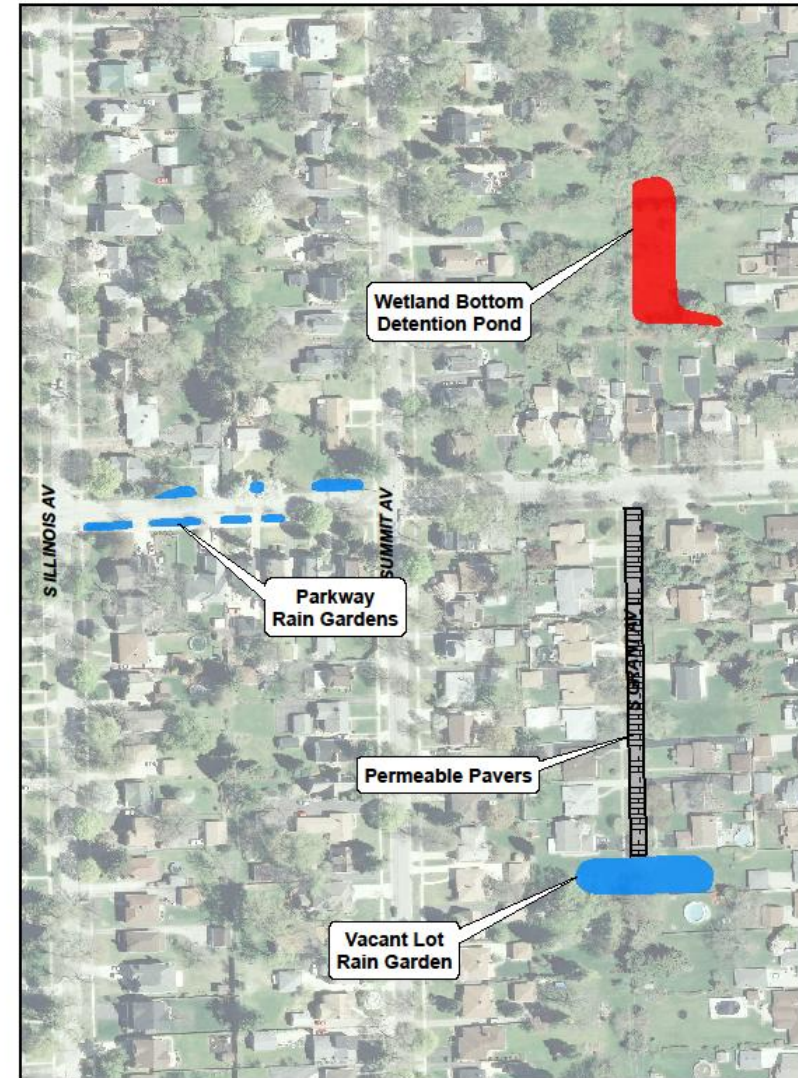
100-Year Level of Protection

- Create 12.4 ac-ft of gravity-drained flood storage on existing private & Village owned lots
- Washington and Monterey sewer separation (previously discussed) required
- Green infrastructure along Washington will reduce the runoff from these areas
- Removes 15 homes from 100-year inundation area
- 3" of ponding on Monterey Ave for the 100-year event



Washington Street Corridor Green Infrastructure

- \$500,000 Grant Received from DuPage County
- Decreases stormwater runoff to the existing sewer
- Enhances water quality in known flooding areas



Comprehensive Flood Study



Overview of Astor Ct & Myrtle Ave Study Area



An area of 18 acres drains through the combined sewer along Astor Court to Myrtle Avenue, eventually to the Park Boulevard combined sewer

Overview of Astor Ct & Myrtle Ave Study Area

During intense rain events, the existing combined sewers do not have the capacity to convey the runoff in these locations and the overland flow is east towards the intersection of Astor Court and Myrtle Avenue

The combined sewer flows north along Myrtle Avenue and then east towards the Villa Avenue storm sewer

Due to the existence of an overland flow route, there is not significant ponding in this area

The sewer system surcharges and potential CSOs occur for storm events greater than a 2-year storm event

Objective: Eliminate potential CSO



Astor Court & Myrtle Avenue Study Area

100-Year Level of Protection

- Construction of 250 lf of 24" storm sewer and 700 lf of 36" storm sewer tying into the Highland Avenue storm sewer system



- Create 0.3 ac-ft of above-ground storage within open parcel
- 0.8 ac-ft of underground storage
- Reduces overland flow cfs and eliminates the potential CSO
- Compatible with RJN proposed separation plan



