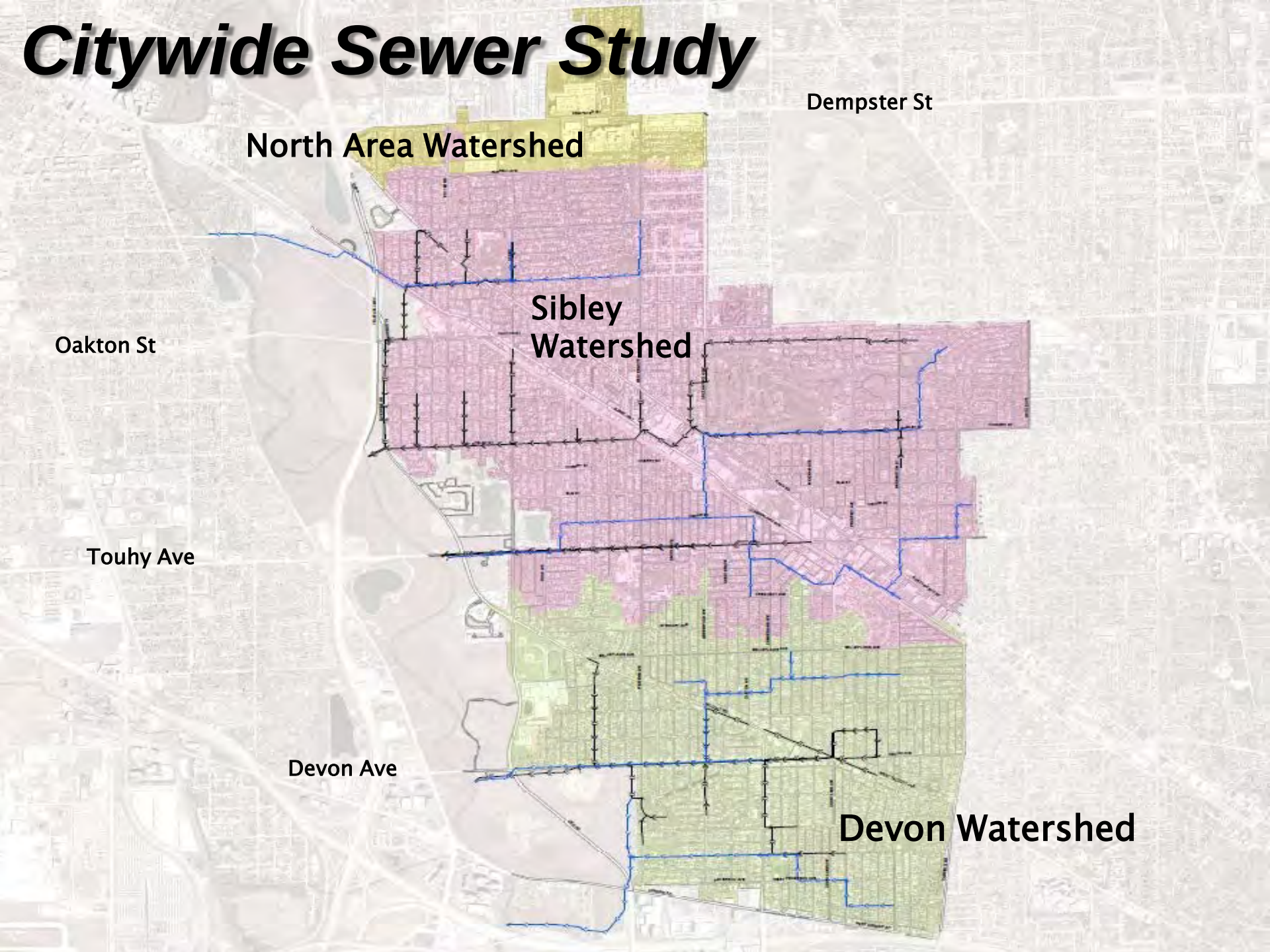
Park Ridge Flood Study
Project Feasibility Report

November 11, 2013

History

- September 2008 Storm
- 2009 Flood Study
  - Flood questionnaires
  - Identified major problem areas
  - Limited modeling
  - Proposed some concept projects
- Citywide Sewer Study
  - Undertaken to answer “what happens if” questions

Citywide Sewer Study



Citywide Sewer Study

Model Components

- ***Sewers***
- ***Overland Flow***
- ***Storage Areas***
- ***Subbasins***

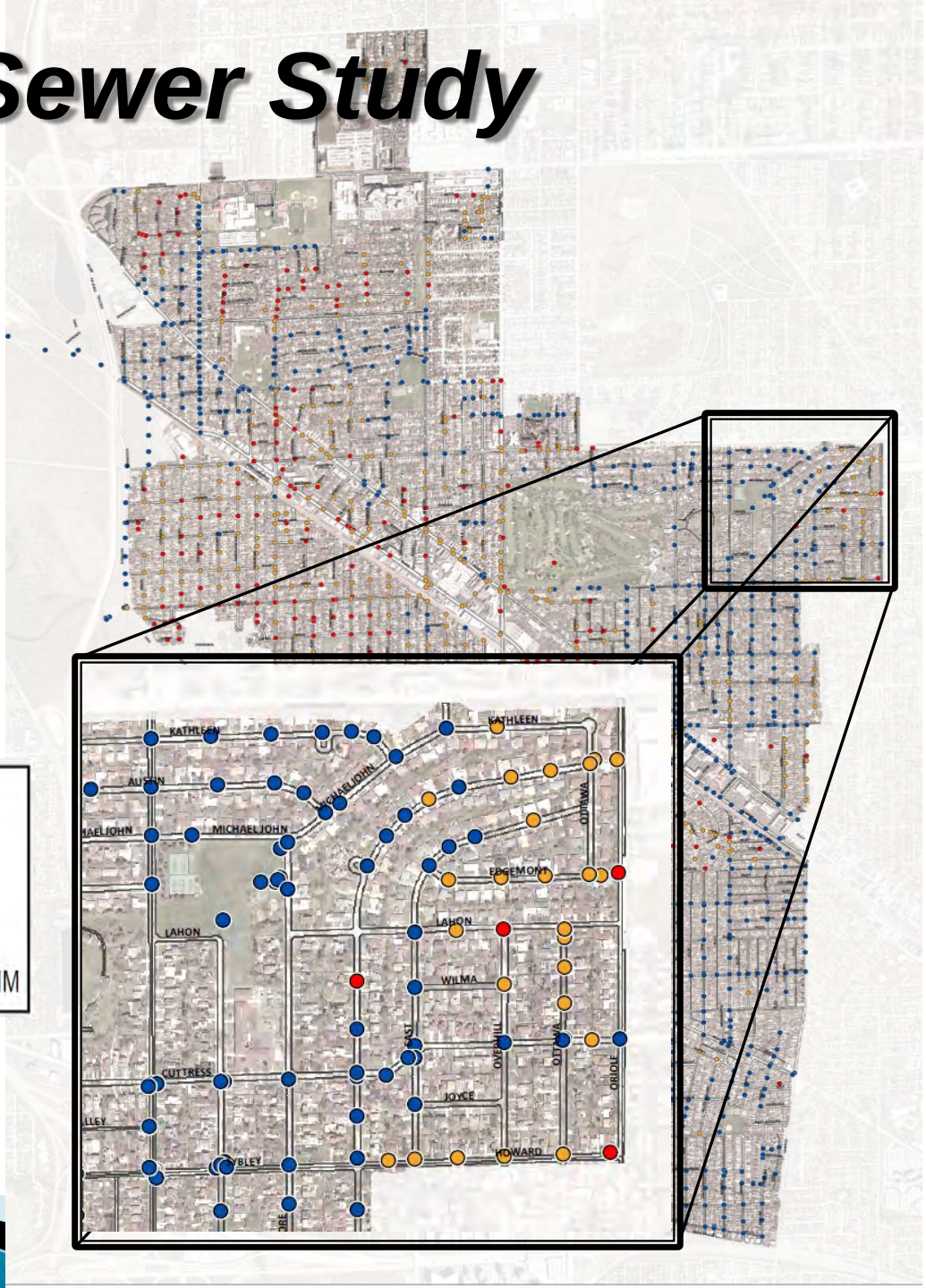
Citywide Sewer Study

Results

- ***Flood Depths***
- ***Overland Flow***
- ***Capacity Atlas***

Citywide Sewer Study

Flood Depths

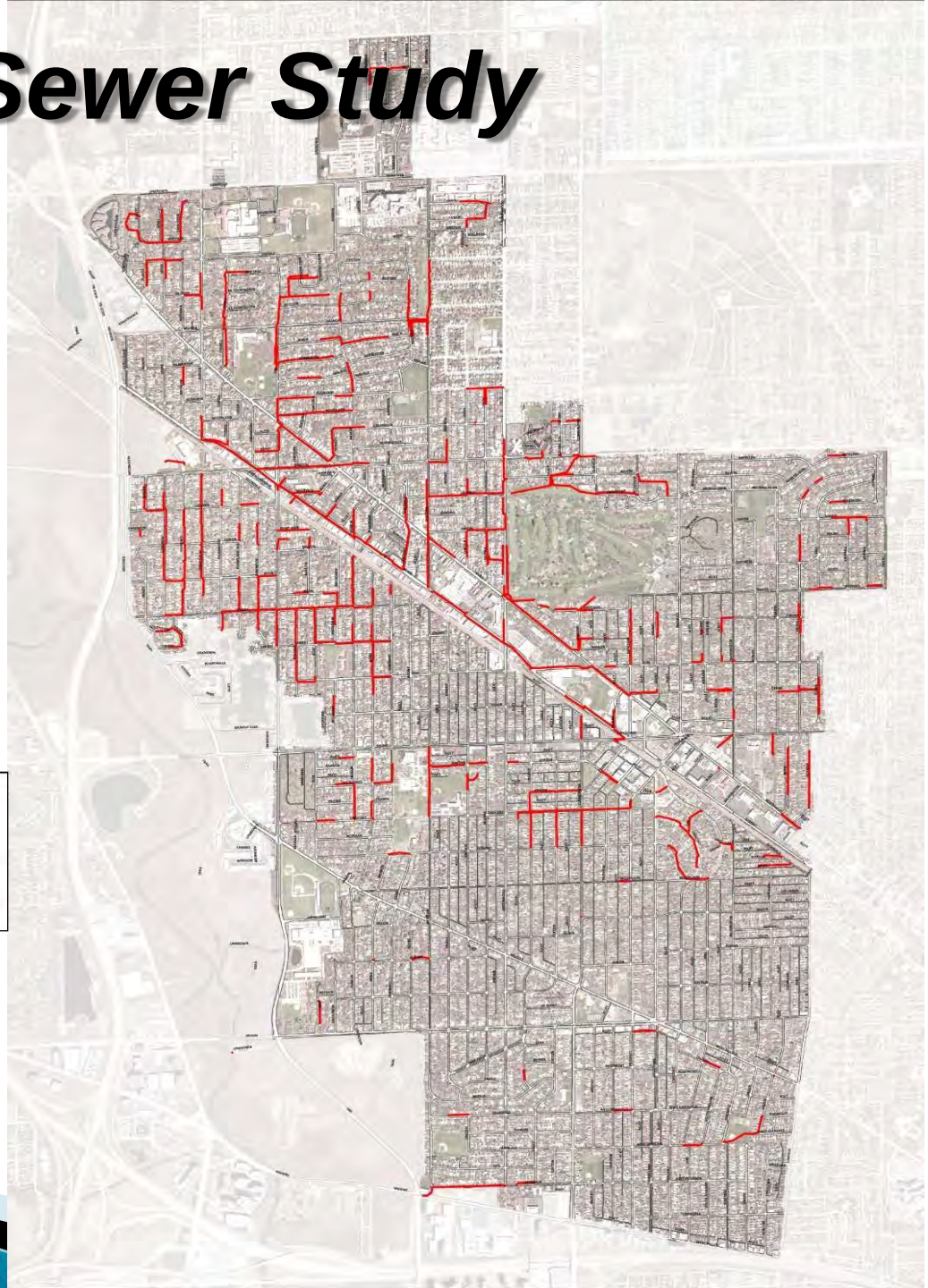


Legend

- HGL ABOVE MH RIM
- HGL 0' TO 3' BELOW MH RIM
- HGL MORE THAN 3' BELOW MH RIM

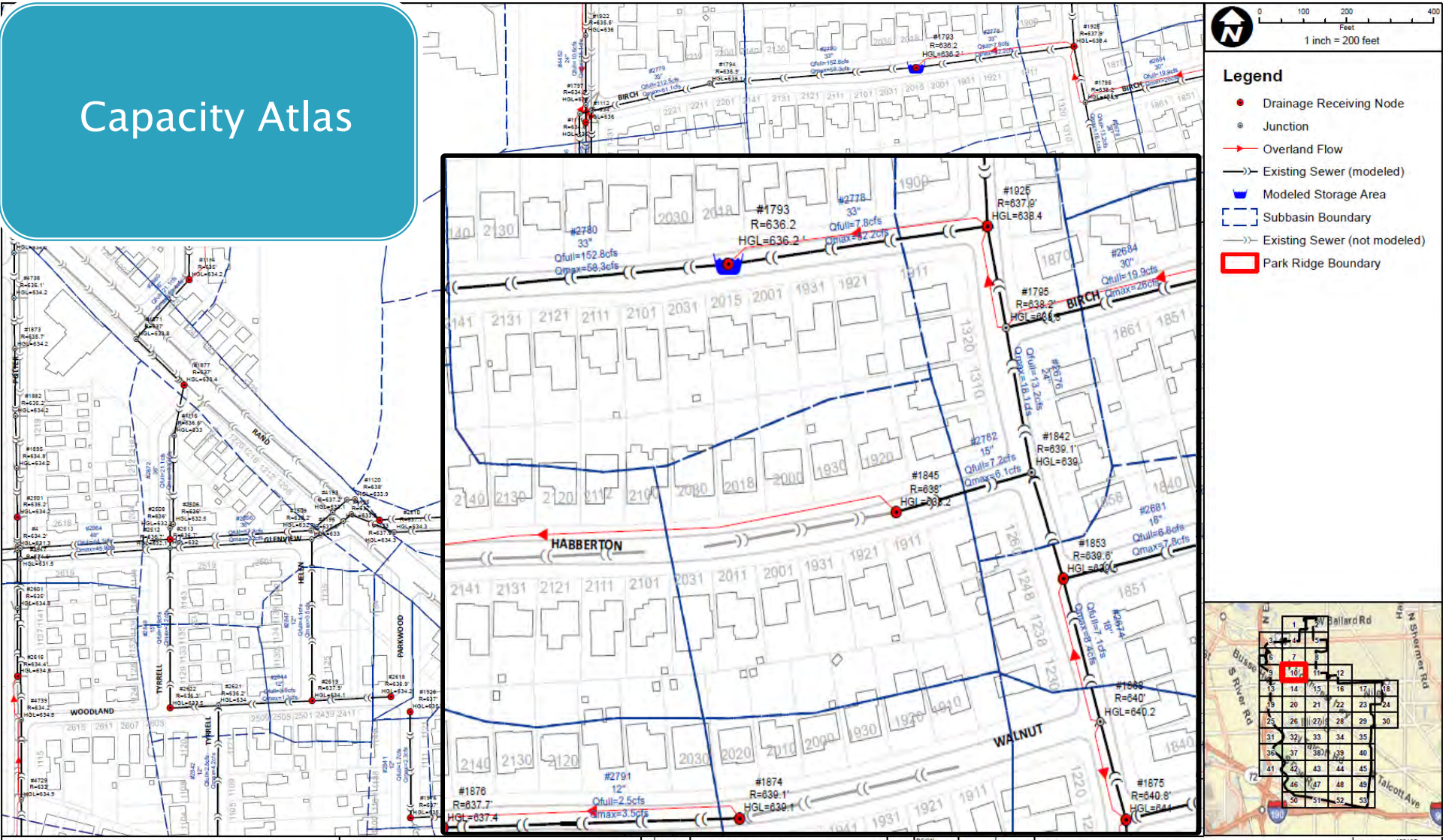
Citywide Sewer Study

Overland Flow Locations



Citywide Sewer Study

Capacity Atlas



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CLIENT: **CITY OF PARK RIDGE**

NO.	DATE	NATURE OF REVISION	CHKD.

DSGN.:
DWN.:
CHKD.:
SCALE: 1:2400
MODEL: ArcGIS 10
PLOT DATE: 7/14/2011
FILE NAME: Sewer Capacity Atlas
PATH: N:\Park Ridge\100197\Water\Exhibits\Sewer Capacity Atlas.mxd

TITLE: **SEWER CAPACITY ATLAS 10-YR STORM**

PROJ. NO. 100197
DATE:
SHEET 10 OF 53
DRAWING NO.

Citywide Sewer Study

Proposed Improvements

Identify Project Areas

Available Capacity

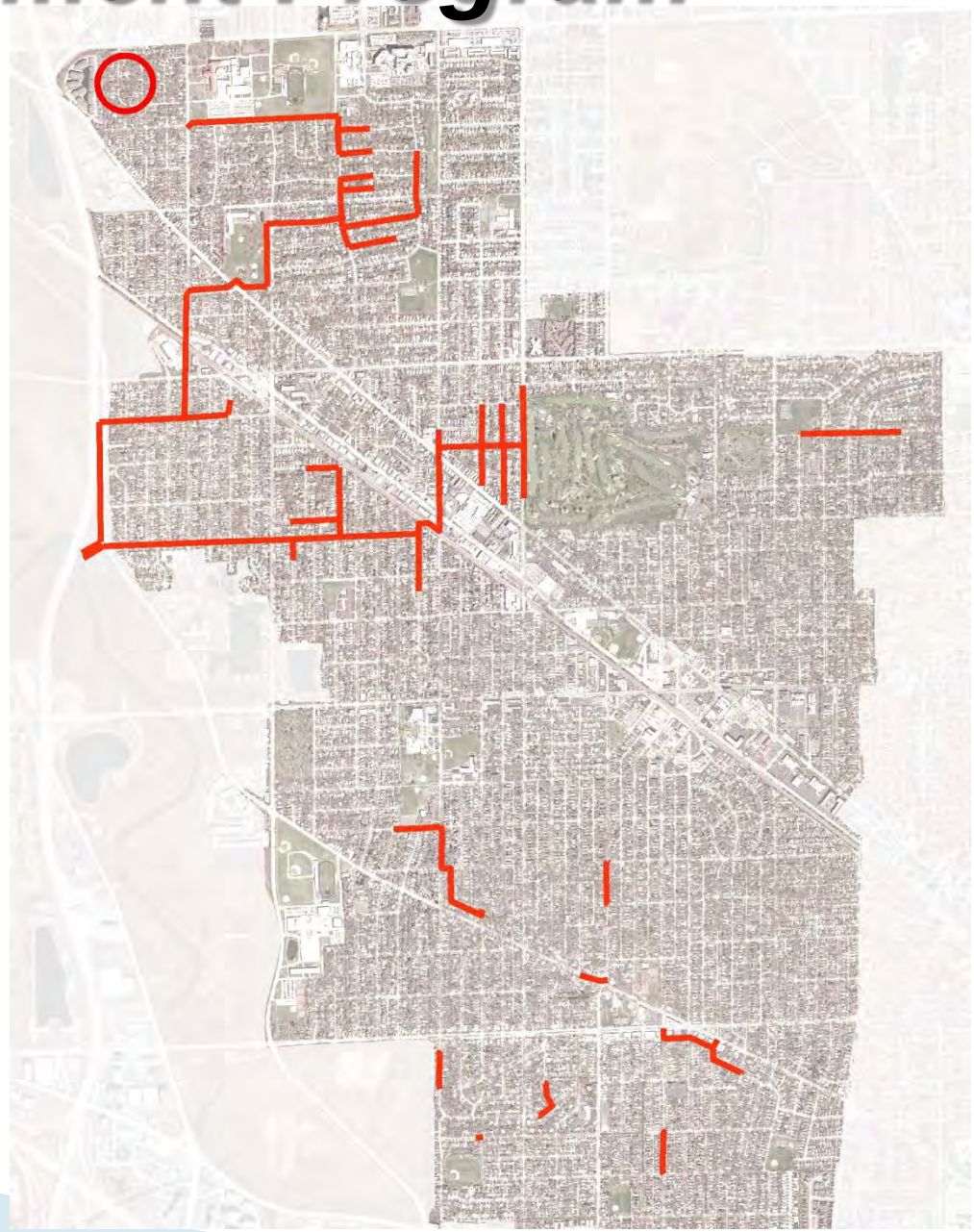
Major Problem Area

Citywide Sewer Study - Summary

- ***Entire City included in study***
  - ***Determined existing hydraulic parameters, performance, restrictions, etc.***
- ***12 Concept Projects Identified***
  - ***Chosen based on density of flooding problems or availability of sewer capacity***
- ***Led to Sewer Improvement Program***

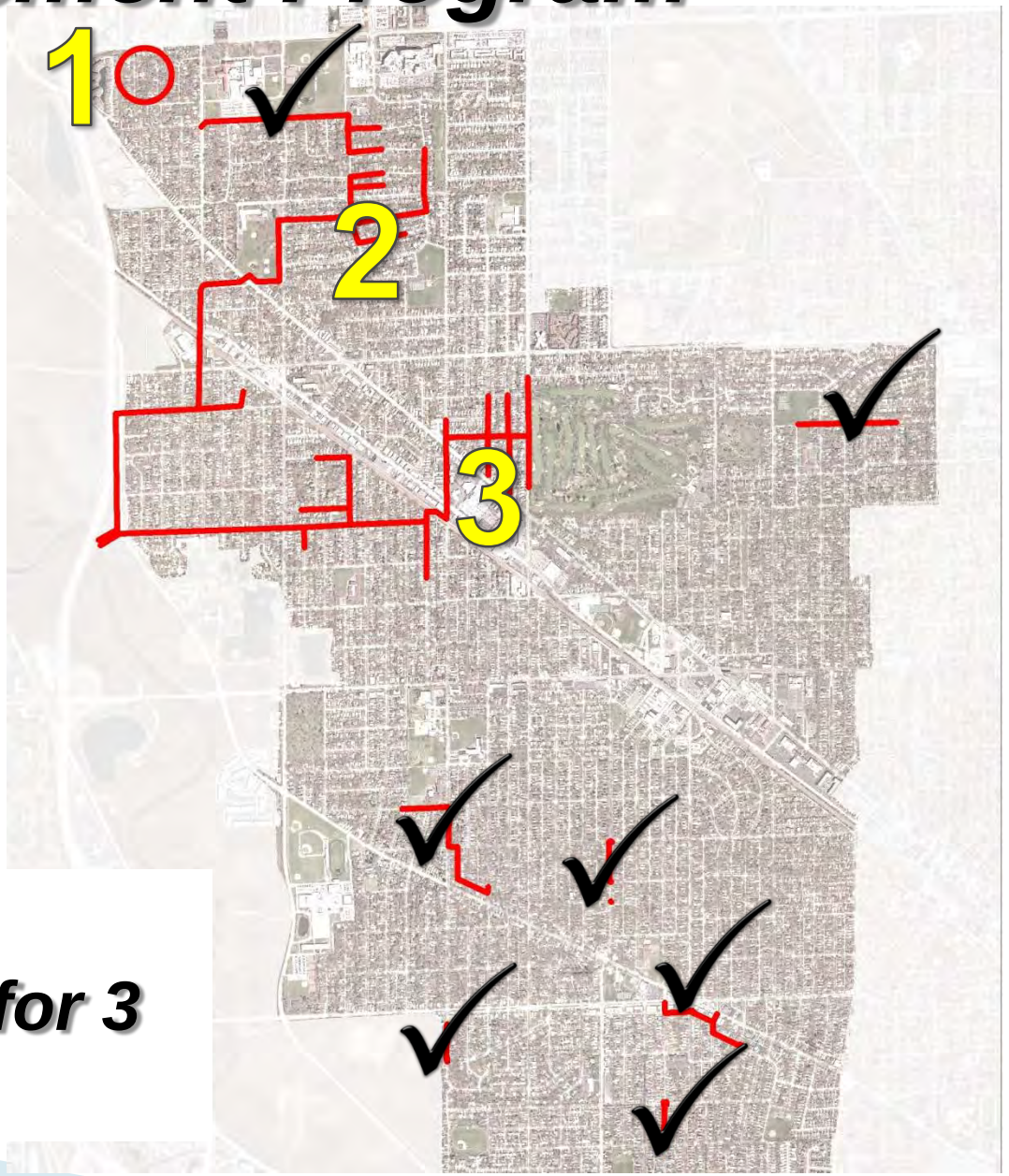
Sewer Improvement Program

- *12 projects*
- *City bonded $5.3 Million to fund 1st phase*
- *Completed final design and construction of 7 projects*



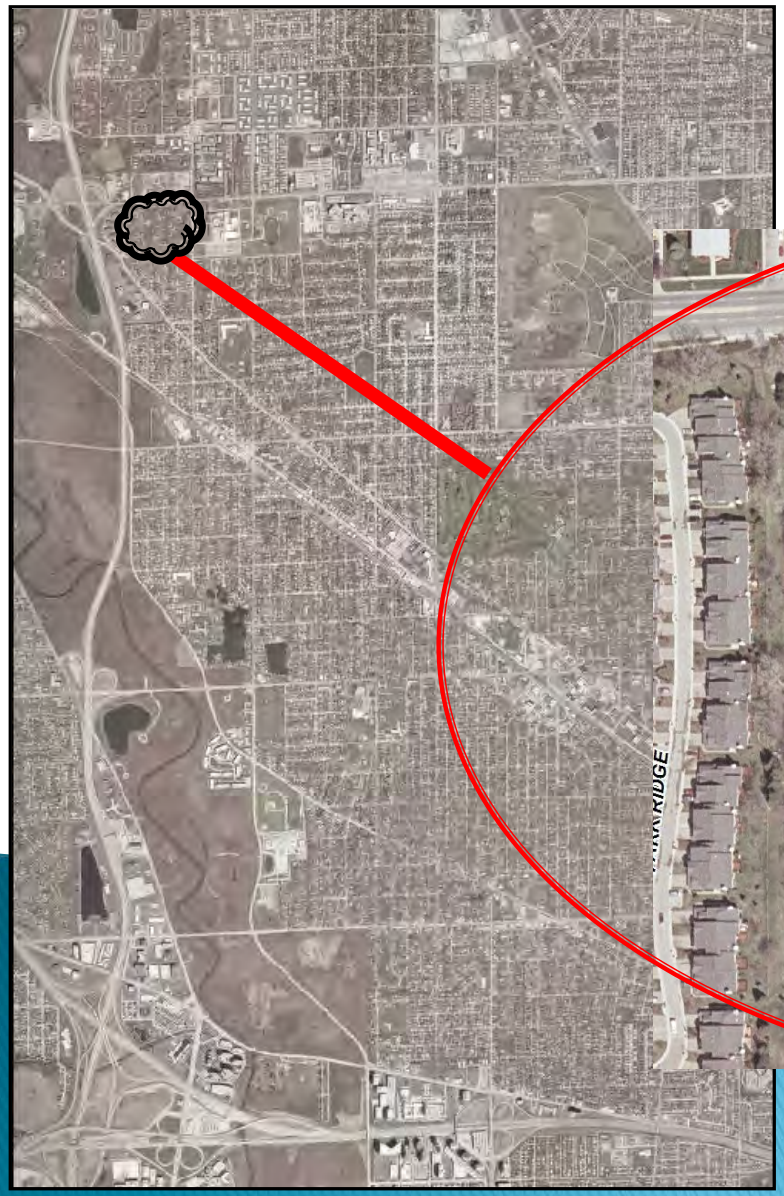
Sewer Improvement Program

- *12 projects*
- *City bonded $5.3 Million to fund 1st phase*
- *Completed final design and construction of 7 projects*
- *Commissioned Feasibility Study for 3 largest projects*




Mayfield Study Area

Mayfield Study Area



Existing Condition

Existing Conditions

Mayfield Pump Station

- Tributary Area = +/- 30 ac
- Capacity = 350 gal/min (0.8 cfs)

Does 350 gal/min seem like a lot?

- Inflow to pump in a **10-yr storm** is approximately **3500 gal/min**

Existing Conditions

100-Yr Inundation Area

- ***24 hour storm = 7.6”***
- ***Approx. 23 homes at risk of flooding***

Options

1. Storage Basin

- Need approximately 8 ac-ft for 100-yr protection
- Would need to acquire +/- 2 acres for a storage basin
  - Equal to acquiring 8 lots at ¼ acre each
- Underground storage is an option
  - Very expensive
  - Still need land to locate the storage vaults

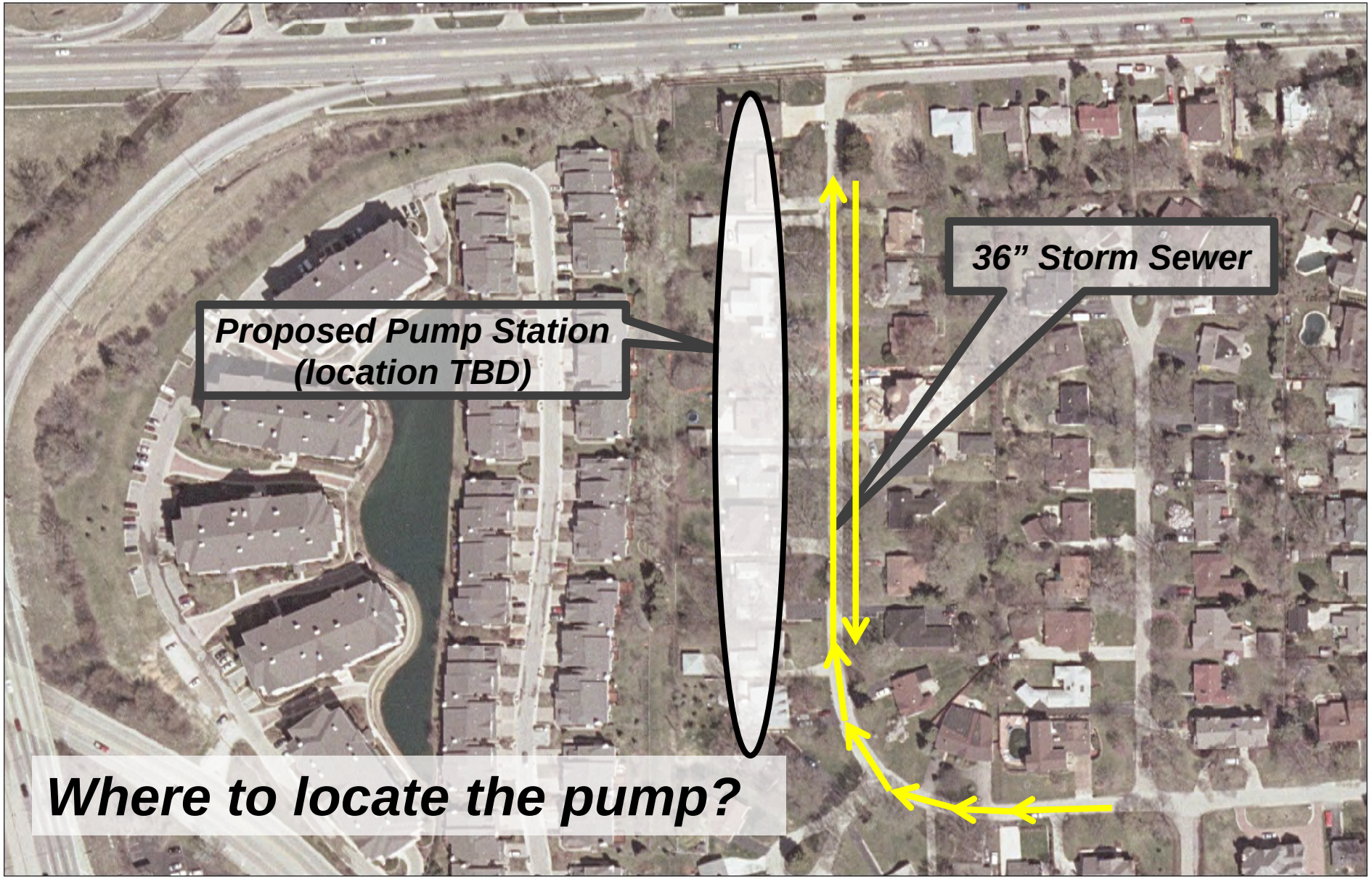
2. Pump Station

- Upgrading existing station does not make sense
  - Downstream improvements would also be needed
- New pump station proposed
- New storm sewers to convey runoff to pump

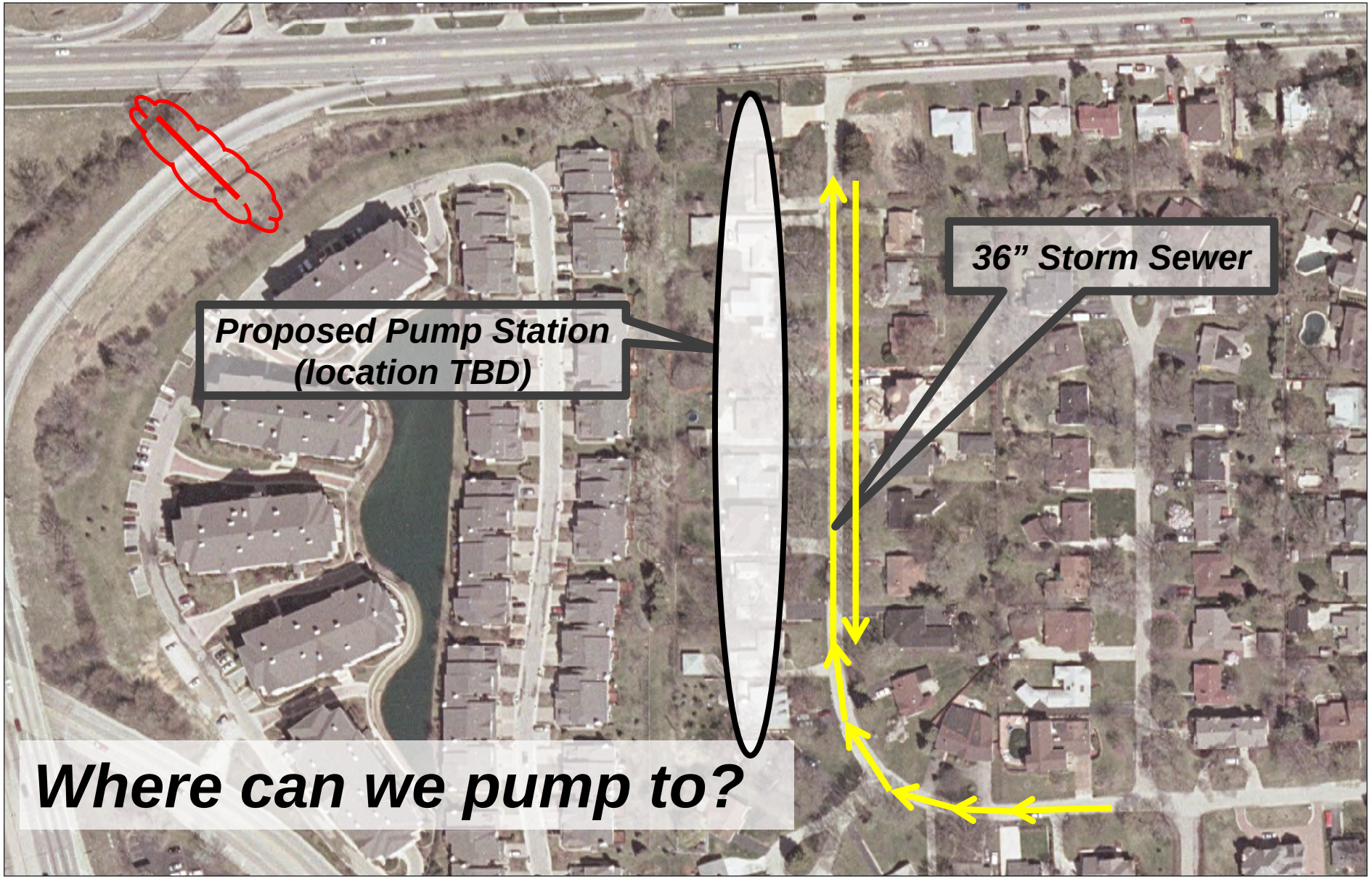
Proposed Improvements

Where to locate the pump?

