Co-Benefits of Utilizing Vacant Land for CSO Reduction

Fleet Avenue Green Infrastructure

Northeast Ohio Regional Sewer District

SVD Slavic Village

AECOM

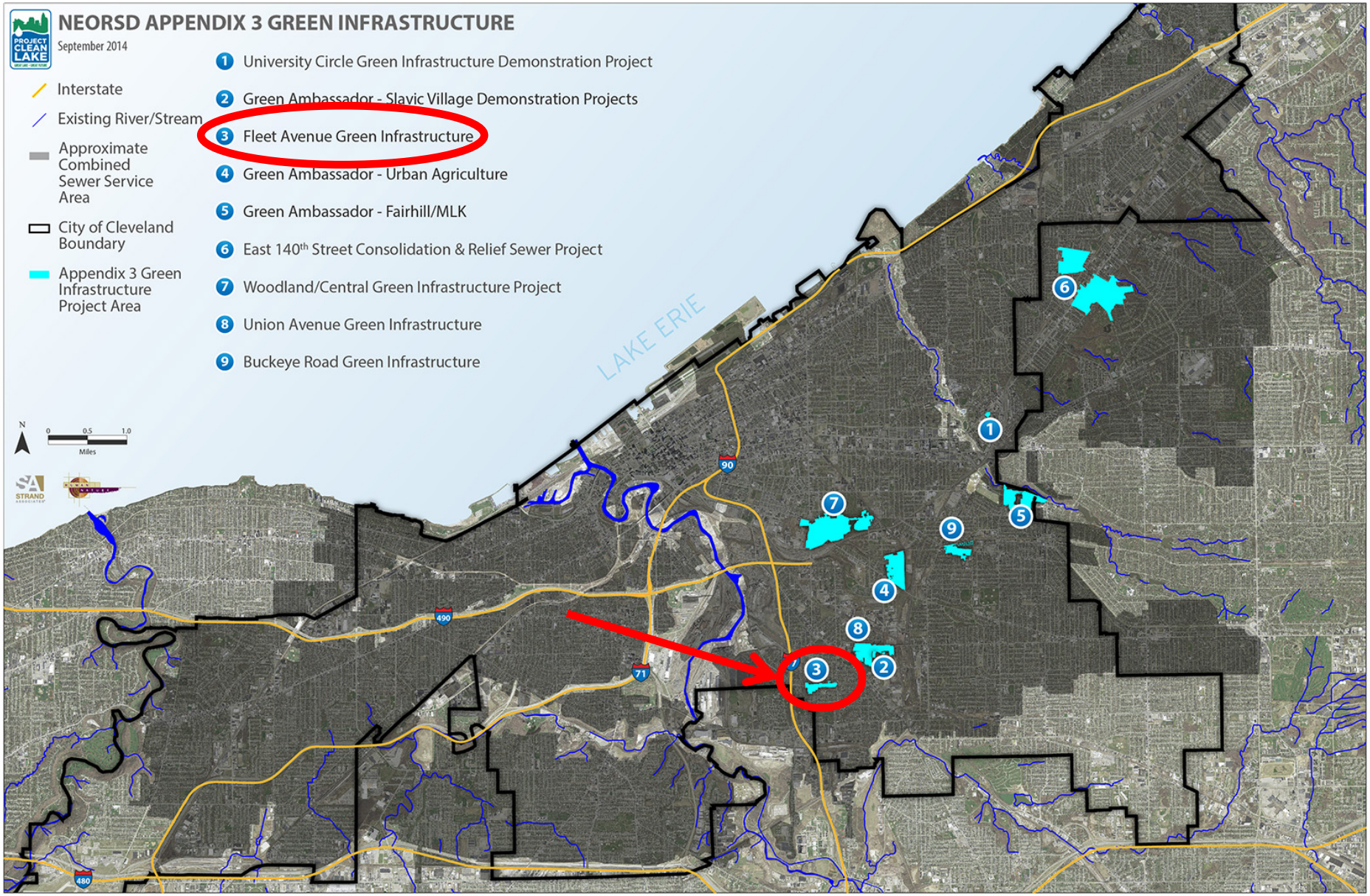
City of Cleveland Ohio

Green Infrastructure Ambassador Project

Presentation Agenda

- **Background**
  - The Project & Strategic Goals
  - Alternatives Analysis
  - Preferred Alternative
- **Design**
  - Hydrology and Hydraulics
  - Connectivity
  - Plant and Soil Selection
- **Construction**
- **Monitoring & Maintenance**

Project Area Map



Your Sewer District Keeping our Great Lake great.