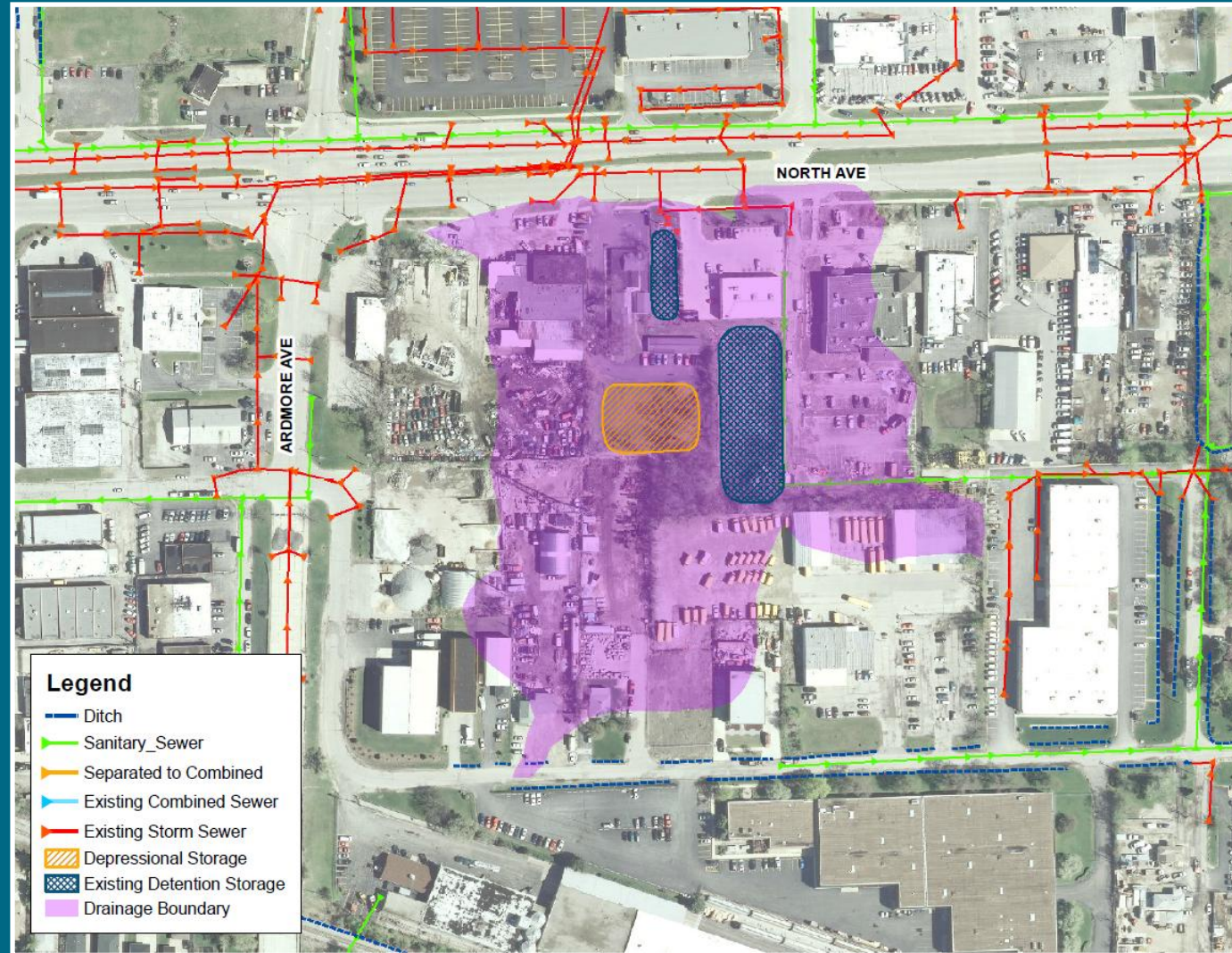
Conceptual Project Cost = \$1.5 million*

***does not include land acquisition**

Comprehensive Flood Study



Overview of Brer Rabbit Motel Study Area



The Brer Rabbit Motel is drained by a separate sewer that has 10 acres of direct tributary area

Overview of Brer Rabbit Motel Study Area

The primary outlet for the Brer Rabbit Motel is a 12" diameter storm sewer that ties into an 18" storm sewer that discharges to the North Avenue trunk sewer

There are three storage areas tributary to this 18" storm sewer:

- AutoZone detention storage facility;
 - OTB detention storage facility (in series with the AutoZone storage facility);
 - Depressional storage area immediately south of the Brer Rabbit Motel
-

There is a low point in the Brer Rabbit Motel, adjacent to the AutoZone that has no outlet

No defined overland flow path, therefore sewer surcharge flows south towards the low point in the Brer Rabbit Motel parking lot and the depth of ponding is 1.9'