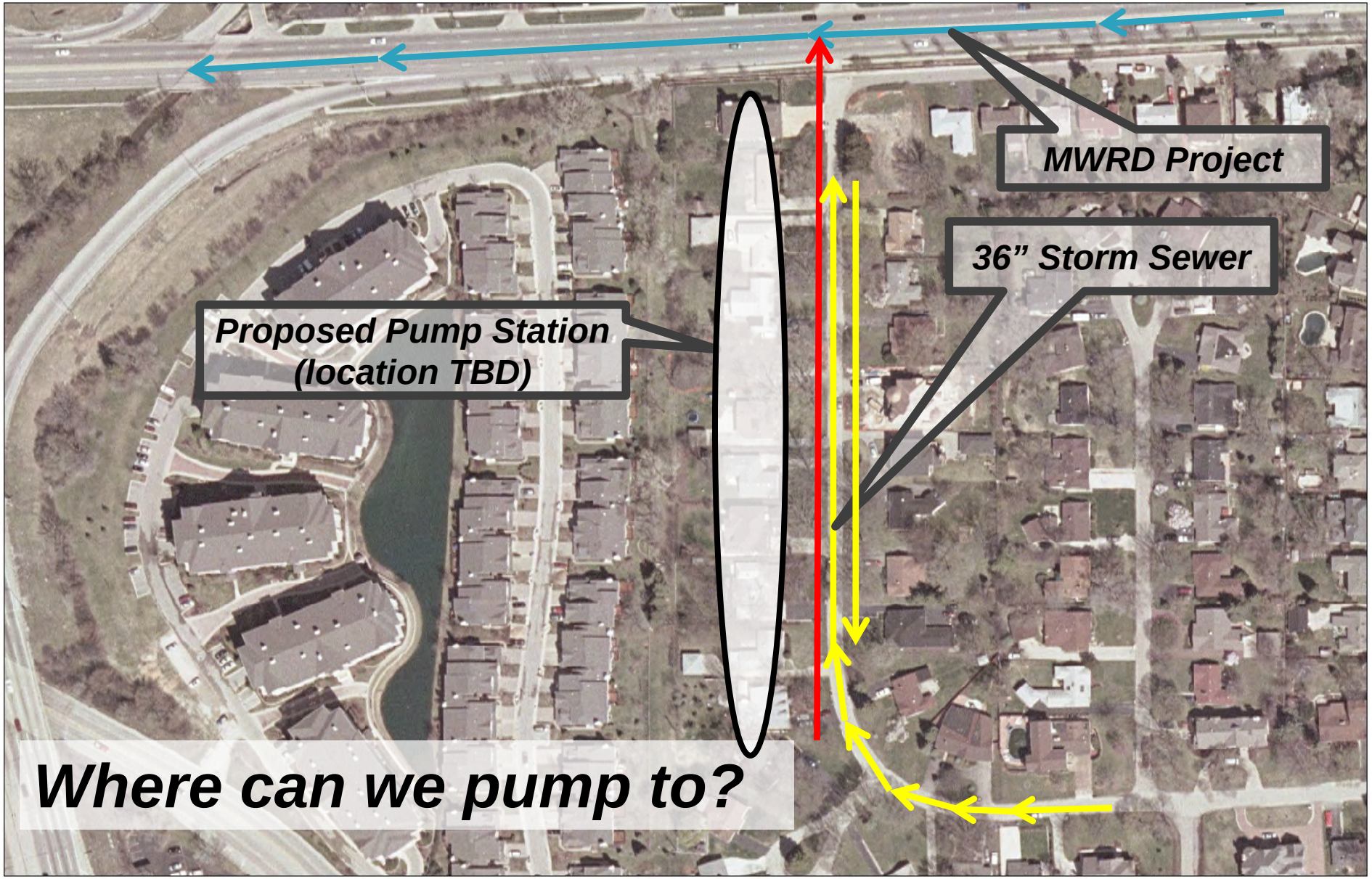
Proposed Improvements



Proposed Improvements



Proposed Improvements



Proposed Improvements

What Size Pump is Needed?

- Larger pump = greater protection
- Cost, regulatory requirements are limiting factors
- Limits to how much flow the MWRD pipe can accept
- Cannot increase flood level in Farmer's Prairie Creek

Option #1 – 15cfs

- Cost considerations
- 20x Existing Pump Capacity

Option #2 – 30cfs

- Maximum allowed due to regulatory constraints
- 40x Existing Pump Capacity

Proposed Improvements

Example Pump Station

Proposed Improvements

Option #1 – 15cfs

100-yr Storm

- 2hr storm = 4.5”
- Lowers 100yr flood depth by 0.5’
- 6 remaining homes at flood risk

Proposed Improvements

Option #1 – 15cfs

50-yr Storm

- 2hr storm = 3.8”
- All homes outside inundation area

Proposed Improvements

Option #2 – 30cfs

100-yr Storm

- 2hr storm = 4.5”
- All homes outside inundation area

Permitting/Approvals

- ***MWRD***
- ***IDOT***
- ***IDNR-OWR***
- ***Easement acquisition if alternate discharge location is pursued***

Estimated Cost

Option #1 – 50yr Protection for all homes

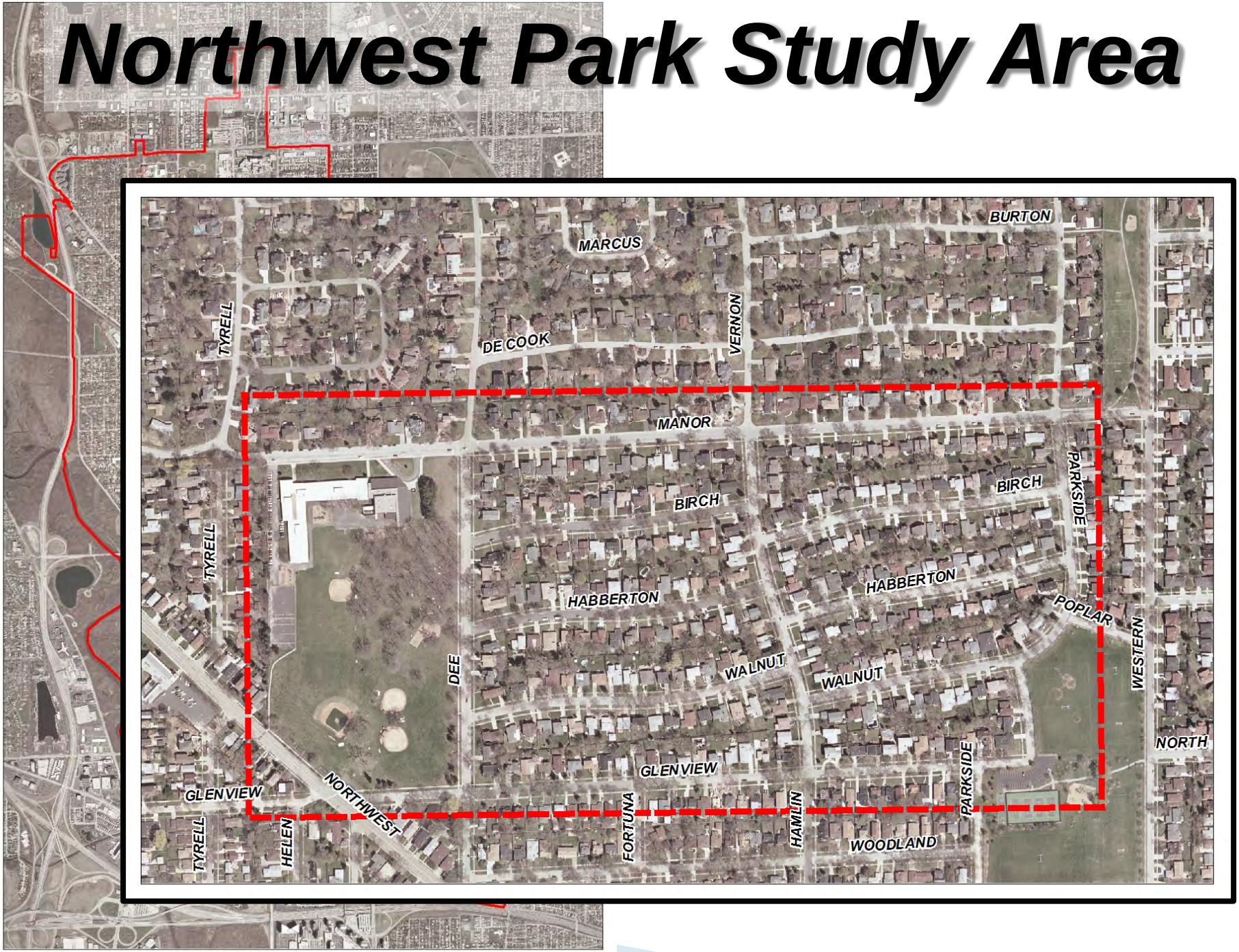
- Estimated Cost = $1.8M
- Does not include cost of property acquisition
- 100-yr protection for 17 homes

Option #2 – 100yr Protection for all homes

- Estimated Cost = $2.3M
- Does not include cost of property acquisition
- 100-yr protection for 23 homes
- $500,000 to protect 6 additional homes and reduce street flooding

Northwest Park Area

Northwest Park Study Area



Existing Conditions

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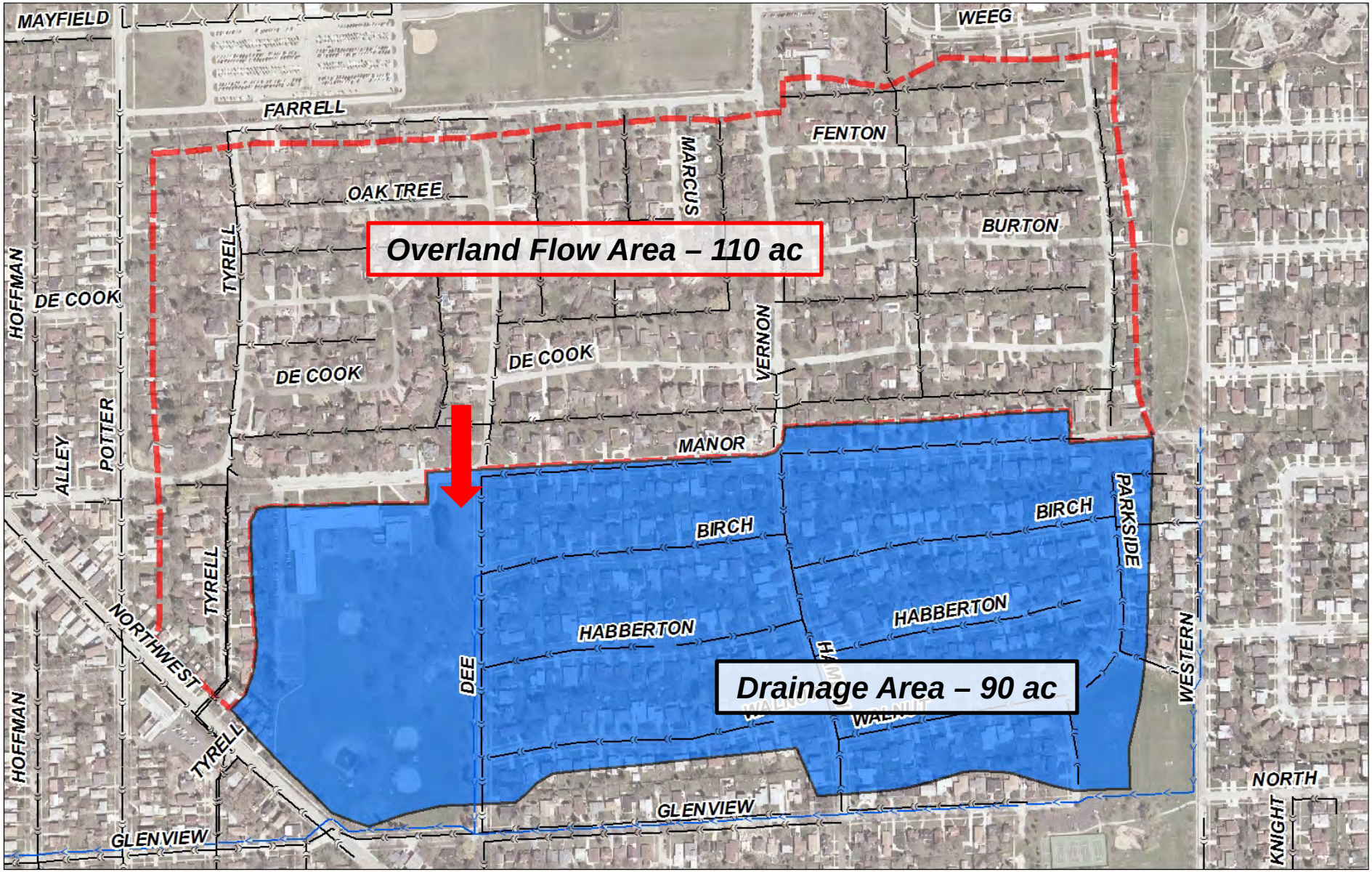

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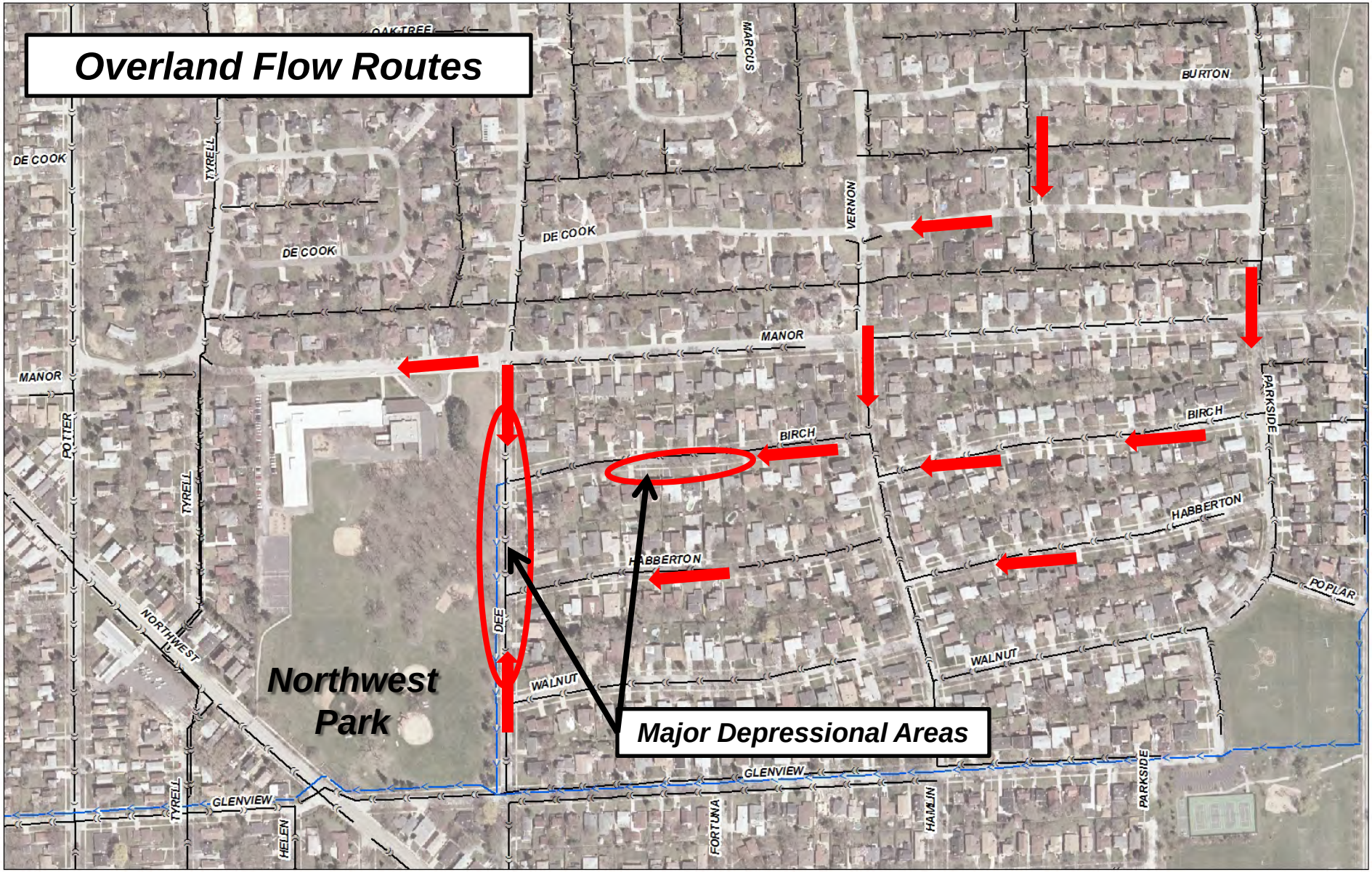

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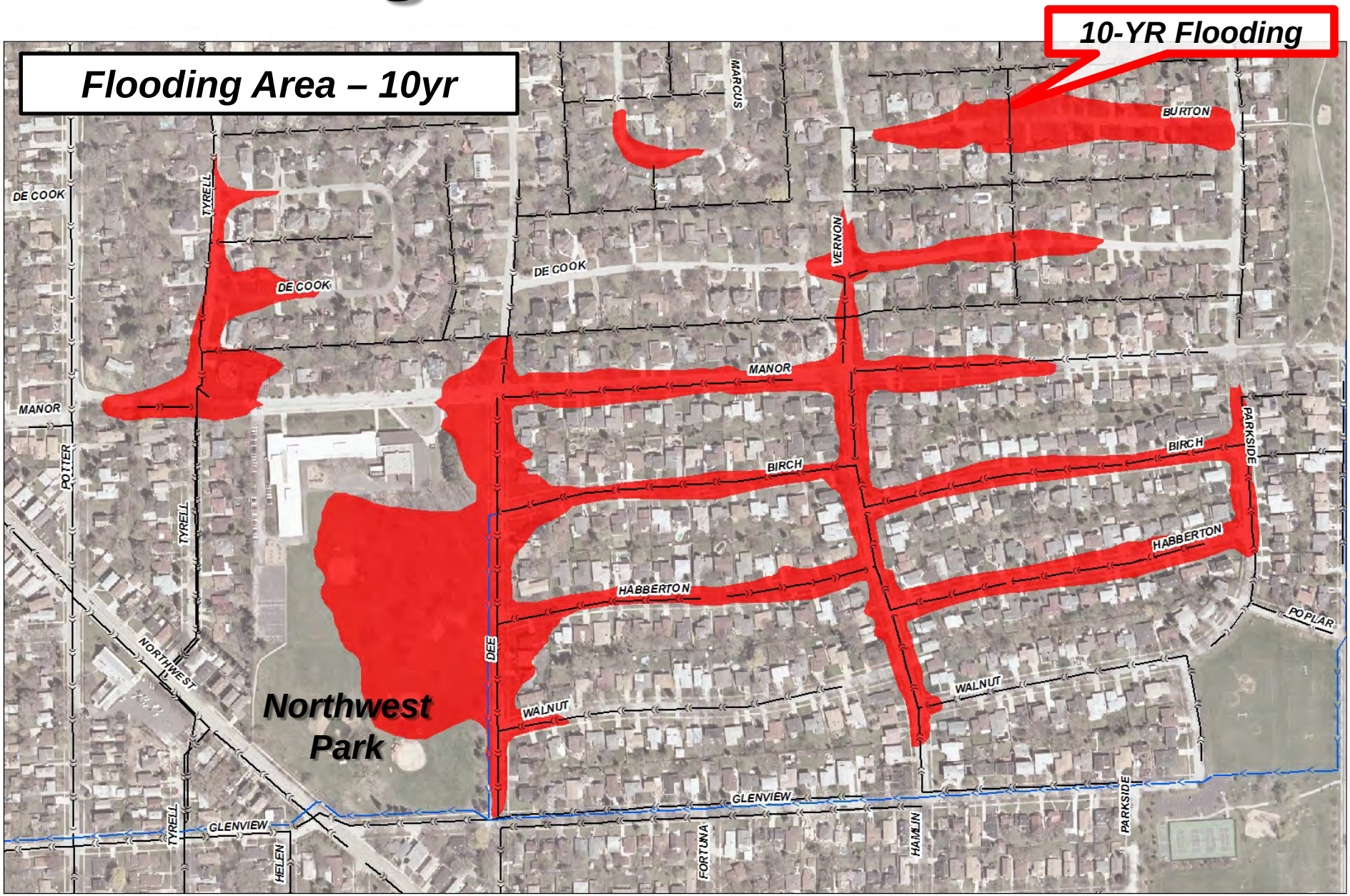

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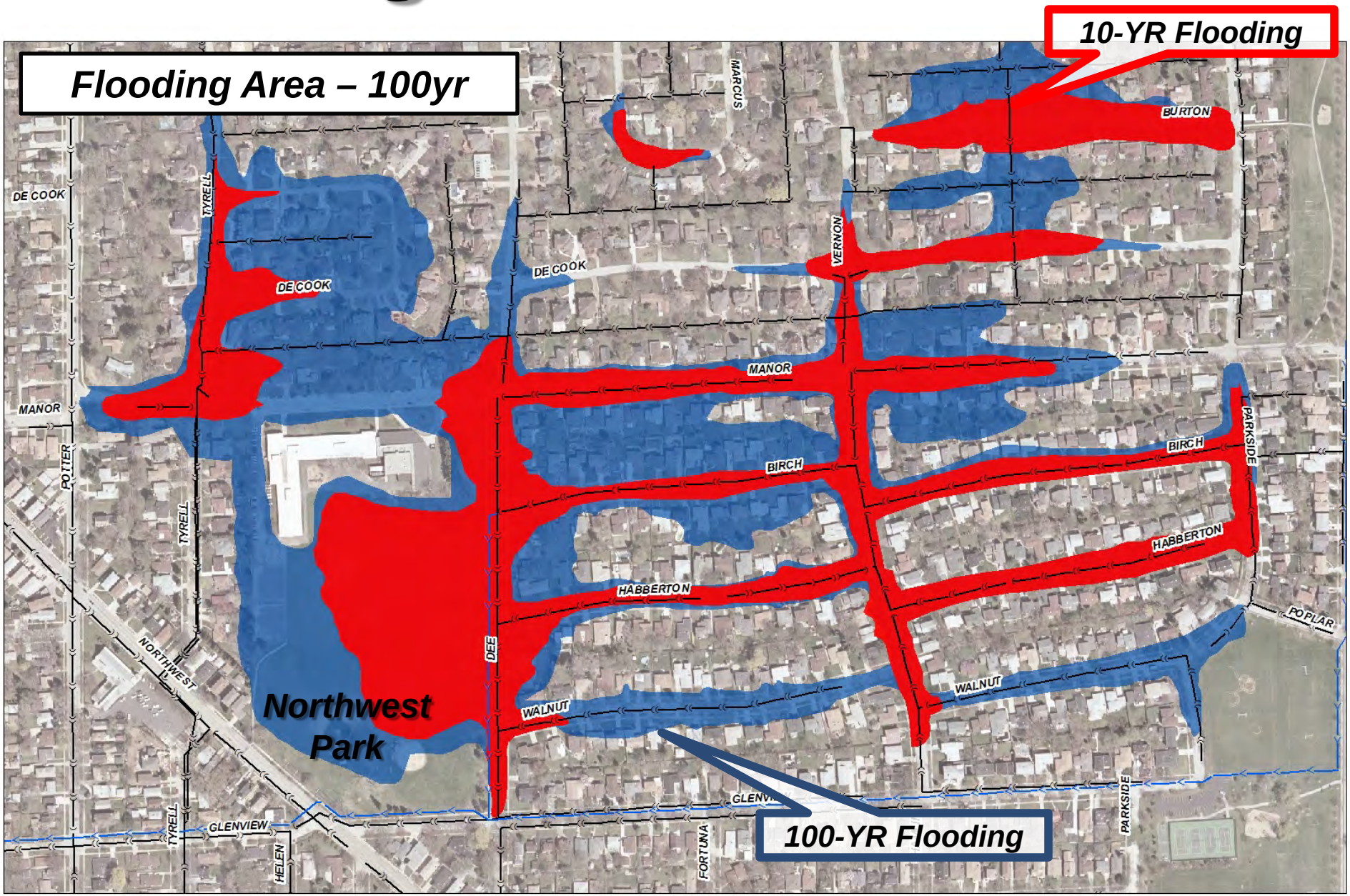
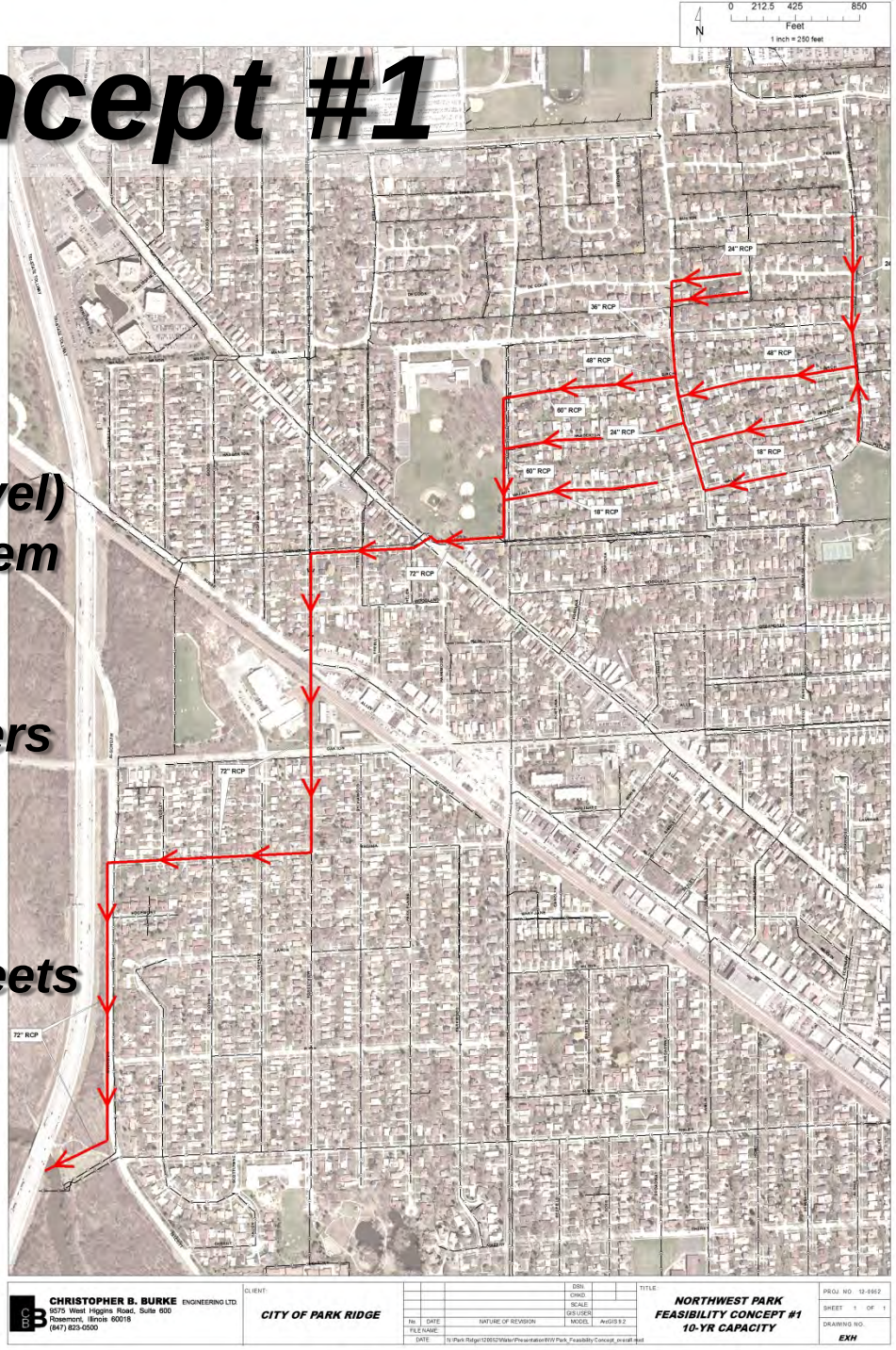


Original Concept

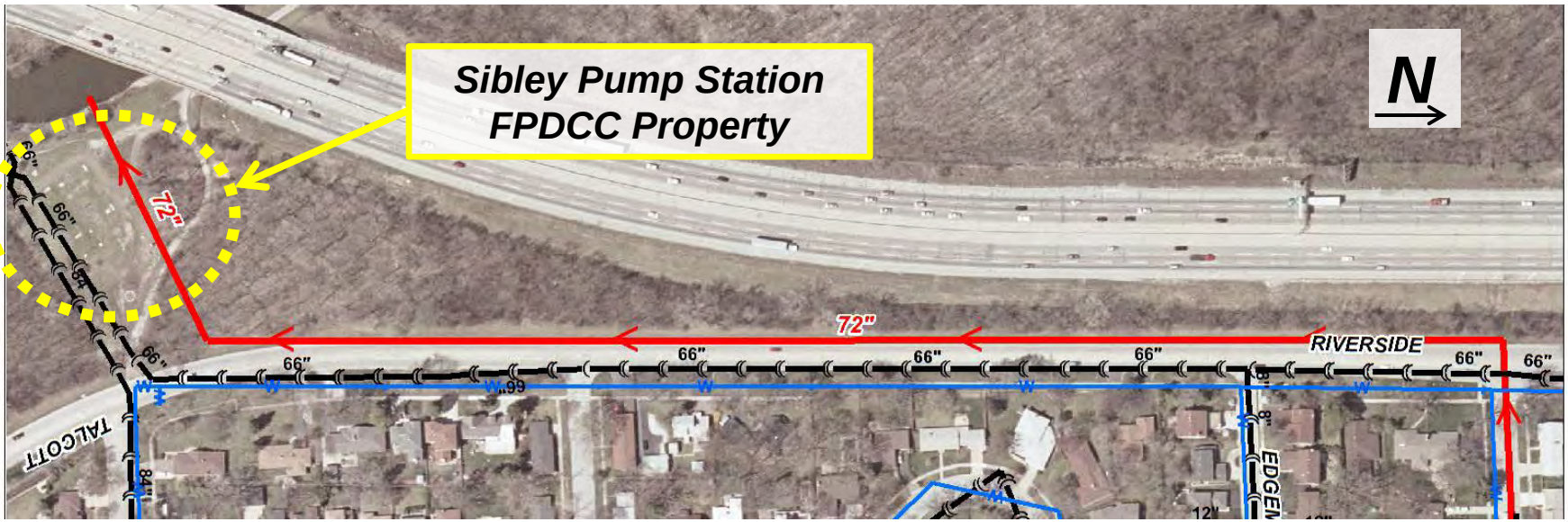
- *Relief Sewer System*
- *Supplement to Combined System*
- *10-year capacity at street level*
- *Outfall to Des Plaines River*

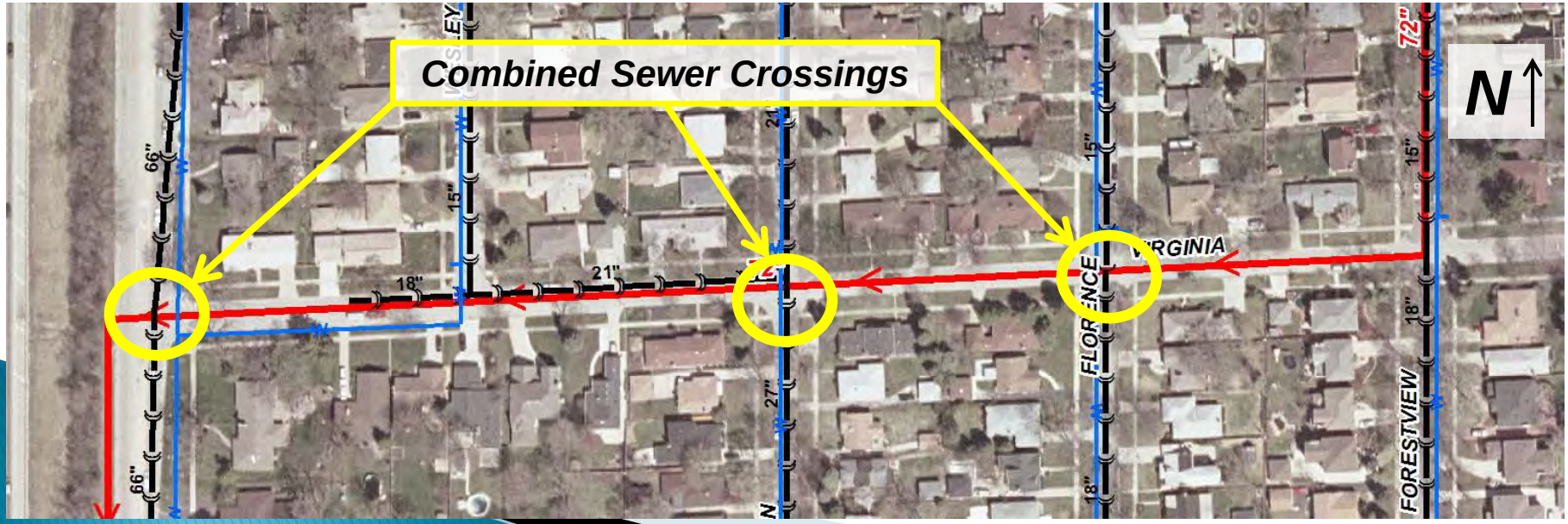
Feasibility Concept #1

- Separate Sewer System
- Outfall to Des Plaines River
- Design Capacity = 10-yr (street level)
- No Connection to Combined System
- All new catch basins/inlets
- Conflicts
  - Crossing over combined sewers
  - Sanitary service lines
  - Water service lines
  - Parallel sanitary sewer lines
- Full resurfacing of all affected streets



Feasibility Concept #1





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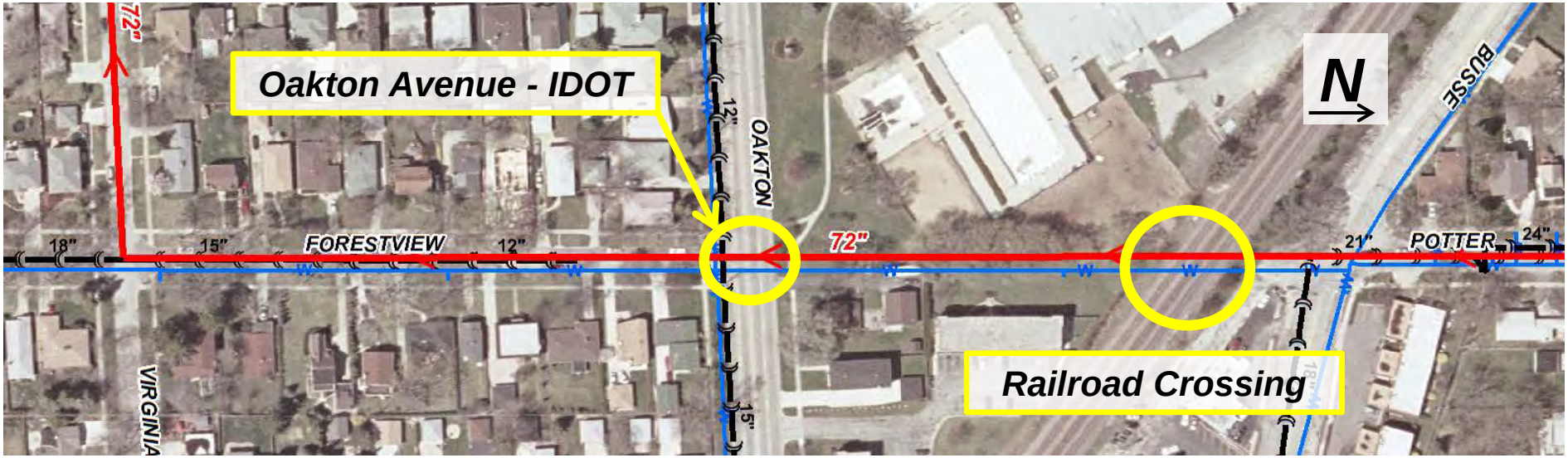

