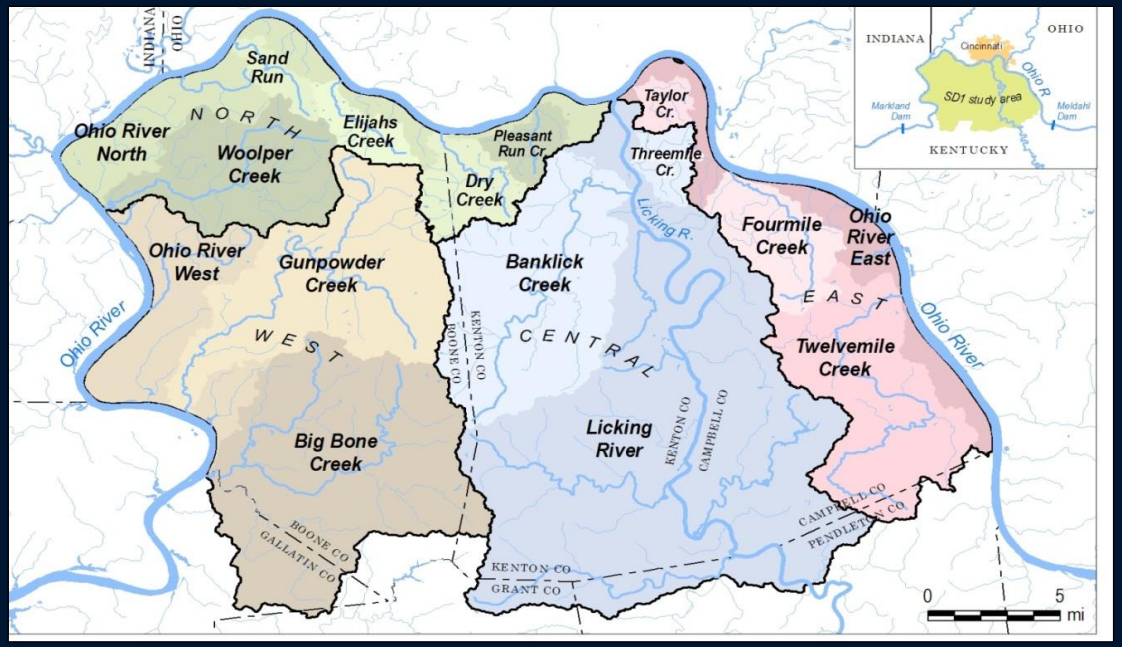
Fishbeck, Thompson, Carr & Huber, Inc.

Church Street CSO Reduction Project

Owner: Sanitation District No. 1 of Northern Kentucky

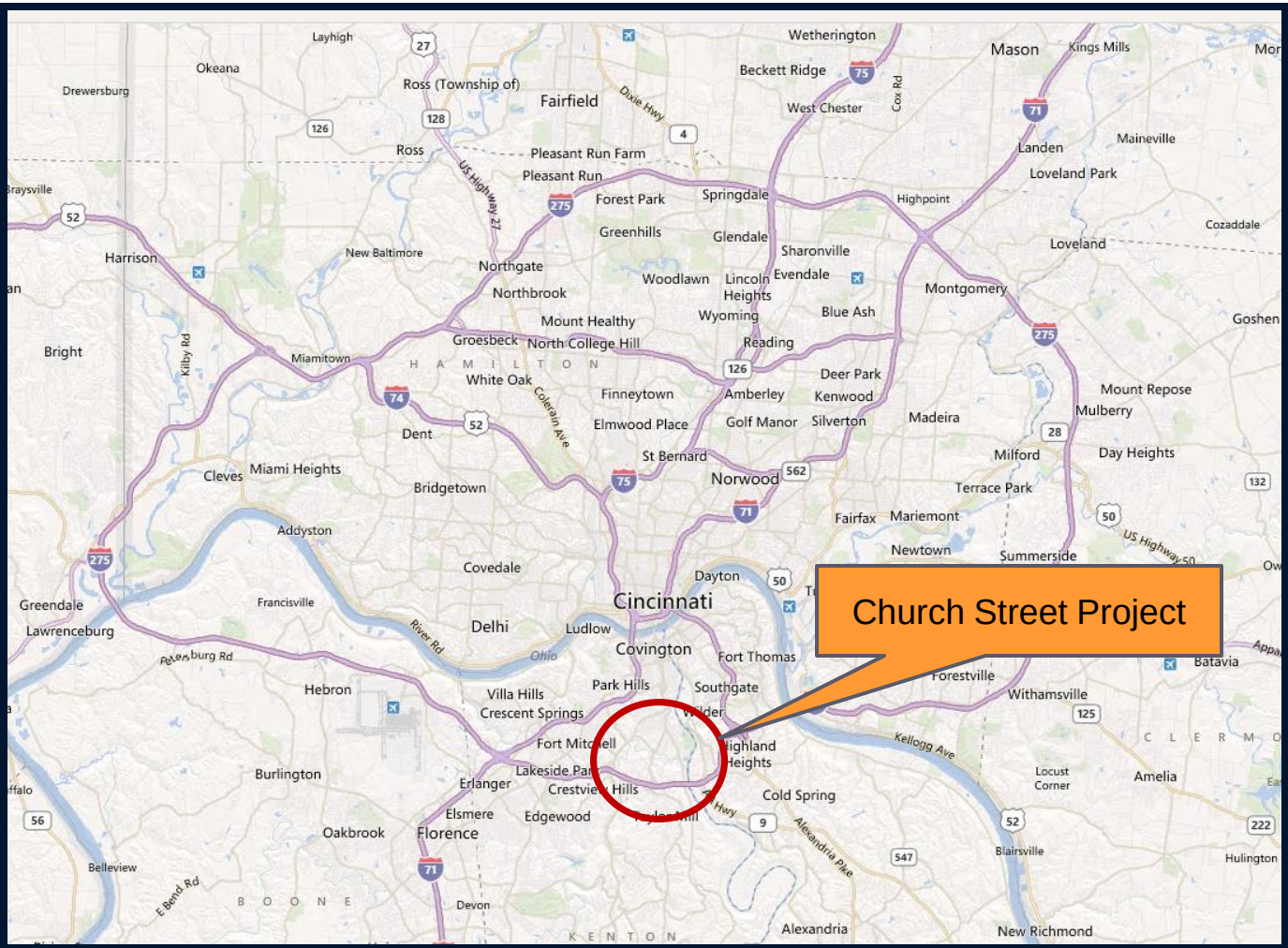
Rick Miller

About the Client

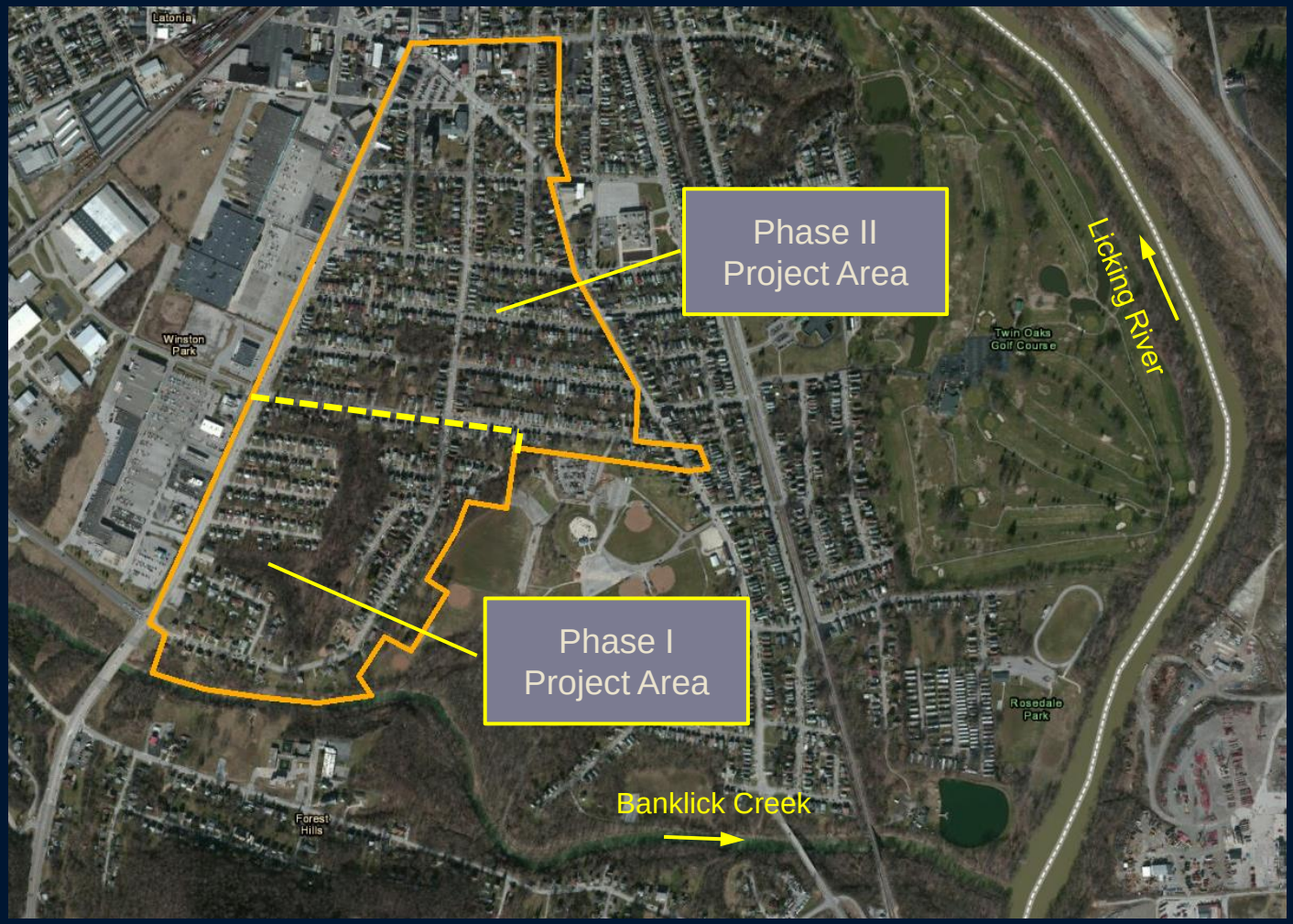


- SD1 Consent Decree
  - Entered April 18, 2007
  - Negotiated with EPA to move away from the Traditional approach and to a more cost-effective watershed based approach
  - Develop plans to address combined and separate sanitary sewer overflows in context with other pollutant sources by December 31, 2025

Project Location



Project Area



Goals for Church Street Project

Annual Overflow to Banklick Creek

Existing Conditions

56 Million Gallons

After Phase I

24 Million Gallons

After Phase II

5.5 Million Gallons

Goals for Church Street Project

General Approach

- Remove as much storm water from the combined sewer as possible.
- Eliminate backwater from Banklick Creek.
- Provide a degree of treatment for storm water removed from the combined system.