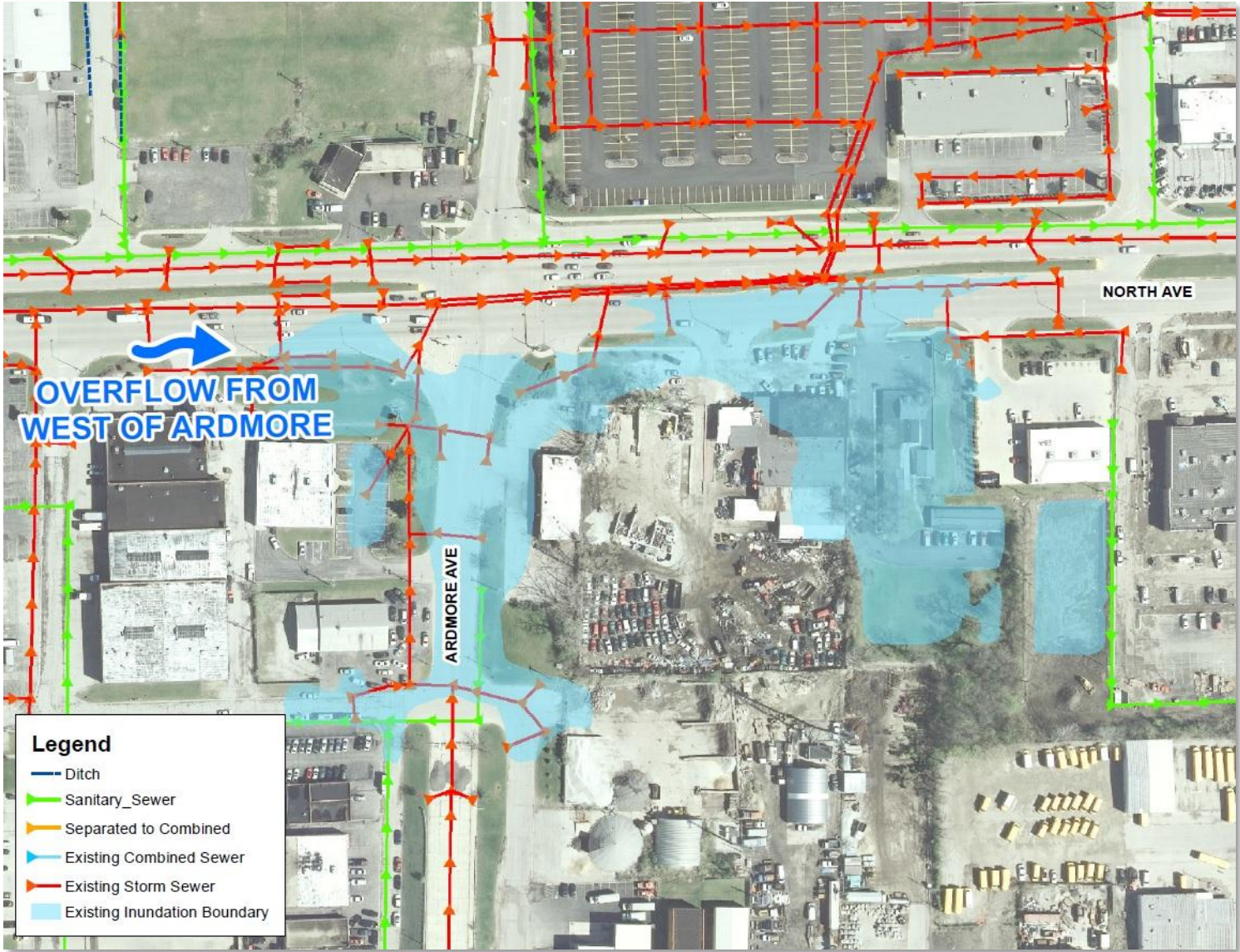
There is overflow from the west that also is tributary to the low point in the parking lot

North Avenue eastbound lanes and Ardmore Avenue closed during intense rain events



Brer Rabbit Motel
Study Area

Existing Conditions
Inundation Area –
North Avenue and
Ardmore Avenue
Street Closures