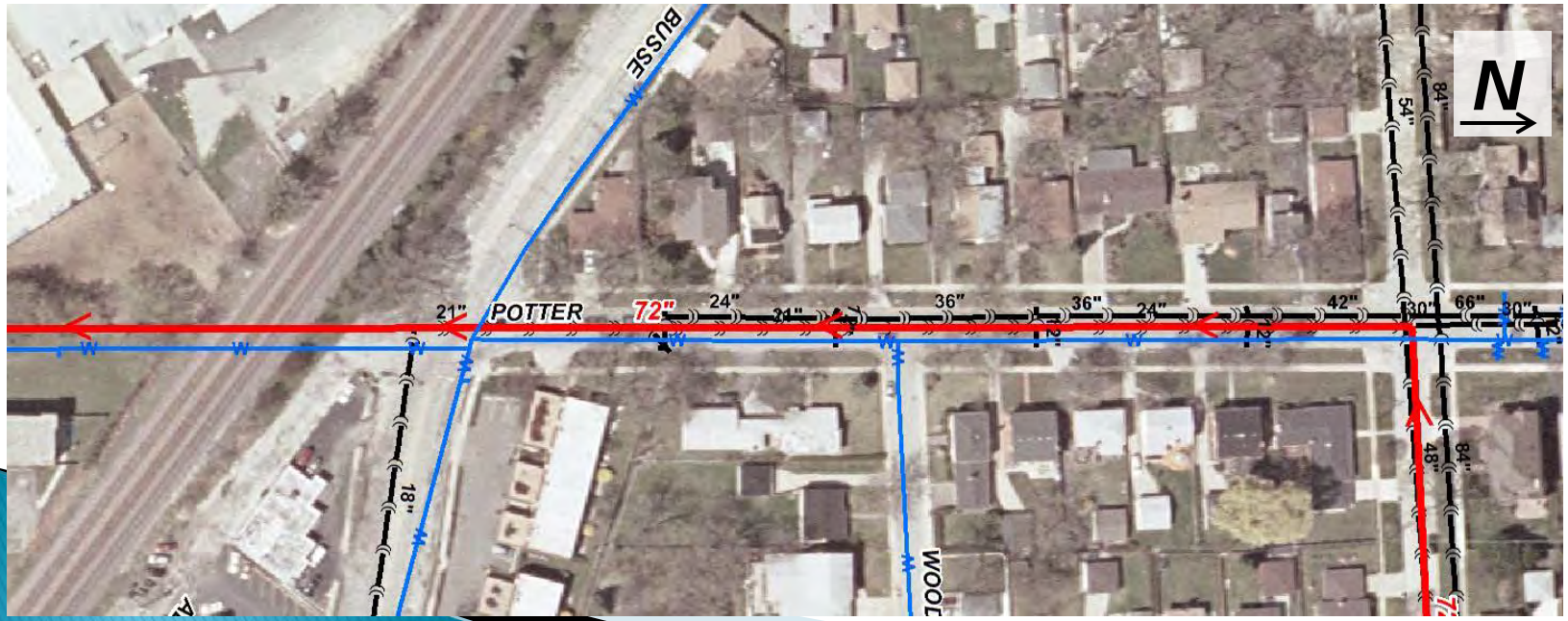

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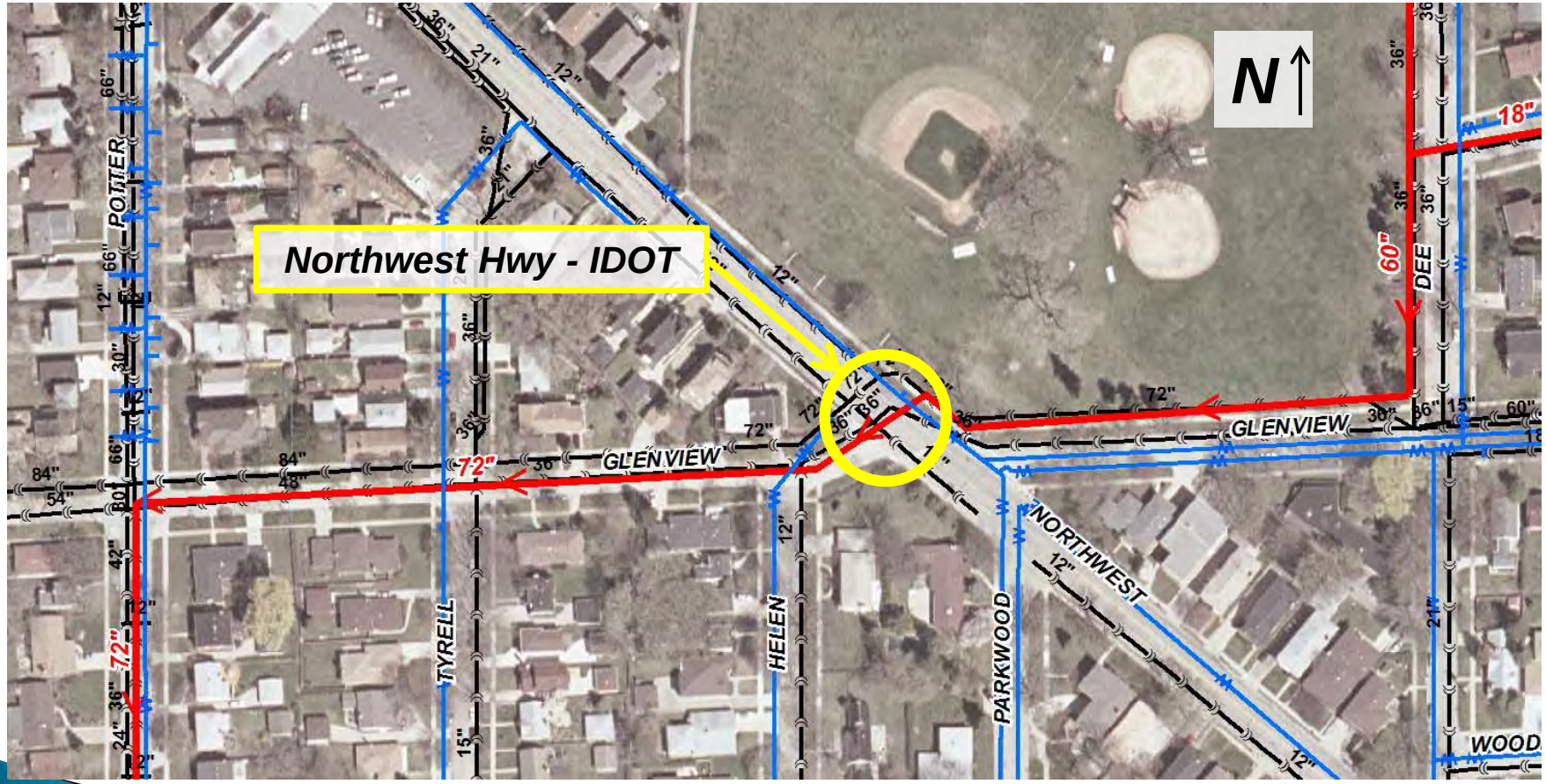

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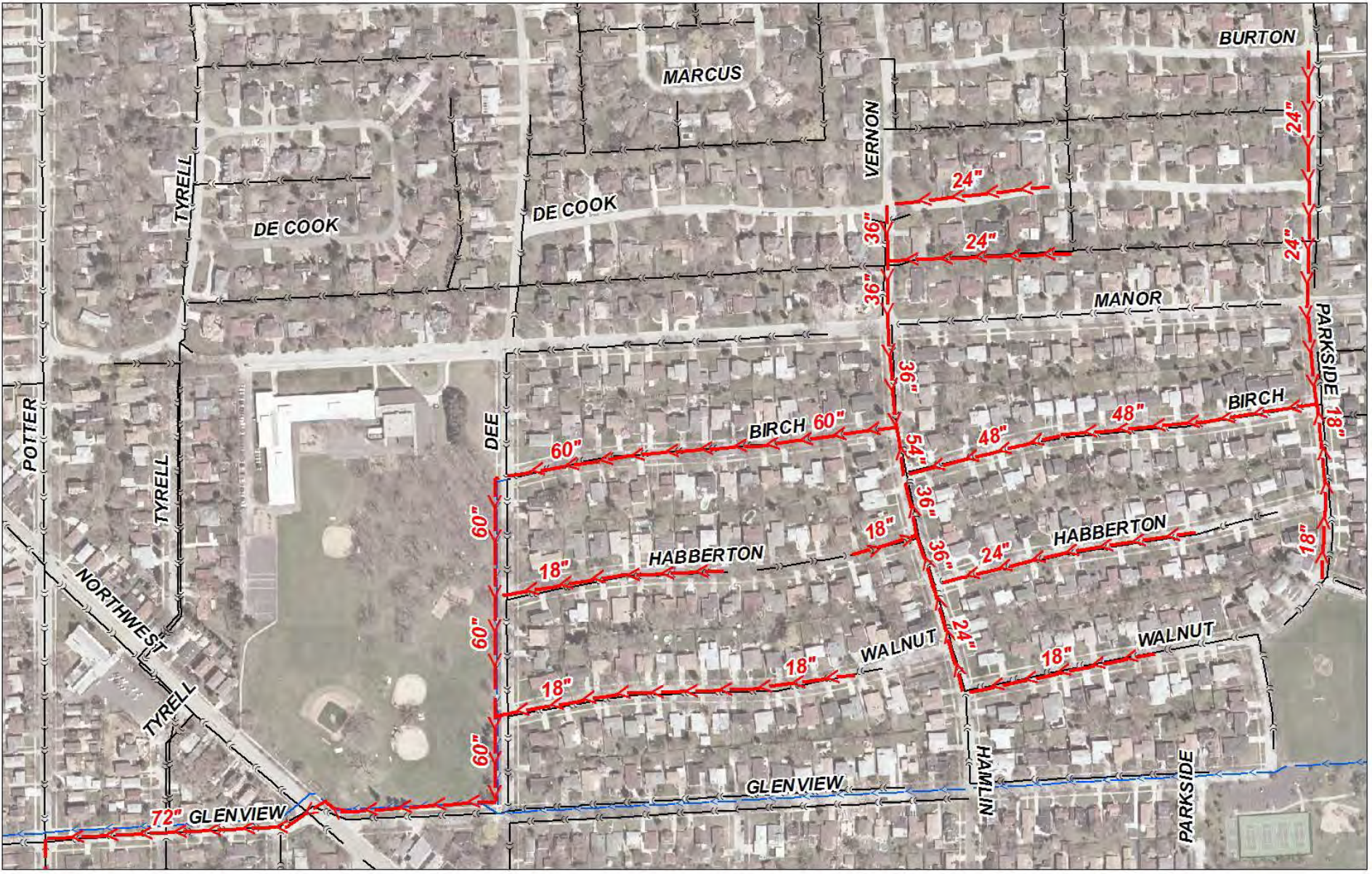

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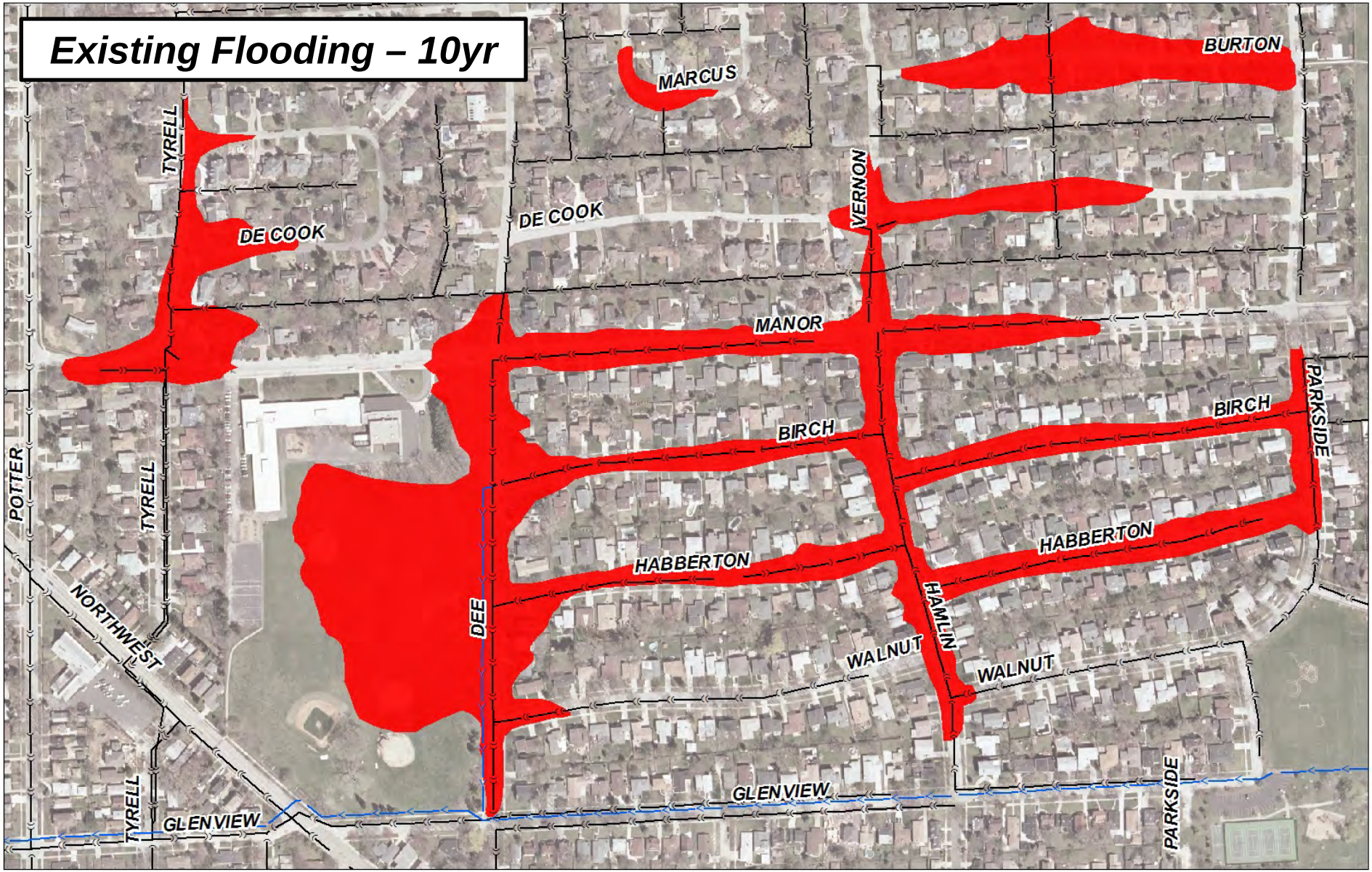

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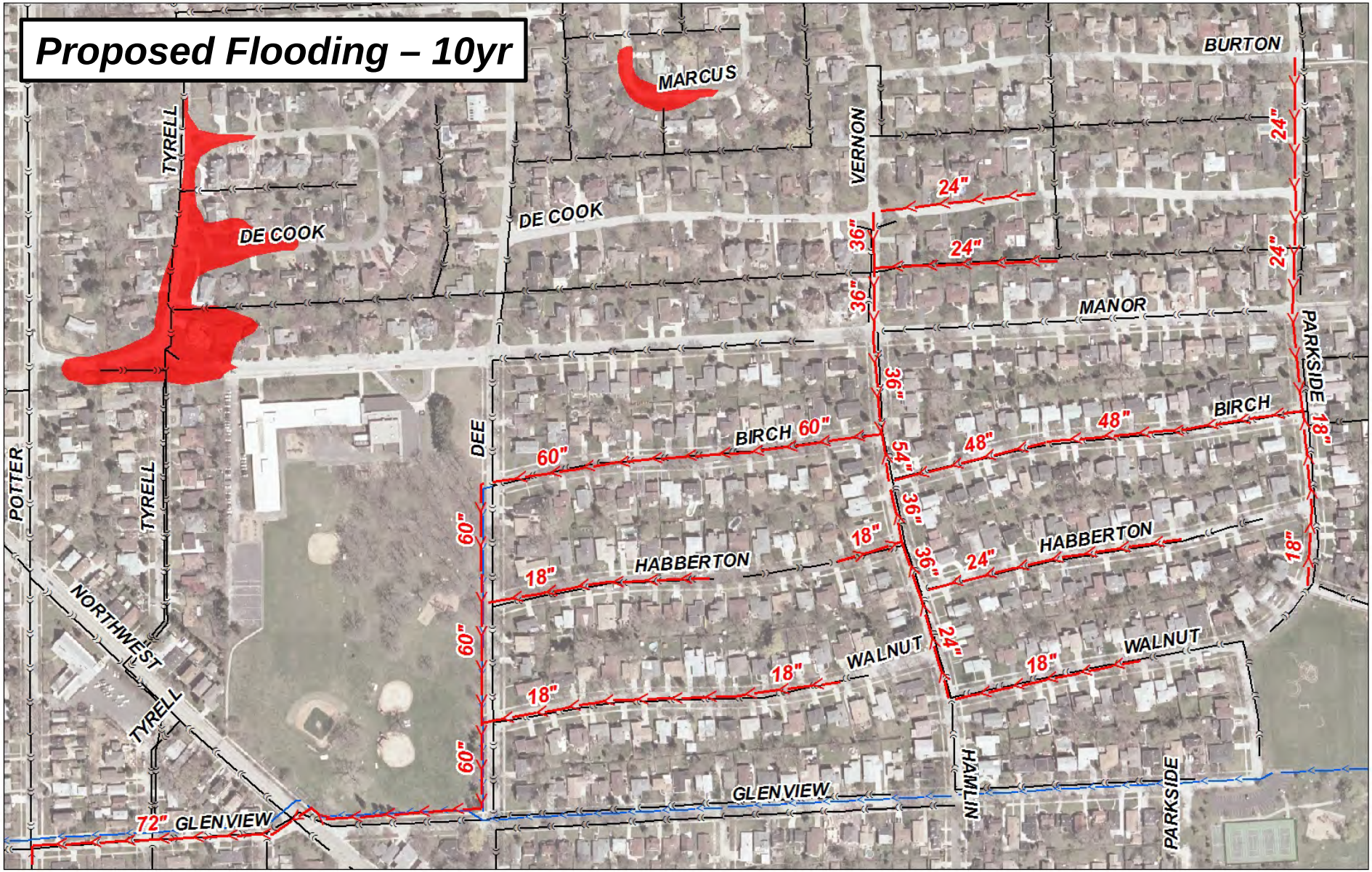

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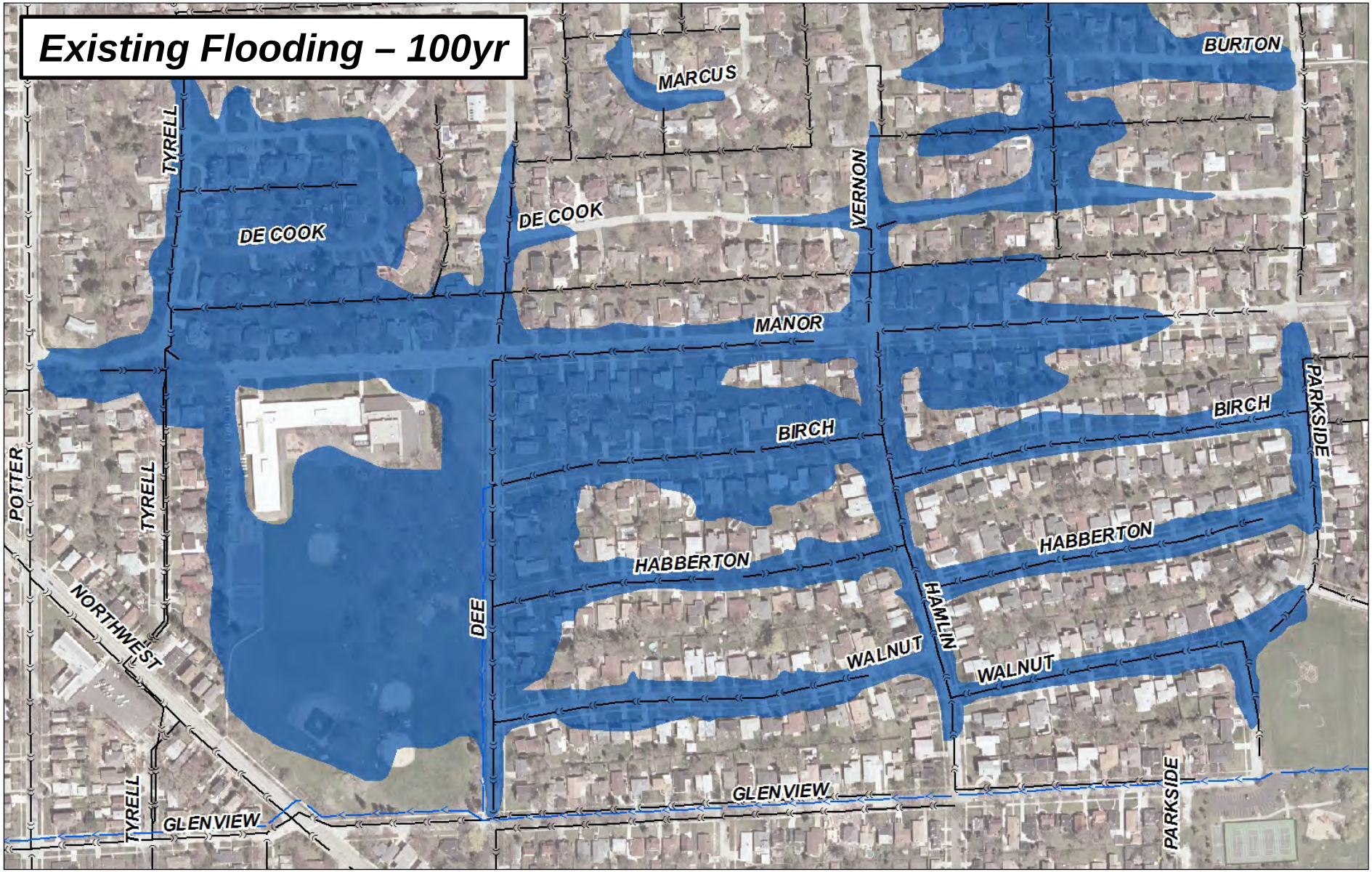

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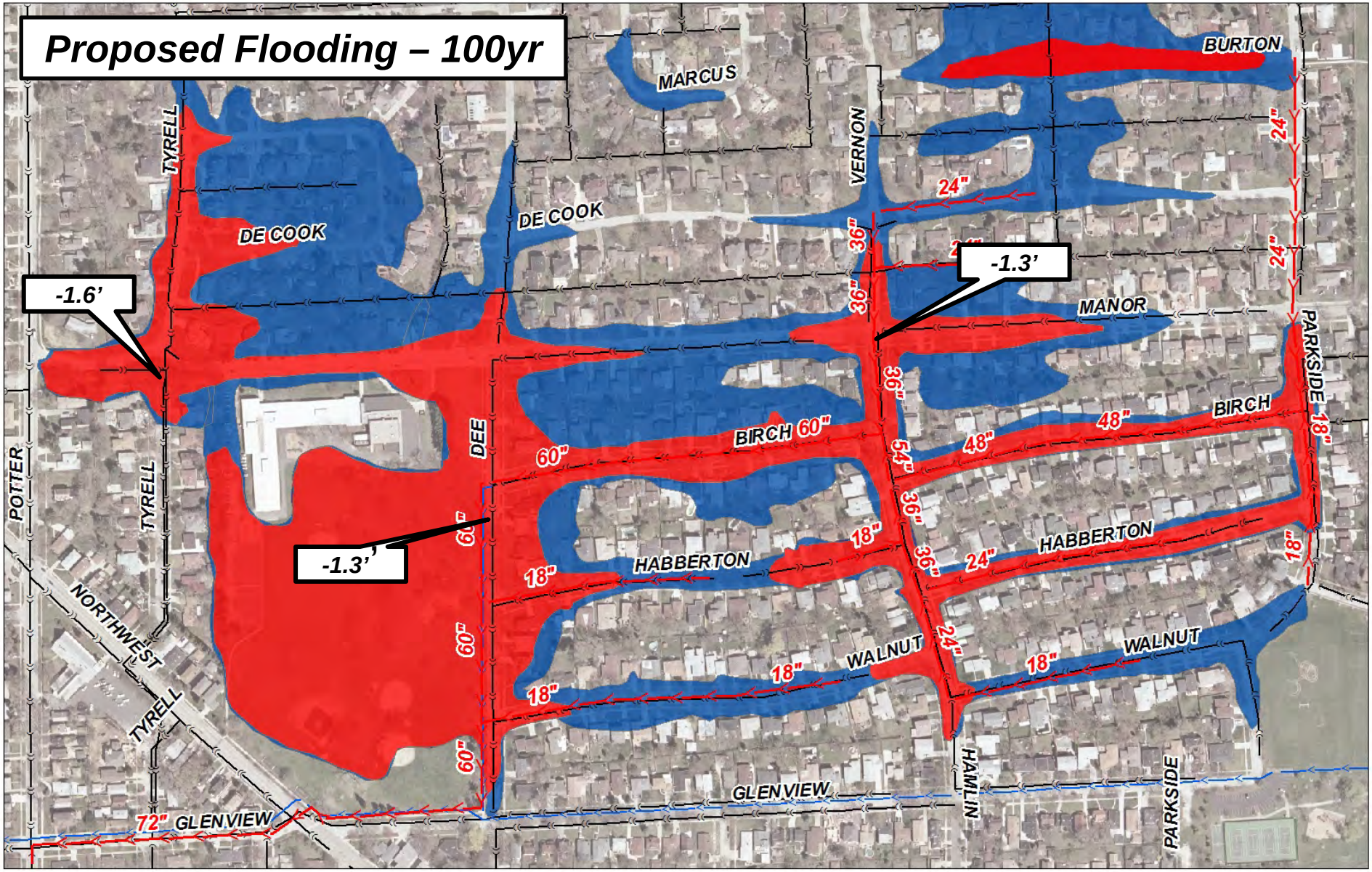
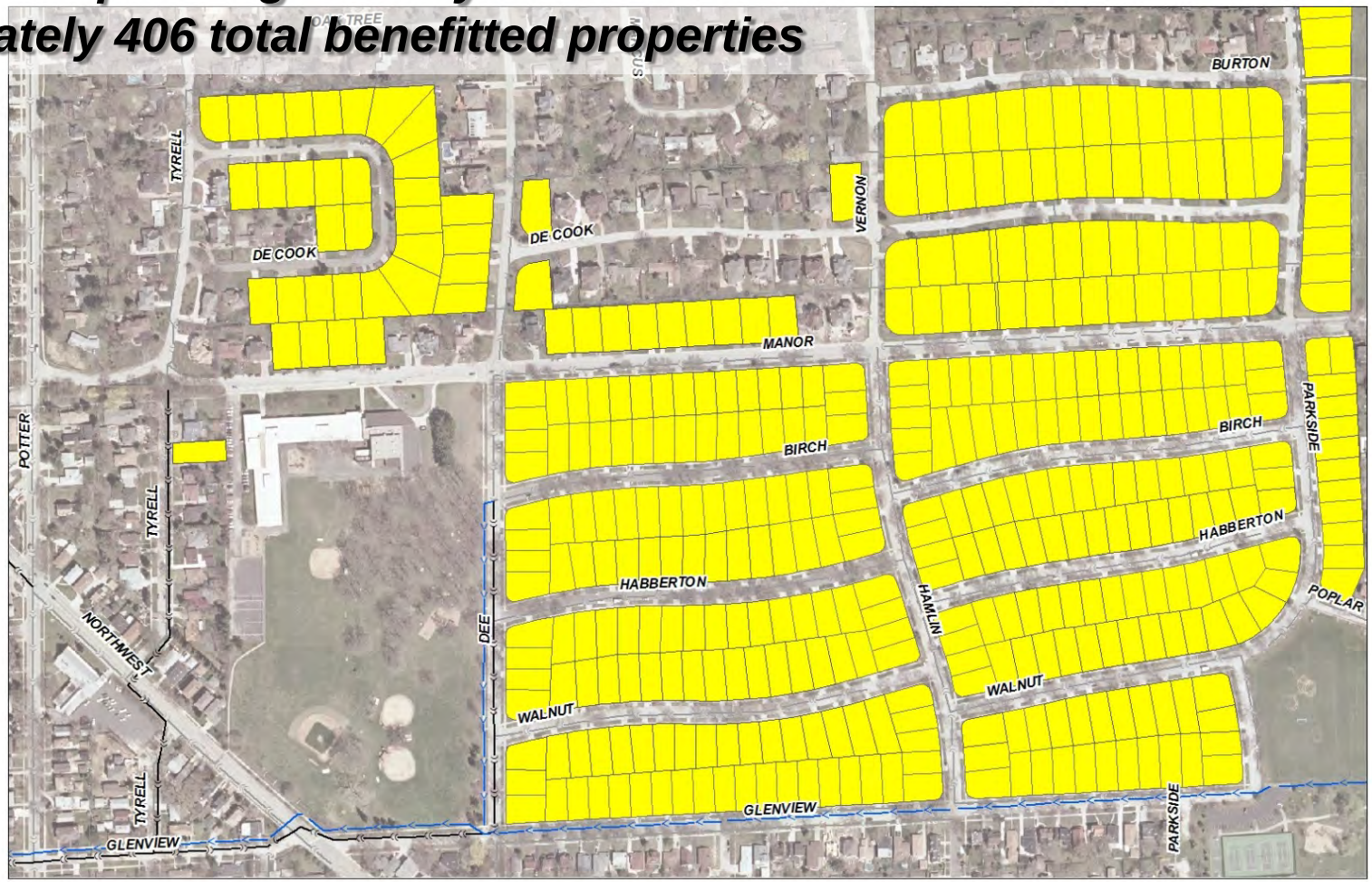


Feasibility Concept #1

Benefits

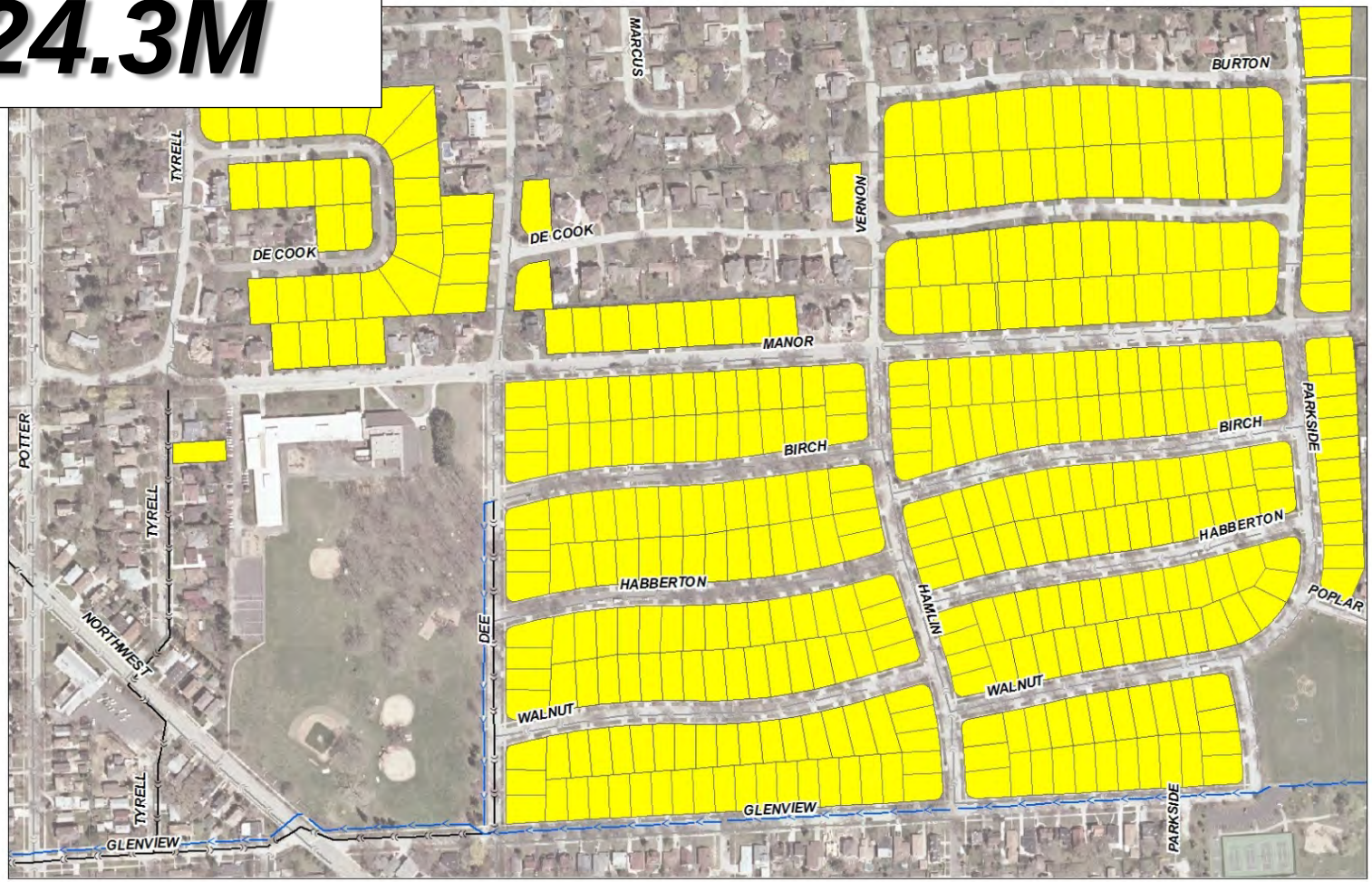
- Reduction in 10-yr HGL (>1')
- Elimination of ponding in 100-yr storm
- Approximately 406 total benefitted properties



Feasibility Concept #1

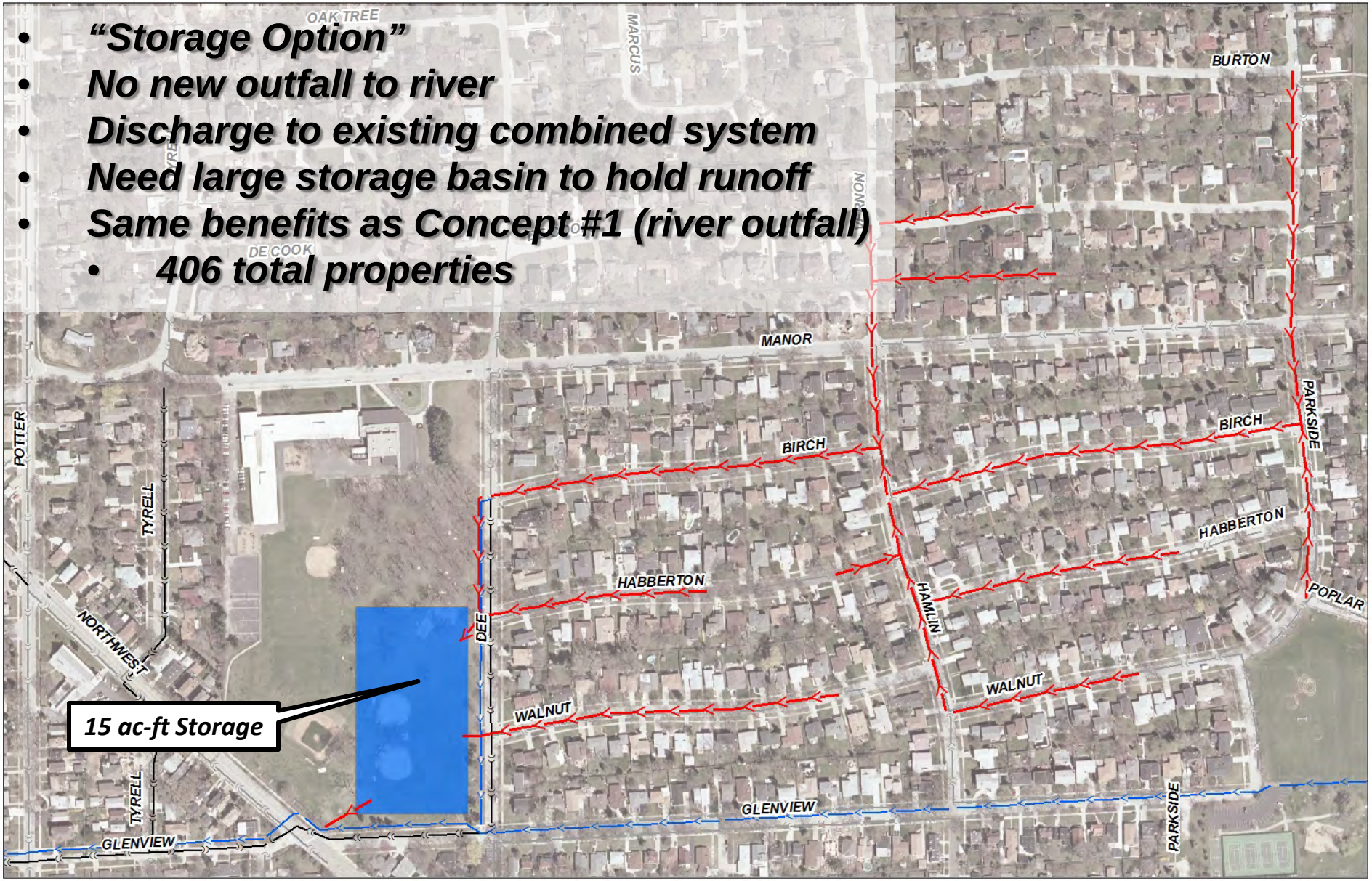
Estimated Cost

- **$24.3M**



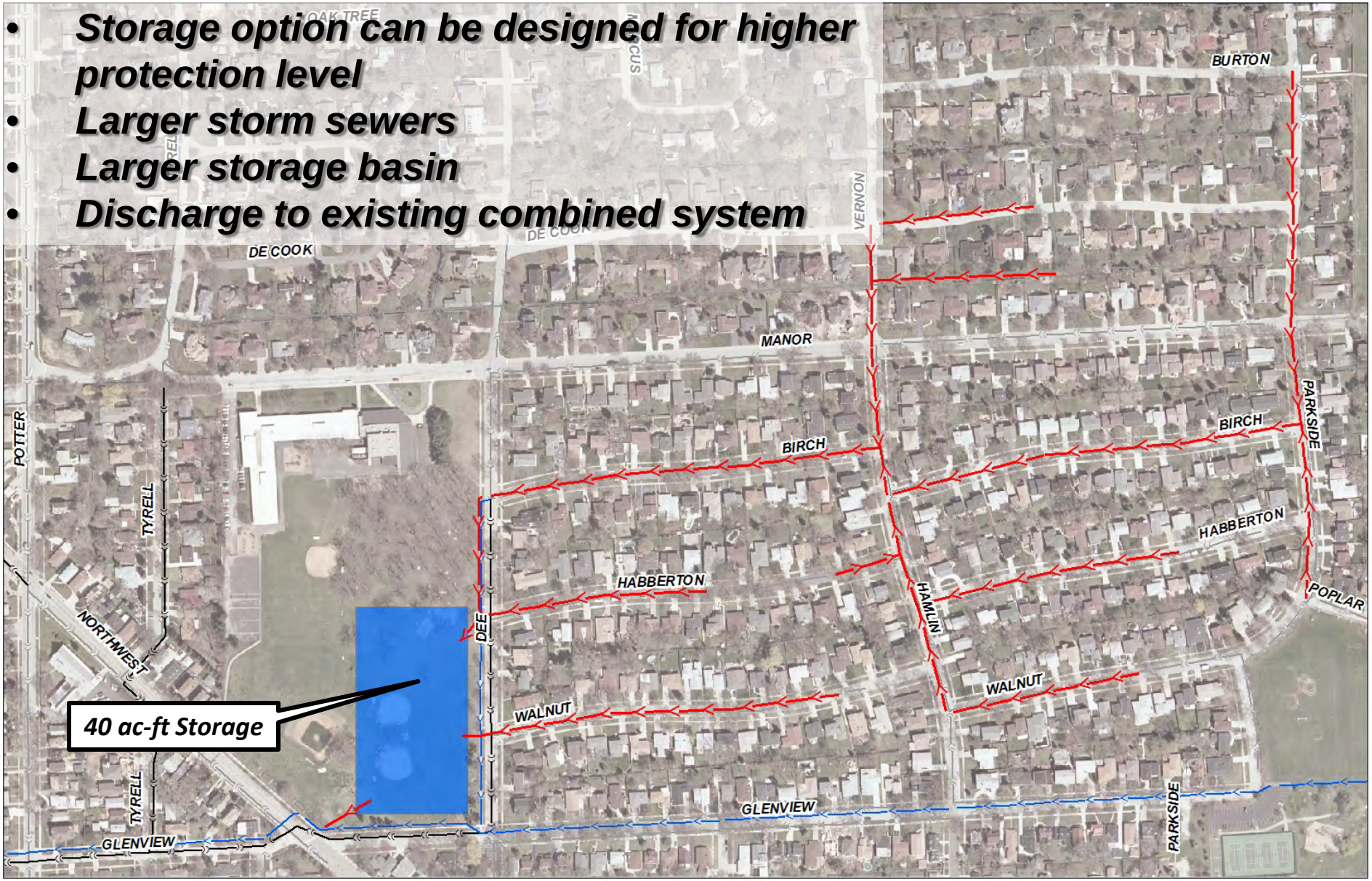
Feasibility Concept #2 – 10YR

- *"Storage Option"*
- *No new outfall to river*
- *Discharge to existing combined system*
- *Need large storage basin to hold runoff*
- *Same benefits as Concept #1 (river outfall)*
  - *406 total properties*