Natural Conditions

Natural Conditions

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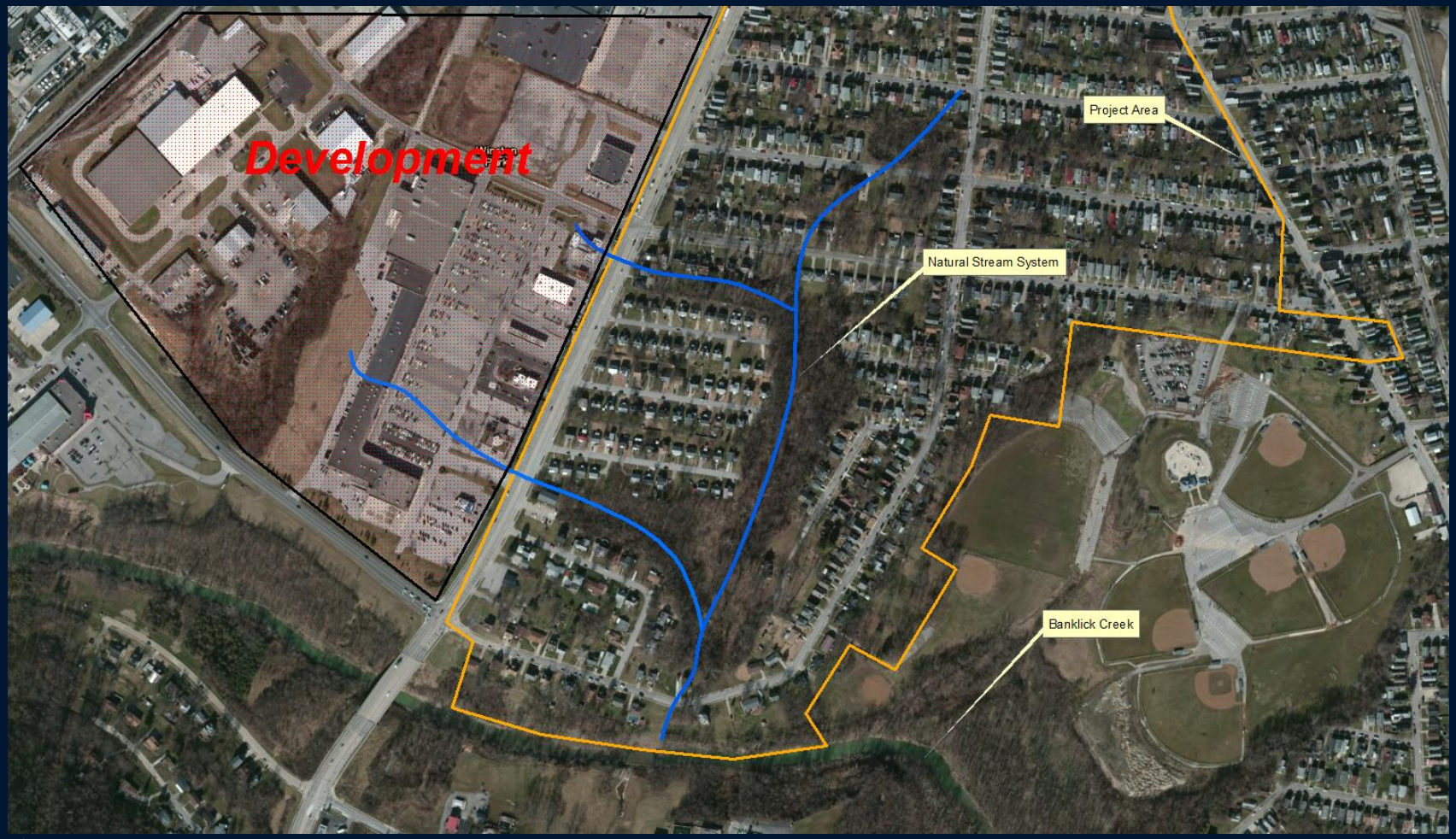
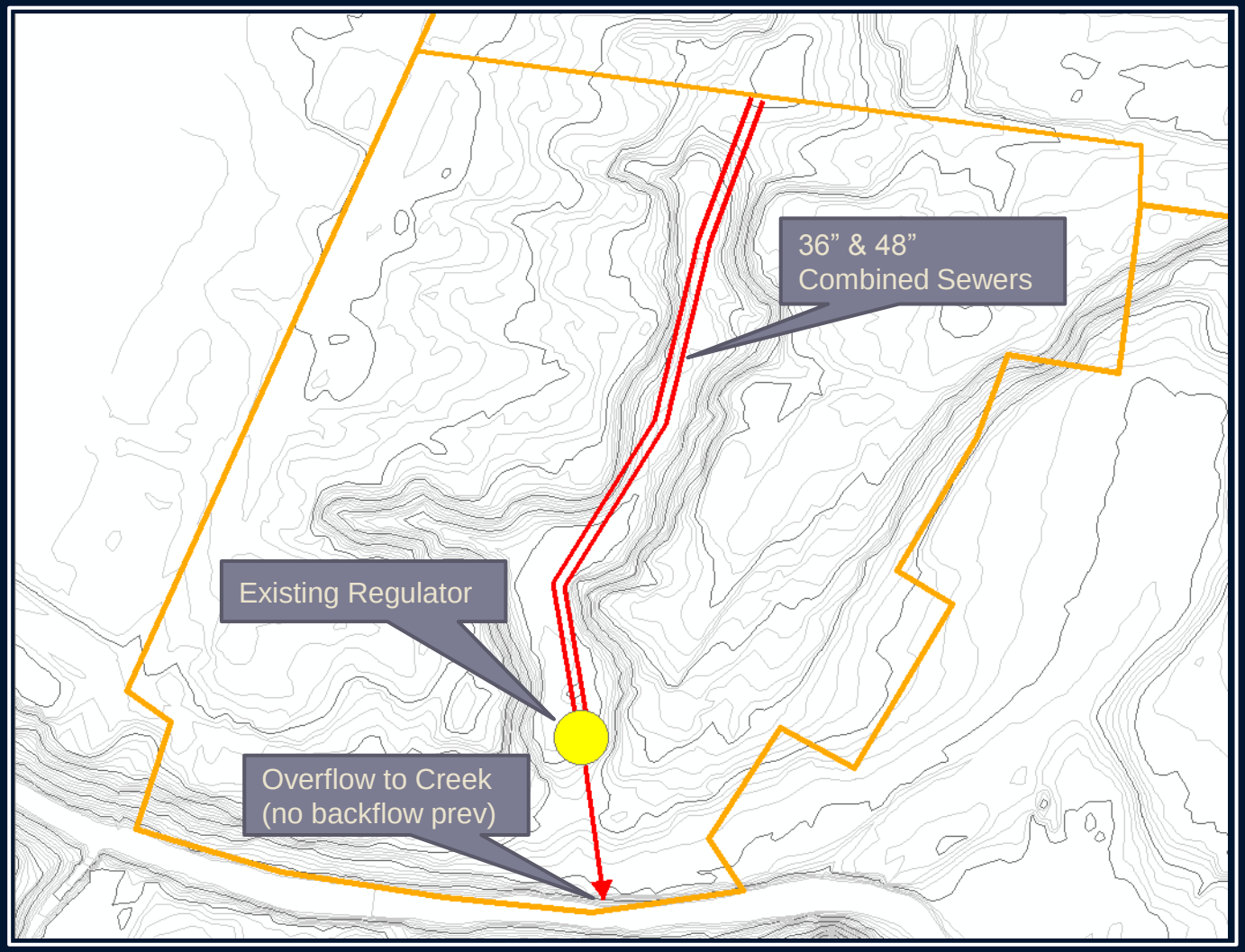
Natural Conditions