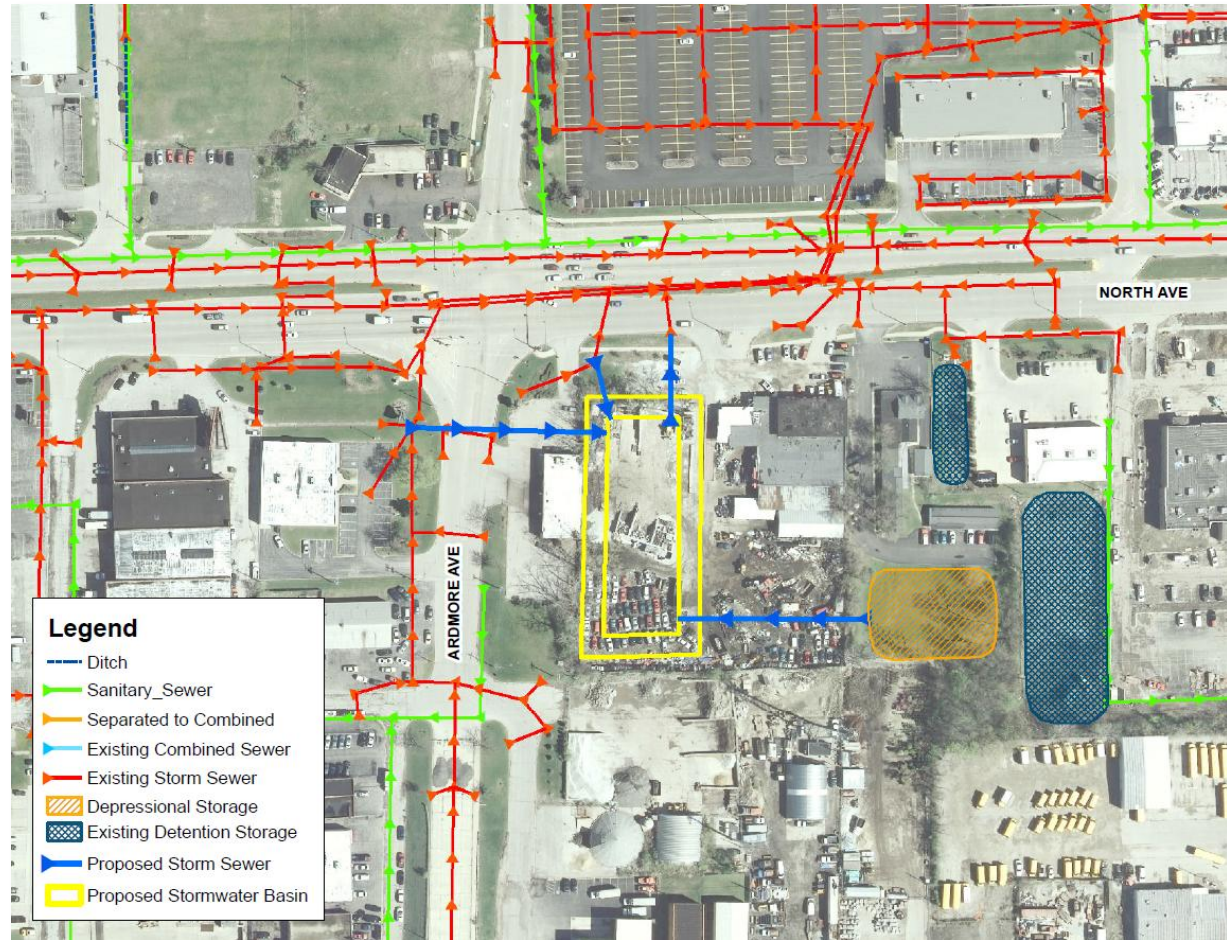
Brer Rabbit Motel Study Area

100-Year Level of Protection

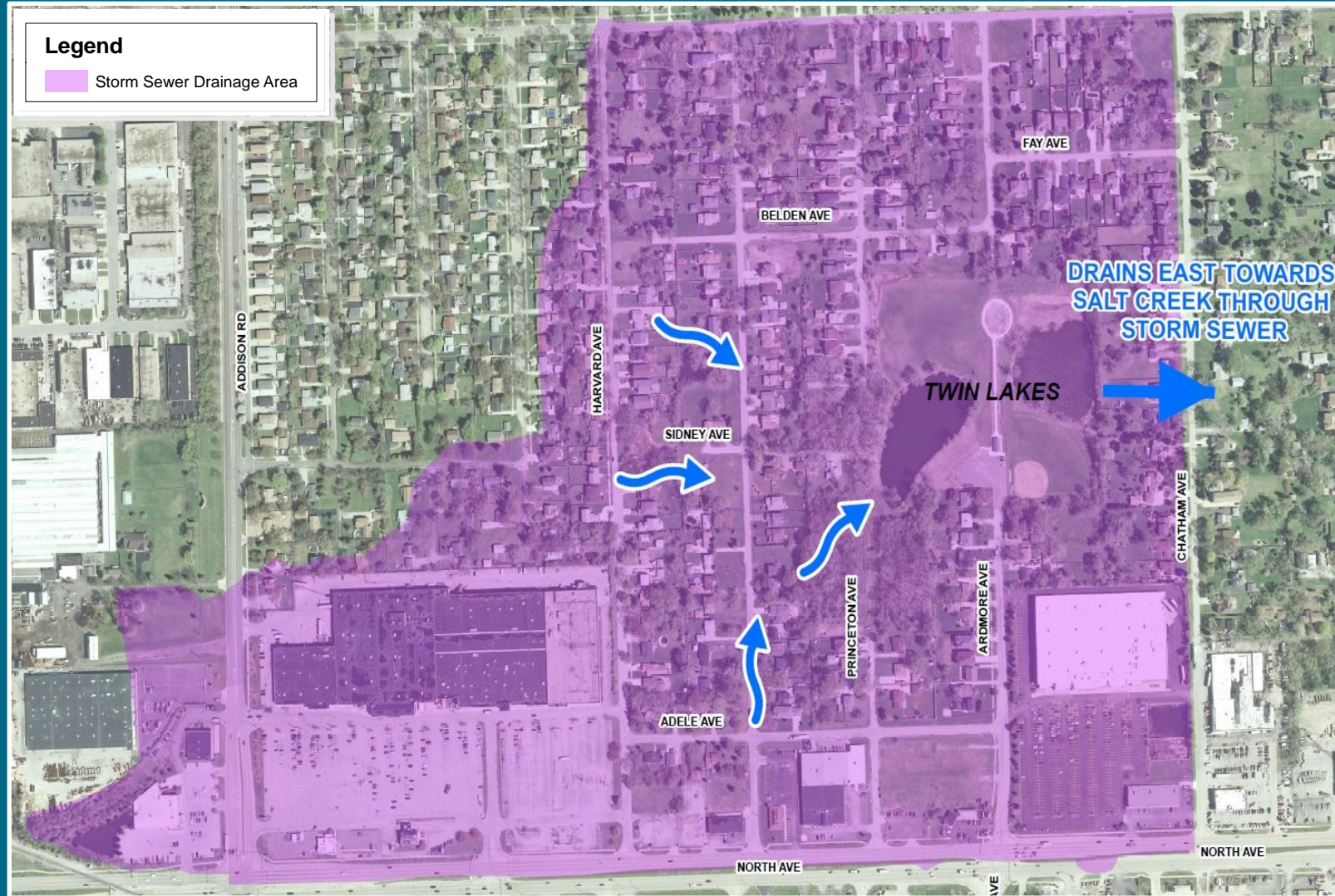
- Create 2.8 acre-feet of above-ground storage on existing recycling facility
- 600 lf of new storm sewer