Feasibility Concept #2 – 100YR

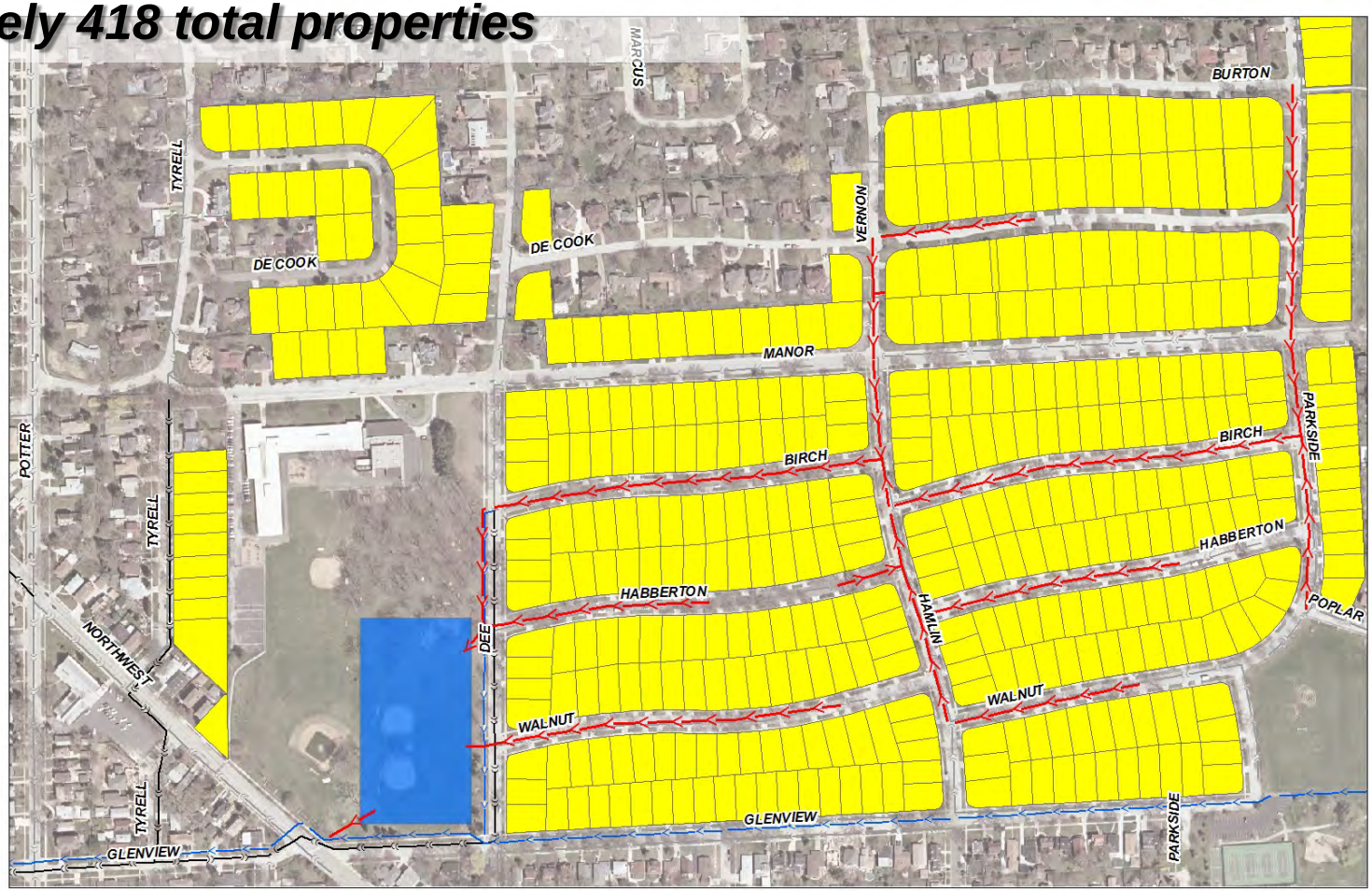
- Storage option can be designed for higher protection level
- Larger storm sewers
- Larger storage basin
- Discharge to existing combined system



Feasibility Concept #2 – 100YR

Benefits

- Reduction in 10-yr HGL
- Elimination of ponding in 100-yr storm
- Approximately 418 total properties



Feasibility Concept #2

- Storage can be created in 2 general ways
  - Underground
  - Surface

Feasibility Concept #2

- **Underground Storage**
  - Large concrete vaults
  - Very expensive
    - +/- $350,000 per ac-ft
- **10-Yr Storage** *(storage only)*
  - +/- $5.3 million
- **100-Yr Storage** *(storage only)*
  - +/- $14 million

Feasibility Concept #2

- Surface Storage
  - Excavated basin
  - Much less expensive
    - +/- $60,000 per ac-ft
- Shape and footprint can be varied
  - 10ac @ 4’ deep
  - 4ac @ 10’ deep

Feasibility Concept #2

Estimated Cost

- Assumed surface storage
- 10YR Protection = $11.4M
- 100YR Protection = $16.6M

Permitting/Approvals

- ***MWRD***
  - ***General sewer construction***
  - ***Potential easement areas at Sibley Pump Station***
- ***IDOT***
  - ***Crossings at Oakton & NW Highway***
- ***IDNR-OWR***
  - ***Construction/discharge into Des Plaines River***
- ***Railroad Crossing***
- ***FPDCC***
  - ***Will need permission/easements for pipe to River***
- ***Park District***

Northwest Park - Summary

- **Option #1 – Outfall to River**
  - Technically Feasible
  - Would need permission from Forest Preserve
  - Maximum 10-yr protection
  - 406 property benefits
  - Cost = $24.3M
- **Option #2 – Storage in Park**
  - Technically Feasible
  - Would need agreement with Park District
  - Can achieve greater protection level
  - 10-yr Protection Cost = $11.4M
  - 100-yr Protection Cost = $16.6M

Northwest Park - Summary

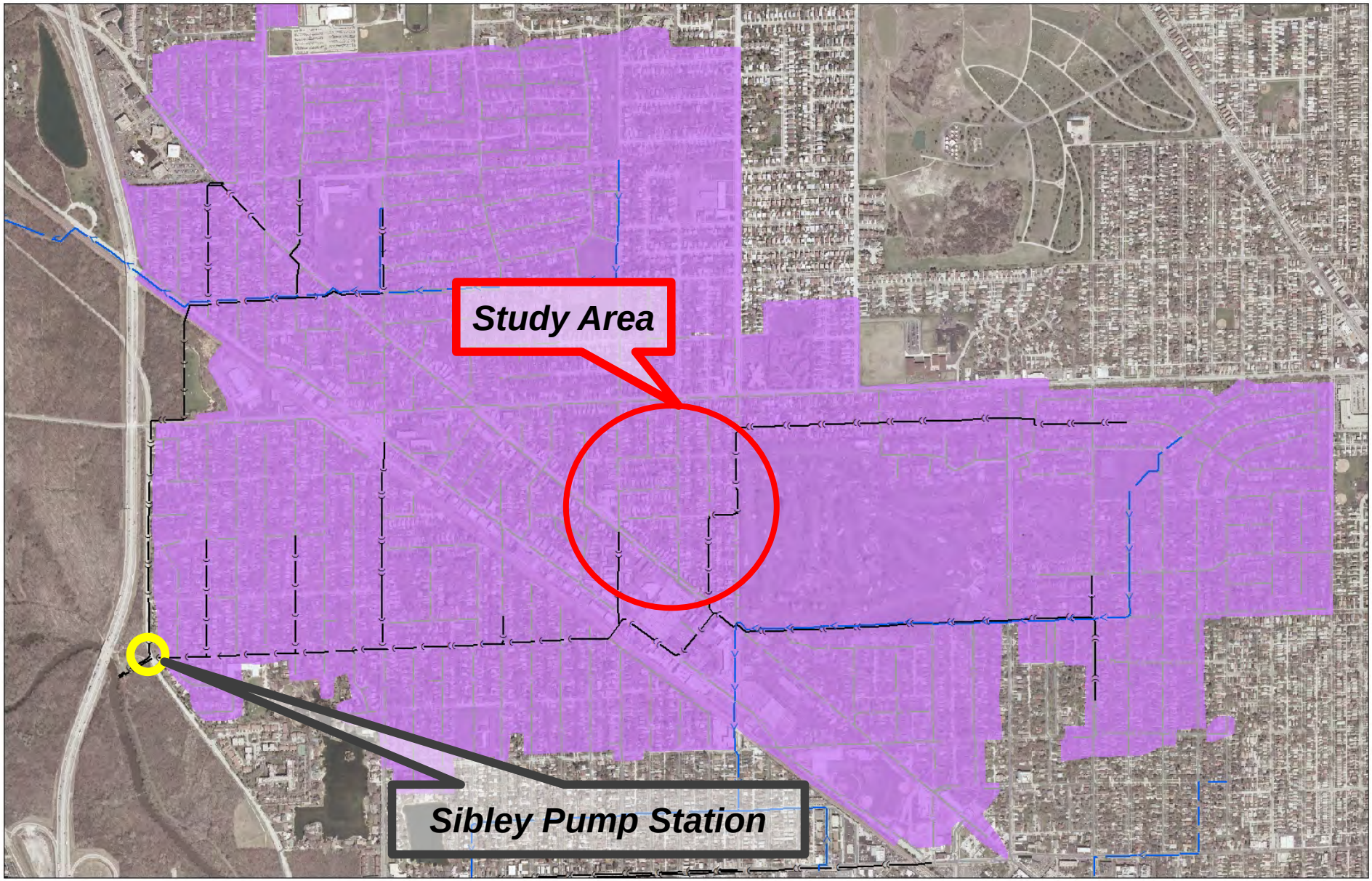
- **Option #1 – Outfall to River**
  - 10-yr Protection Cost = $24.3M
- **Option #2 – Storage in Park**
  - 10-yr Protection Cost = $11.4M
  - 100-yr Protection Cost = $16.6M
- **Underground Storage in Park**
  - 10-yr Protection Cost = +/- $16M
  - 100-yr Protection Cost = +/- $28M


Park Ridge Country Club Area

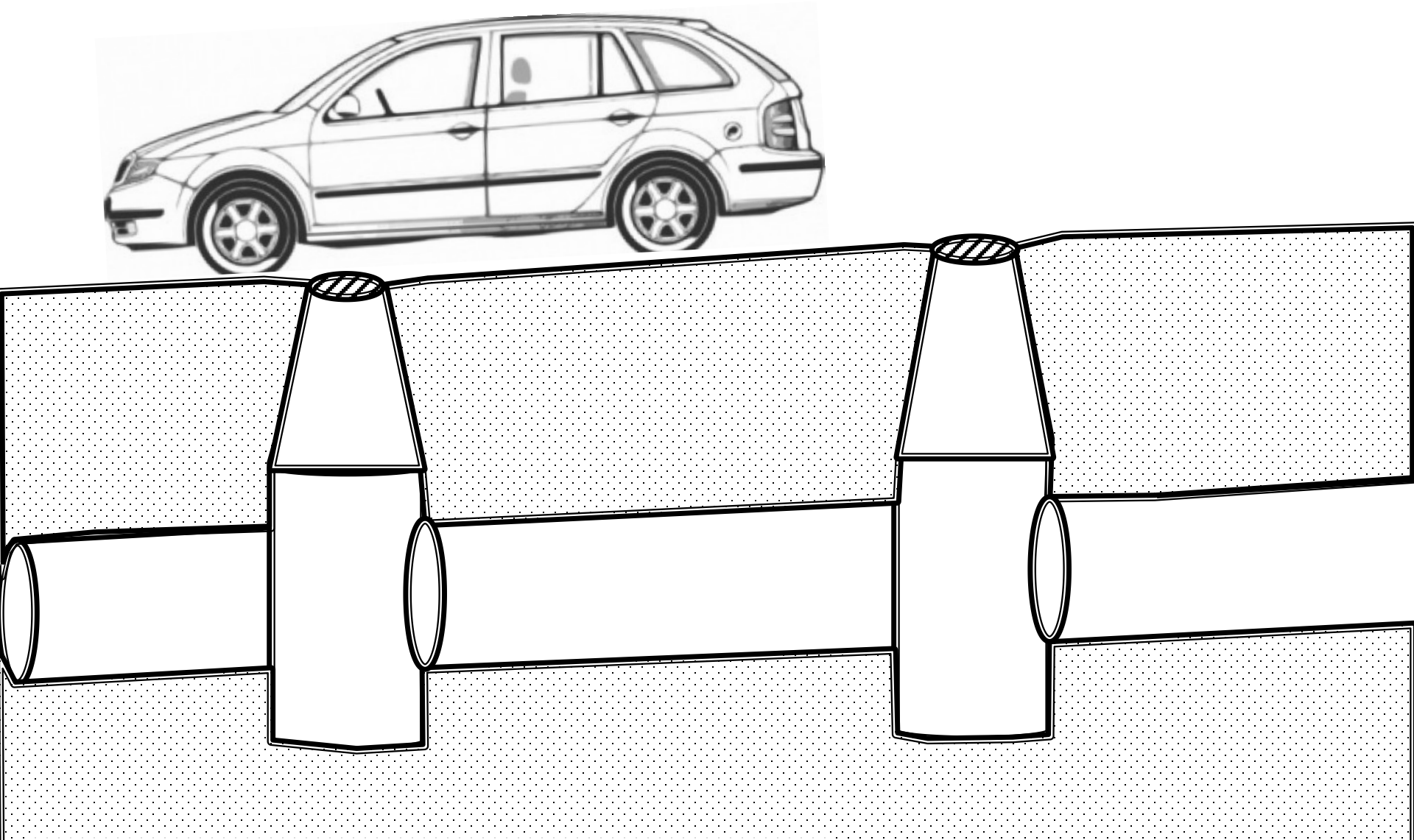
Study Area


Why does it flood here?
MARGUERITE
HAMLIN
OAKTON
RENE
BEAU
RENE
CLIFTON
ALLEY
FAIRVIEW
EDGEMONT
SHIBLEY
SEELEY
WILKINSON
TOMAWADEE
LAVERNE
LINCOLN
GREENWOOD
CYNTHIA
LAHON
SEMINARY
NORTHWEST
MARVIN
BUSSE
WESTERN
HOME
SIBLEY
ALDINE
DELPHIA
HASTINGS

Watershed Area



Hydraulic Gradeline



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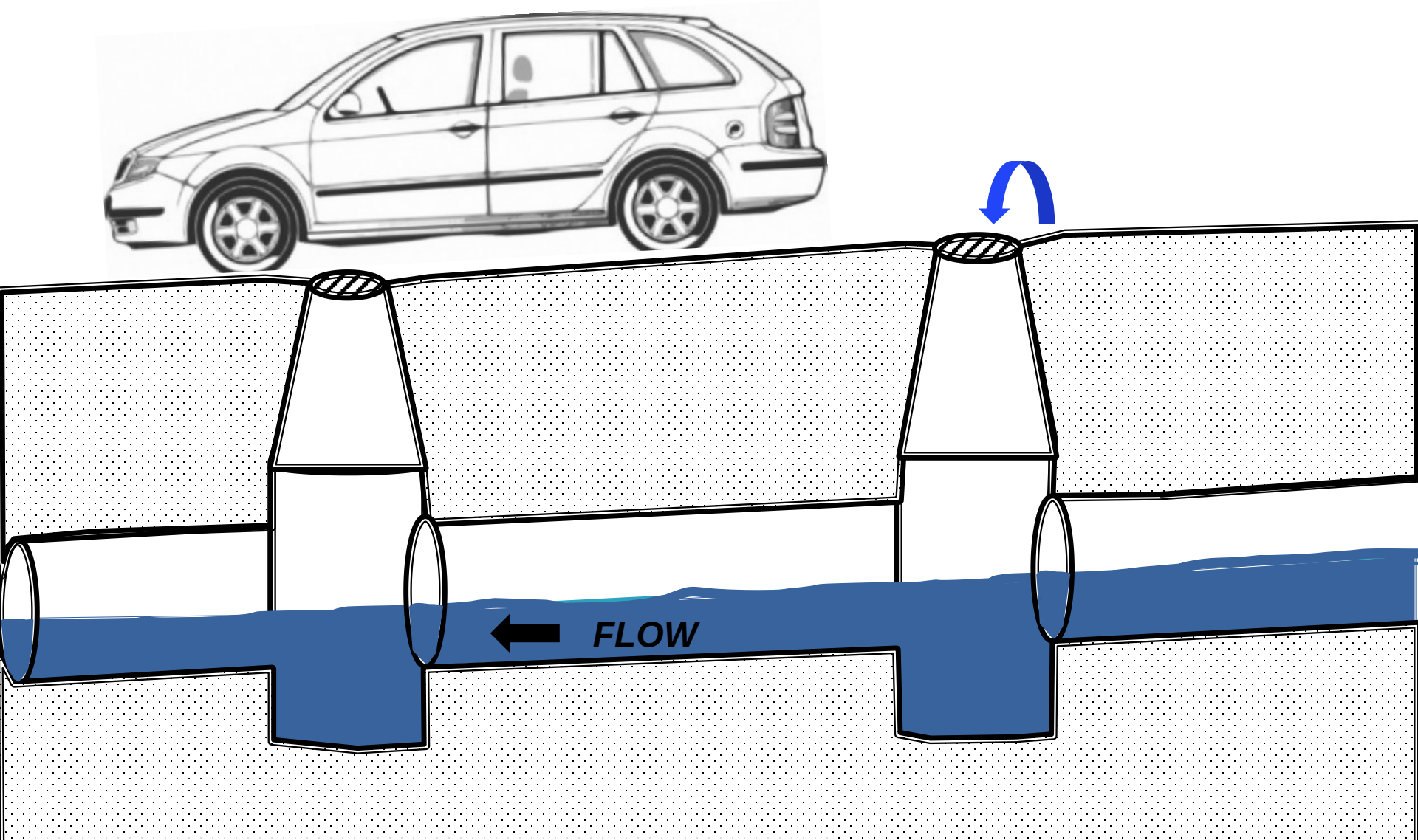

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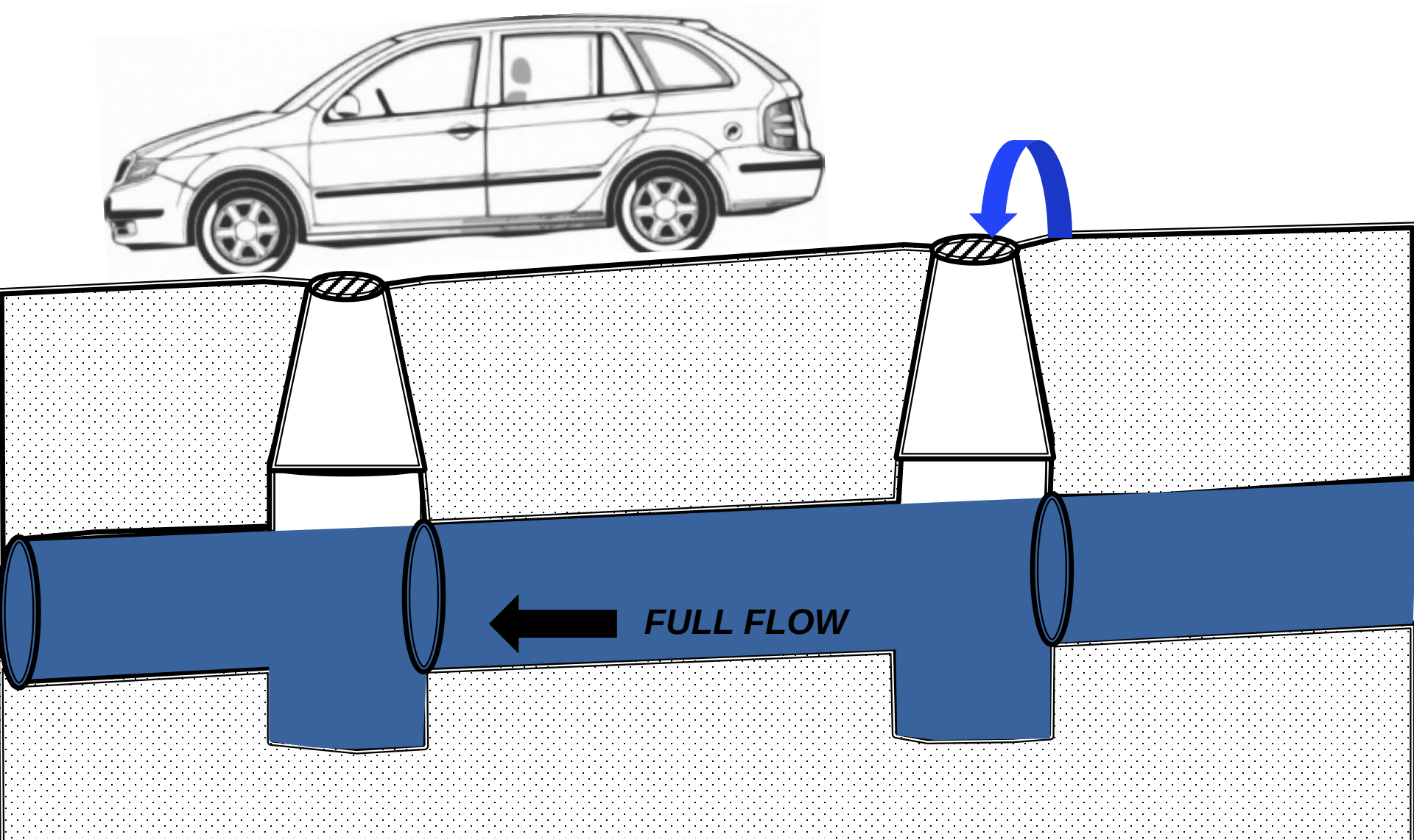

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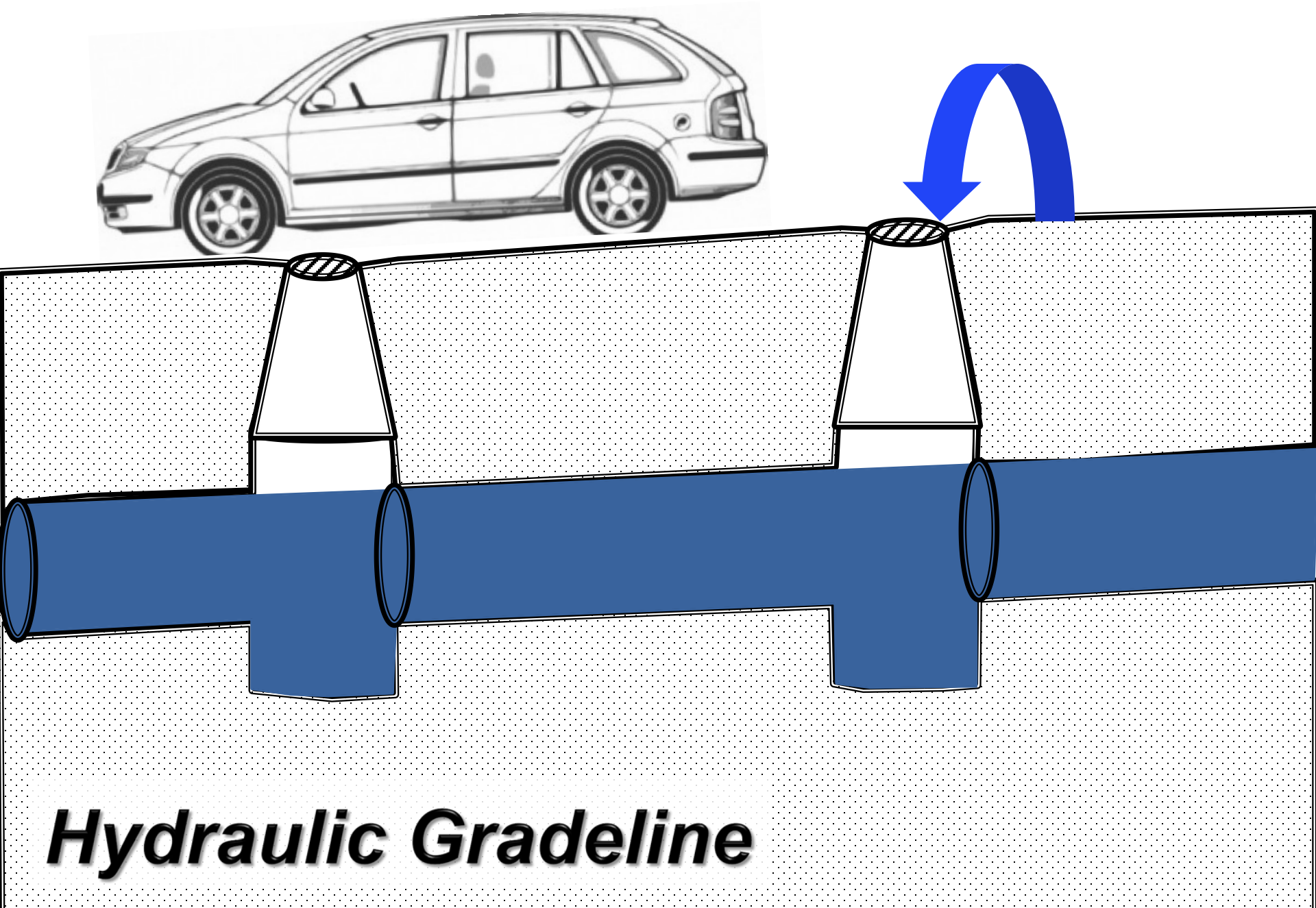

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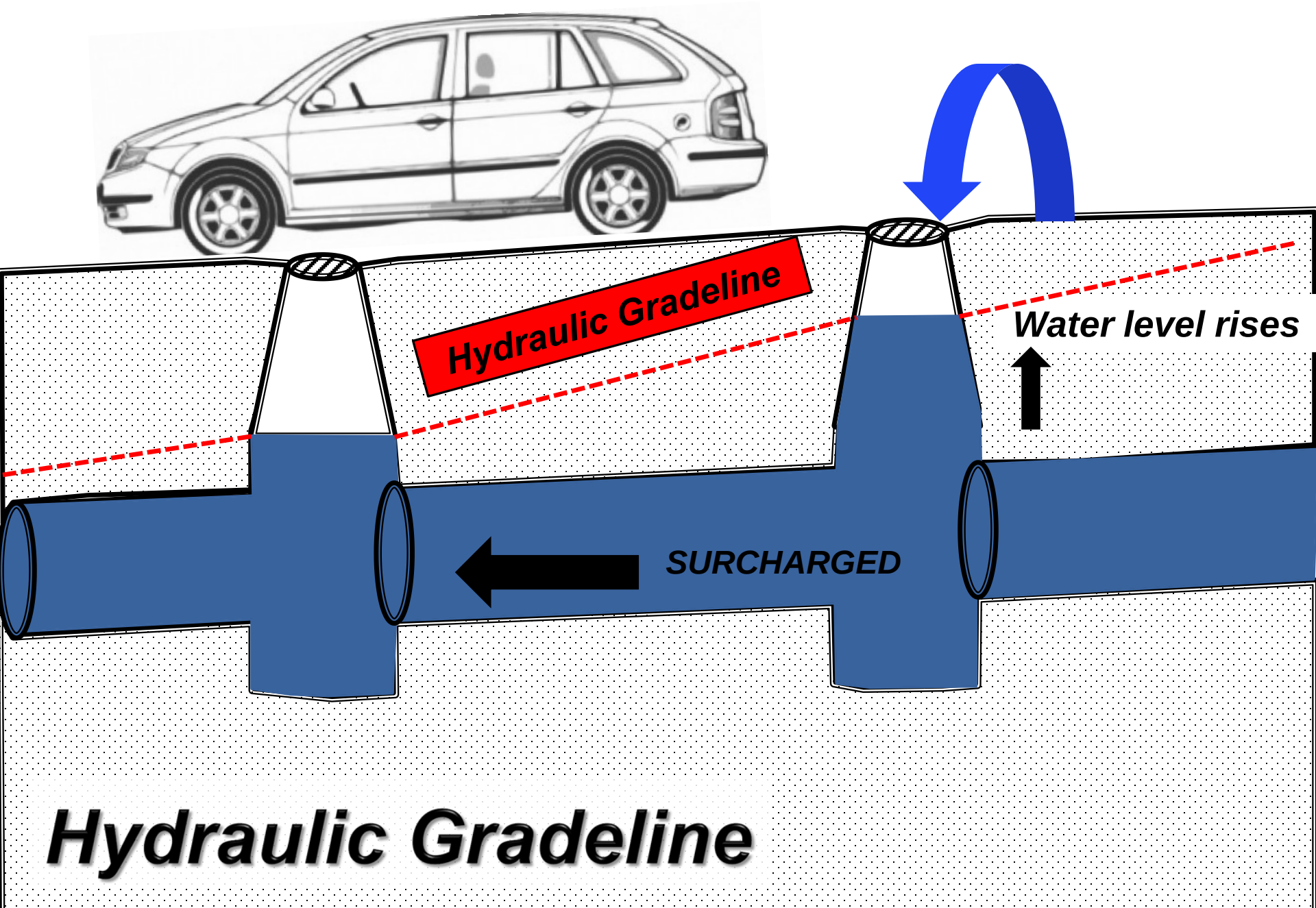

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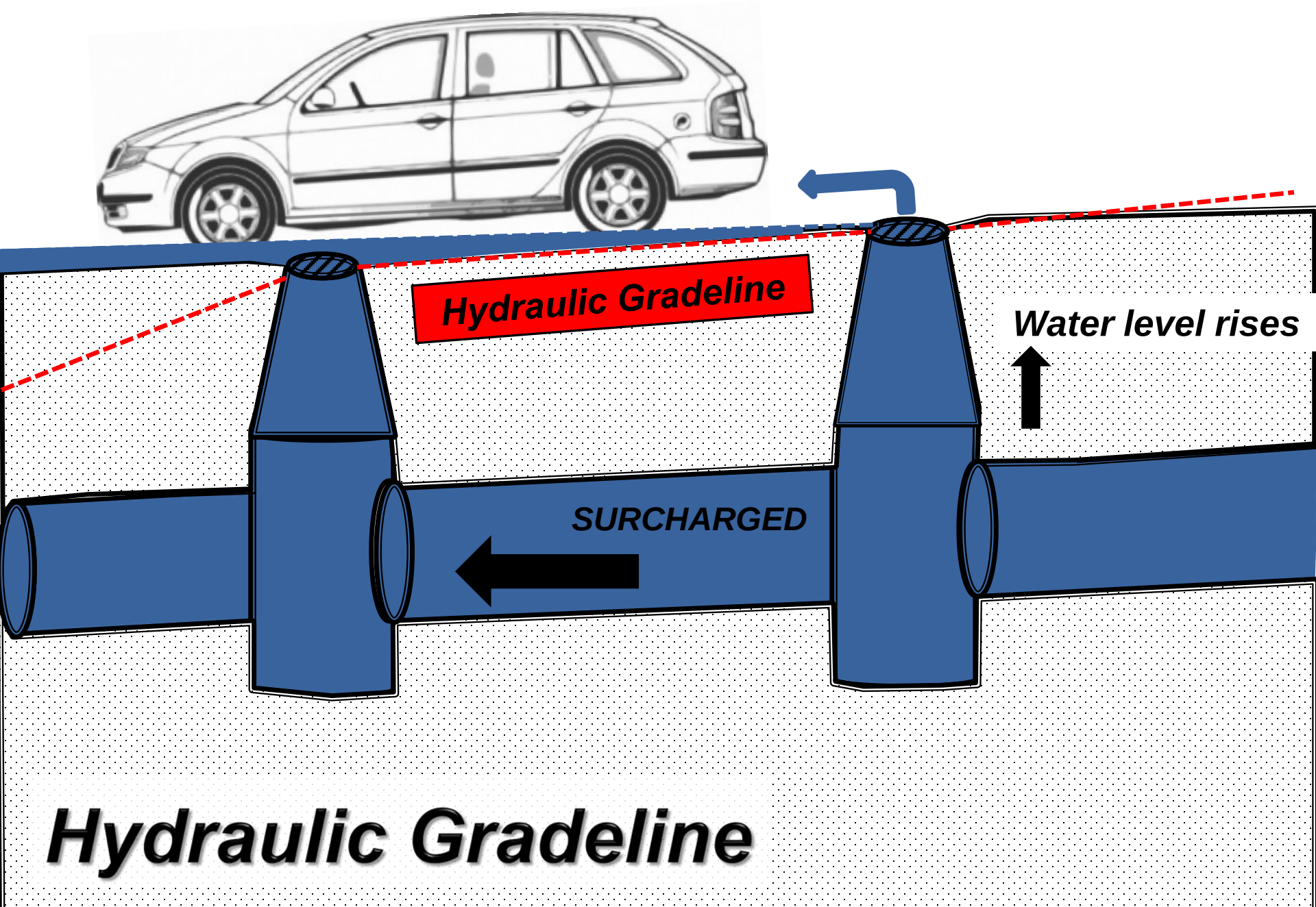