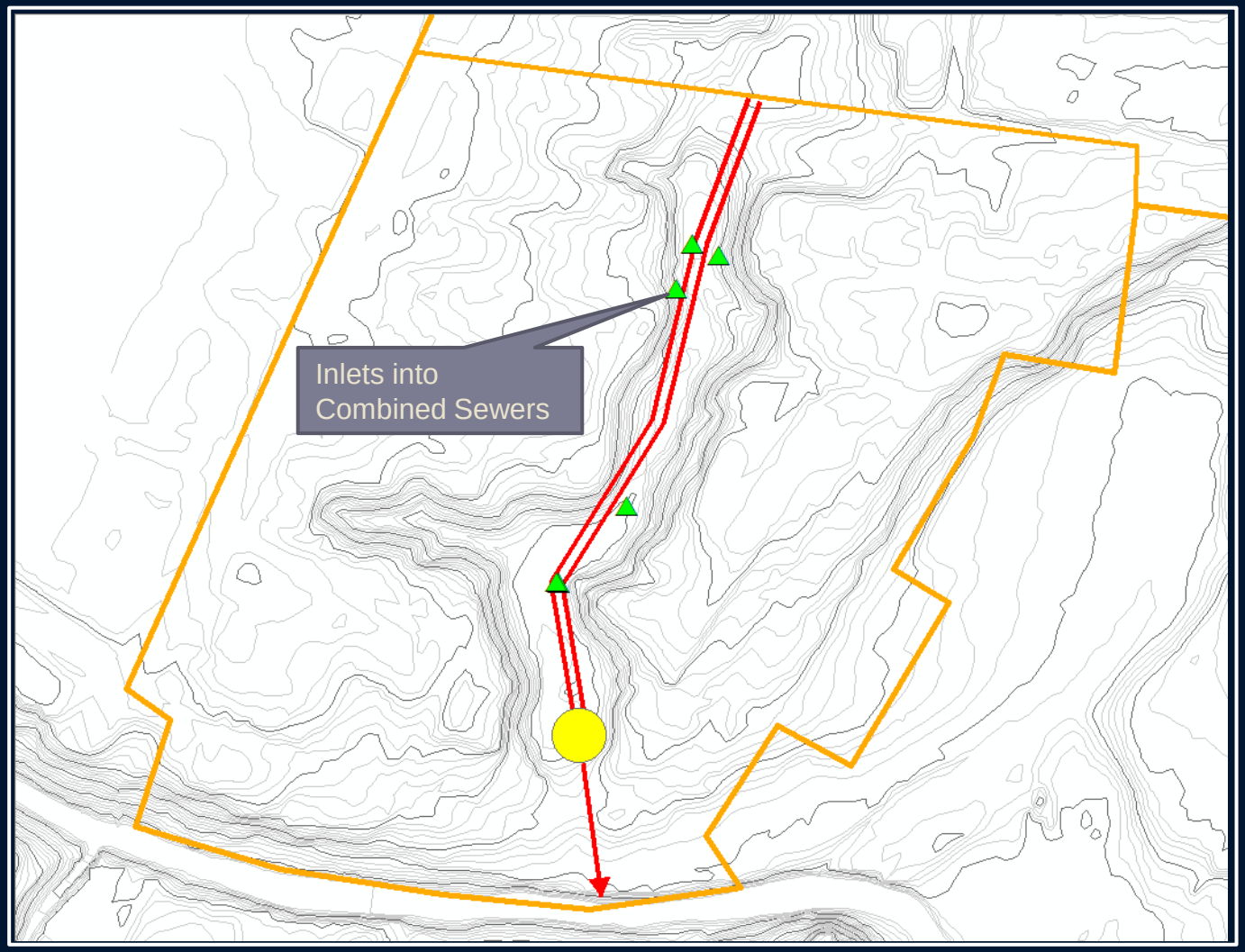


Natural Conditions

Existing Conditions



Existing Conditions



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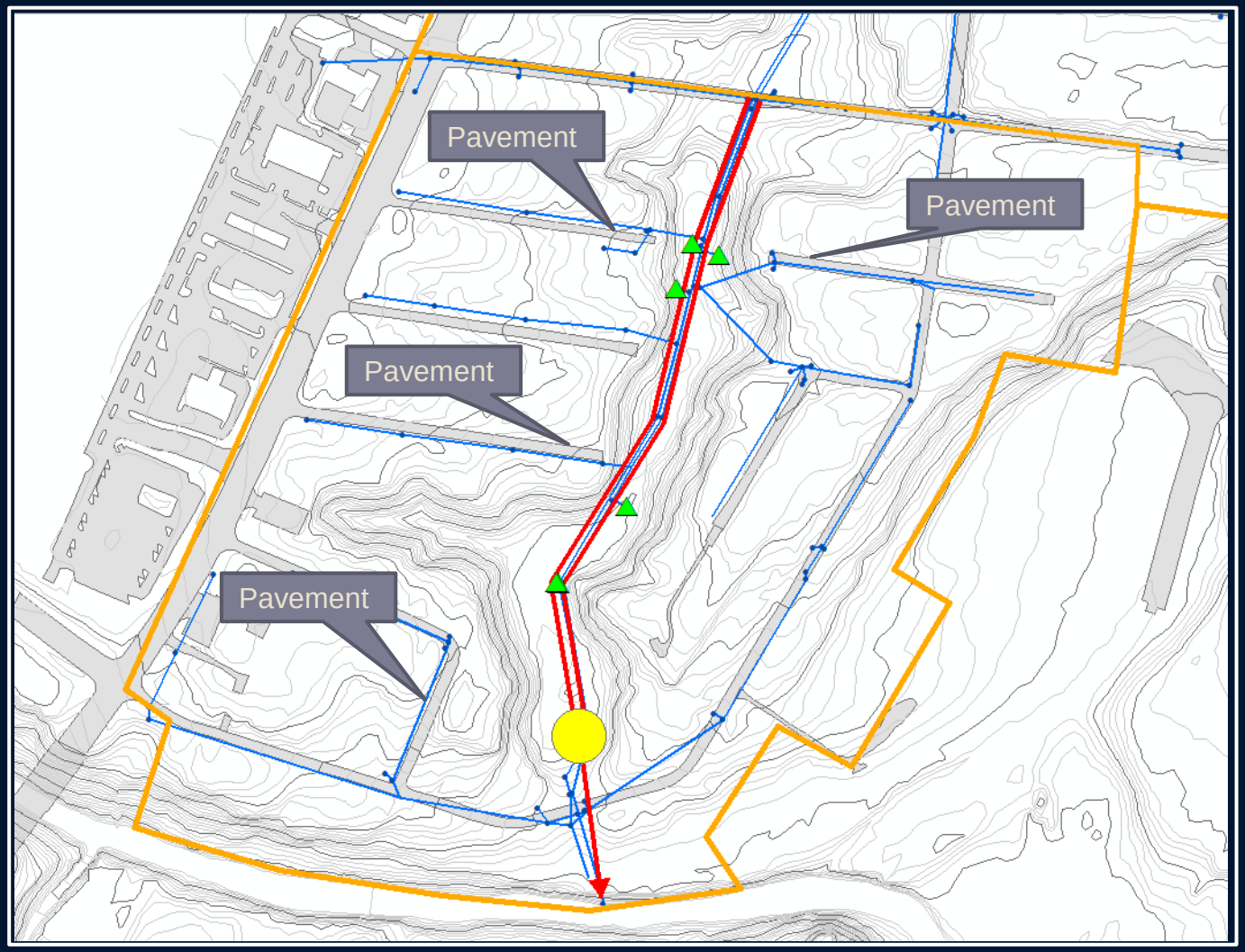

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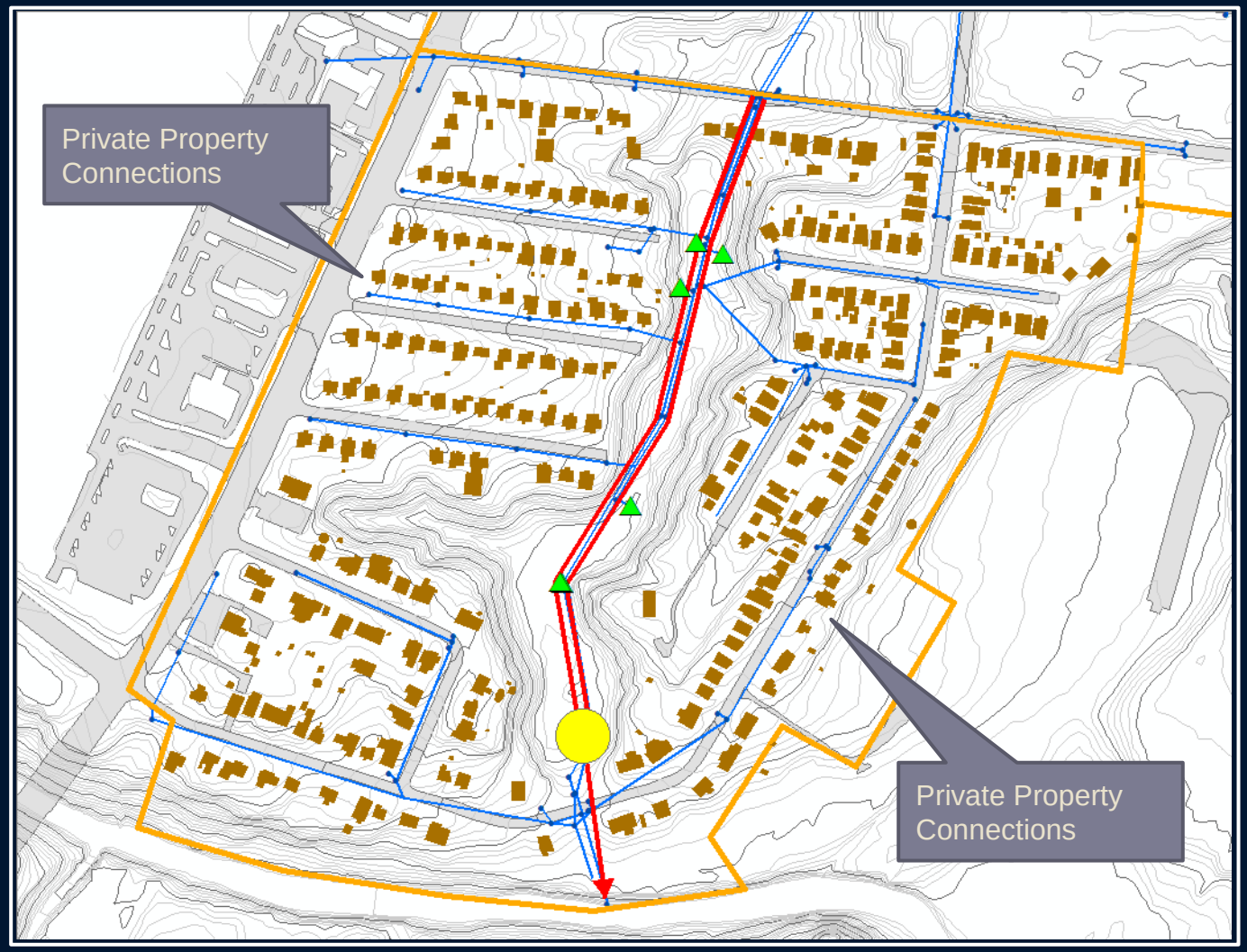