City of Cleveland Coordination

- Complete and Green Streets Ordinance in effect as of January 2012
- Fleet Avenue Reconstruction project is the first complete and green street under the Ordinance
- Fleet Avenue falls within a target area for CSO removal for NEORSD
- Actively coordinated with Slavic Village Development and the City's Ward Councilman, Anthony Brancatelli

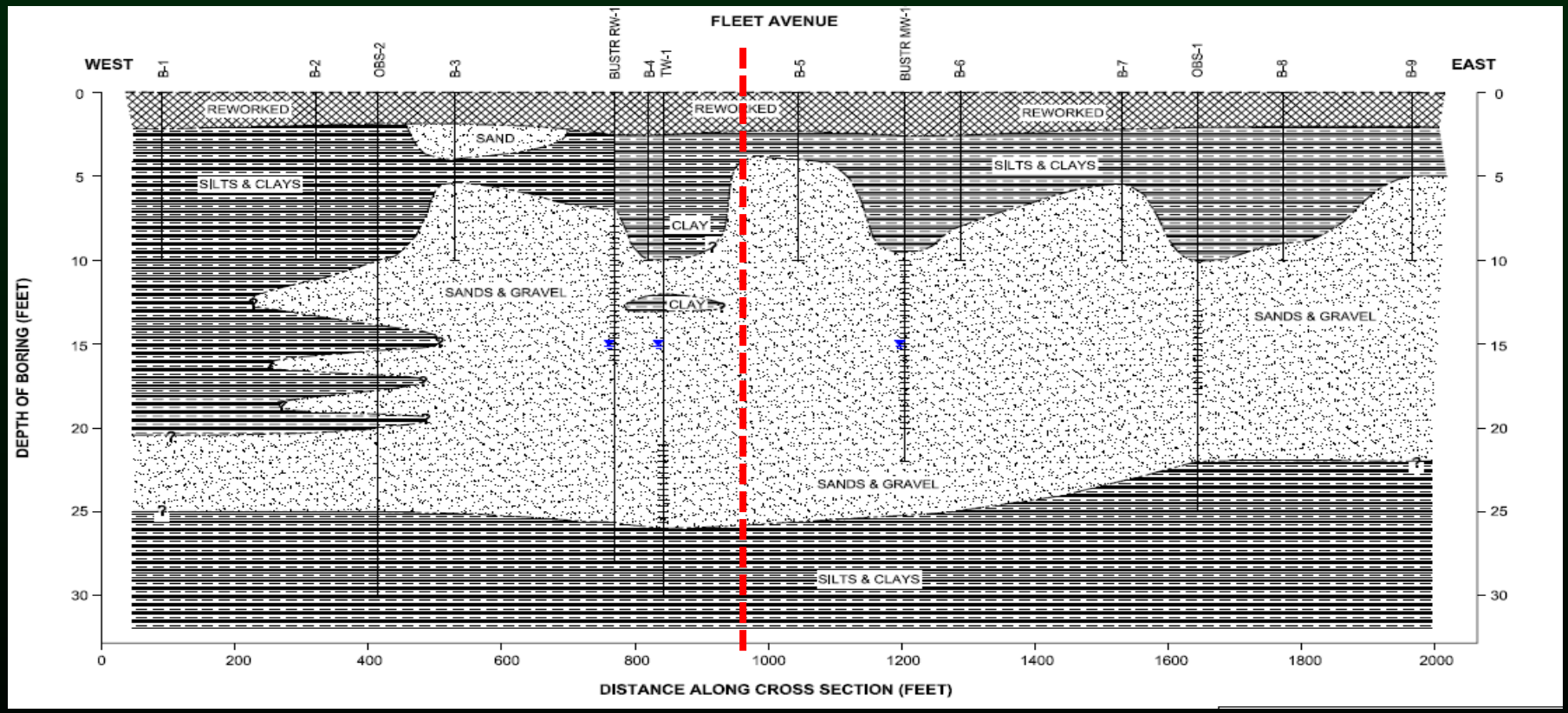
Green Infrastructure Design

Preferred Alternative - Infiltration Basin

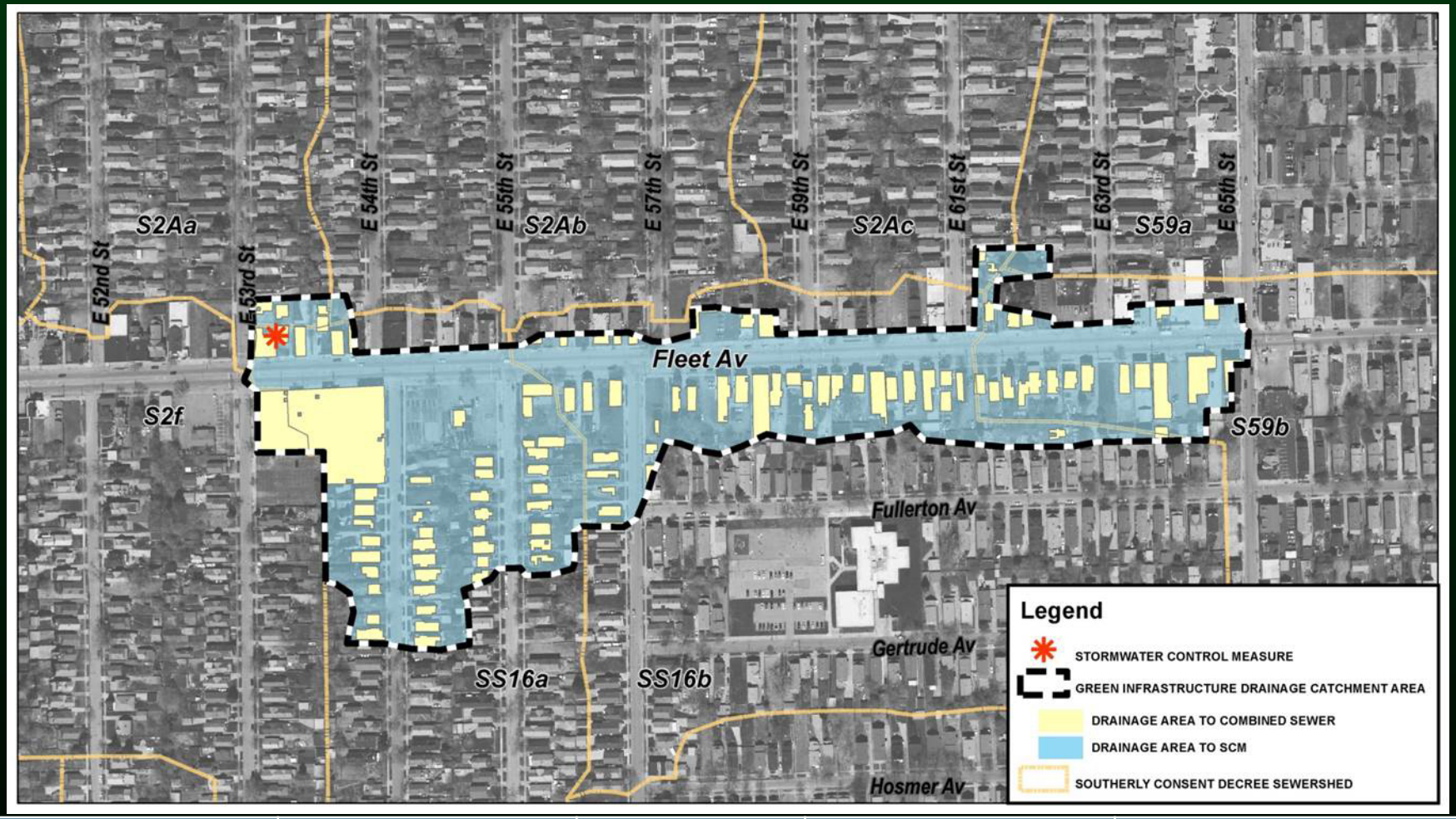
- Reduce Utility Conflicts
- Available Land (Vacant)
- Controls and offloads typical year event, overflows to combined system
- Reduces flow and volume
- Centralizing O&M
- Community Benefits