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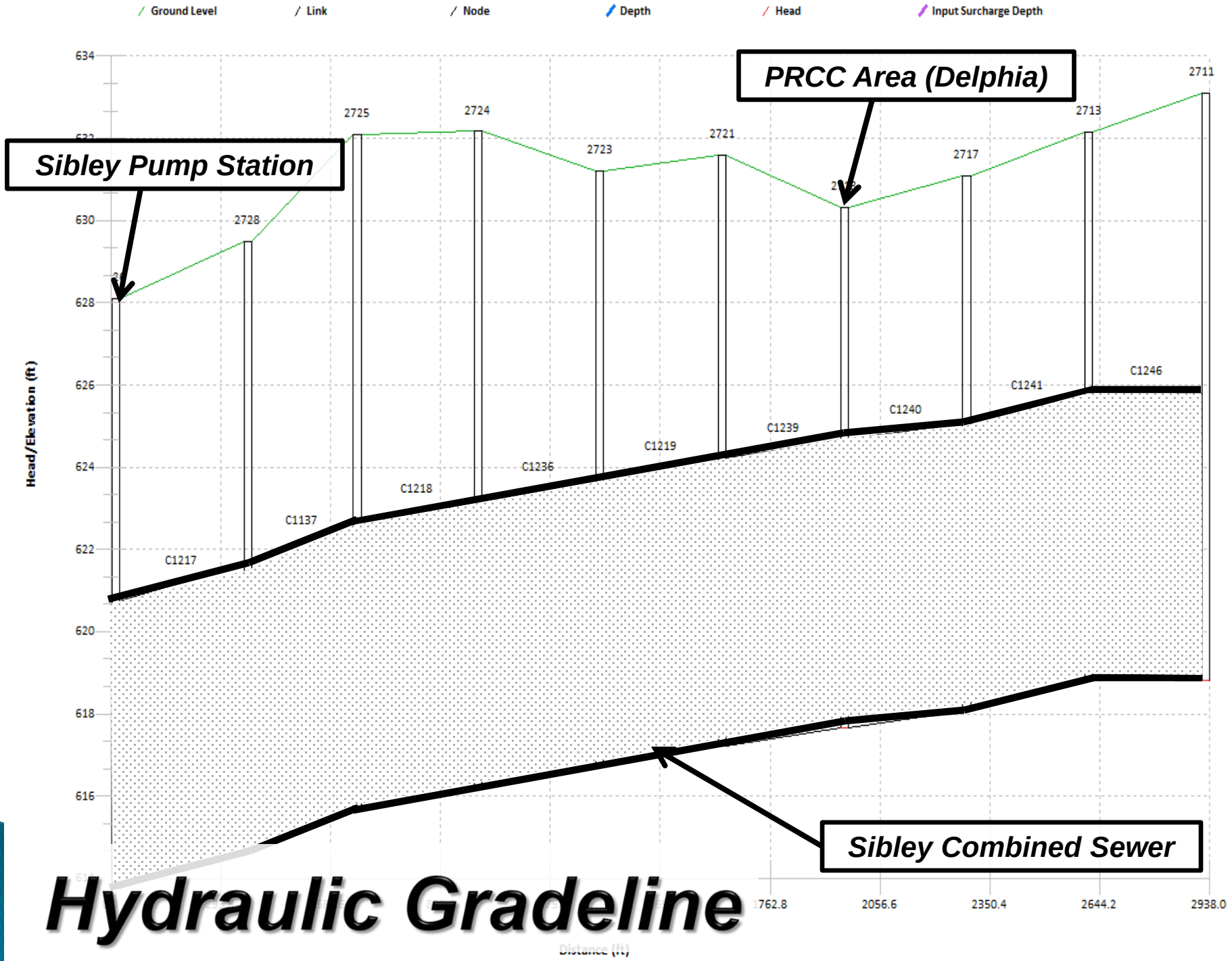

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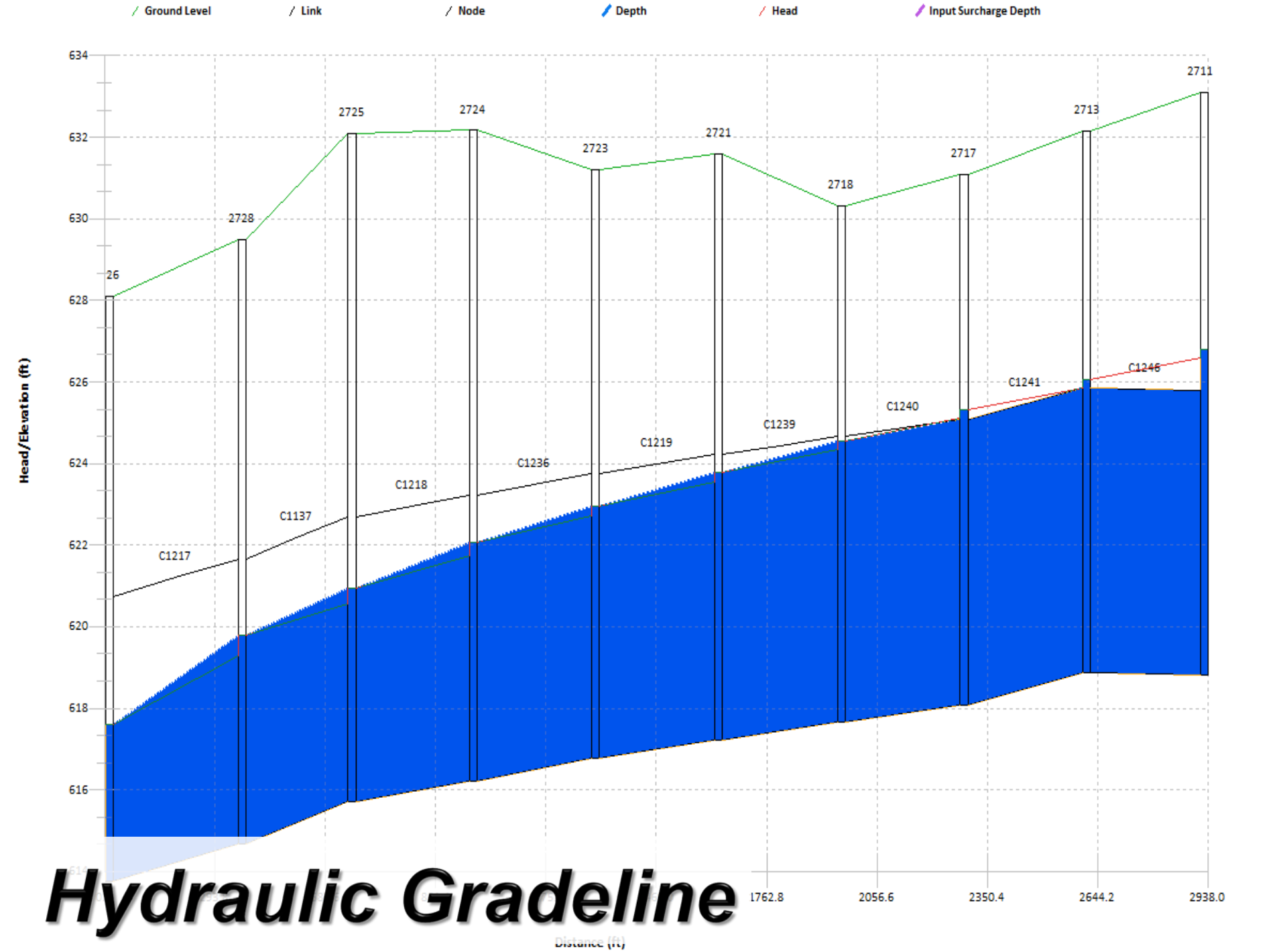

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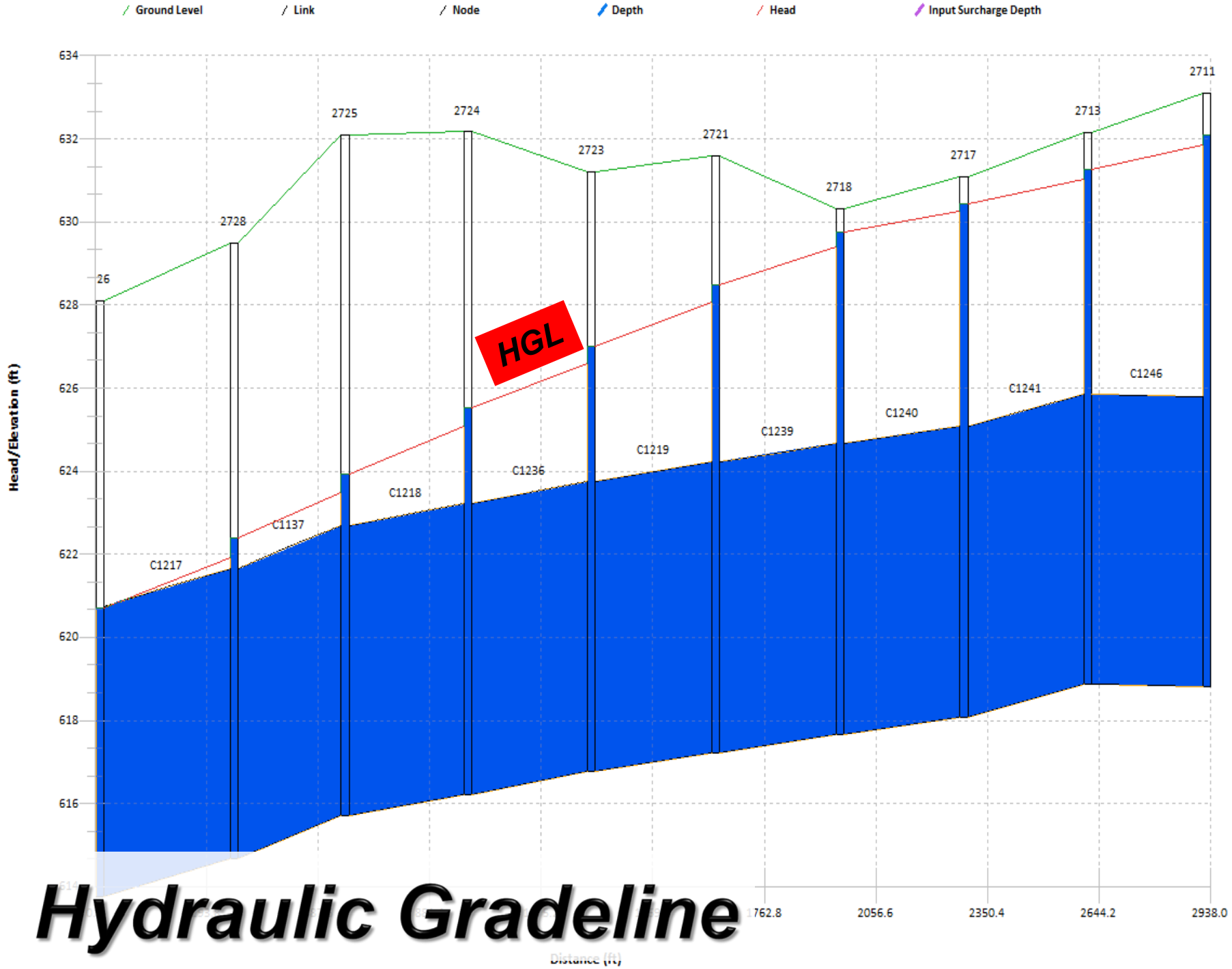

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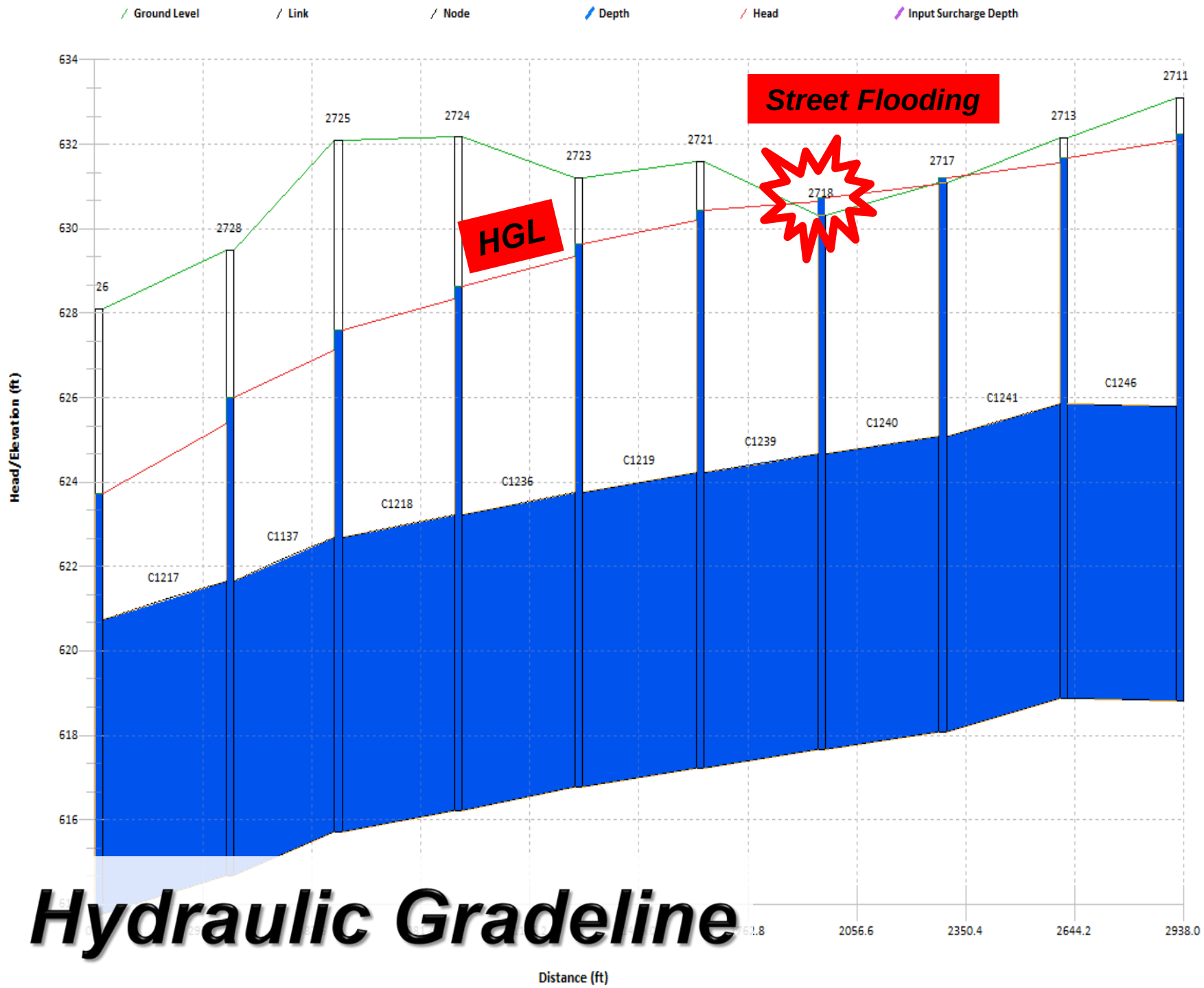
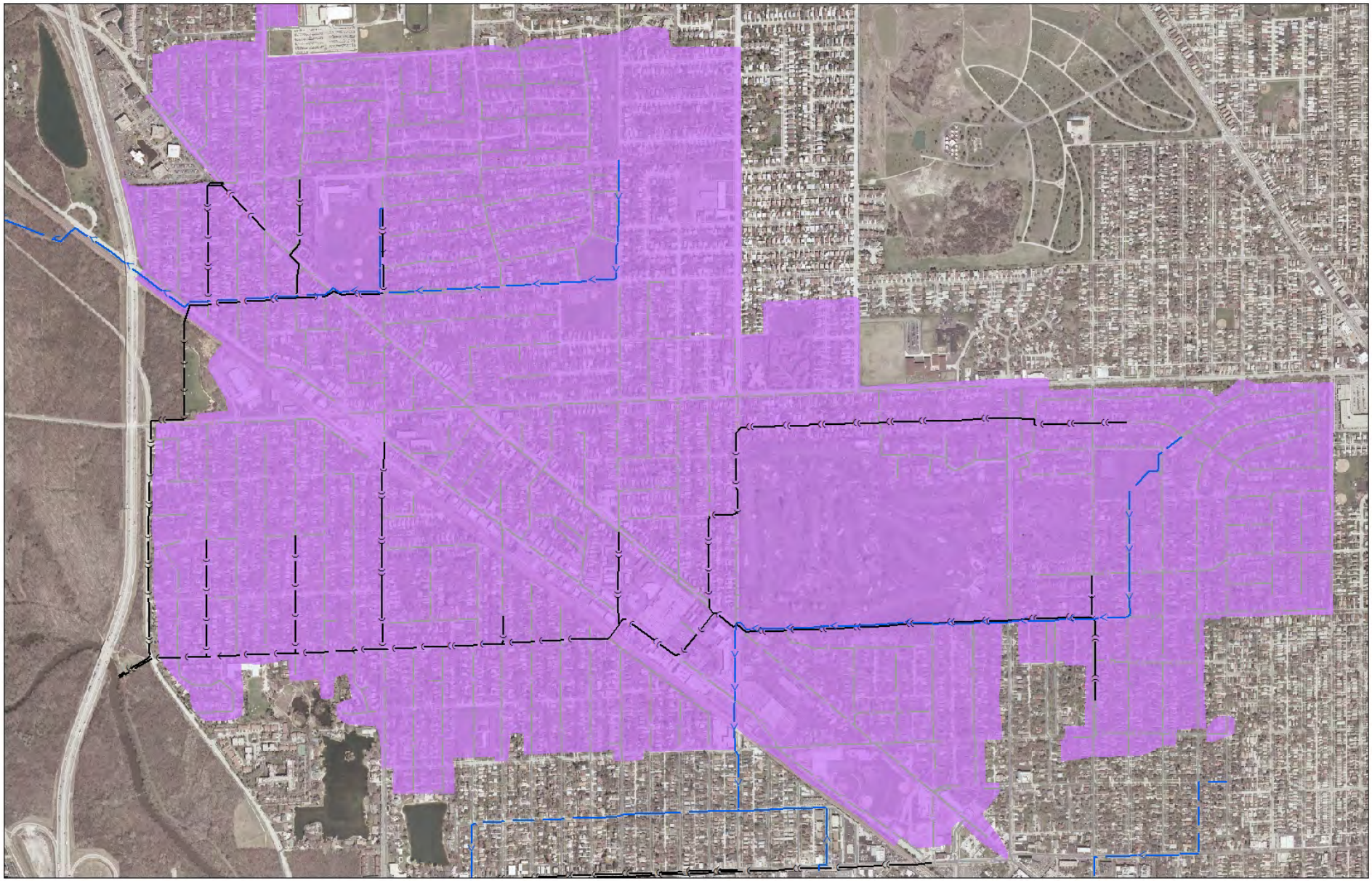
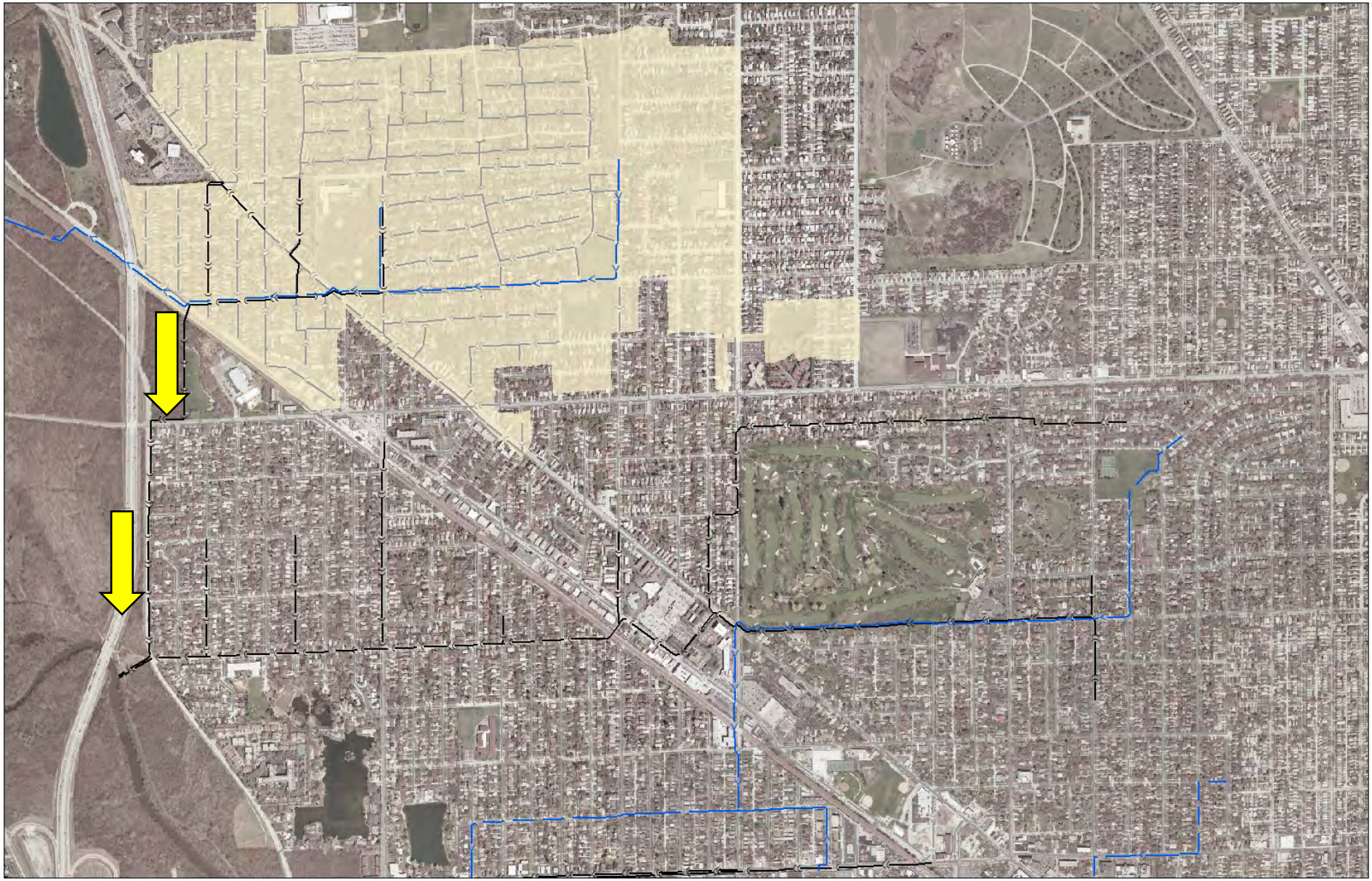


Hydraulic Gradeline

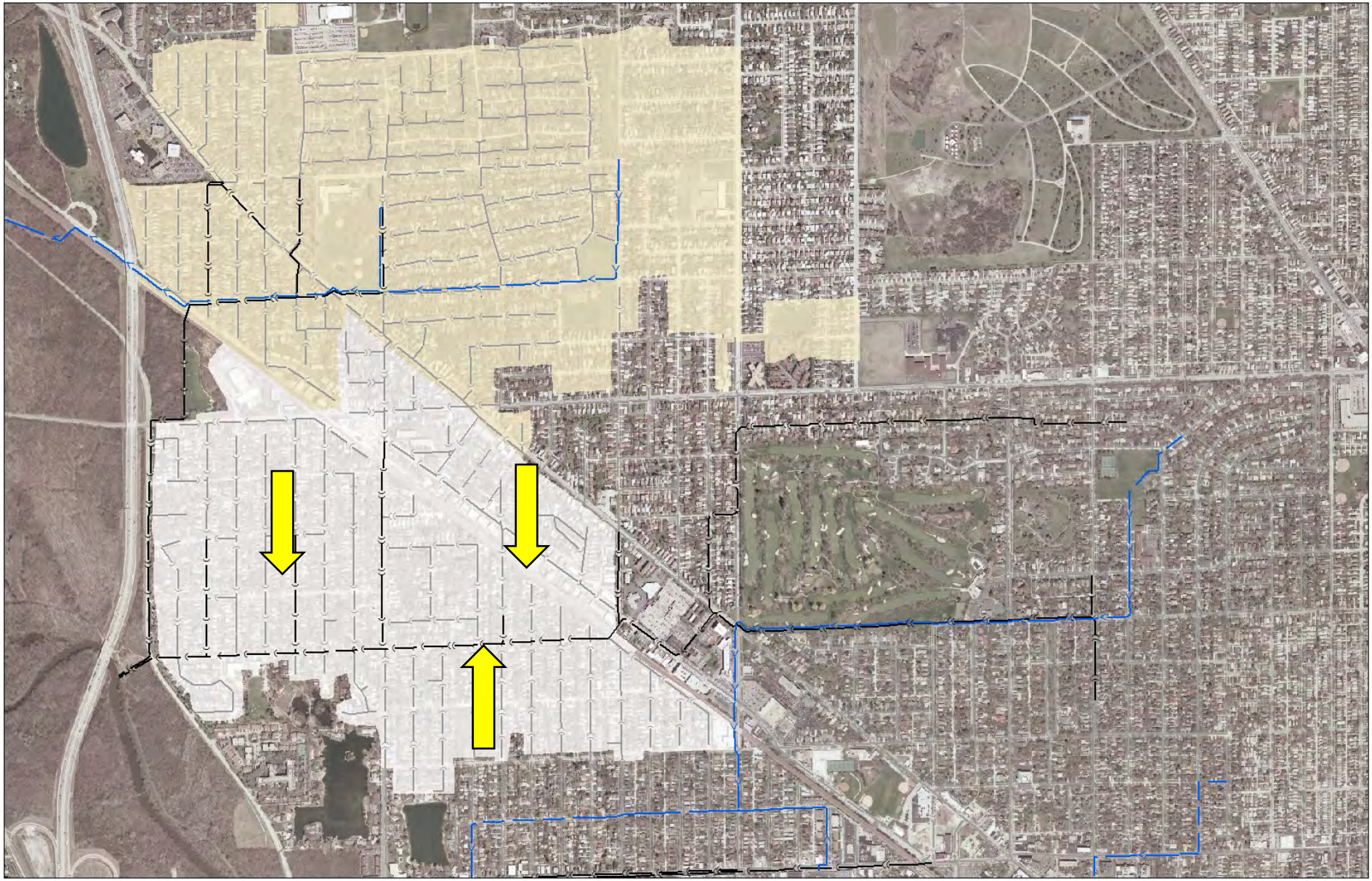
Watershed Area



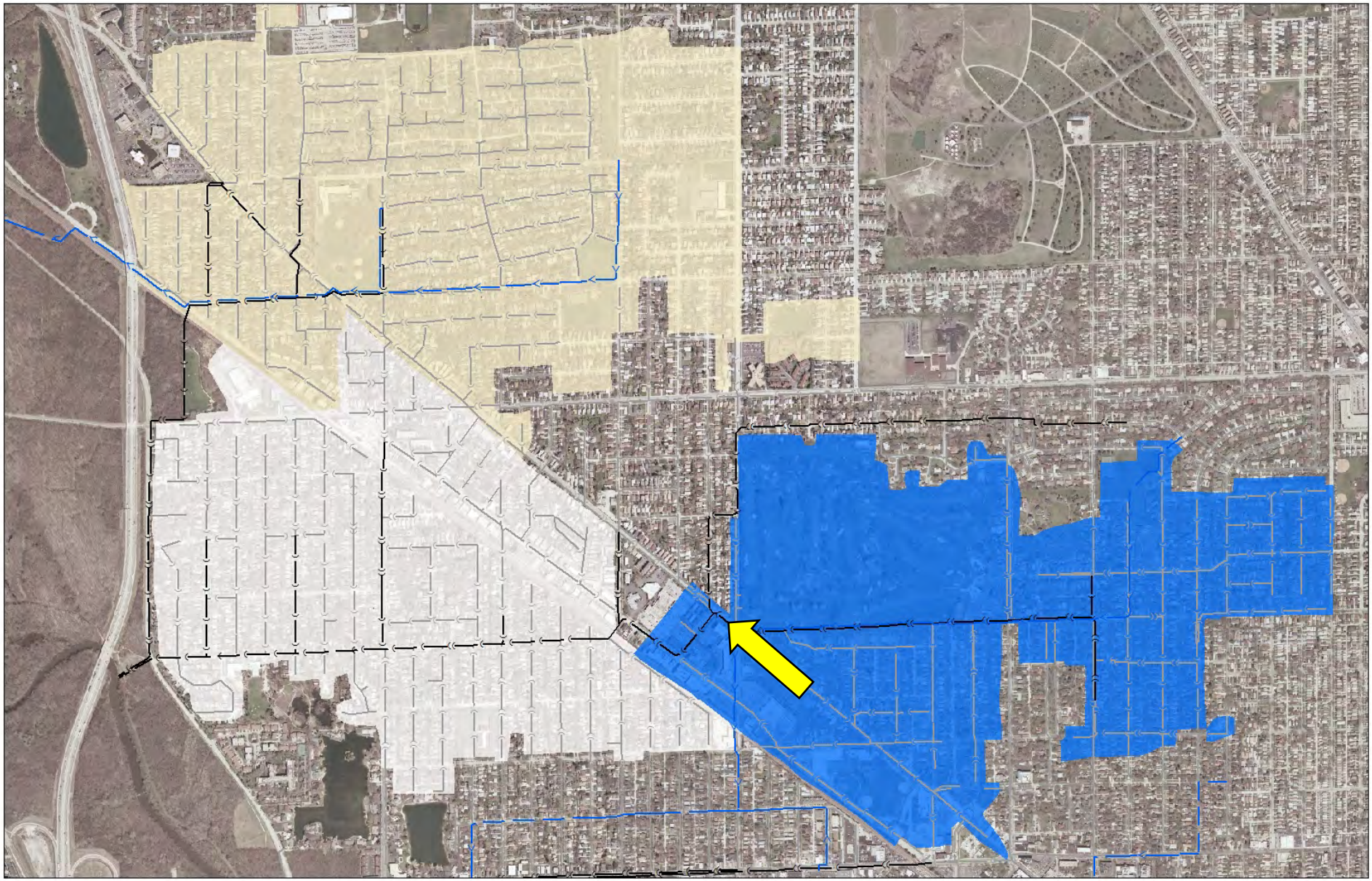
Watershed Area



Watershed Area



Watershed Area



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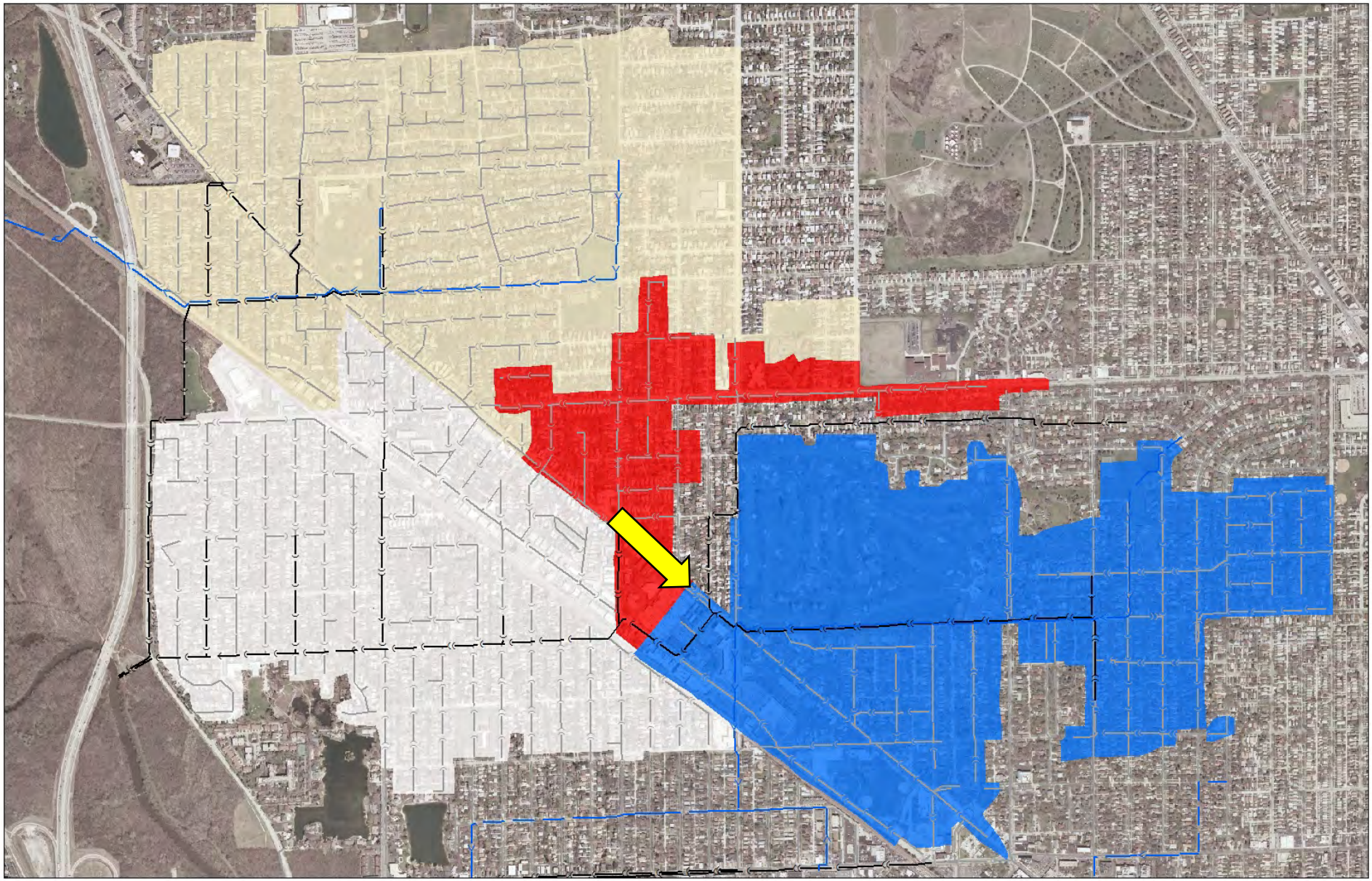
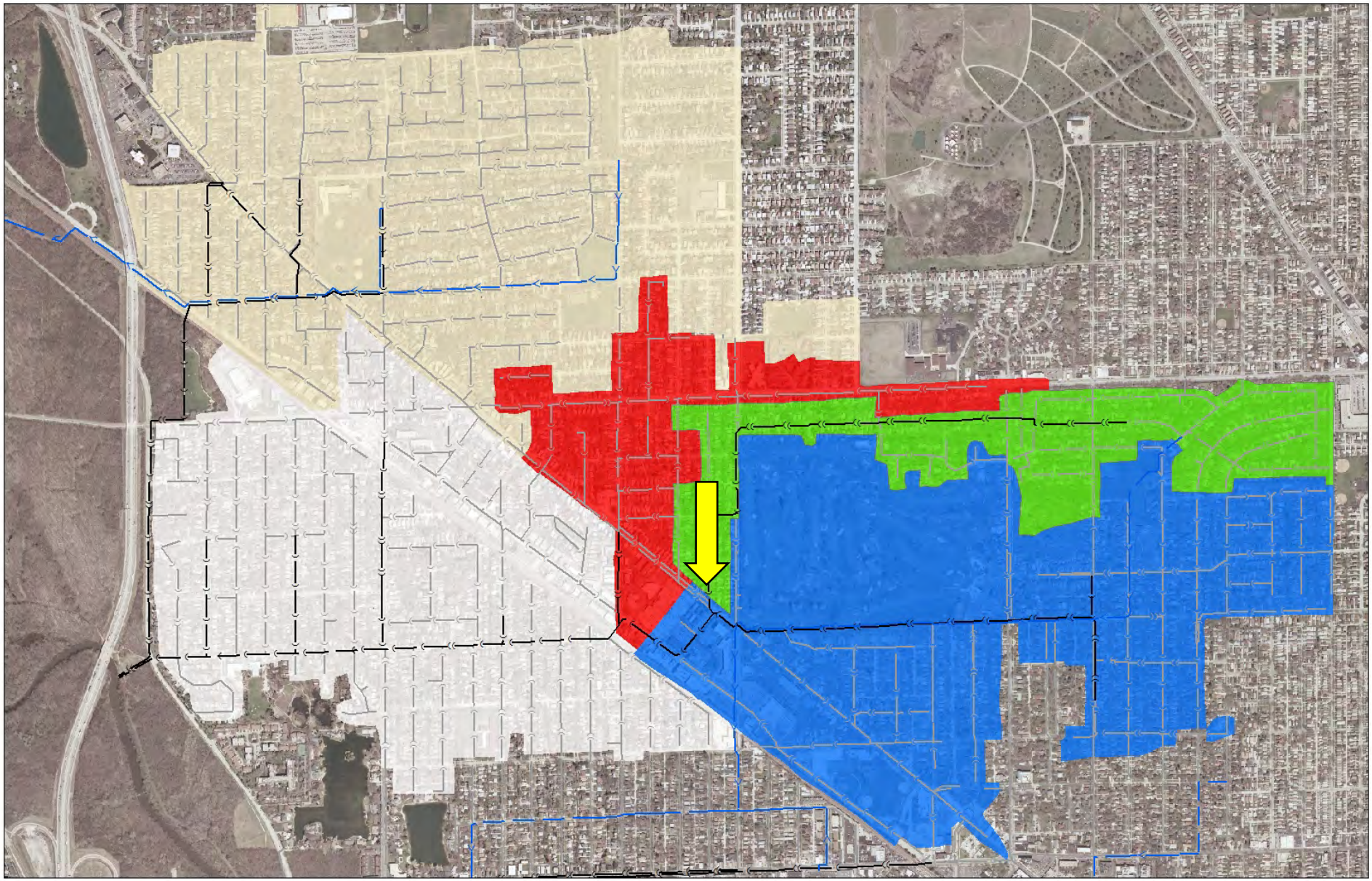
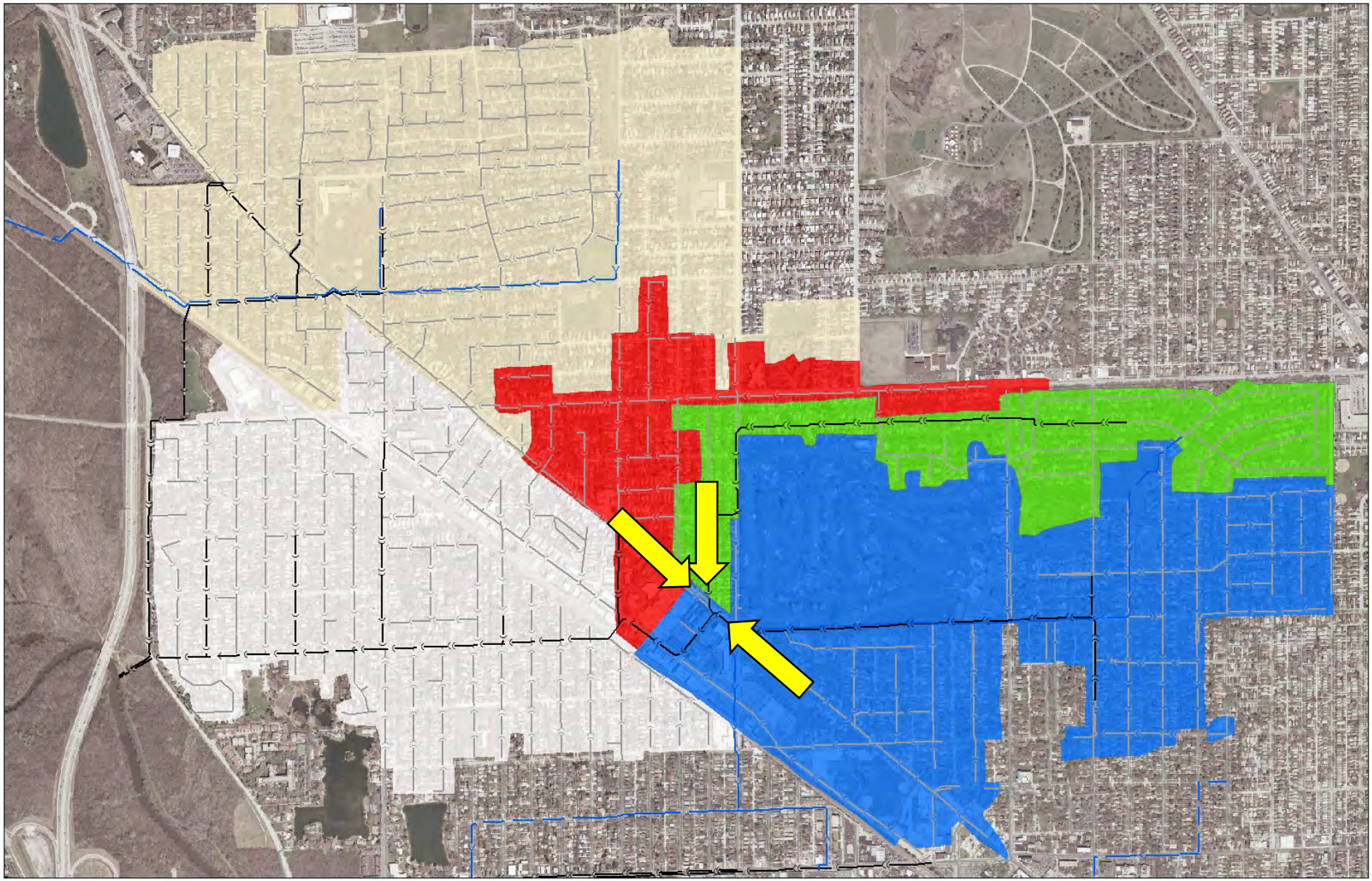