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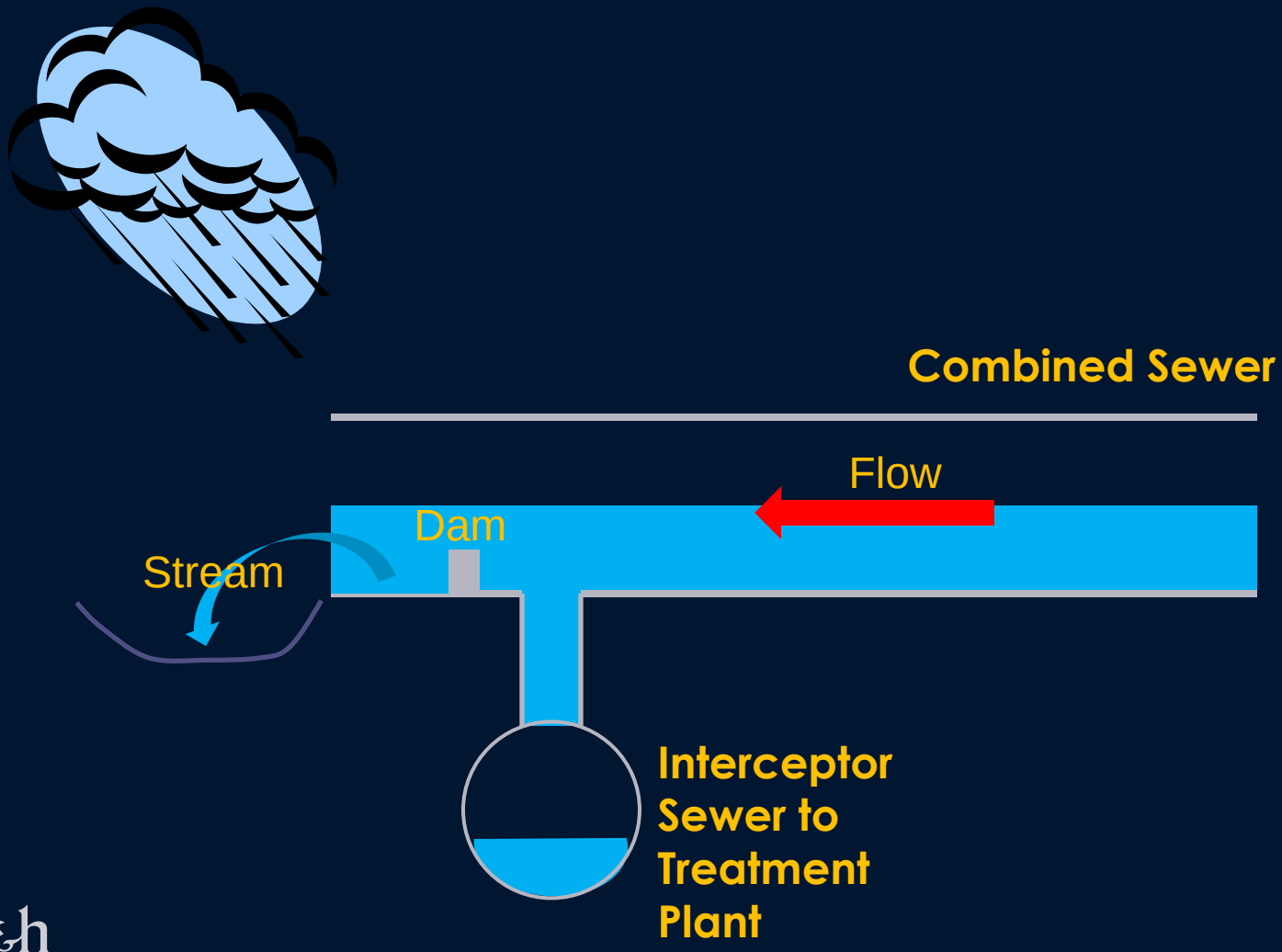

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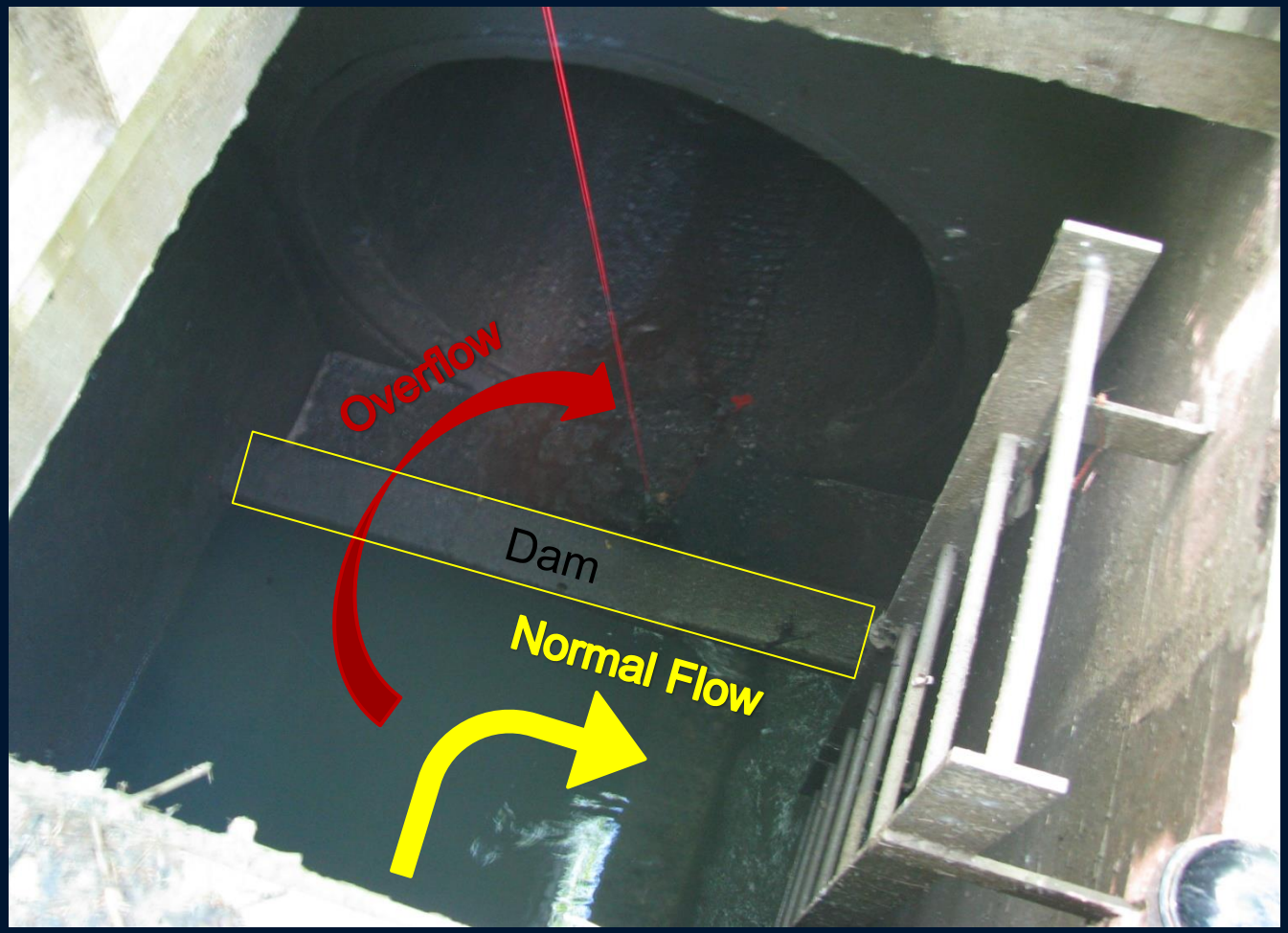
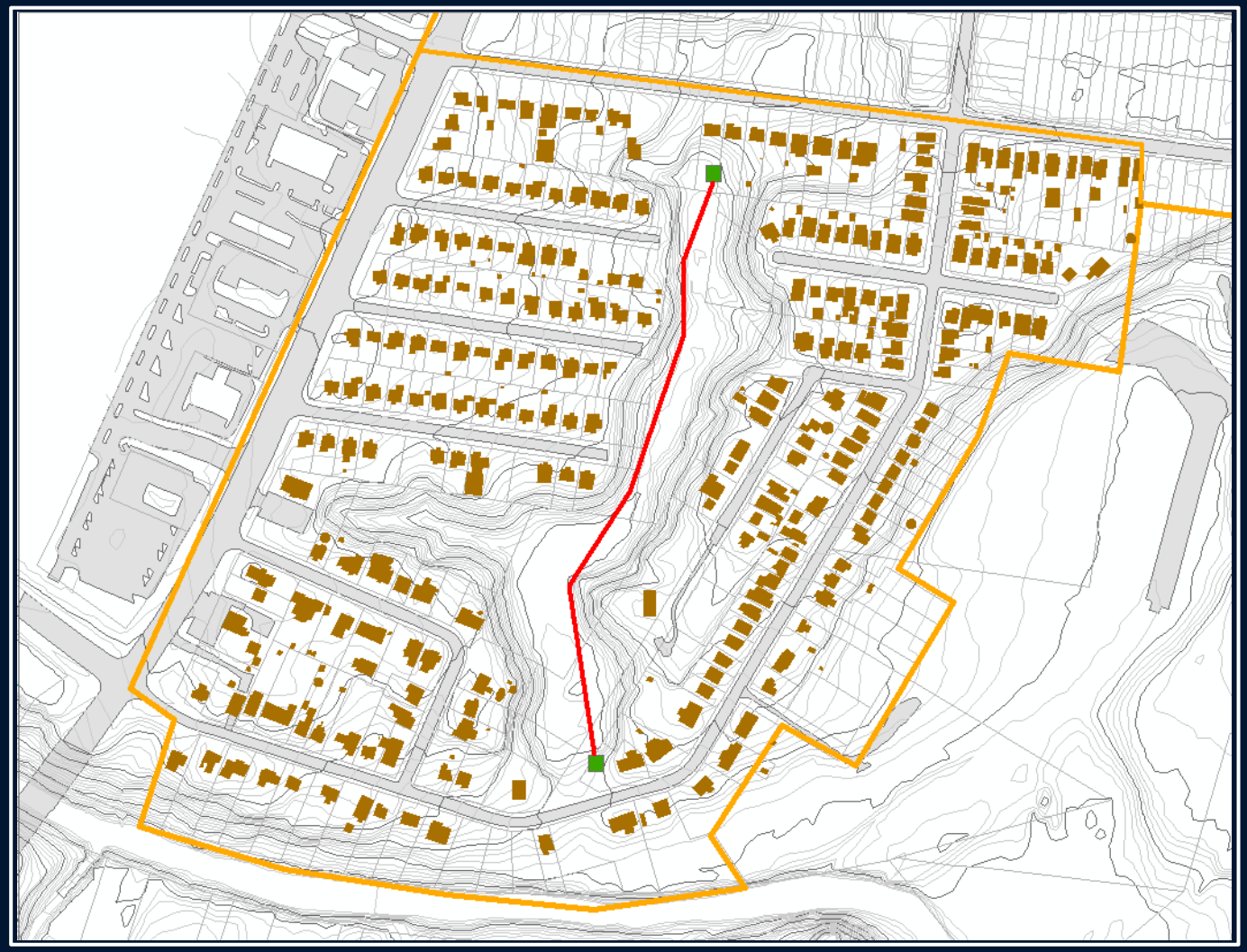