- Creates an outlet for the existing depressional storage area
- All surface flooding in parking lot removed for 100-year event
- Reduces flooding at the North Ave/Ardmore Ave intersection
- Reduces overland flow over Ardmore Avenue



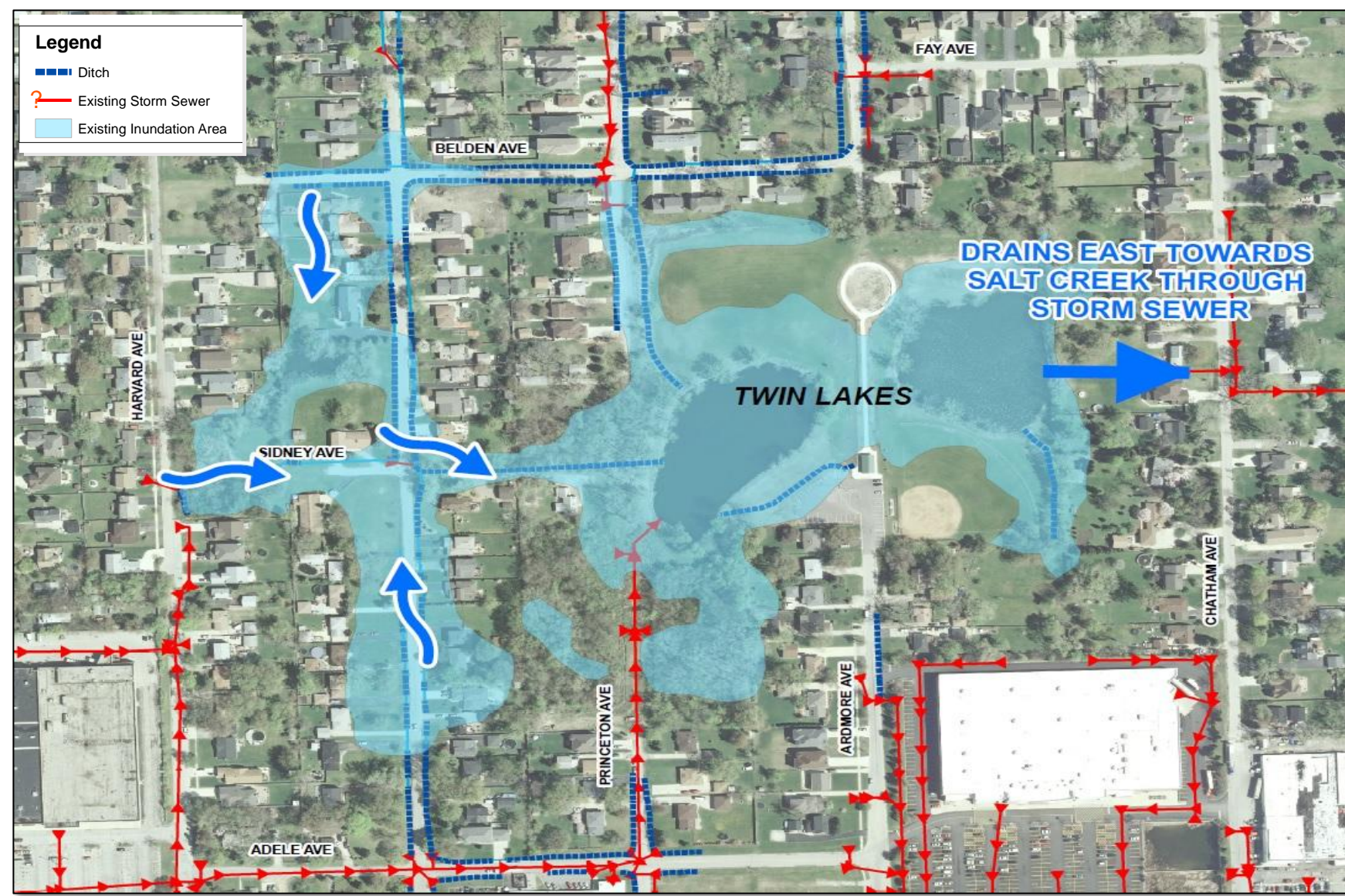
Overview of Twin Lakes Study Area



This study area consists 231 acres of tributary area and is drained by open ditches and storm sewer