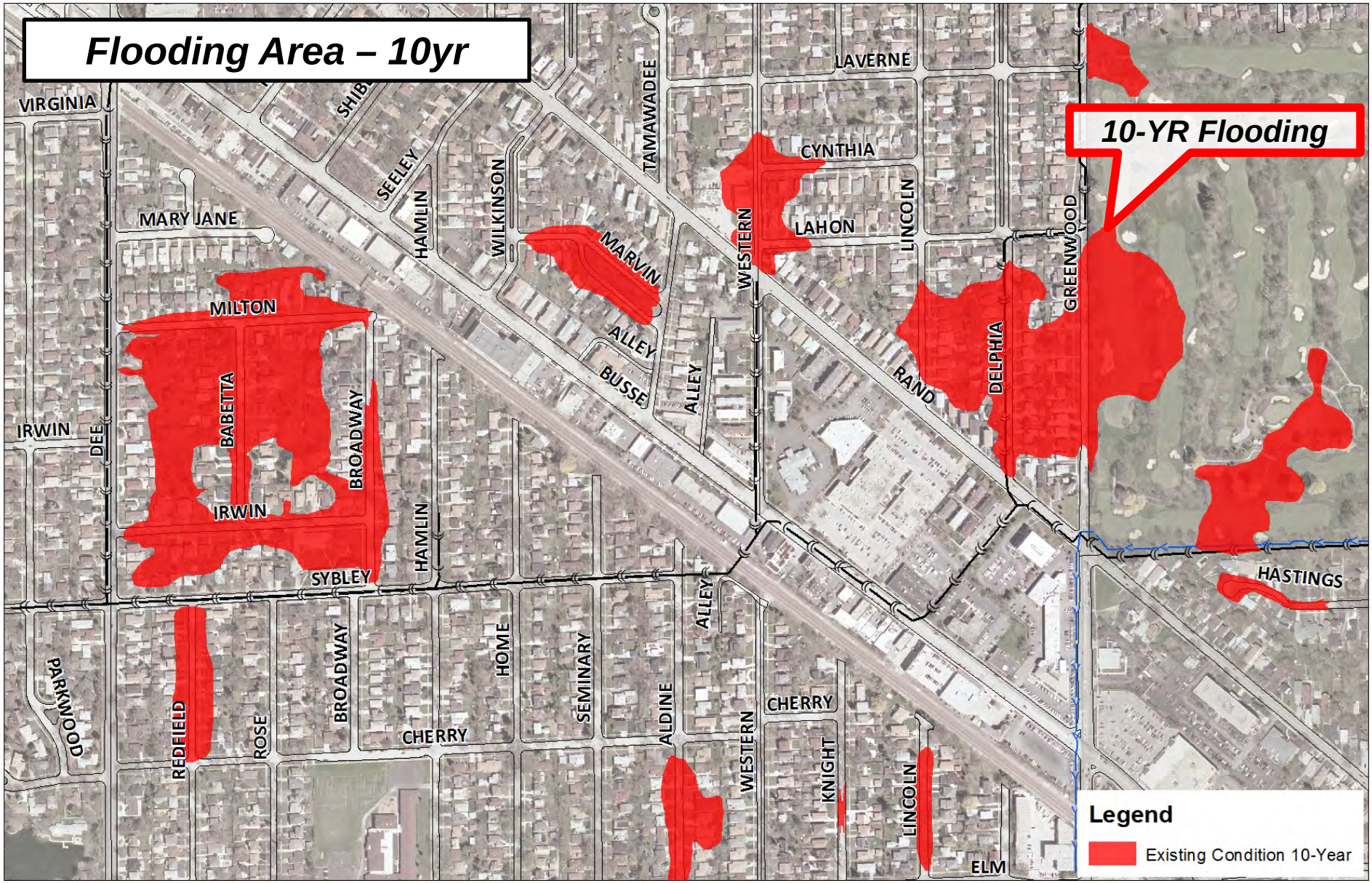
Watershed Area



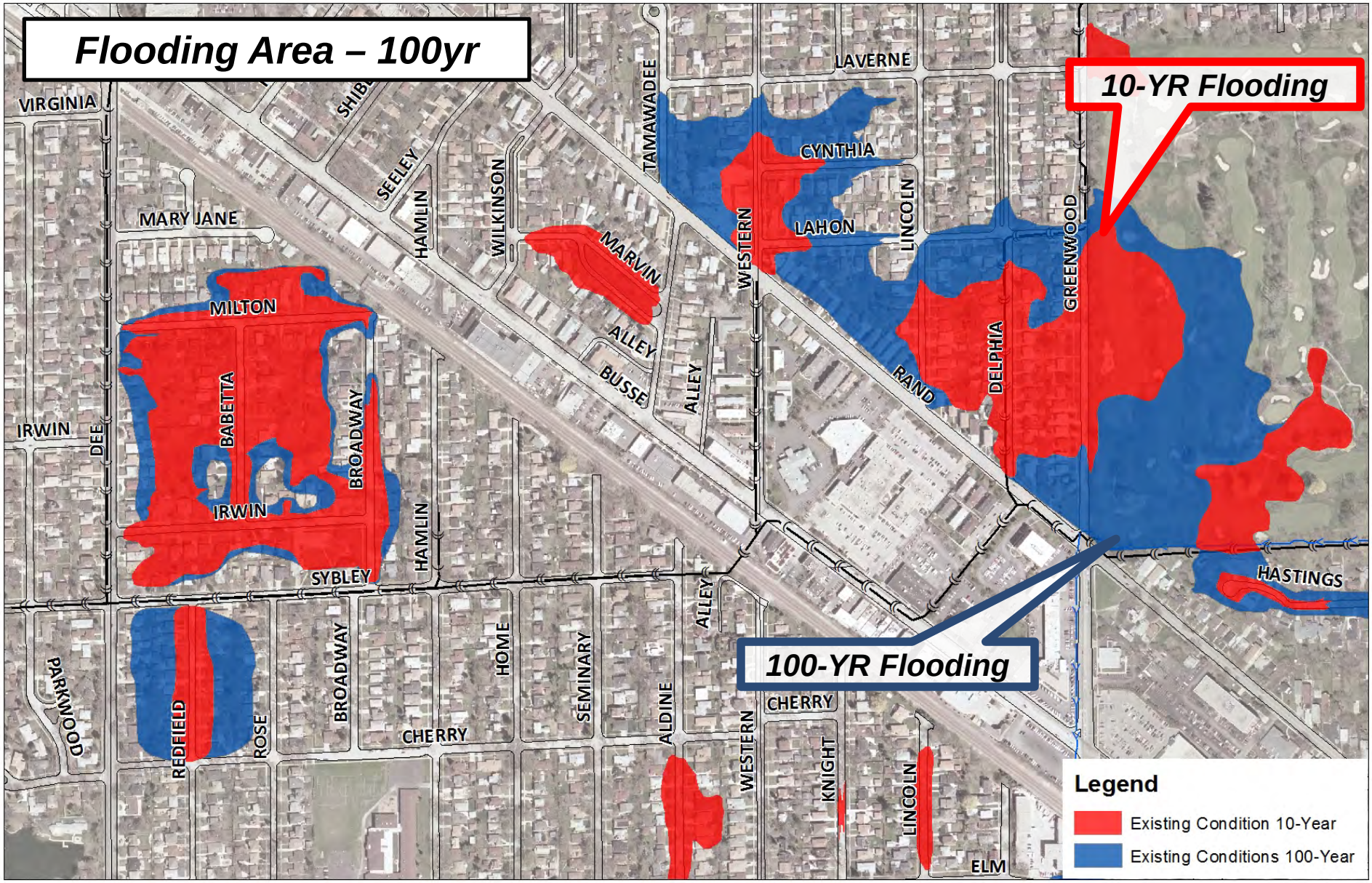
Watershed Area



Existing Conditions

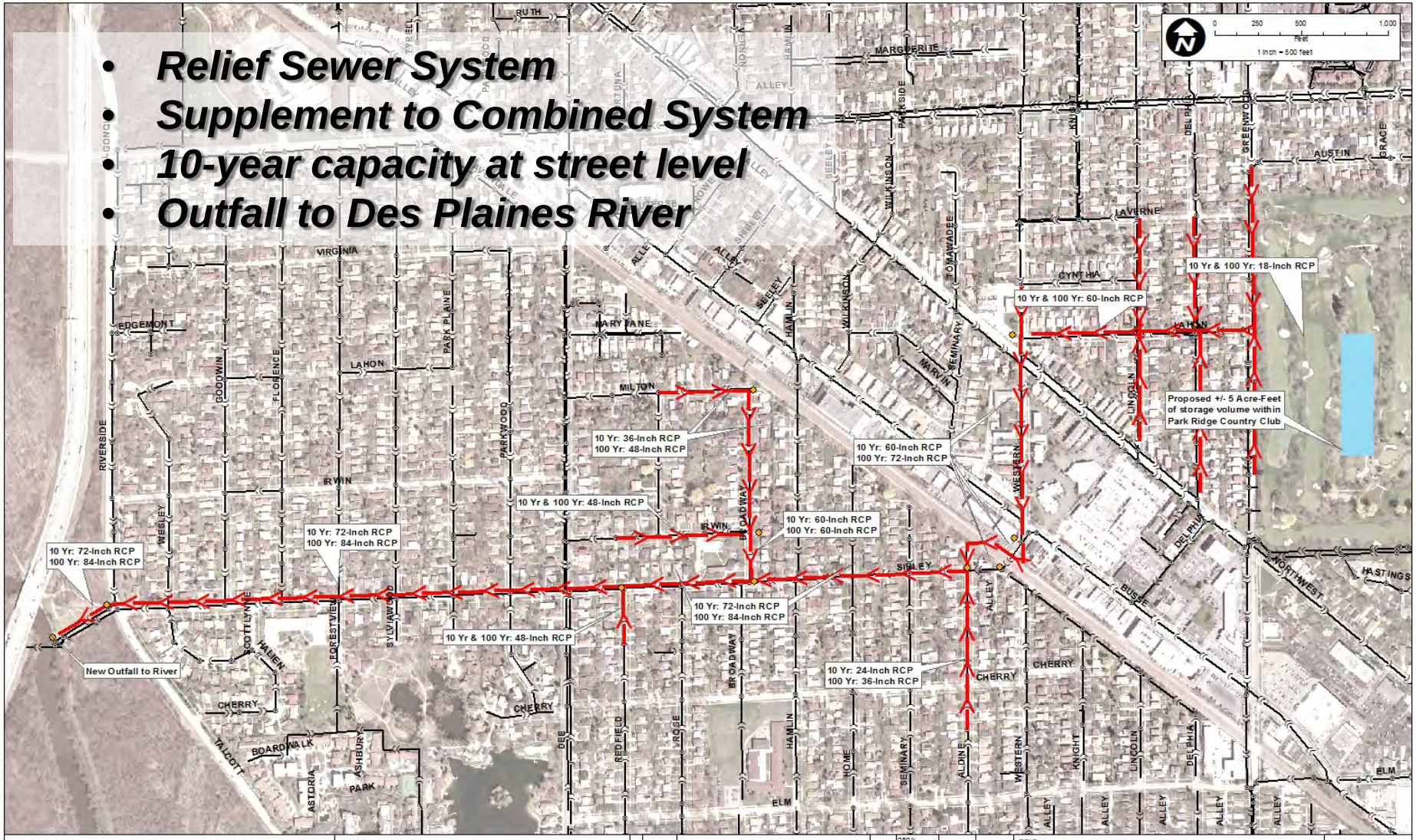


Existing Conditions



Original Concept

- *Relief Sewer System*
- *Supplement to Combined System*
- *10-year capacity at street level*
- *Outfall to Des Plaines River*



CHRISTOPHER B. BURKE ENGINEERING LTD.
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Rosemont, Illinois 60018
(847) 823-0500

CLIENT: CITY OF PARK RIDGE

NO.	DATE	NATURE OF REVISION

FILE NAME: N:\Park Ridge\120052\Water\Presentation\Exh 18 Area#4 PRCC Vicinity Sibley Relief.mxd

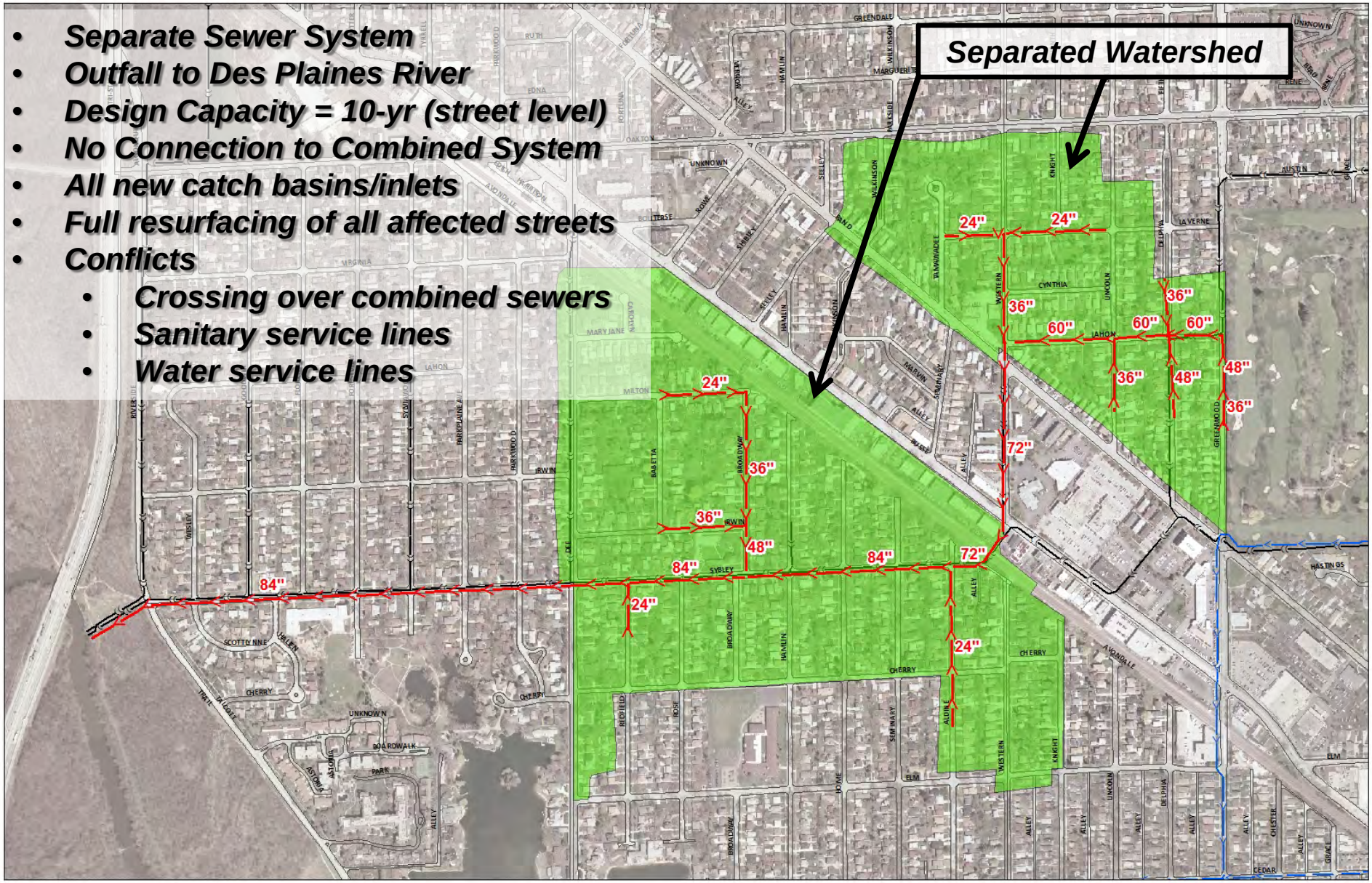
DSGN. | DWN. | CHKD. | SCALE: 1"= | PLOT DATE: | CAD USER: | MODEL:

TITLE: PROPOSED IMPROVEMENTS
AREA #4 - PARK RIDGE COUNTRY CLUB
VICINITY & SIBLEY RELIEF SEWER

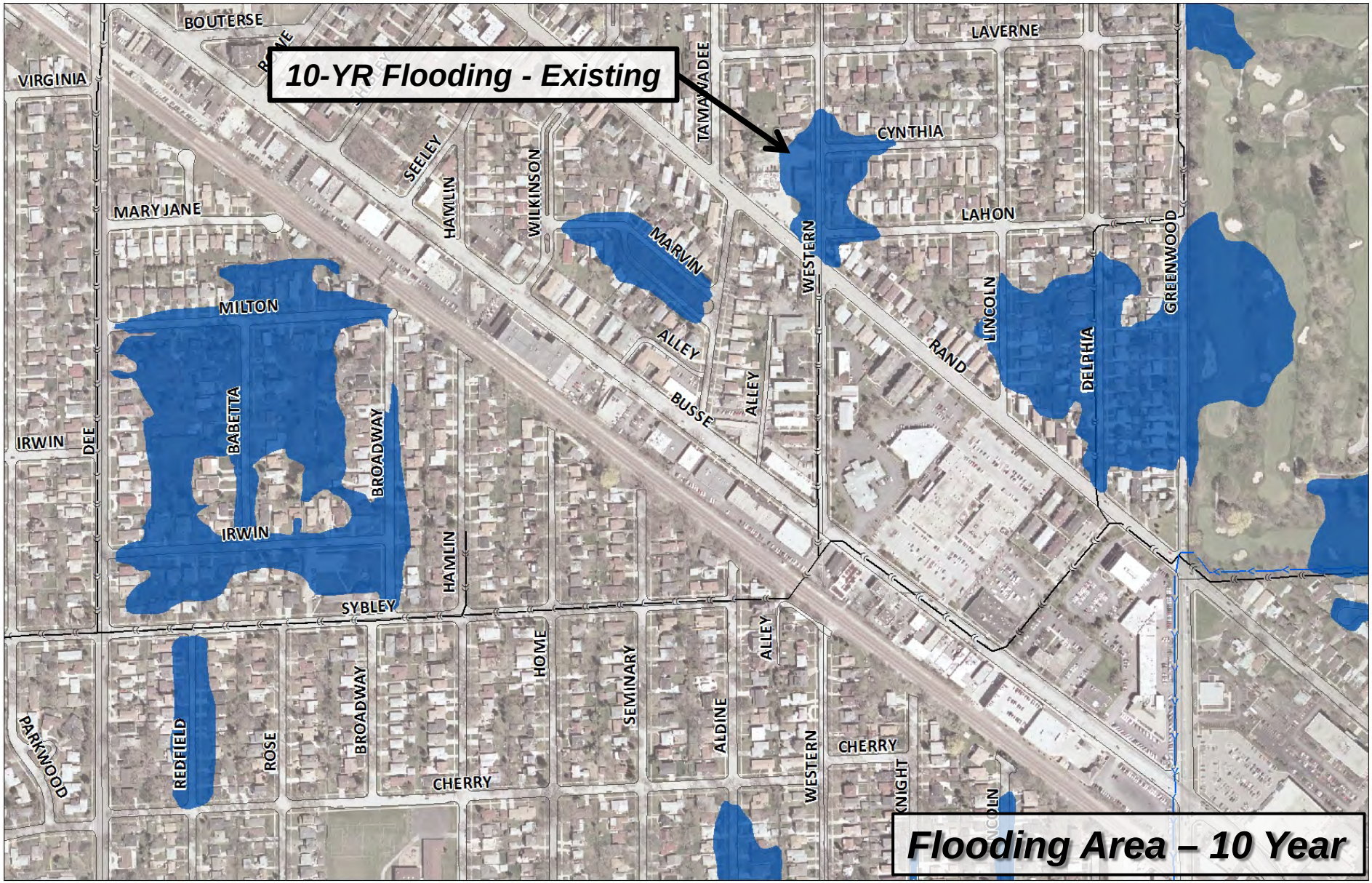
PROJ. NO. 10-019T
DATE:
SHEET 0 OF 0
DRAWING NO.
EXH 18

Feasibility Concept

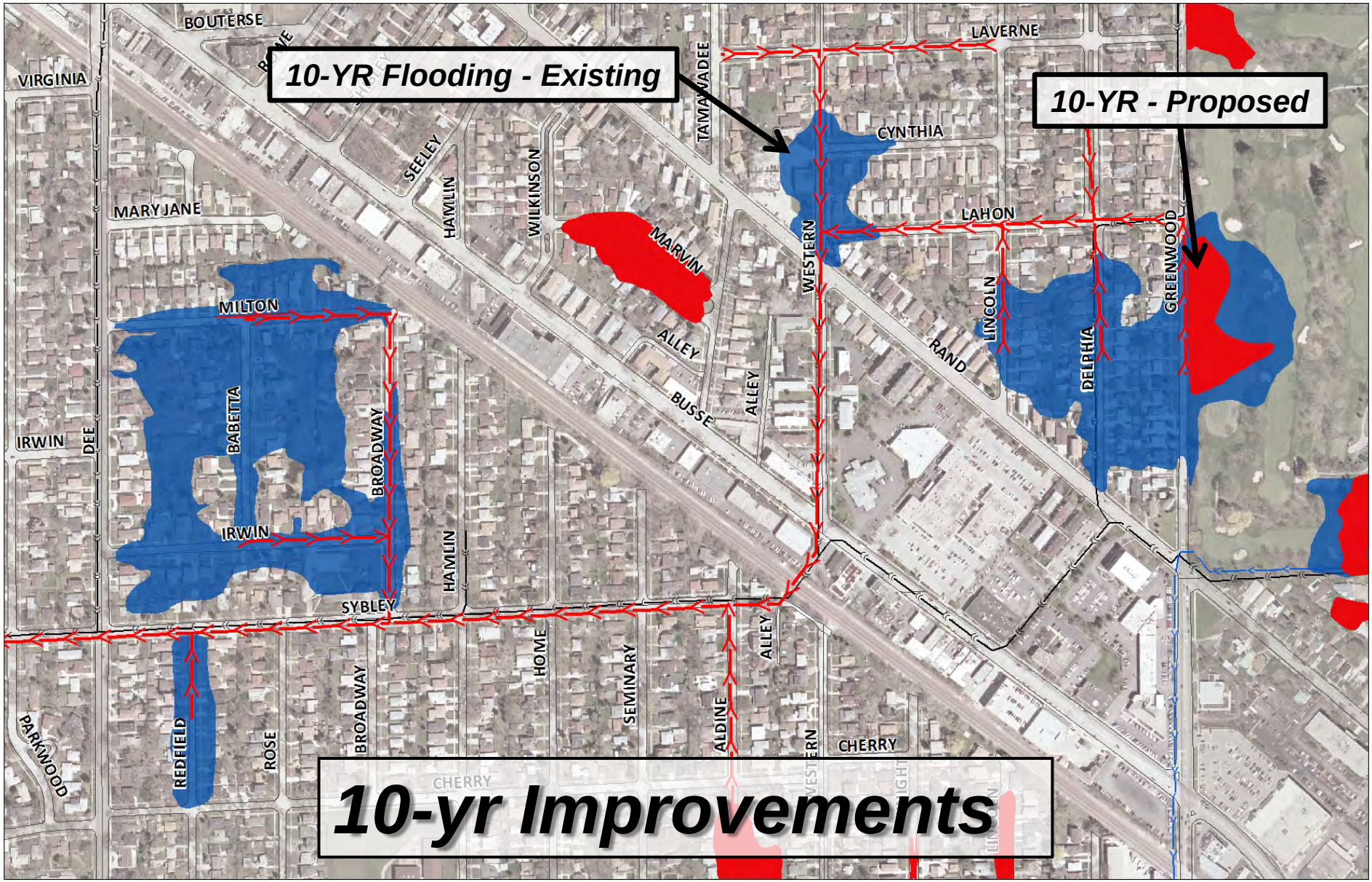
- Separate Sewer System
- Outfall to Des Plaines River
- Design Capacity = 10-yr (street level)
- No Connection to Combined System
- All new catch basins/inlets
- Full resurfacing of all affected streets
- Conflicts
  - Crossing over combined sewers
  - Sanitary service lines
  - Water service lines