Initial Project Components

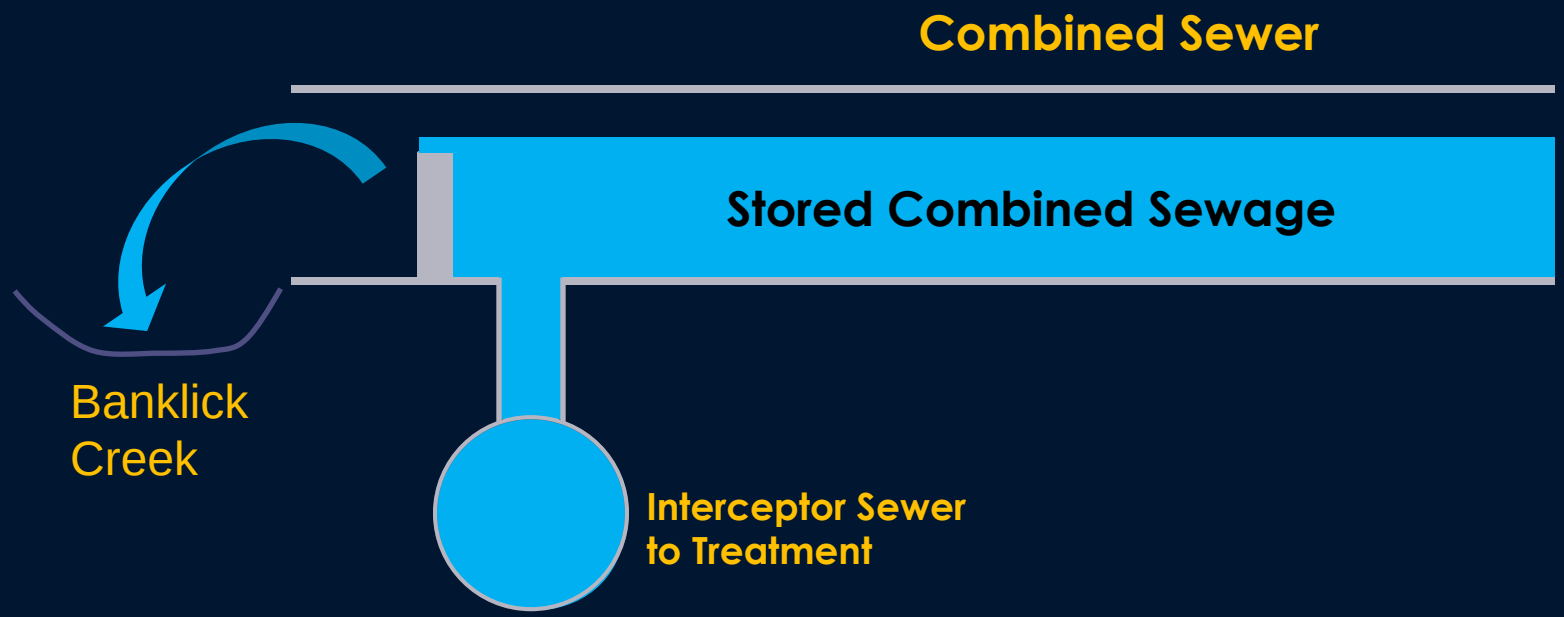
- New combined sewer with storage
- Removing the street load storm water
- Redirecting private-source storm water connections
- Biofiltration Basin for storm water treatment