Twin Lakes
Study Area

18 homes in Existing
Conditions
Inundation Area



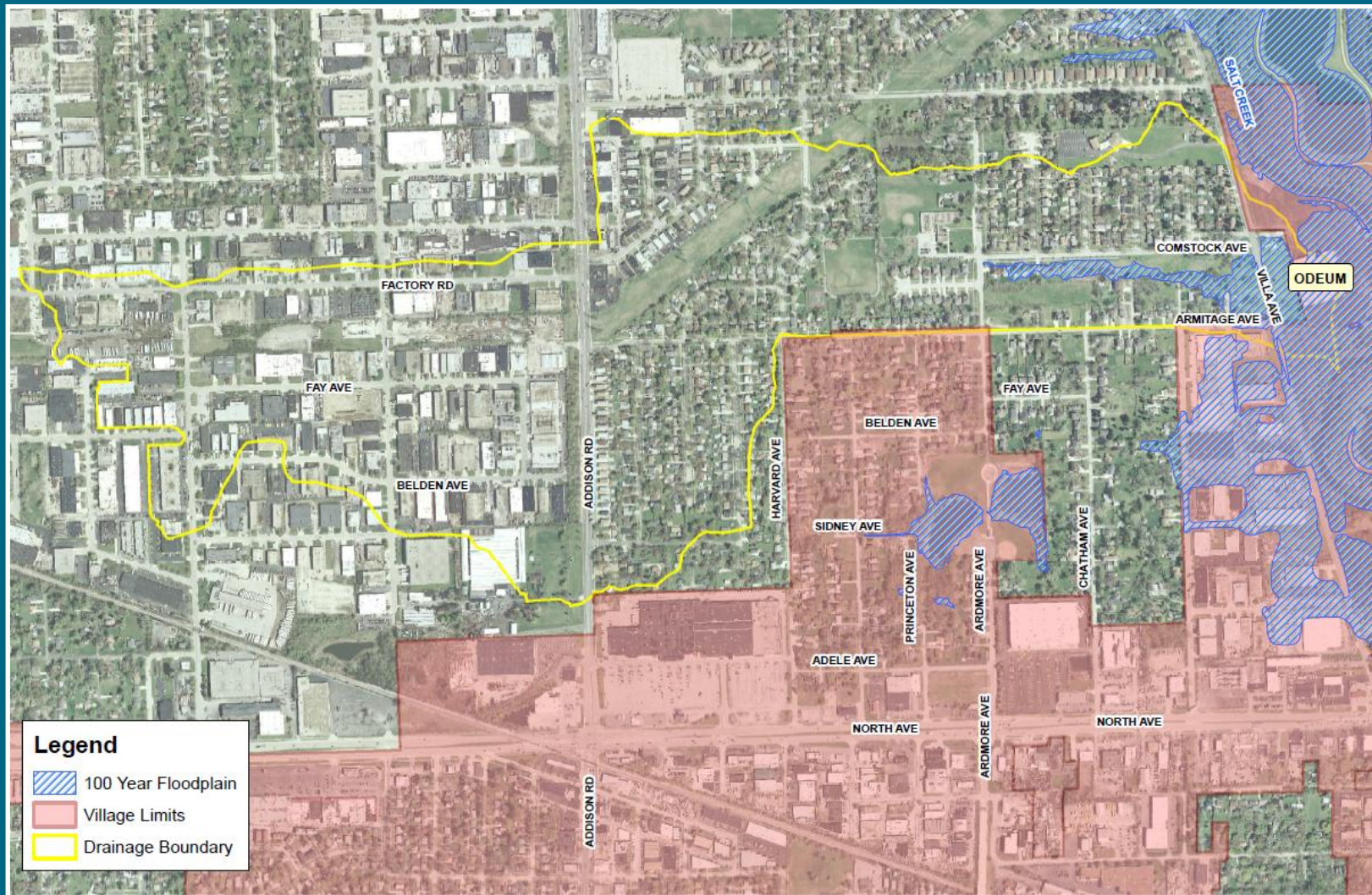
Twin Lakes Study Area

100-Year Level of Protection

- Create 8.9 acre-feet of above-ground storage
 - 3,400 lf of new storm sewer
- → → → →
- Re-grade existing roadside ditch along Yale Avenue to create positive drainage
 - Removes 18 homes from the 100-year inundation area