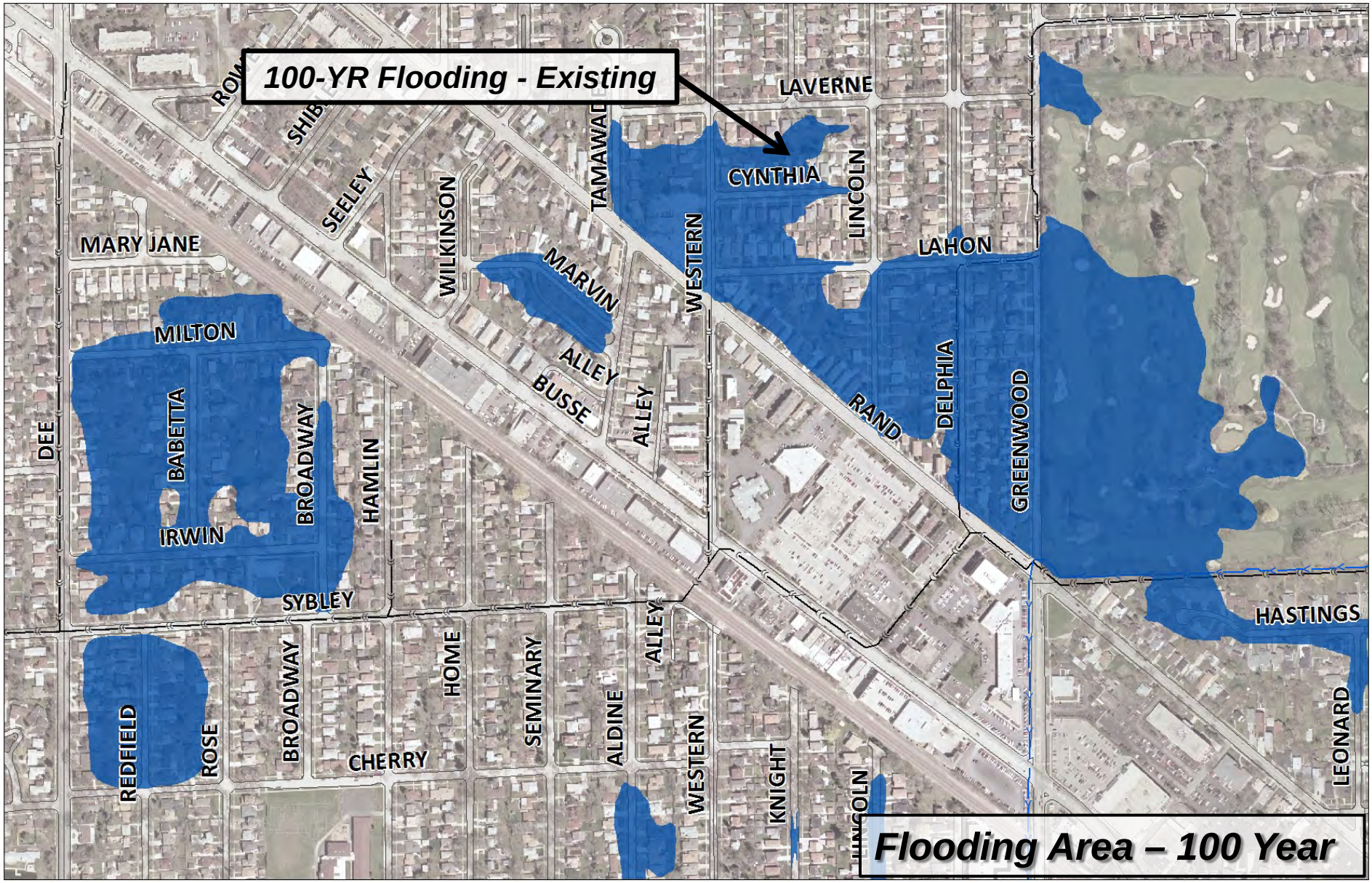
Feasibility Concept



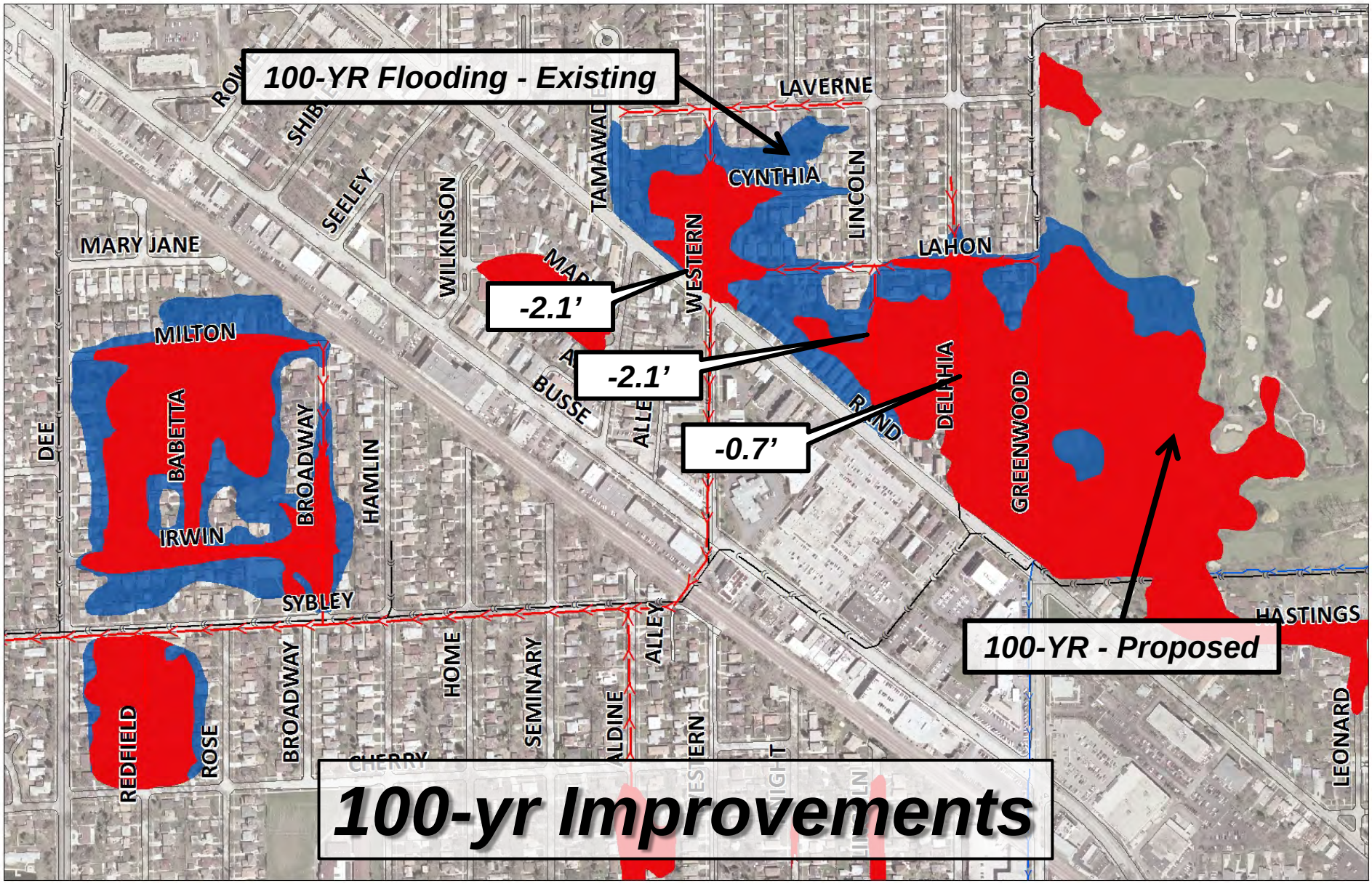
Feasibility Concept



Feasibility Concept



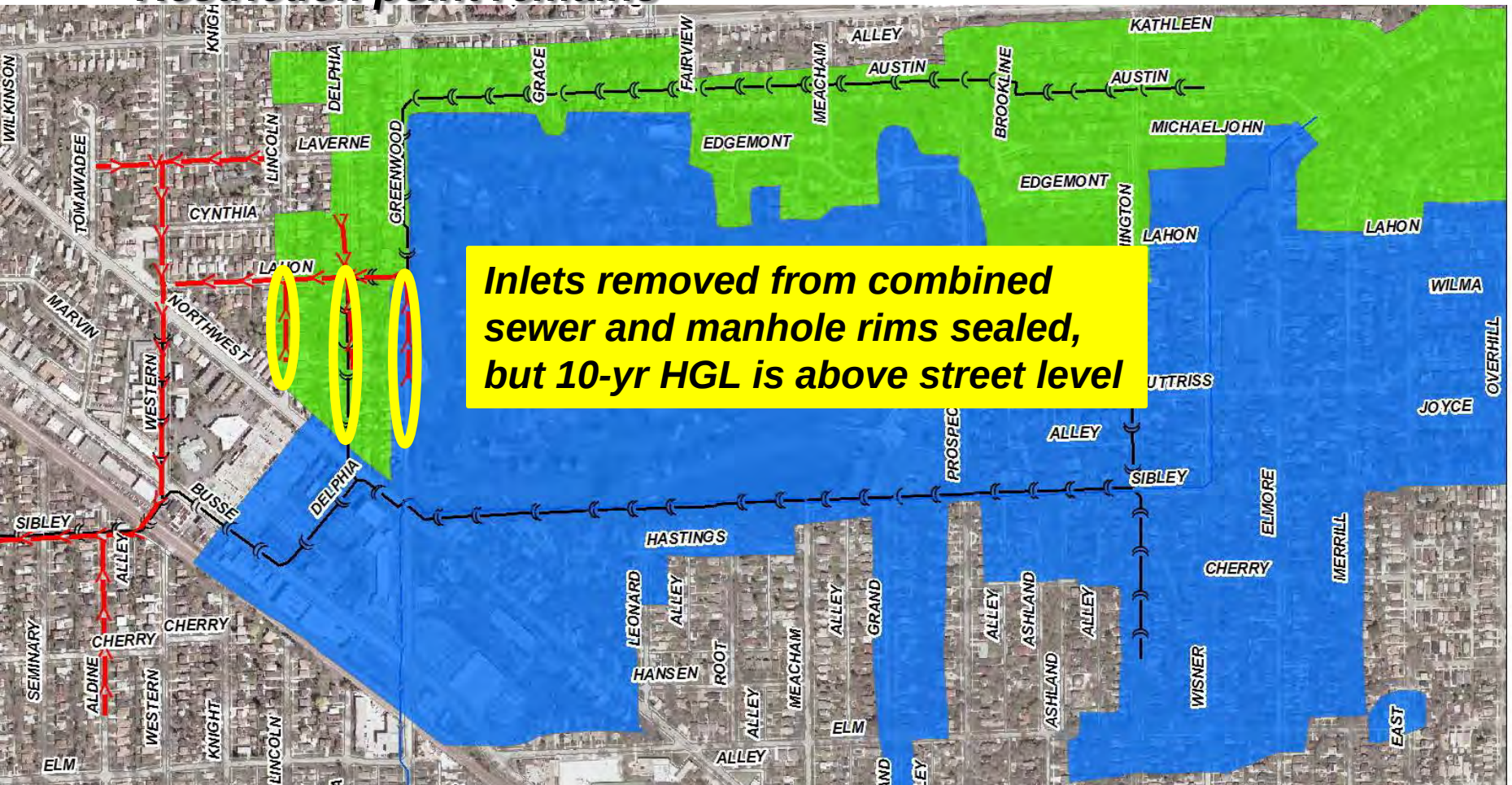
Feasibility Concept



Limitations

Separation has little effect on combined sewer system

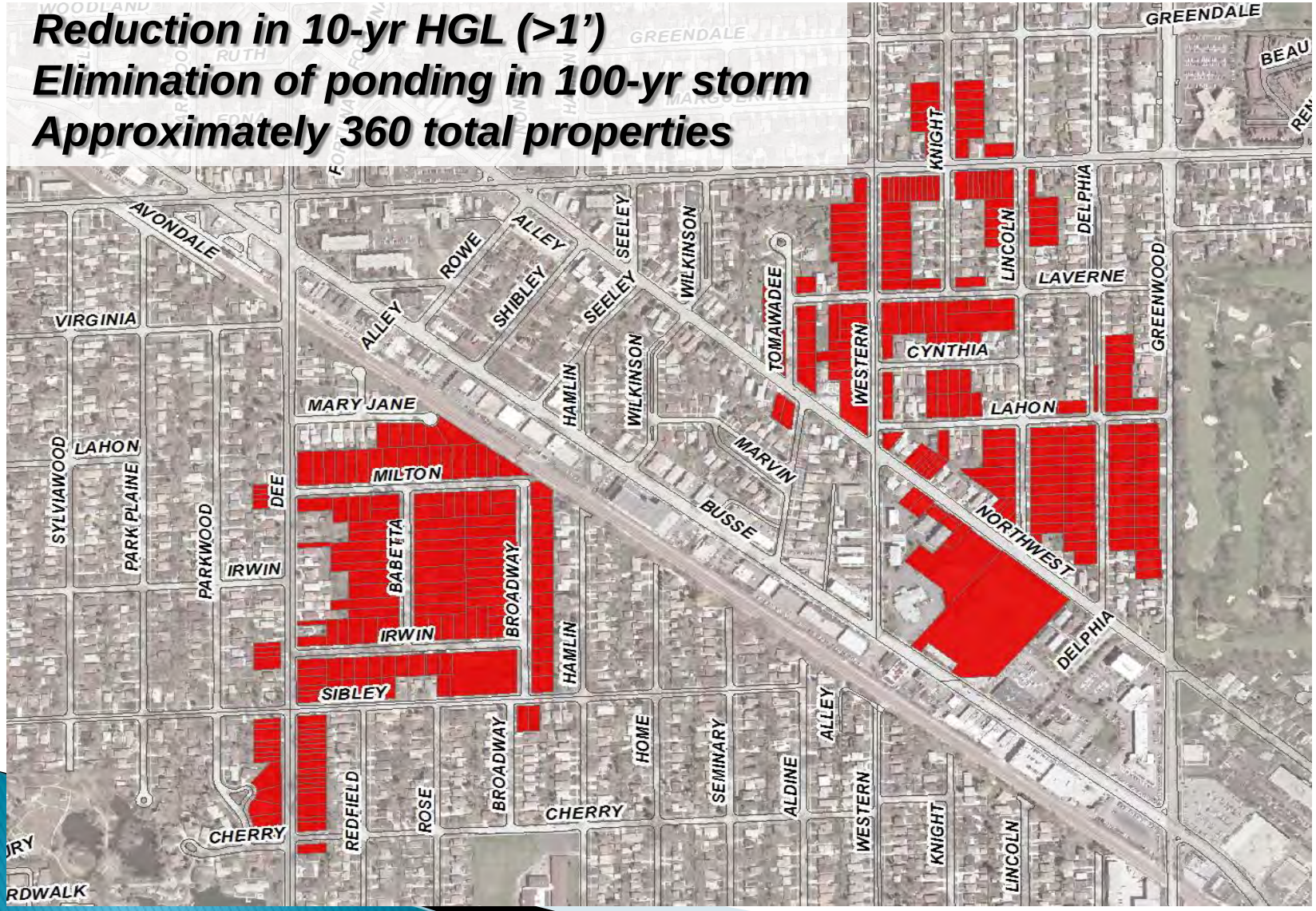
- ***Upstream areas continue to drain through area***
- ***Restriction point remains***



Feasibility Concept

Benefits

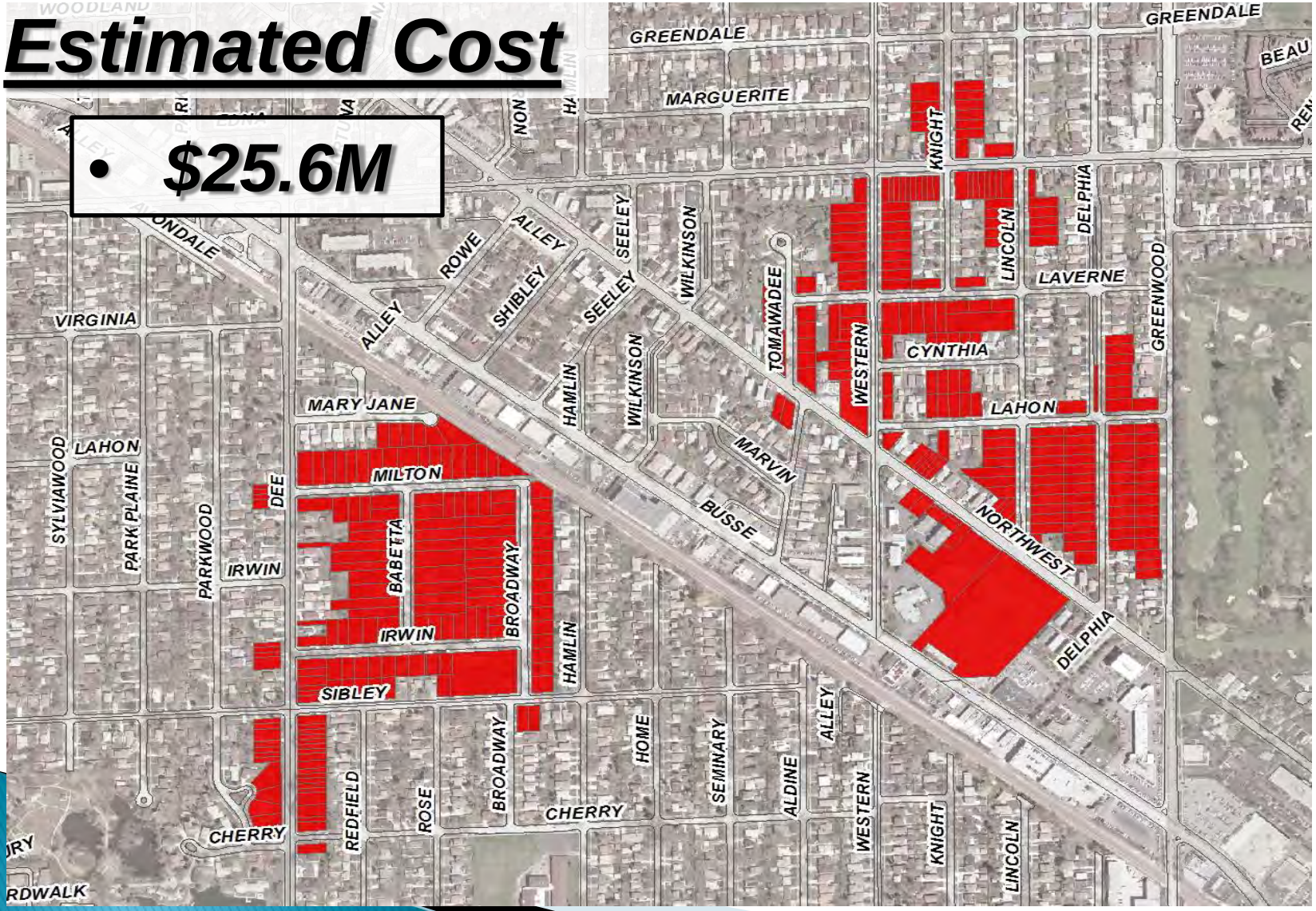
- Reduction in 10-yr HGL (>1')
- Elimination of ponding in 100-yr storm
- Approximately 360 total properties