New Combined Sewer

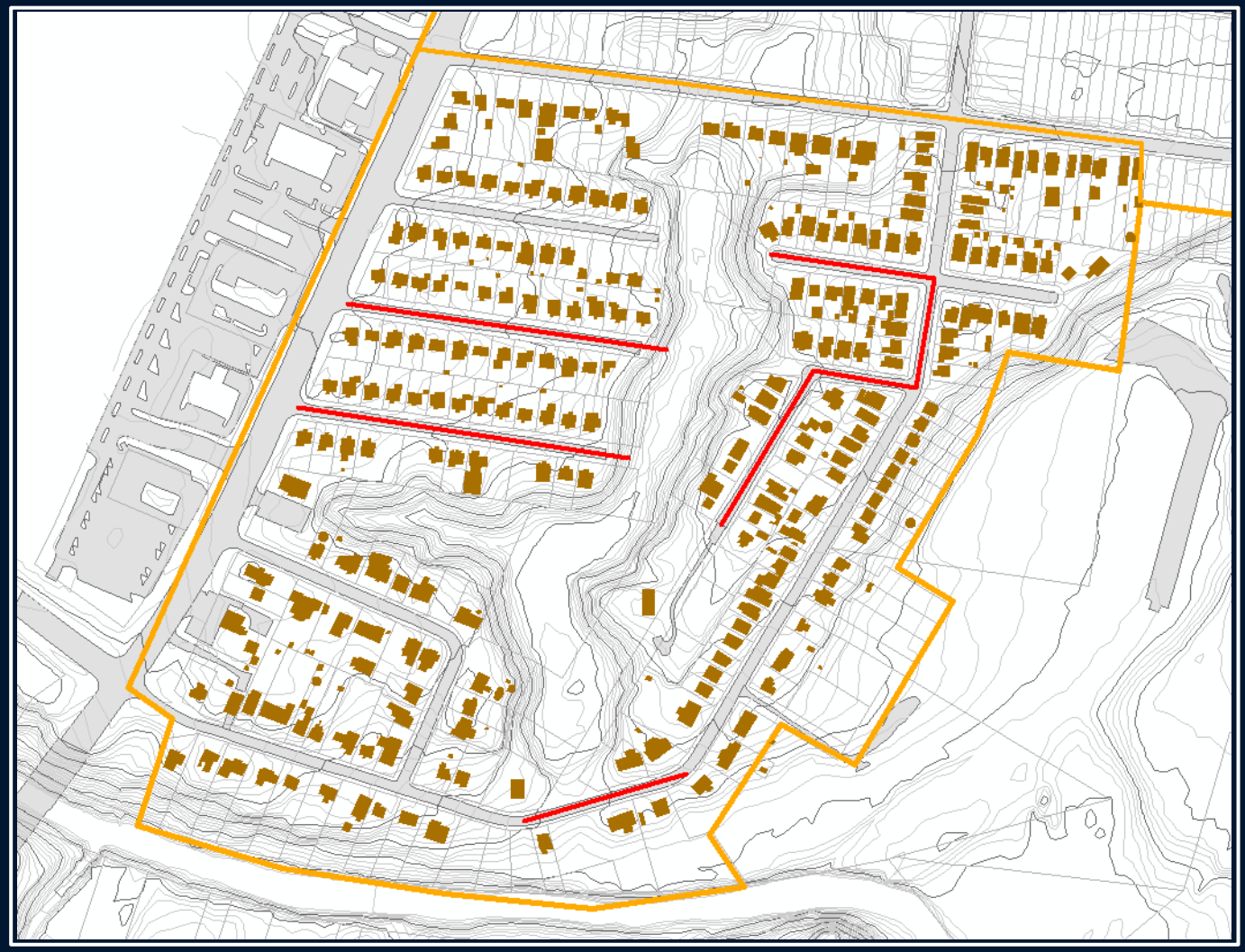


New Combined Sewer

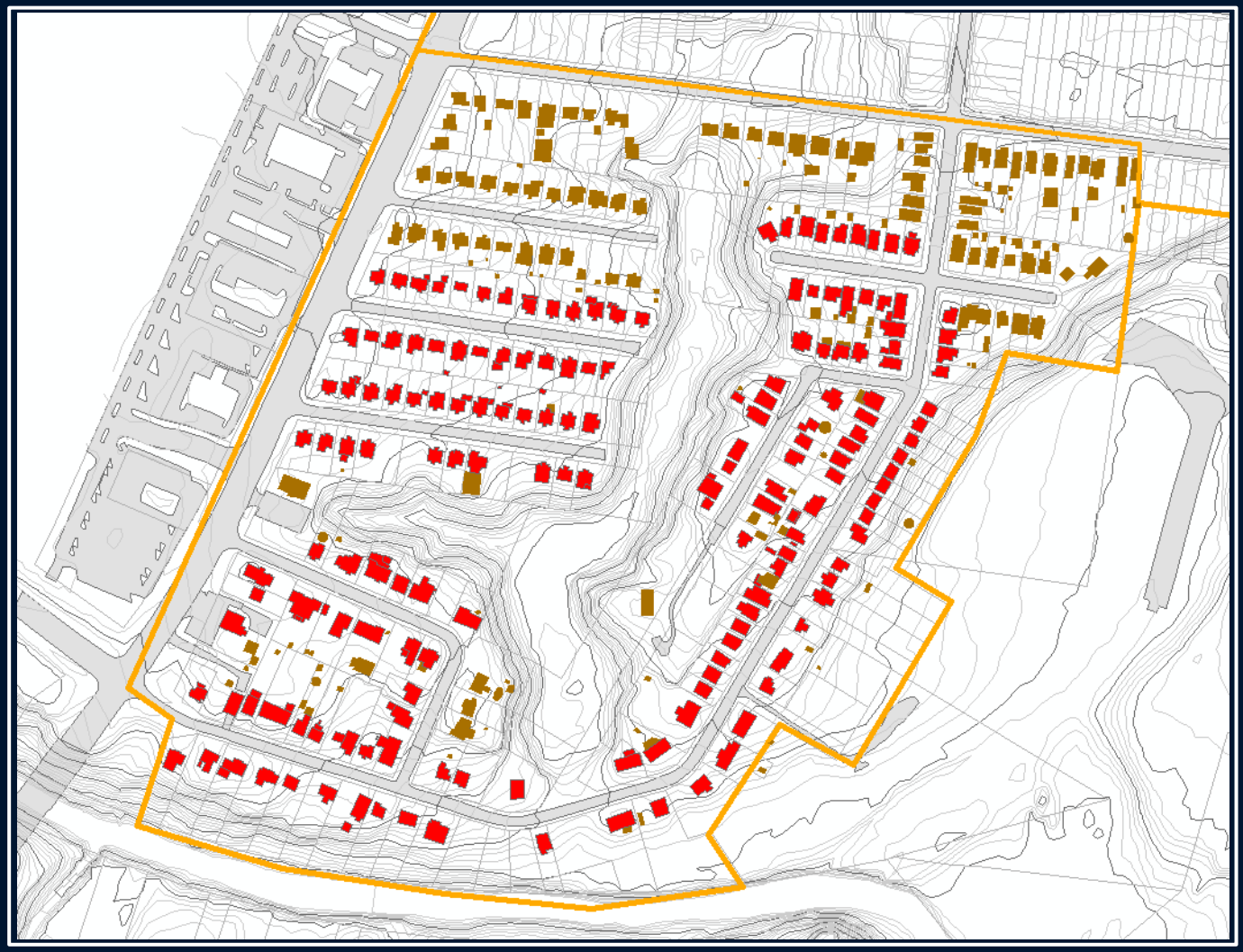
- New 72-inch pipe that can be used for limited in-line storage of wet weather flows.