Overview of Odeum Study Area



There are approximately 305 acres outside of the Village that are tributary to the Odeum

Overview of Odeum Study Area

The primary outlet is a 21" diameter storm sewer draining to Salt Creek

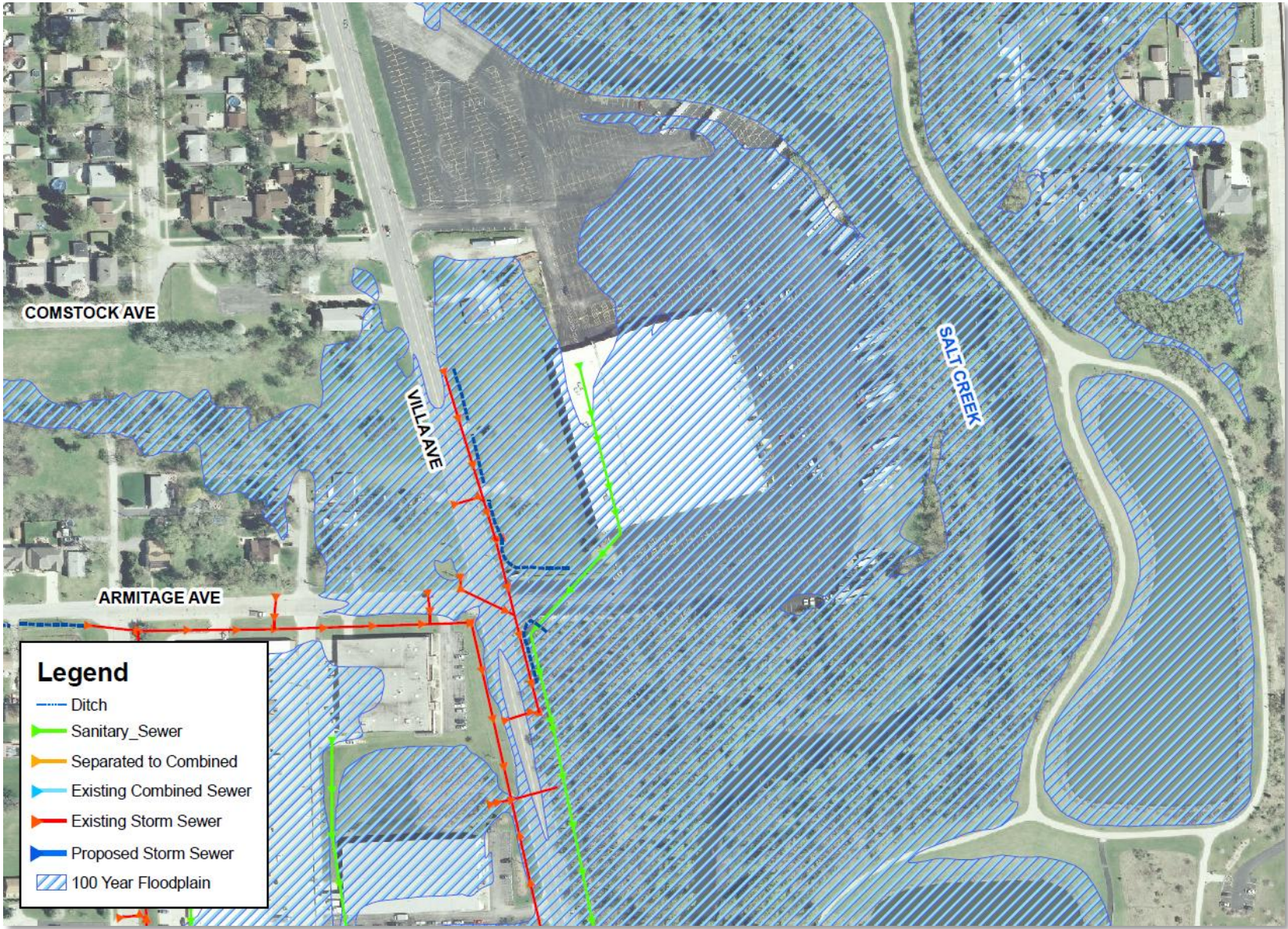
Site is located within the floodplain of Salt Creek

Flooding occurs when the bank elevation of Salt Creek is exceeded

Due to the proximity to Salt Creek, a hydraulic analysis was not performed for this study area

Odeum Study Area

Existing Conditions Inundation Area



Odeum Study Area

100-Year Level of Protection

- Construct 1,300 lf of floodwall, 3 feet in height (2 feet above the 100-year elevation of Salt Creek)
- 14 building access points



Overview of Rotary Park Study Area



Rotary Park is drained by storm sewer and has 4 acres of direct tributary area

Overview of Rotary Park Study Area

Review of possible flood storage locations for the proposed improvements within Lion's Park included:

- Rotary Park
- Ovaltine Court Pond
- Open Parcel South of 53 S Euclid

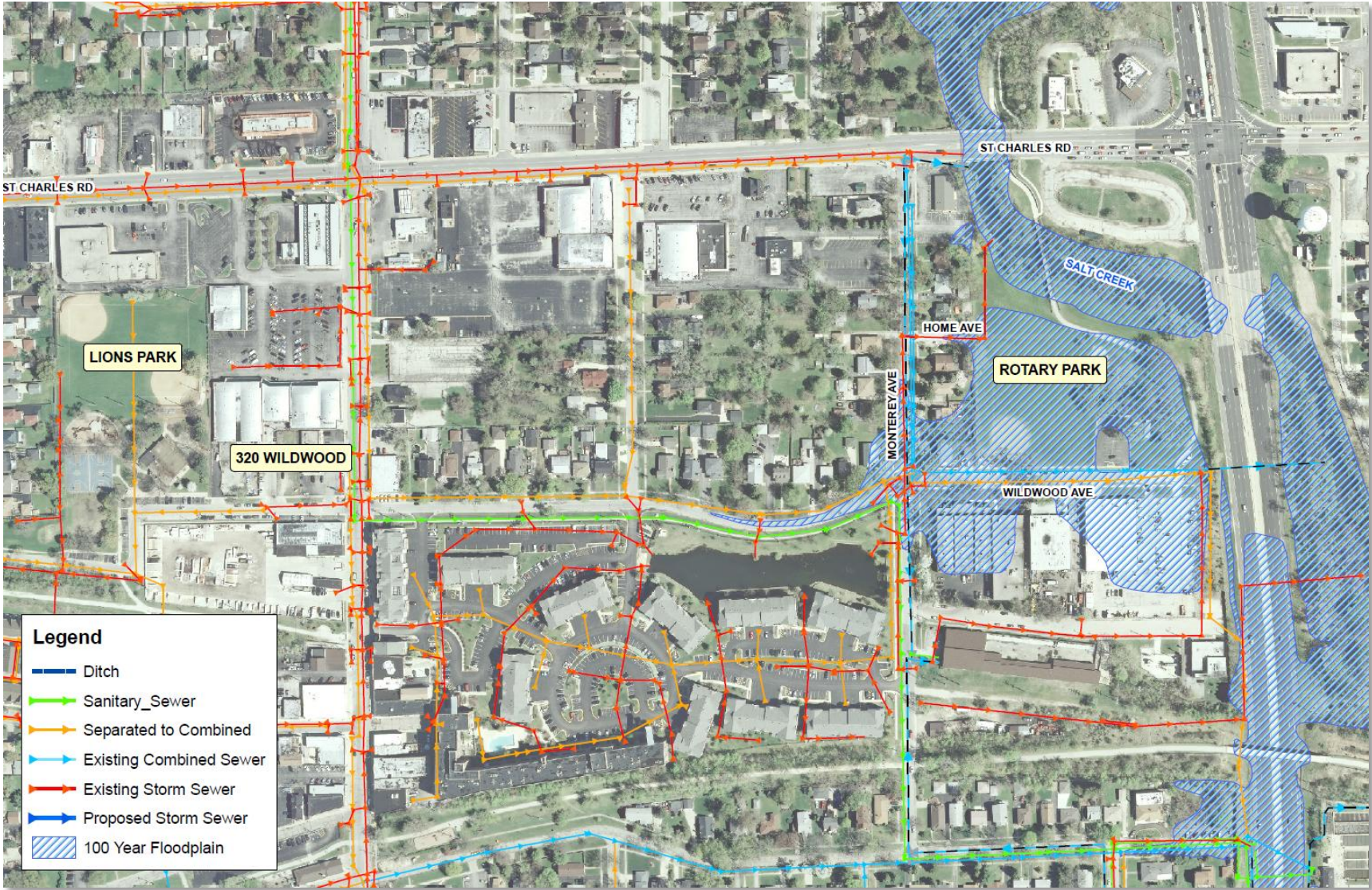
Required detention storage volumes based on 0.8 acres of new impervious area (0.4 acre-feet of storage volume required at a 0.1 cfs/acre release rate)

Any detention storage needs to be provided as “new storage”



Rotary Park Study Area

Existing Conditions Inundation Area



Rotary Park Study Area Improvement Options

Rotary Park, Ovaltine Court Pond & 53 S Euclid:

- Able to provide up to 0.9 acre-feet of new storage volume
- Parking to be provided 1 foot below 100-year floodplain of Salt Creek



Conclusion

- Improvement Project Costs:
 - Sewer Separation: \$1.0 million - \$10.6 million
 - Storm Sewer: \$1.7 million - \$8.0 million
 - Ditches: \$440,000 - \$3.3 million
 - Floodproofing: \$1.2 million
 - Development: \$300,000
- Improvement projects independently designed for approximately 100-year level of protection
- Components include storage and new storm sewer to handle large stormwater volume from 100-year storm
- No increases are proposed to Salt Creek at any outlet. Utilizes all existing outlets.





Comprehensive Flood Study