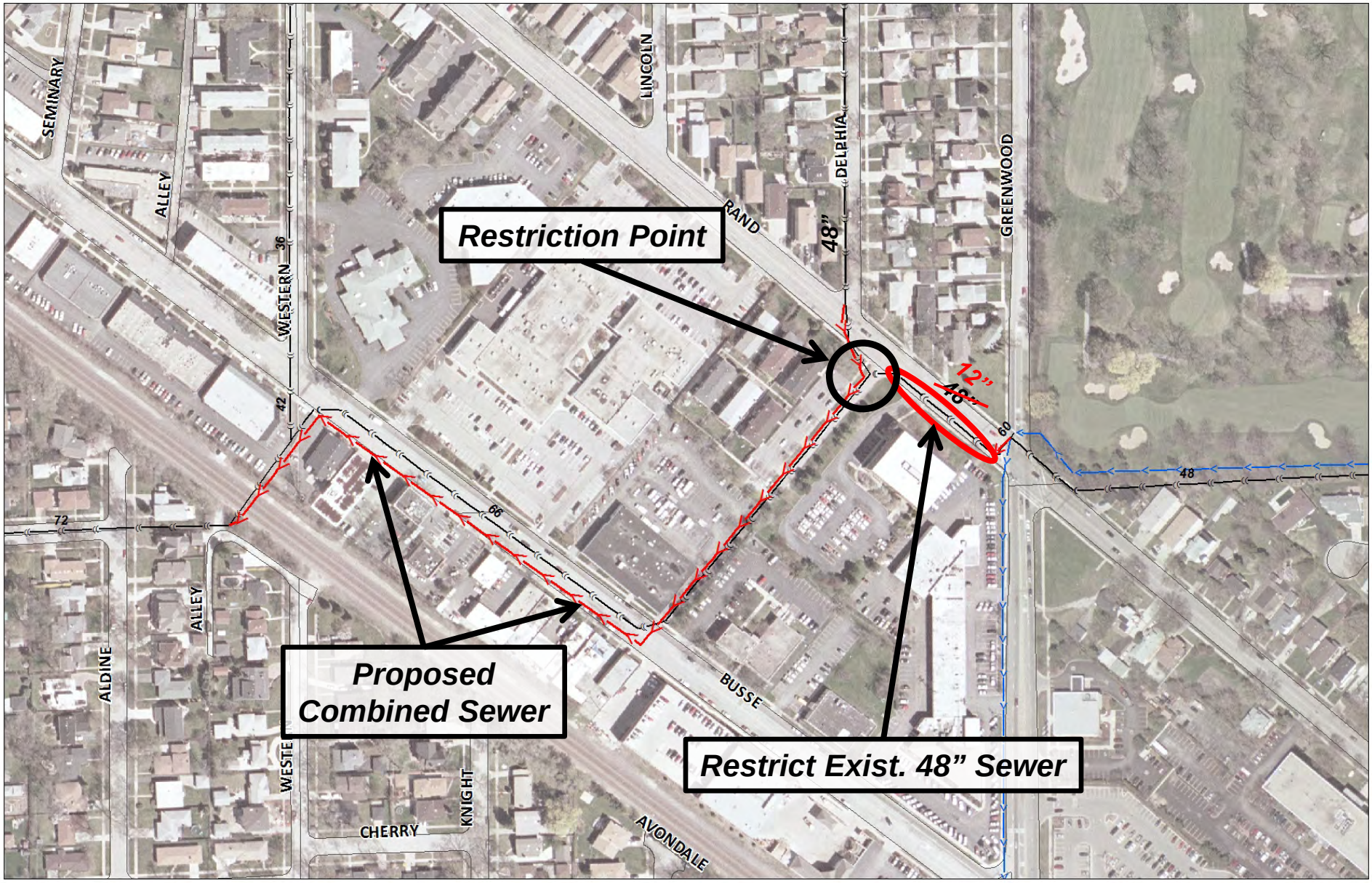
Feasibility Concept

Estimated Cost

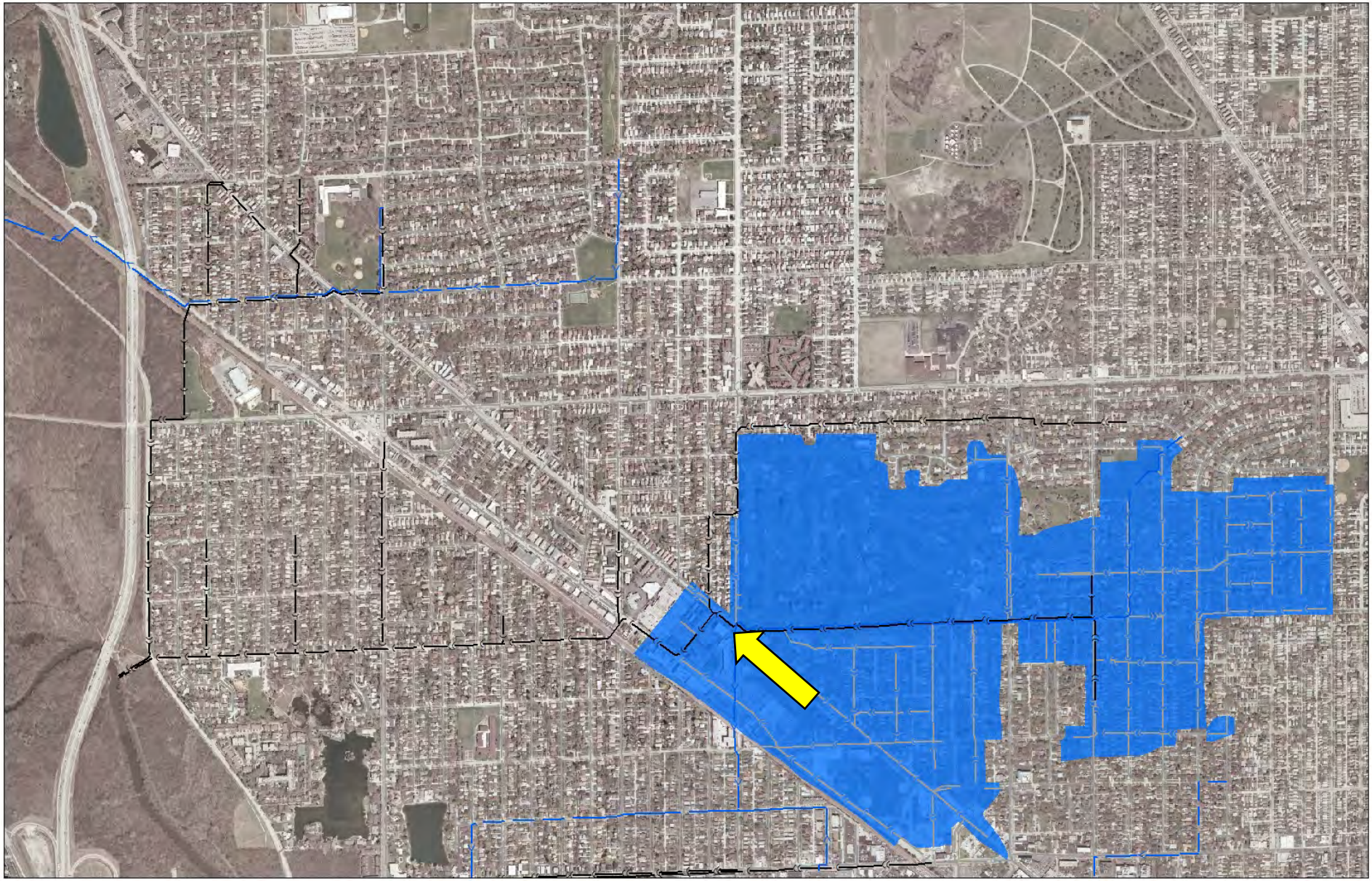
- $25.6M



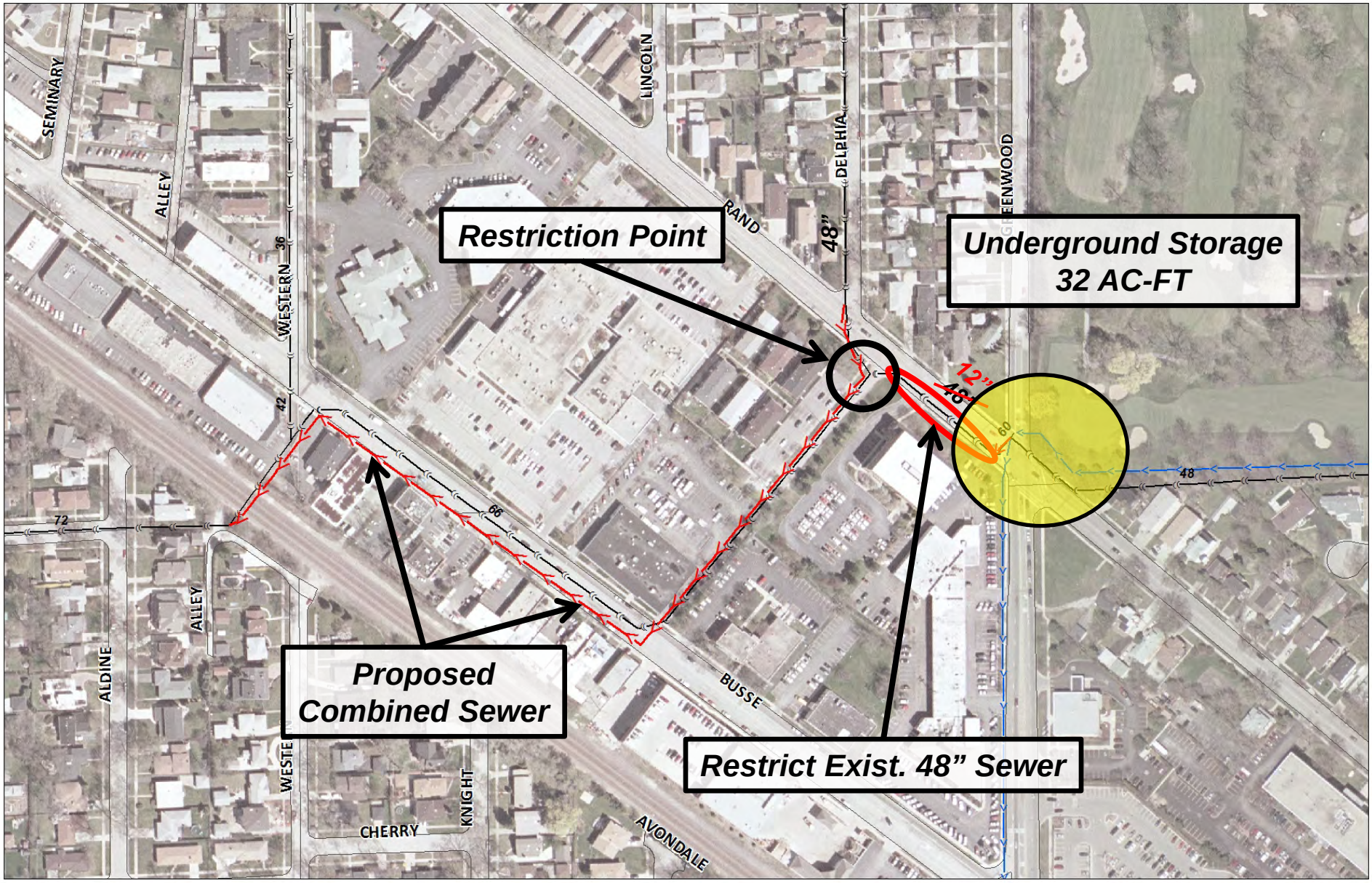
Storage Concept



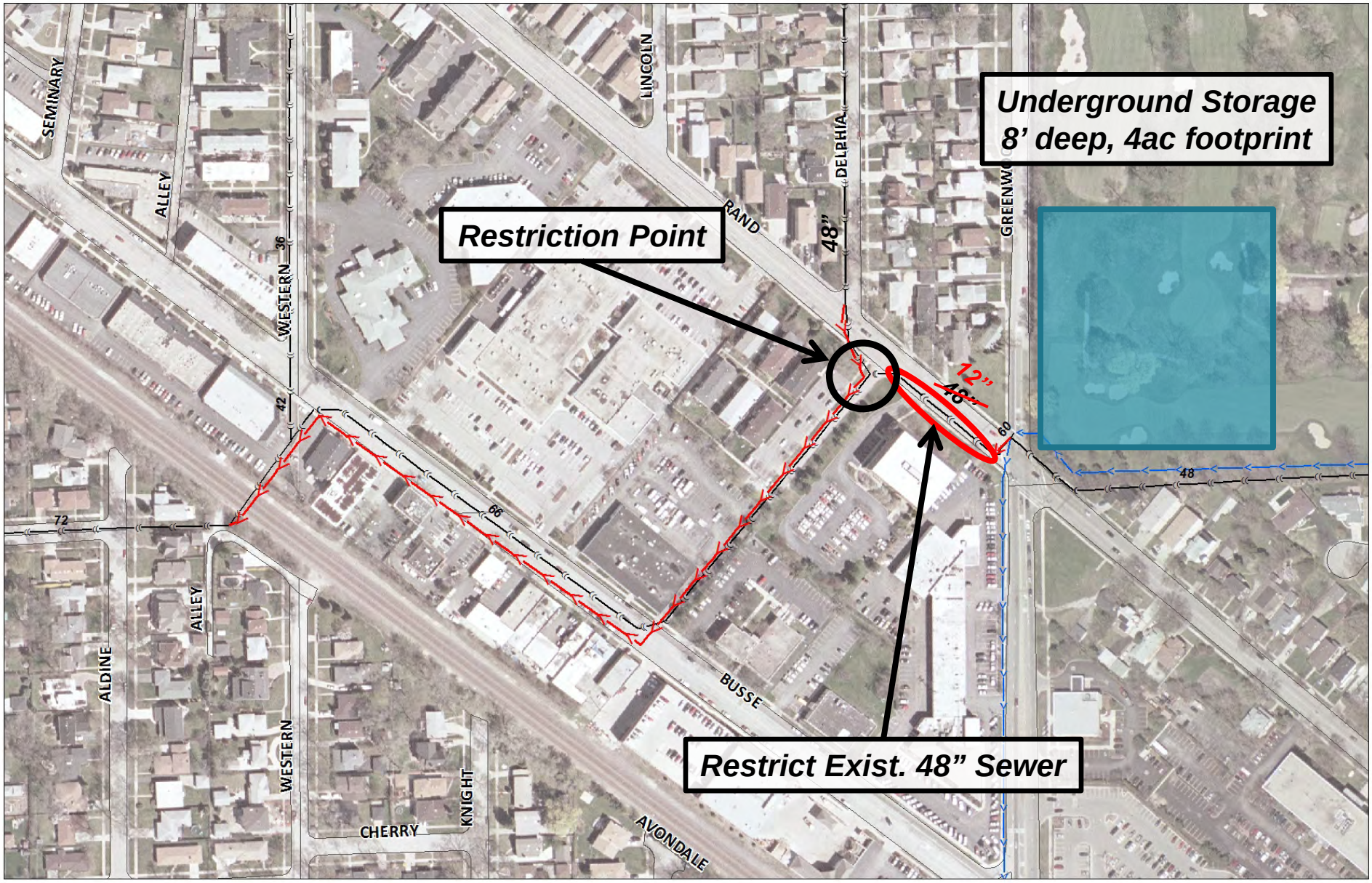
Storage Concept



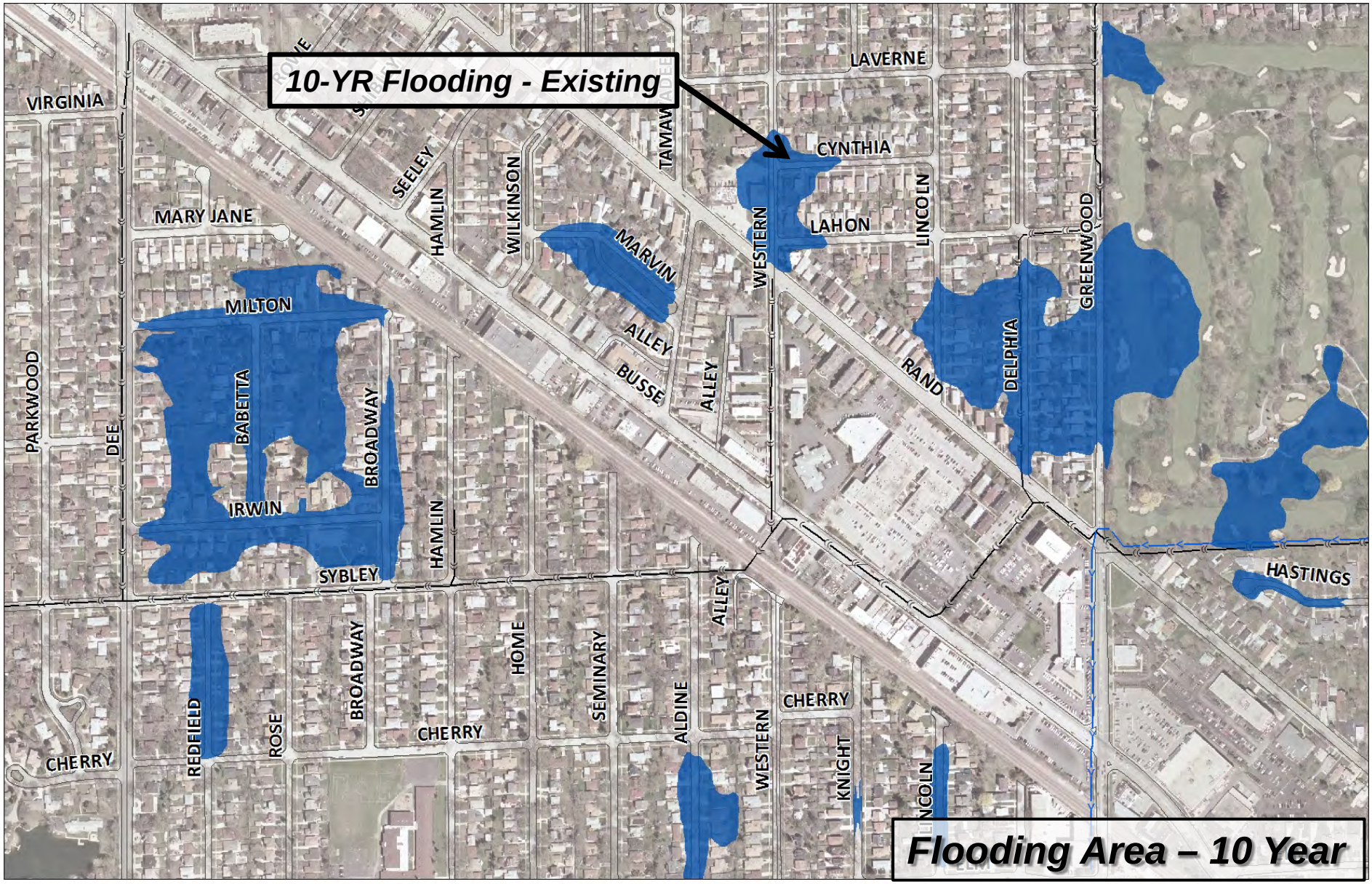
Storage Concept



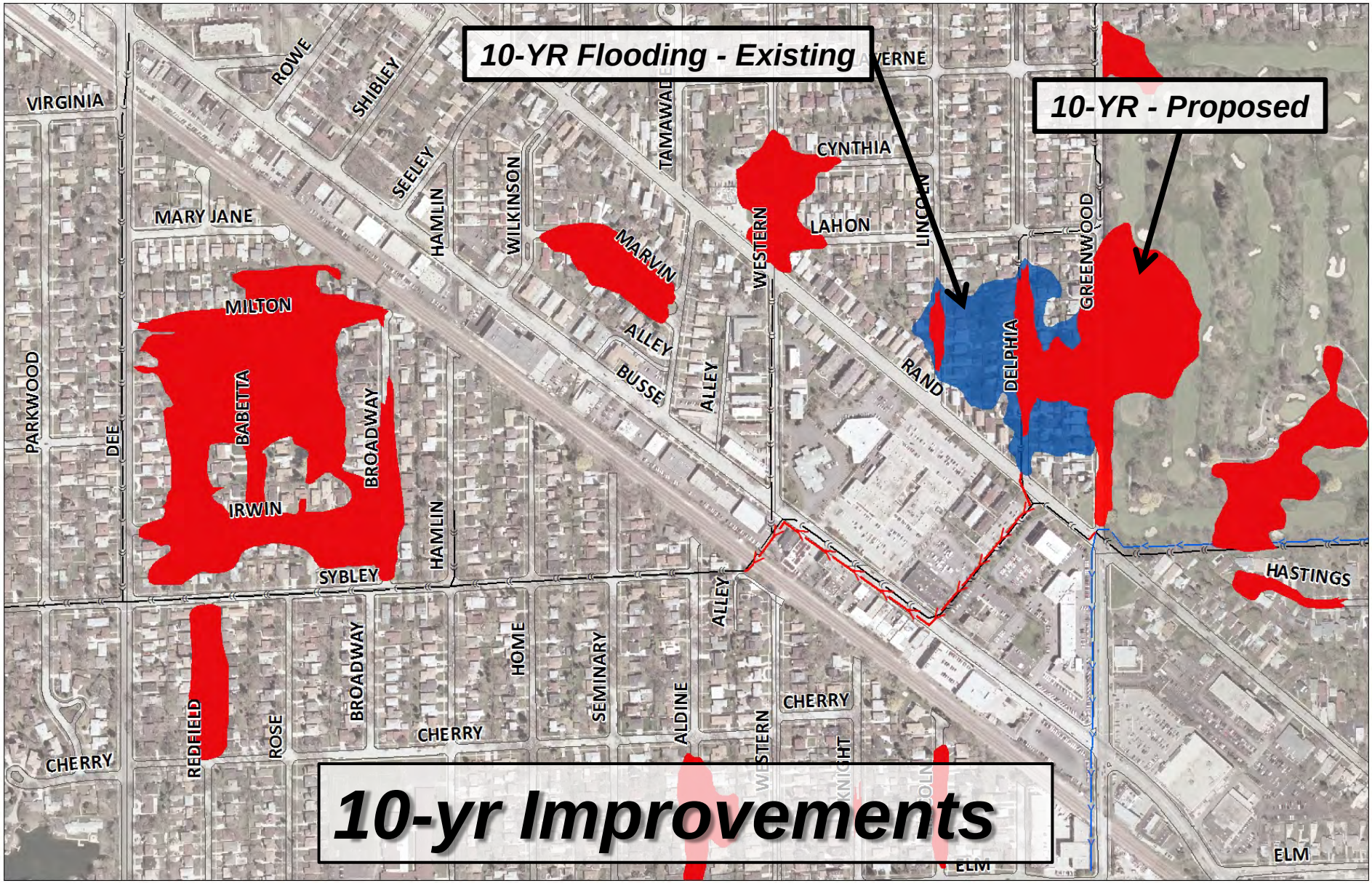
Storage Concept



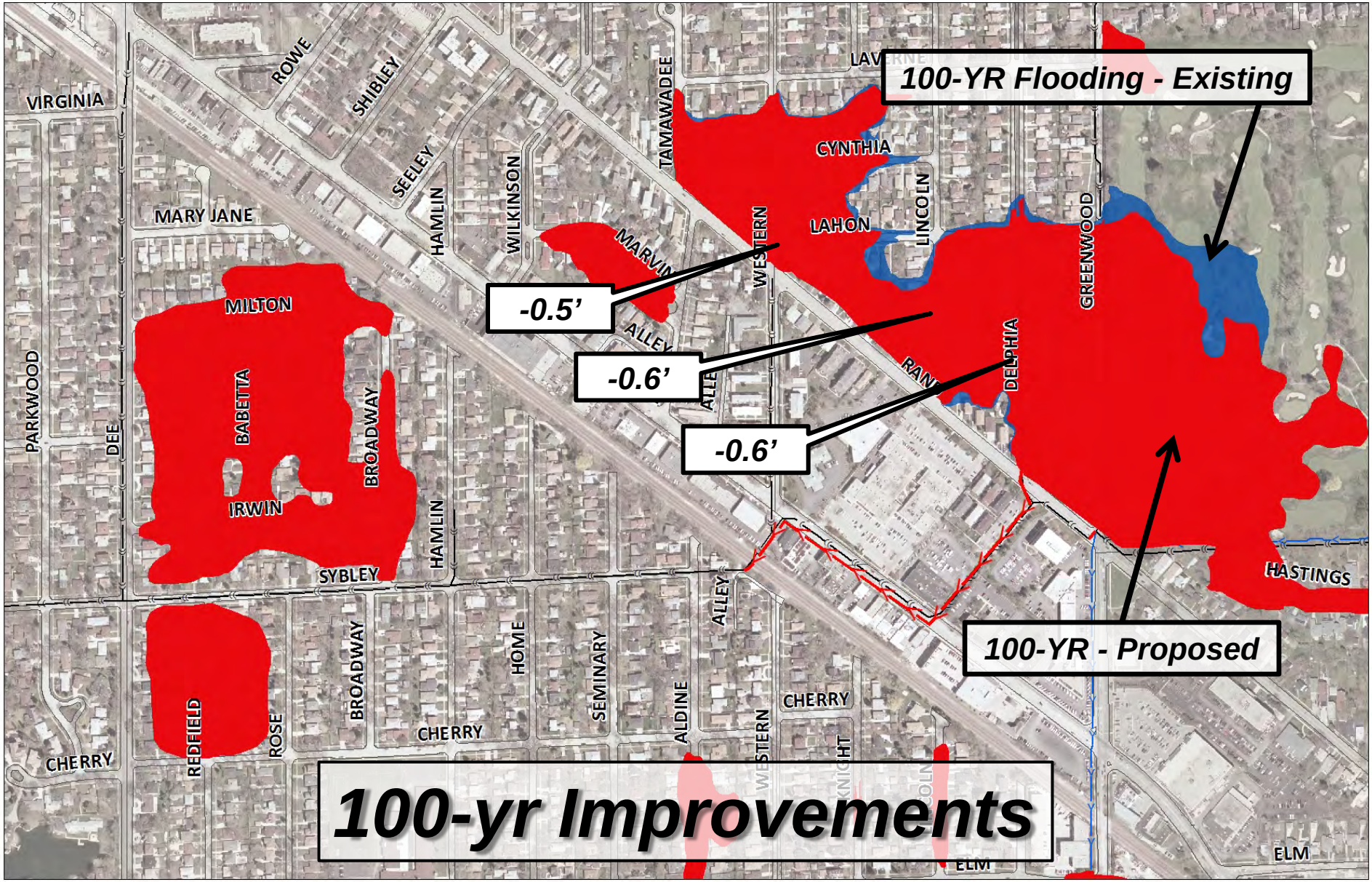
Storage Concept



Storage Concept



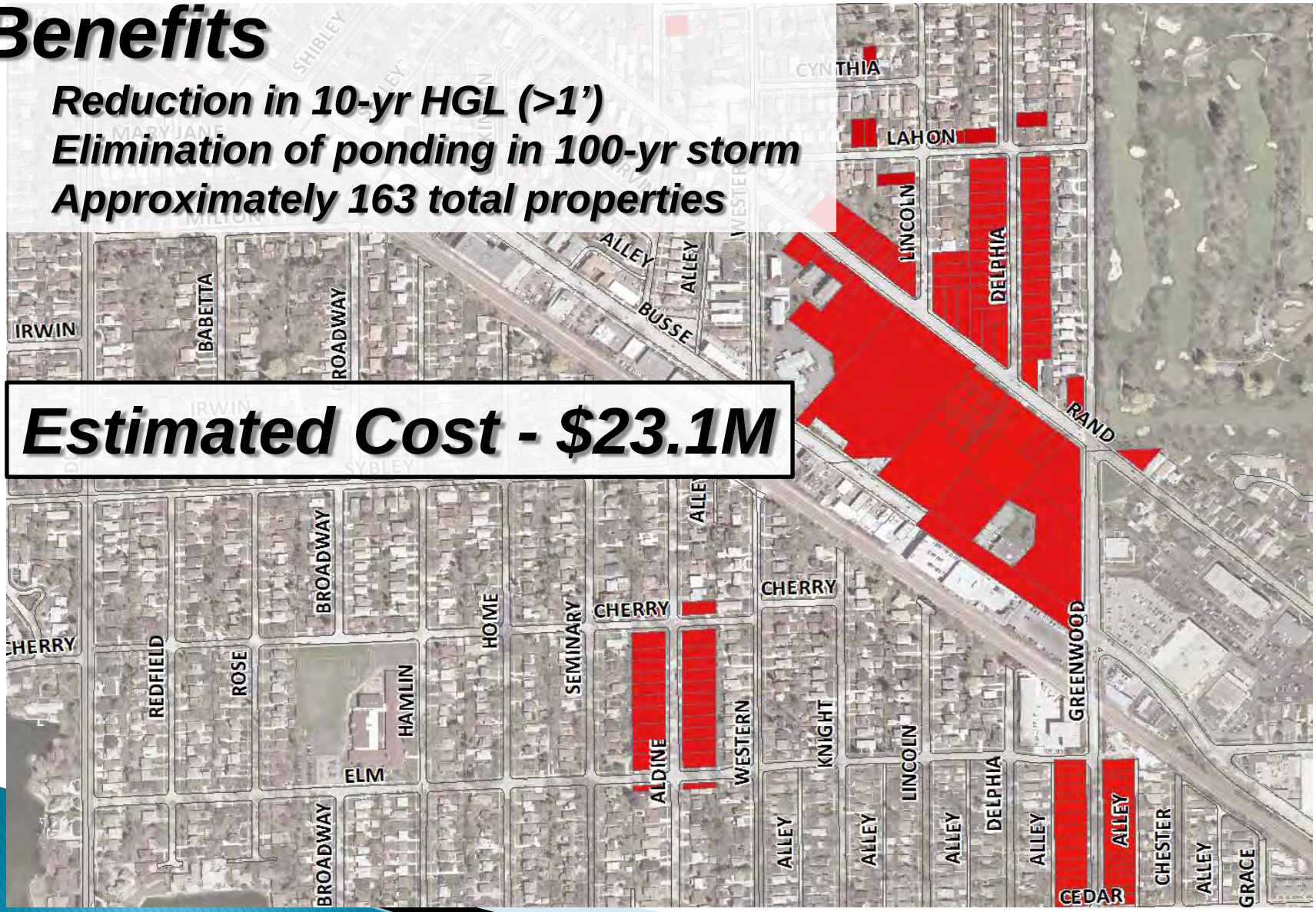
Storage Concept



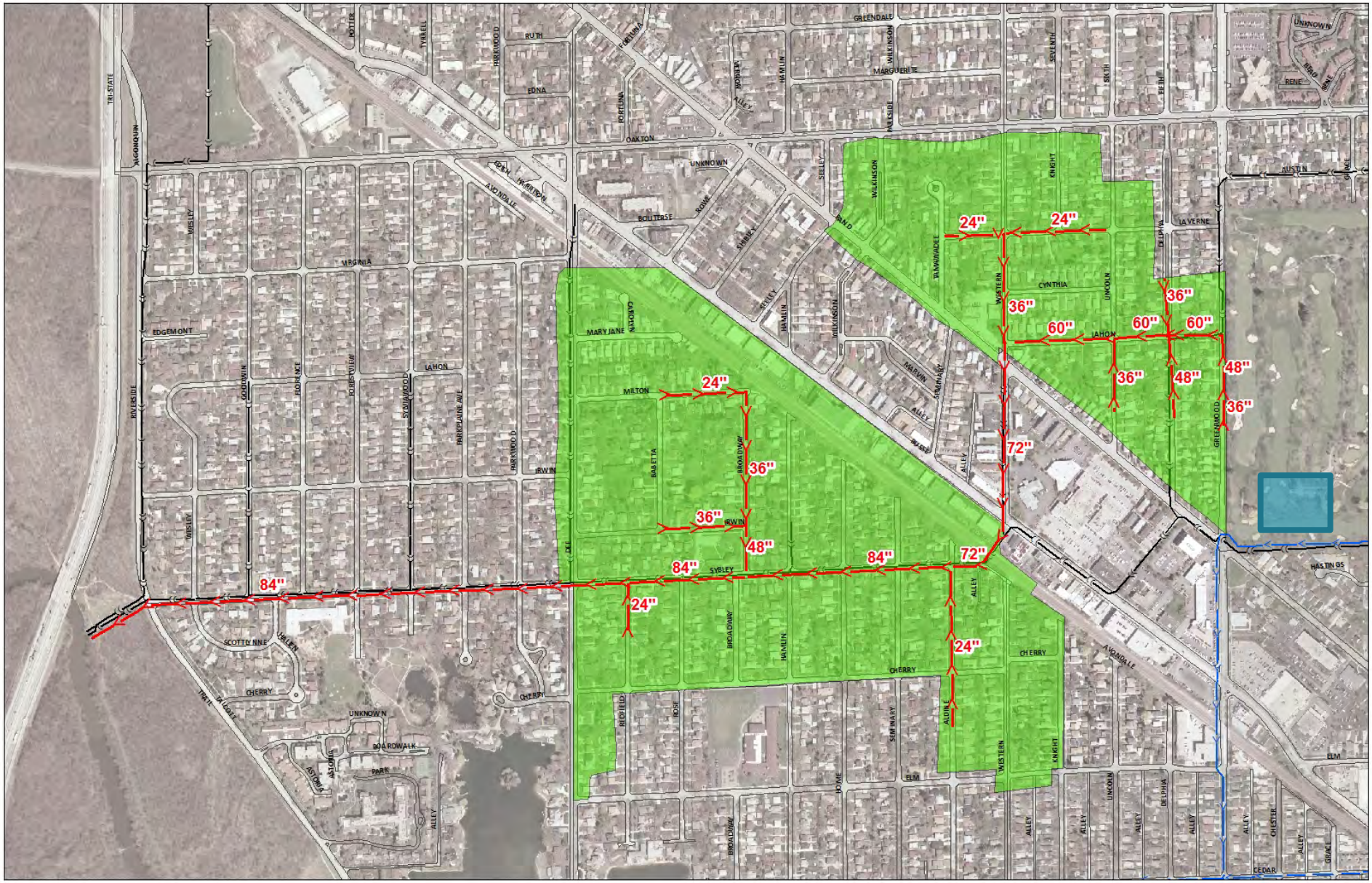
Storage Concept

Benefits

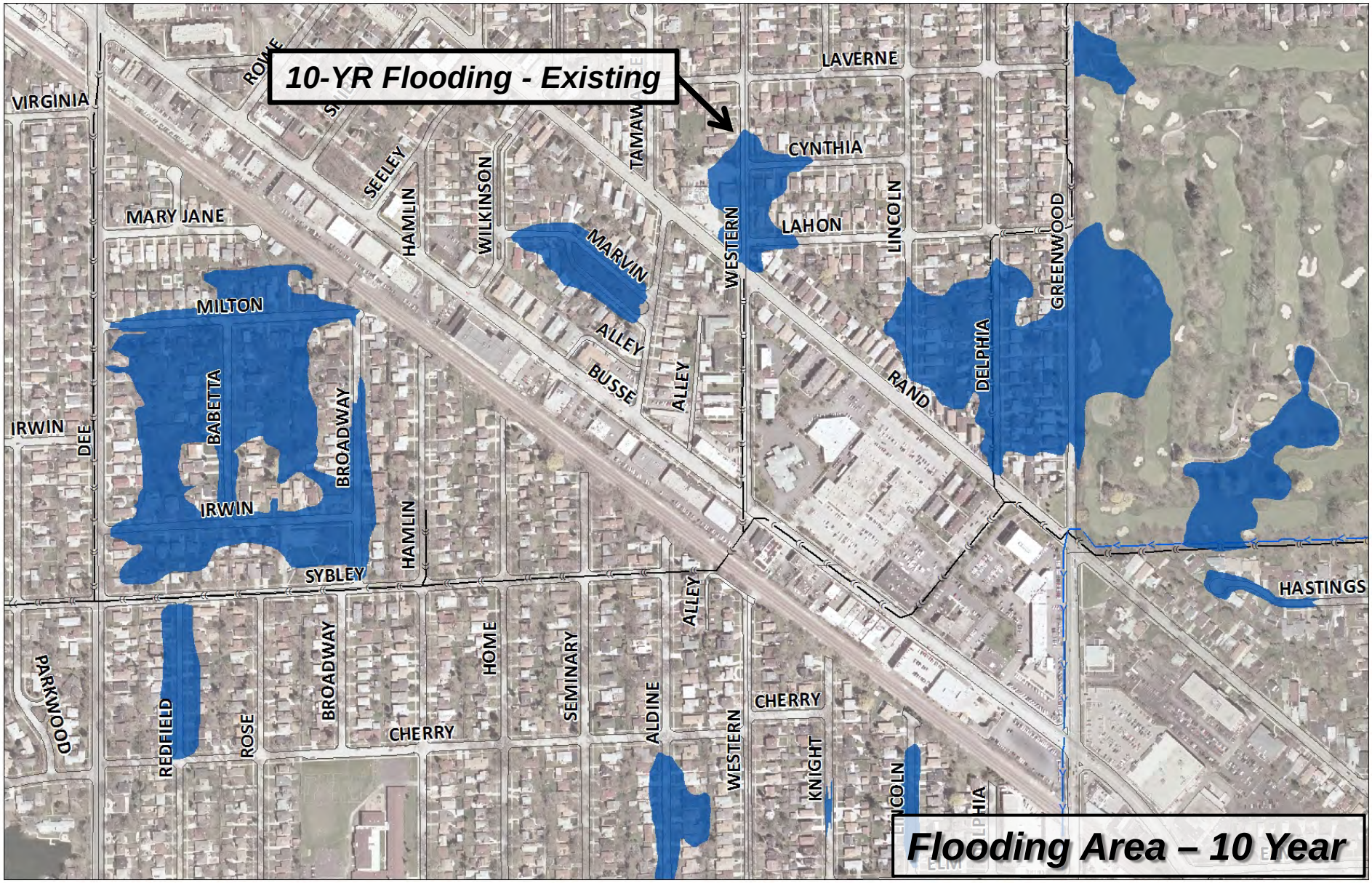
- Reduction in 10-yr HGL (>1')
- Elimination of ponding in 100-yr storm
- Approximately 163 total properties



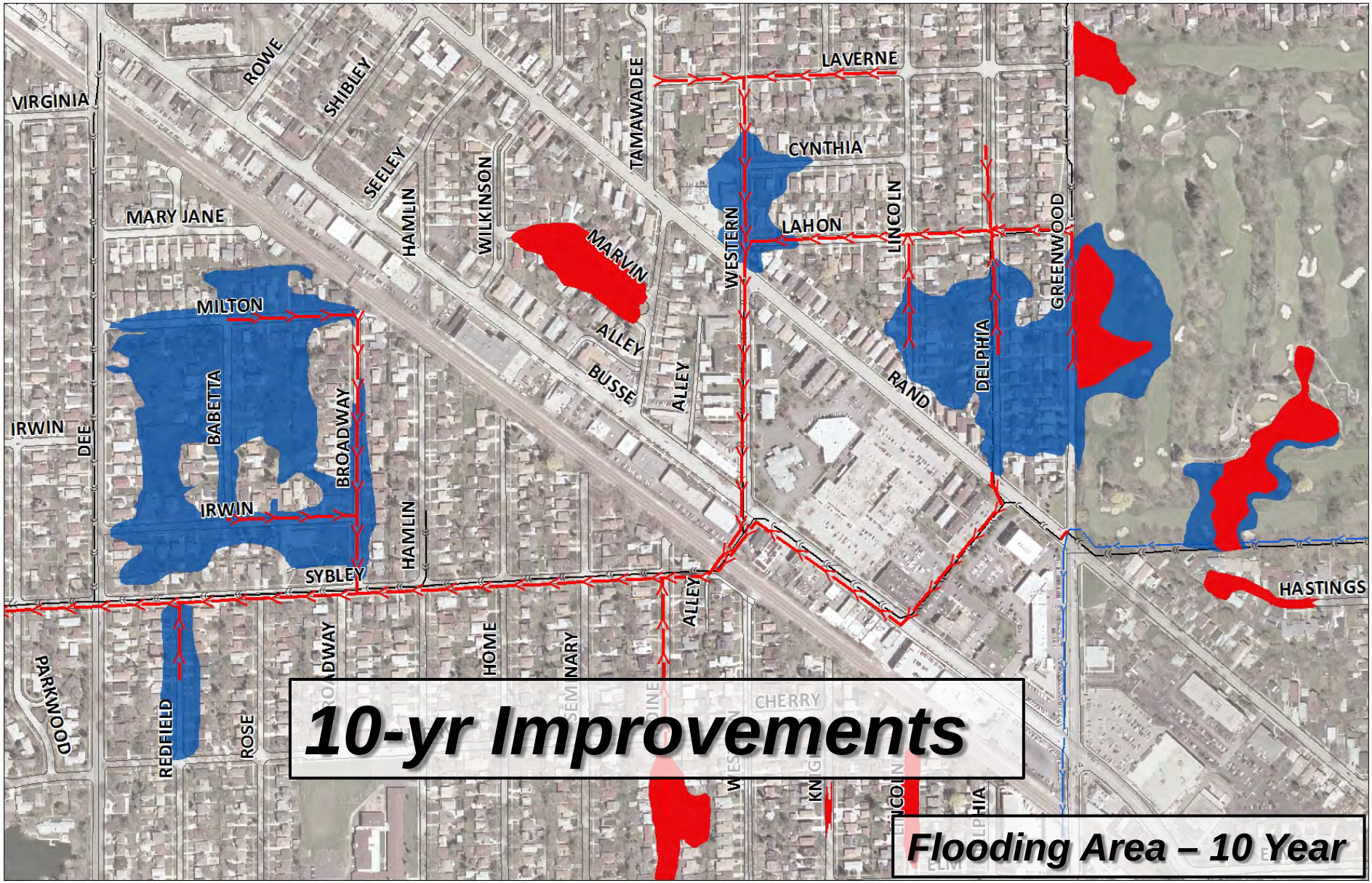
Storage + Separation



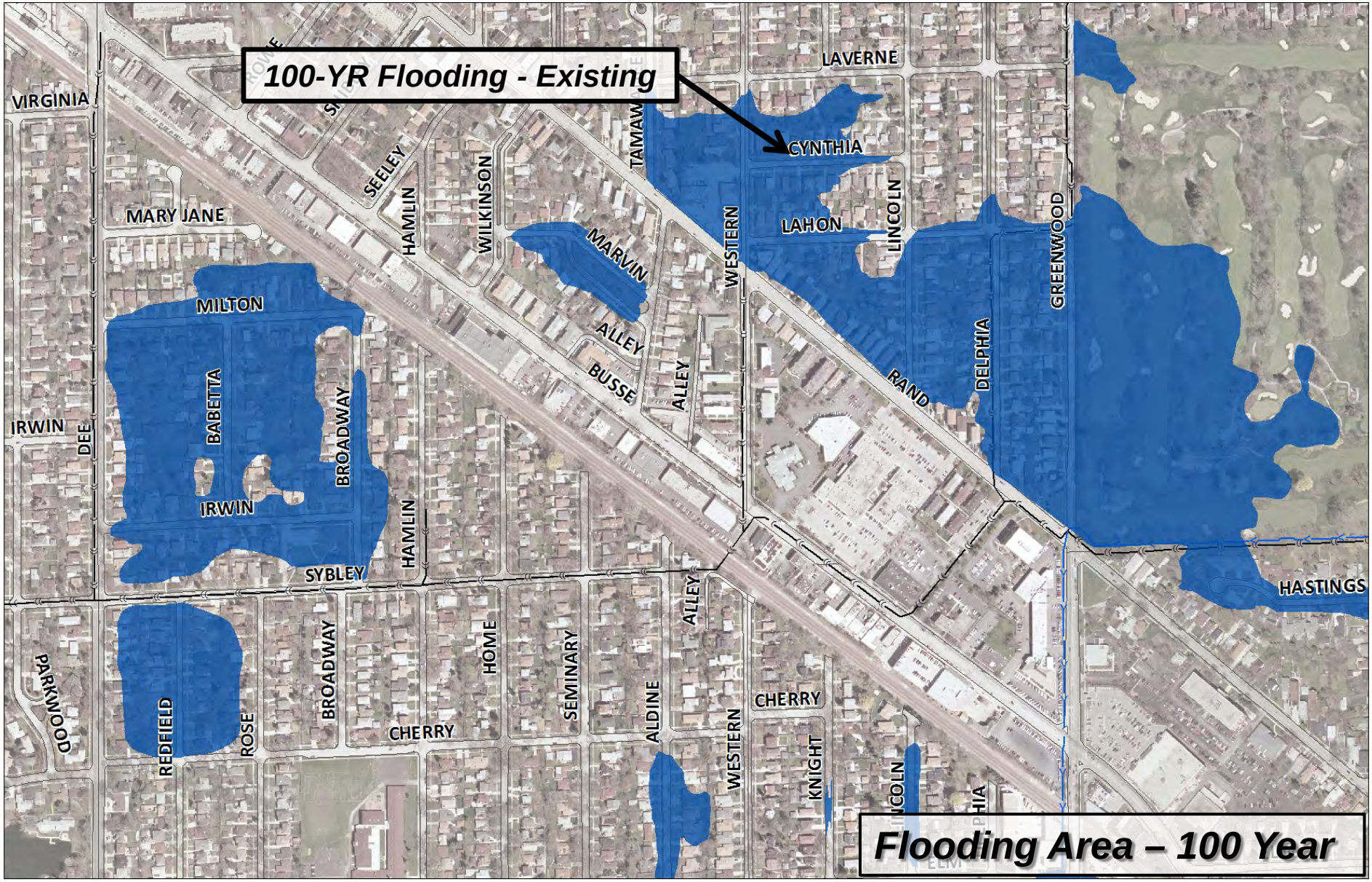
Storage + Separation



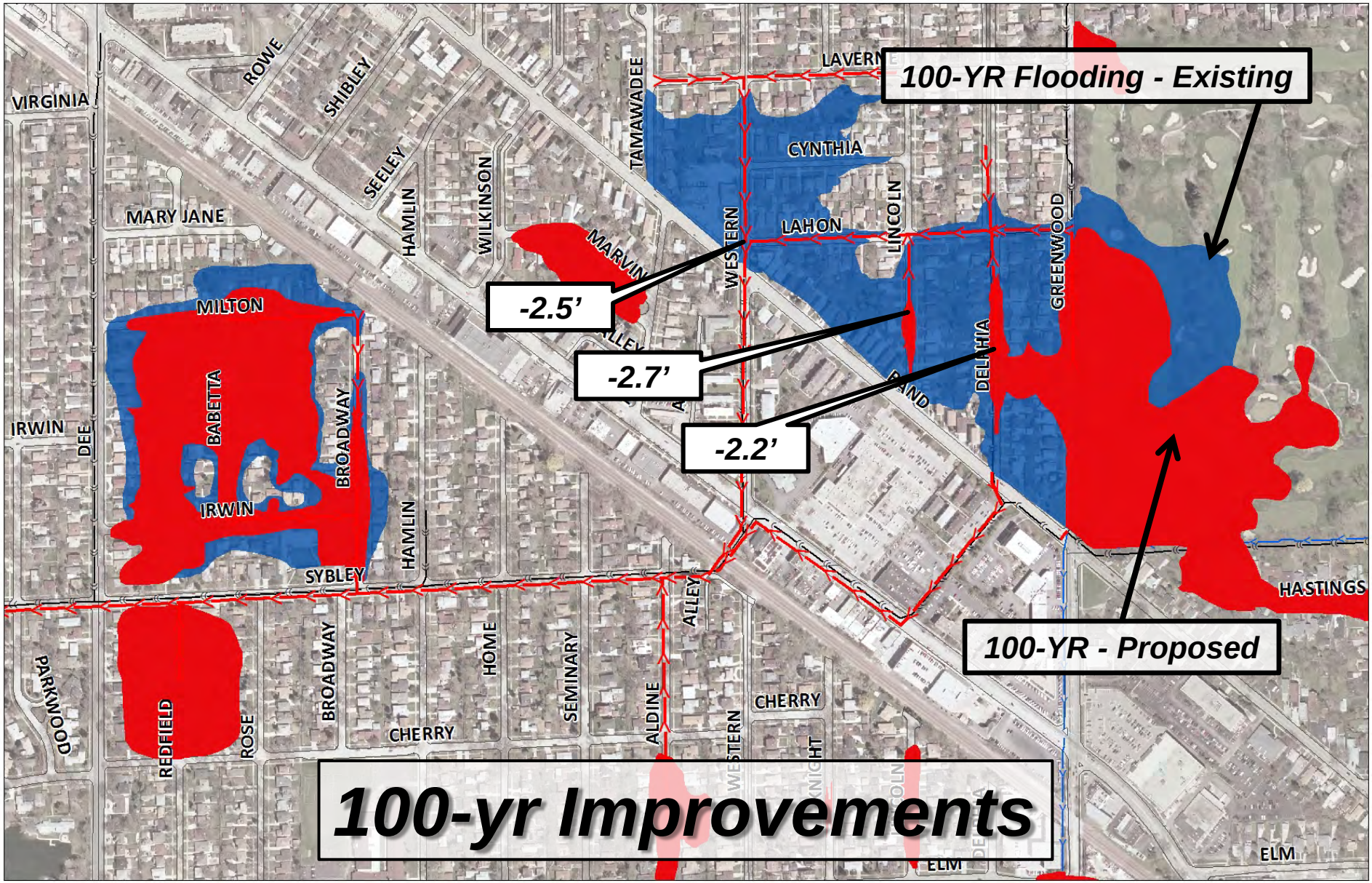
Storage + Separation



Storage + Separation



Storage + Separation

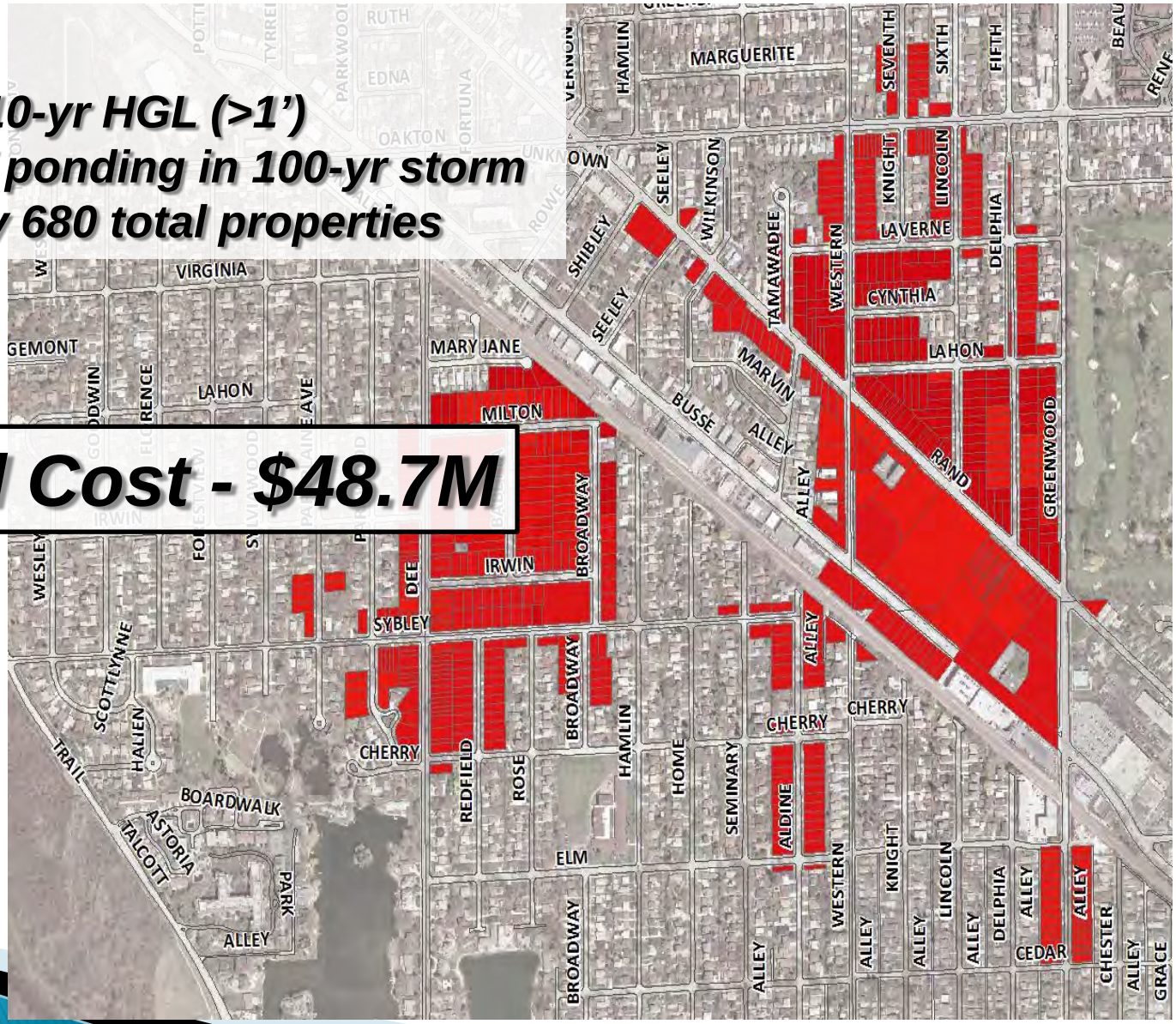


Separation + Storage Concept

Benefits

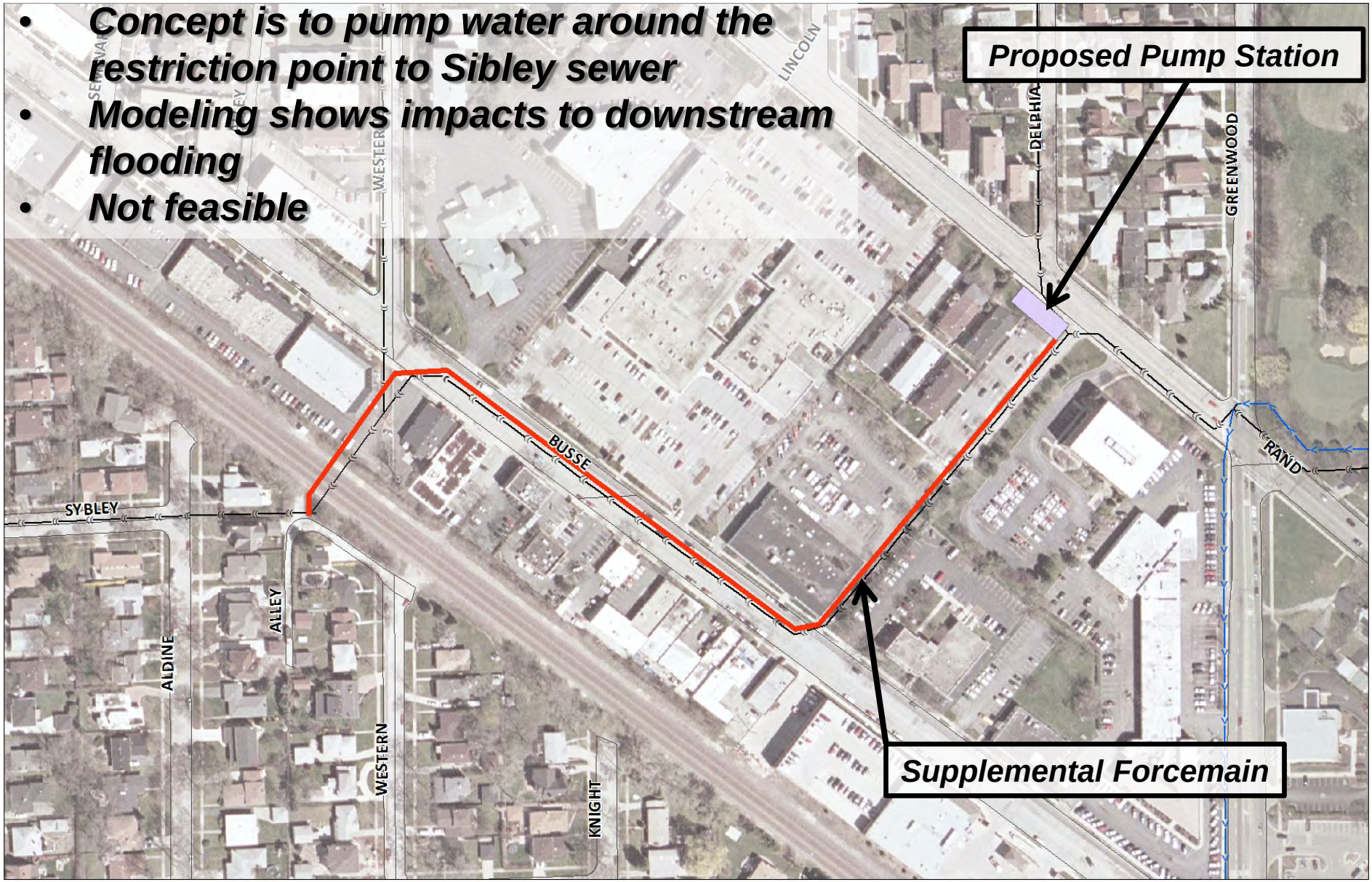
- Reduction in 10-yr HGL (>1')
- Elimination of ponding in 100-yr storm
- Approximately 680 total properties

Estimated Cost - $48.7M



Pump Concept

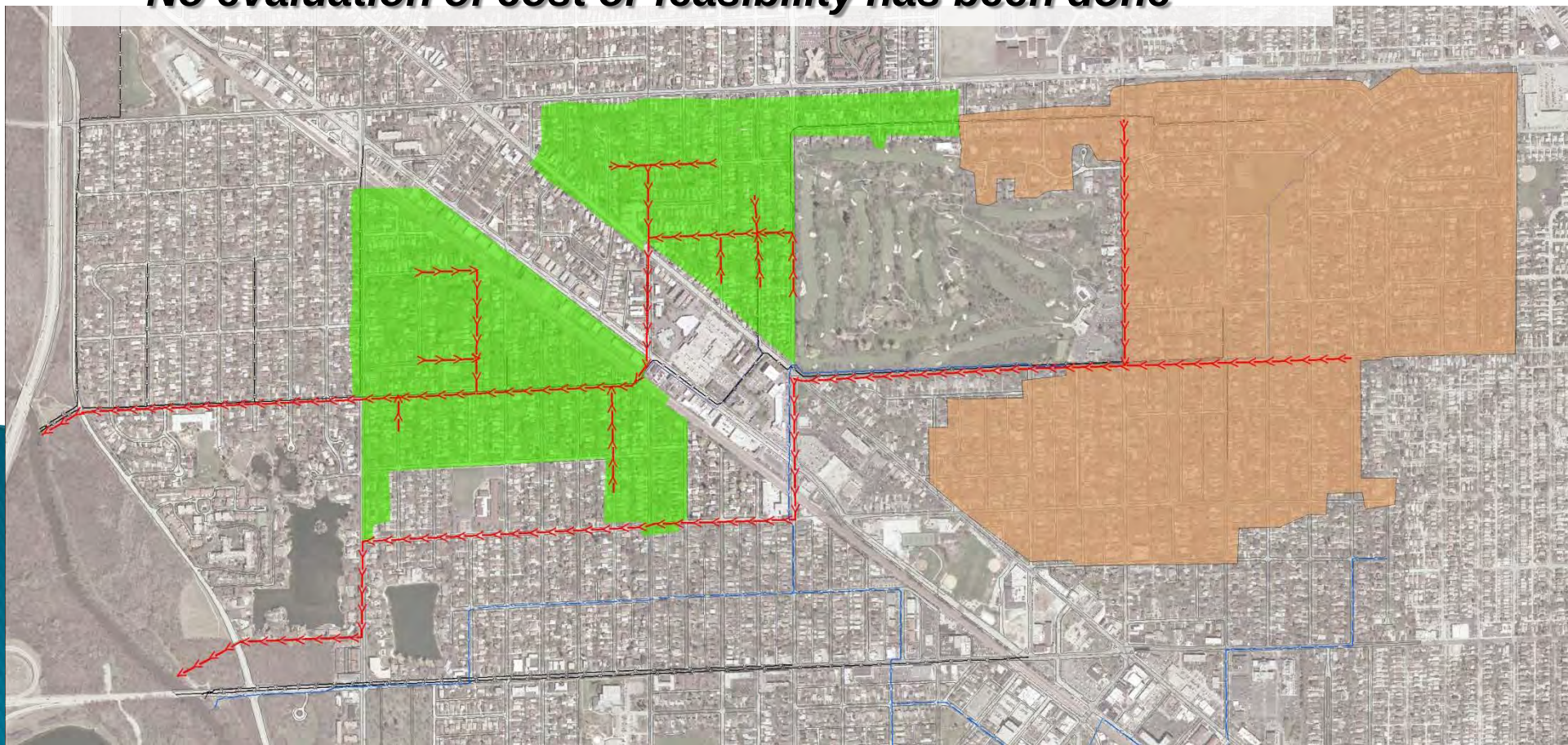
- *Concept is to pump water around the restriction point to Sibley sewer*
- *Modeling shows impacts to downstream flooding*
- *Not feasible*



Additional Separation

To go above 10-yr protection, need to remove upstream drainage area

- ***Would be very expensive and long term project***
- ***No evaluation of cost or feasibility has been done***



PRCC Area - Summary

- ***Option #1 – Sewer Separation Project***
  - ***10-yr protection from surface flooding***
  - ***Limitation on benefit to combined sewer system***
  - ***360 property benefits***
  - ***Cost = $25.6M***

- ***Option #2 – Underground storage***
  - ***Does not achieve 10-yr protection***
  - ***Would need location for large storage vault***
  - ***163 property benefits***
  - ***Cost = $23.1M***

- ***Option #3 – Combination of #1 and #2***
  - ***10-yr protection including combined sewer system***
  - ***Would need location for large storage vault***
  - ***680 property benefits***
  - ***Cost = $48.7M***

Overall Summary

Location	Scenario	# of Homes Benefitted	Cost
Mayfield	#1 – 50yr protection	17	$1.8 Million
	#2 – 100yr protection	23	$2.3 Million
Northwest Park	#1 – 10yr, River Outfall	406	$24.3 Million
	#2 – 10yr, Storage	406	$11.4 Million
	#3 – 100yr, Storage	418	$16.6 Million
Country Club Area	#1 – 10yr, River Outfall	360	$25.6 Million
	#2 – Underground Storage	163	$23.1 Million
	#3 – 10yr, River Outfall + Storage	680	$48.7 Million

Questions?