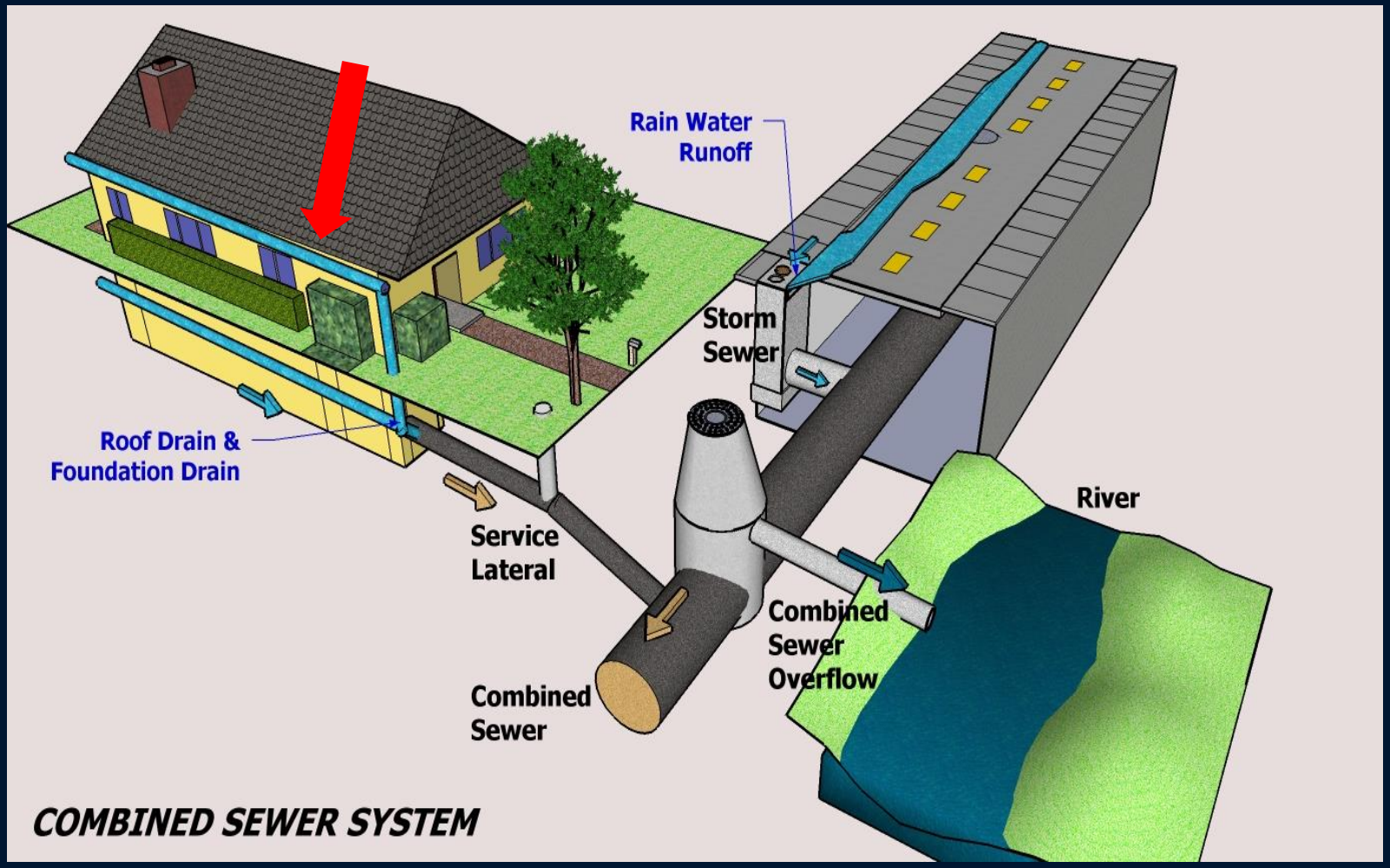
New Storm Sewers



Private Source Removals



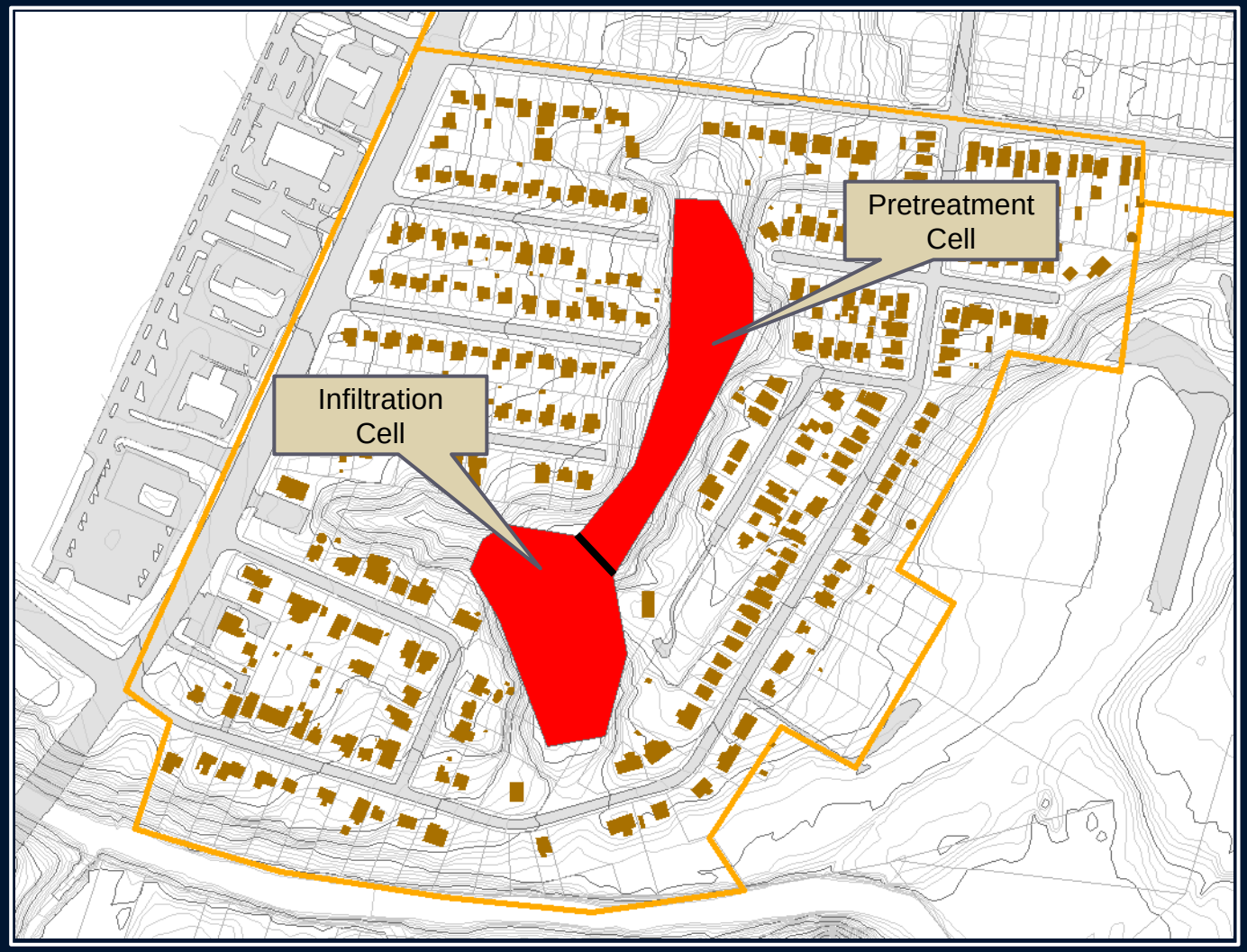
Private Source Removals



Private Source Removals

- SD1 funded project with no cost to property owners
- Requires buy in with property owners
- Existing drainage issues need to be considered

Biofiltration Basin



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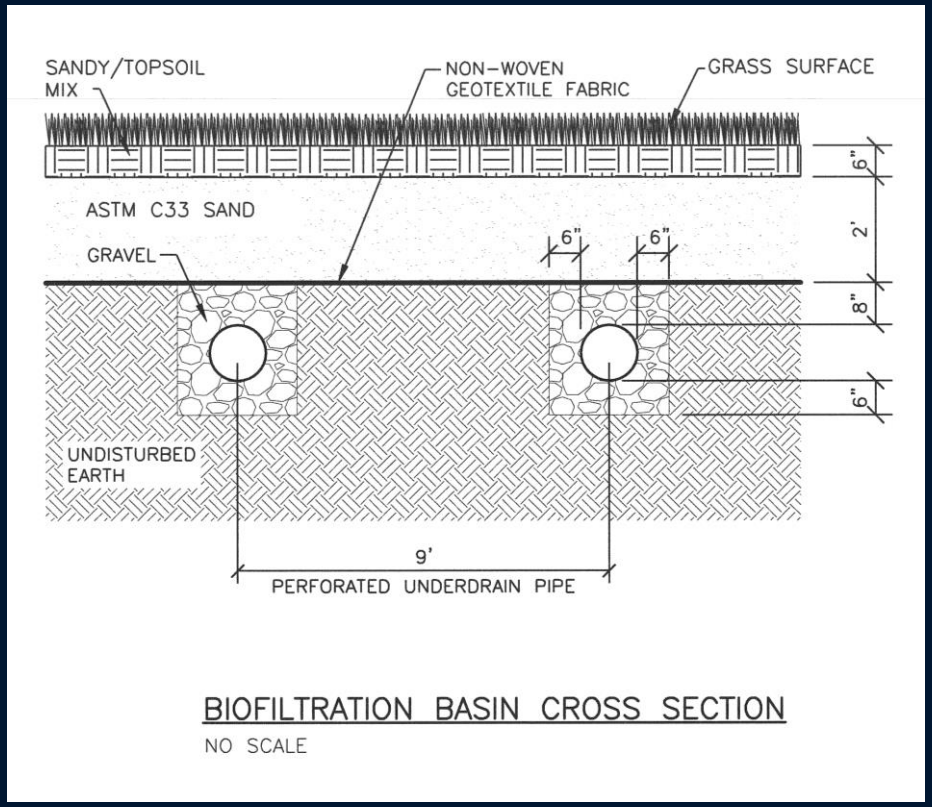
Biofiltration Basin

- Captures and treats the runoff from first 0.8 inches of rain
- Removal of bacteria, sediments and other pollutants
- Installation of native plant material



BIOFILTRATION BASIN CROSS SECTION

NO SCALE

Biofiltration Basin

- Biofiltration Basin Maintenance Plan
  - Short Term – 1st Two Growing Seasons
  - Long Term – 3rd Growing Season and Beyond

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Biofiltration Basin

- Short Term Maintenance
  - Weed Control:
  - Mow to manage weed growth if abundant annual weeds are present within the first and second growing seasons after sowing native seeds.
  - When vegetation reaches a height of 10 to 12 inches, mow to a height of approximately 6 inches.
  - Mow before the flowering stage of the target weed species.
  - Discontinue mowing at the end of the growing season (September).
  - Spot treat aggressive weeds, such as Canada thistle, spotted knapweed, purple loosestrife, and common reed, with appropriate herbicides, following the Manufacturer's guidelines.

Biofiltration Basin

- Long Term Maintenance
  - Brush hog the biofiltration basin in the spring (cutting about 6 inches from the ground surface) or mow to suppress woody vegetation which will try to establish in this area.
  - Inspect the basin for woody vegetation in mid to late summer.
  - Pull seedlings or cut stems close to the ground, and treat the cut stem with a systemic herbicide.
  - Herbicide should be applied by a licensed herbicide applicator. The applicator should select an herbicide labeled appropriately for the targeted species and application method.

Basis of Design Technical Memo

Church Street CSO Reduction Project
CIP No. S-580-4
for
Sanitation District No. 1 of Northern Kentucky

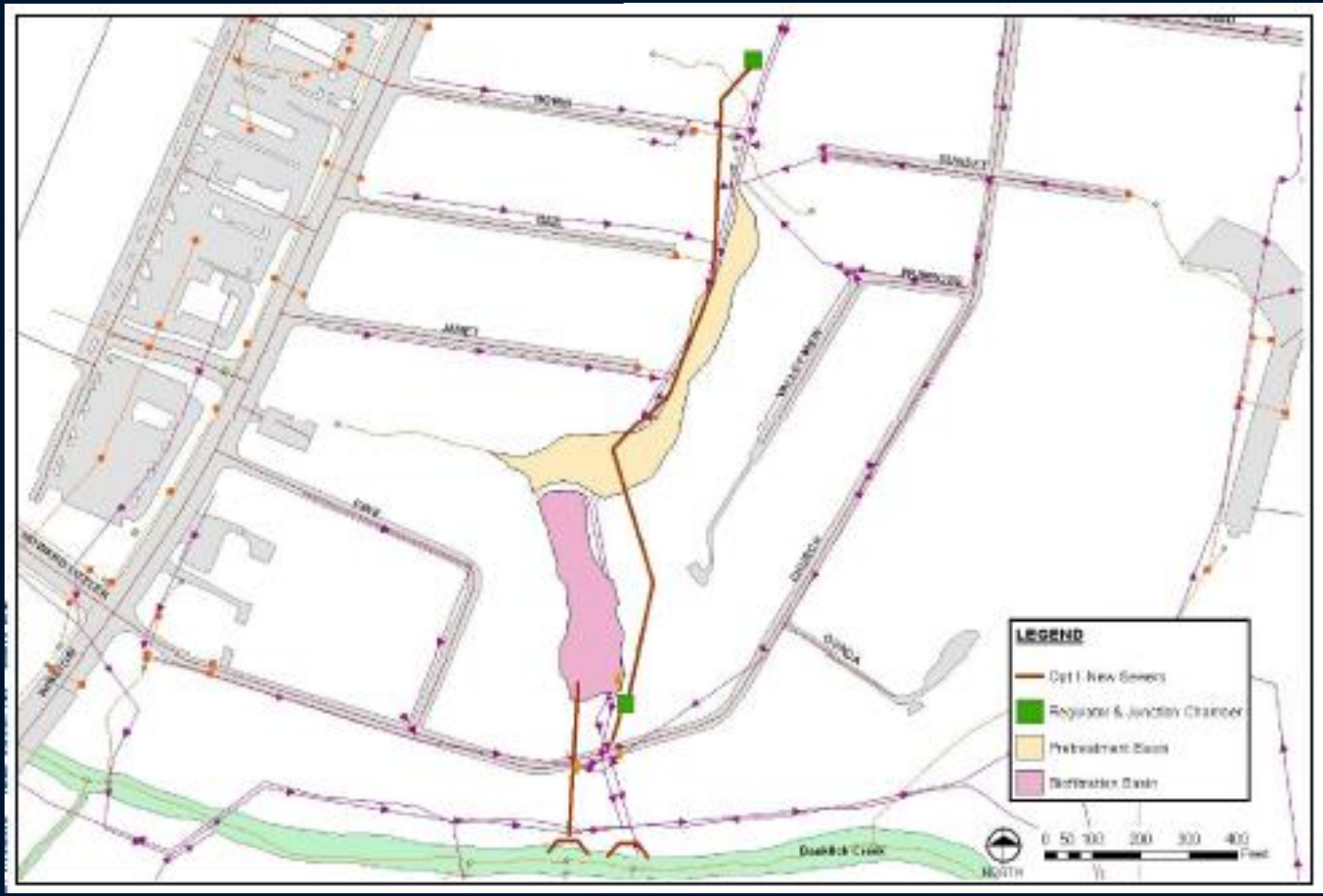
Prepared by
fishbeck, thompson, carr & huber, inc.
with
XCG Consultants, Inc.
Thelen Associates, Inc.
Berding Surveying

January 18, 2012
Project No. G110250

fTC&h
Fishbeck, Thompson, Carr & Huber
engineers • scientists • architects • constructors

fTC&h

Basis of Design Technical Memo



08/31/2011

	Construction Cost
	$2,416,005
	749,750
	257,403
	98,550
	61,840
revention	128,656
	-
	34,451
	$3,746,655

Basis of Design Technical Memo

	Construction Cost
	$3,746,655
mrose)	163,821
disconnect -	481,121
	$3,910,476

Basis of Design Technical Memo

e Disconnects)	Construction Cost
	$4,227,776
	347,249
	194,795
	$4,769,820

Basis of Design Technical Memo

Disconnects)	Construction Cost
	$4,769,820
	220,739
	721,356
	$5,711,915

Basis of Design Technical Memo

Table 6 - Construction Costs – Options 1 through 4

Alternative Analysis of Removal Options

Option	Effective Area Removed (Ac)	Construction Cost ($)	Cost per Gallon Removed** ($/Gal)	Incremental Cost per Gallon Removed** ($/Gal)	Overflow in Typical Year	
					w/o RWIP* (MG)	w/ RWIP* (MG)
Existing	0.0	0	$0.00		57.6	45.0
1	16.7	$3,746,655	$0.11	$0.11	25.0	21.8
2	19.0	$3,910,476	$0.12	$0.33	24.5	21.2
3	23.1	$4,769,820	$0.14	$0.78	23.4	20.2
4	35.0	$5,711,915	$0.16	$0.50	21.5	18.4

* River Water Intrusion Program

** Cost per gallon removed based on overflow without RWIP implemented

Ac acres

MG million gallons

Recommended Improvements

- New 72-inch combined sewer
- Junction chamber at head of new 72-inch combined sewer
- New regulator structure
- New sections of 12-inch underflow pipe and 60-inch overflow pipe downstream of new the regulator with backflow prevention

Recommended Improvements

- Bio-filtration basin and bypass channel
- New 60-inch Bio-filtration outfall with backflow prevention

Recommended Improvements

- New 12-inch and 15-inch storm sewers to serve private source storm water disconnections and street load separations
- Private source storm water disconnections (131 properties).

Recommended Improvements

Total Construction Cost

$5,181,000

Project Challenges

Mother Nature

Project Challenges

Myotis Sodalis

(Indiana Bat)

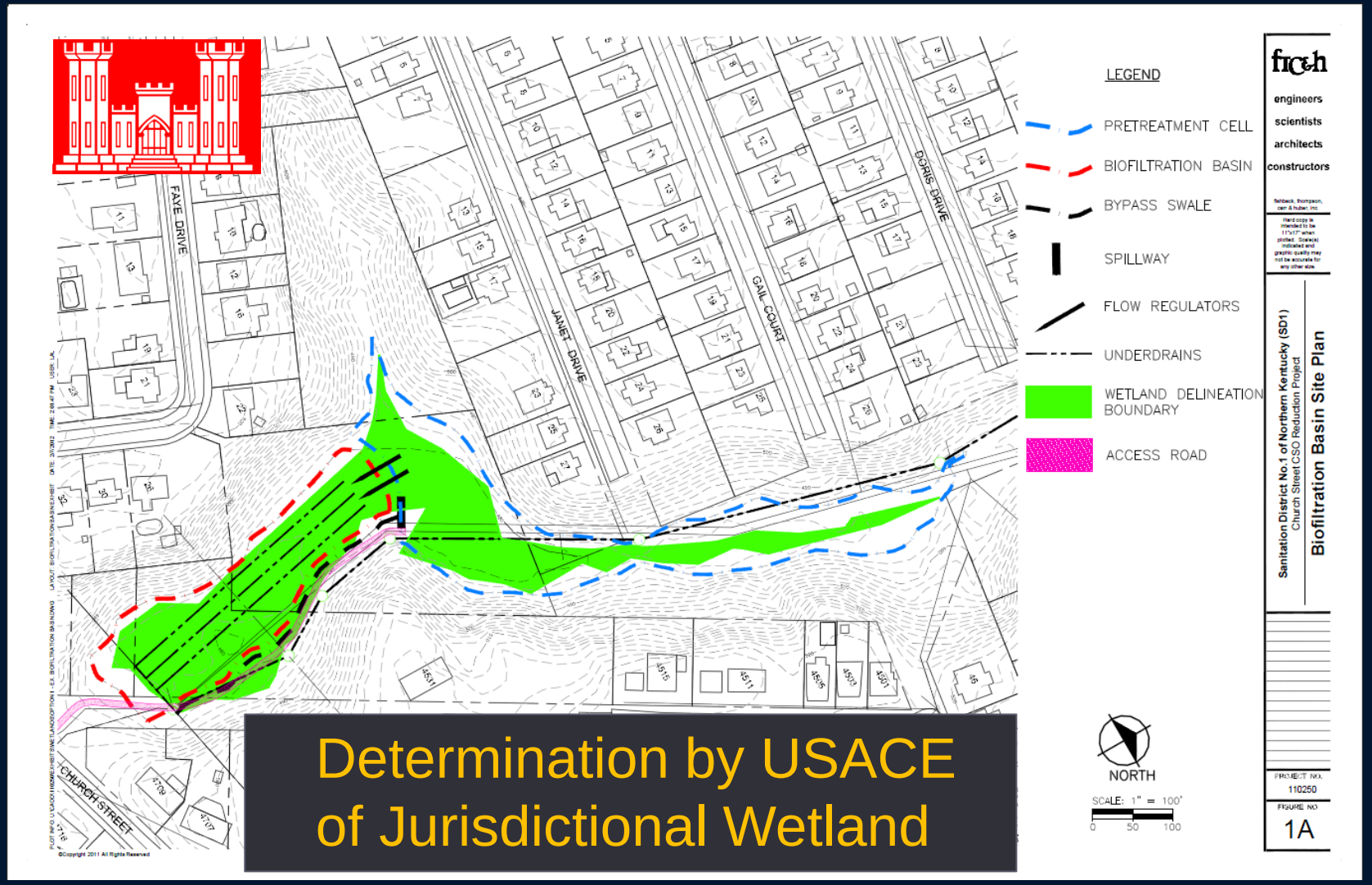
Project Challenges

Myotis Sodalis

Options

- Prove there are none in the project area by an approved study.
- Restrict the cutting down of trees to between October 15 and March 31.
- Pay into the Indiana Bat Conservation Fund

Project Challenges



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Project Challenges

- Nationwide versus Individual Permit
  - Public Hearing req'd for Individual Permit
  - SD1 opposed to Public Hearing
  - Project changes to fit under Nationwide Permit

Project Challenges

- Changes Due to USACE Ruling
  - Remove access road
  - Change Biofiltration Basin size
  - Purchase mitigation credits (1.22 ac. credits)

Project Challenges

Before USACE

0.9 Acres

After USACE

0.3 Acres

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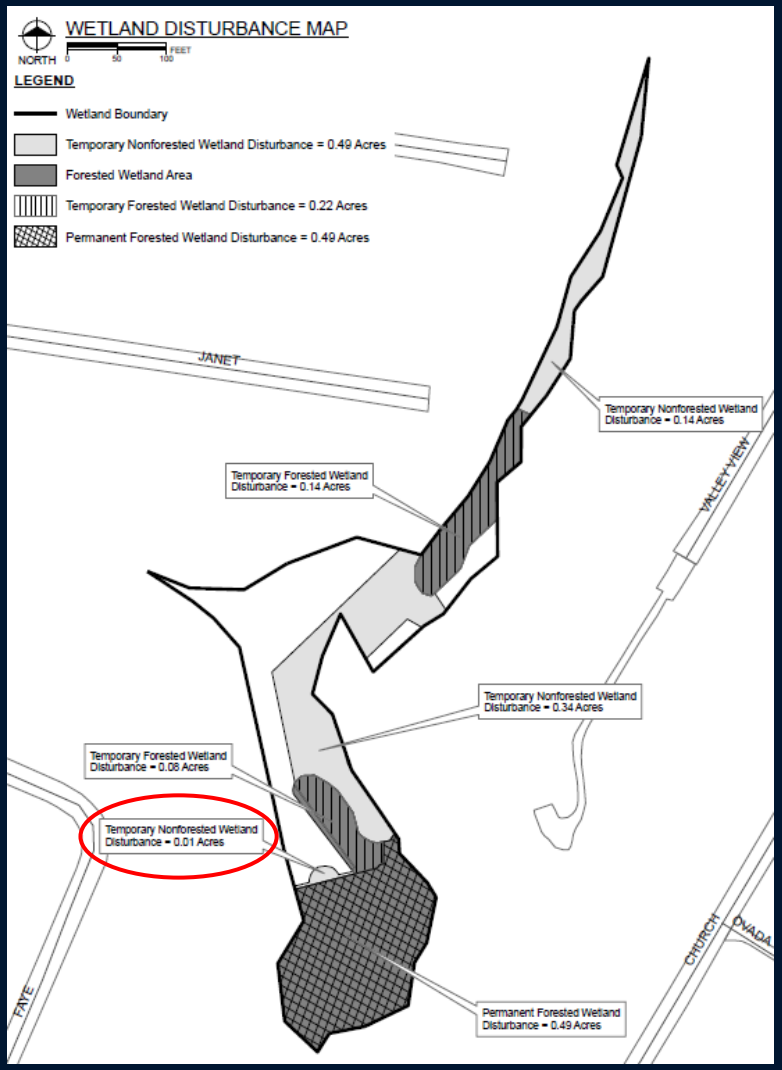
Project Challenges



Project Status

- Drawings & Specs Complete
- Bid Date – December 2013
- Construction Complete – Spring 2015
  (allows for spring delays in construction)

Questions