Green Infrastructure Design

Sandy Soil Profile Along Fleet

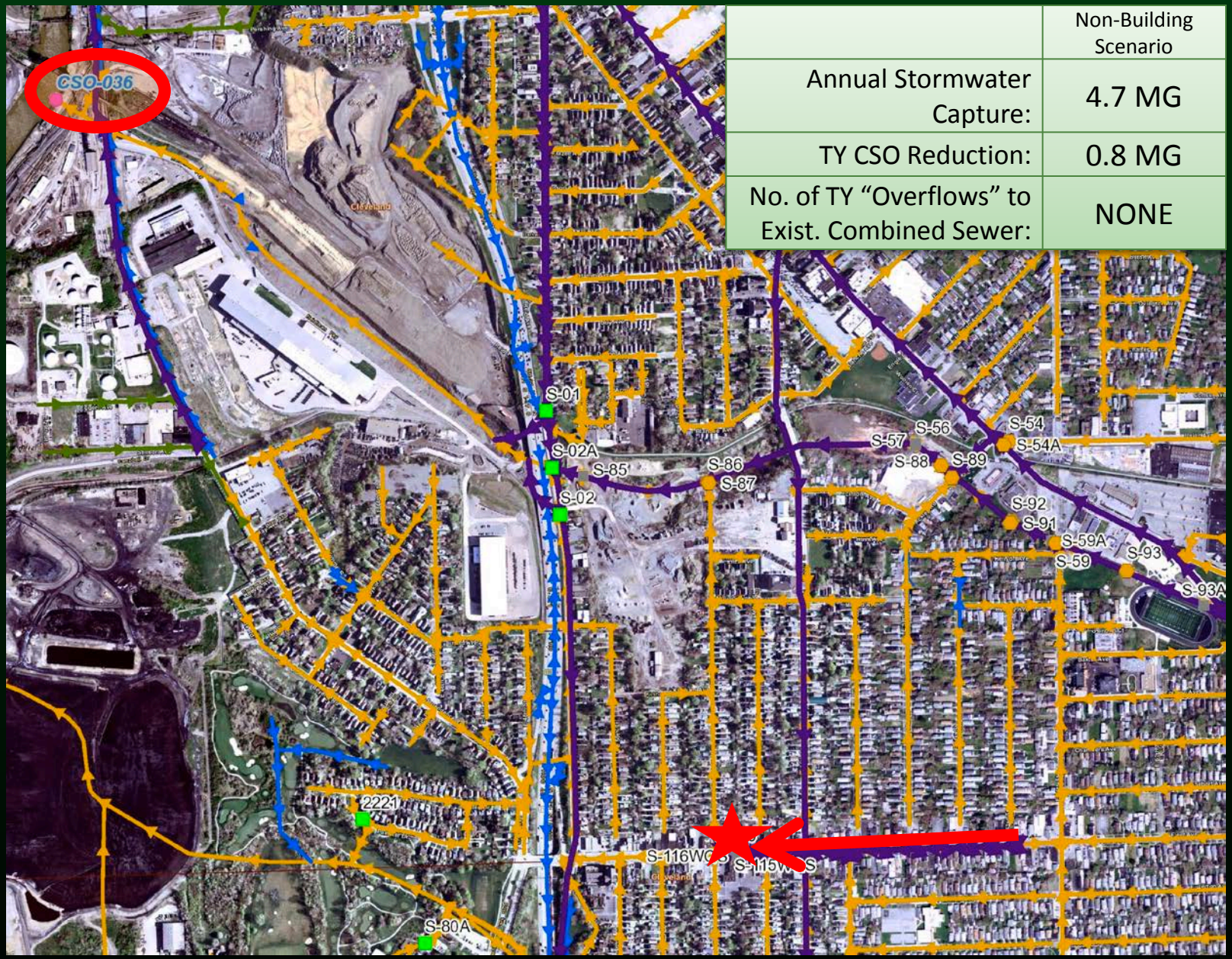


Contributing Drainage Area



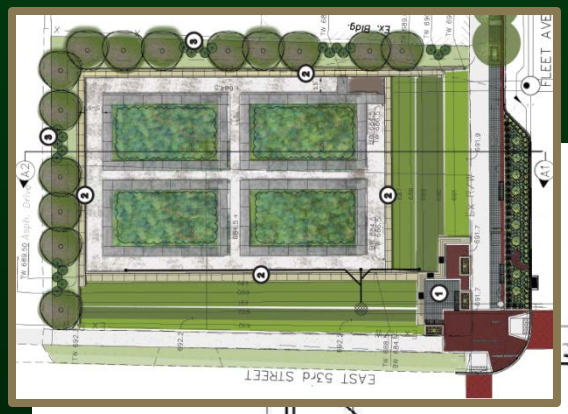
Total Catchment Area	Area to GICM Feature	Imp. Area to GICM	% Imp. to GICM	Remaining Area to Exist Comb. Sewer
19.4 acres	15.2 acres	10.0 acres	66%	4.2 acres
% Area Captured:	78%		**Annual CSO Reduction = 0.8 MG**	

Modeling/CSO Reduction



	Non-Building Scenario
Annual Stormwater Capture:	4.7 MG
TY CSO Reduction:	0.8 MG
No. of TY "Overflows" to Exist. Combined Sewer:	NONE

Design: Existing Site



ITEM SPECIAL – DECORATIVE PROPERTY FENCE, C.I.P. TYP

18 – INCH INLET RISER. SEE SHEET 271.

SUB–SURFACE INFILTRATION LIMITS, SCM SUBSURFACE LAYOUT PLAN, SEE SHEET 263.

95.1'

16.2'

5' TO START OF FENCE

RW1

SEE STREETSCAPE PLAN SHEETS

SEE SPLAN & PROFILE SHEETS

42+00

GI–7 PROP. MANHOLE, NO. 3, AS PER PLAN

SEE LANDSCAPE PLAN SHEETS

ENERGY DISSIPATION AREA & PIPE THROUGH WALL. SEE SHEET 268.

ITEM 608 – CONCRETE WALK MISC.: PAVER EDGING, AS PER PLAN

FLEET AVENUE

B 266

C 267

73.5'

1.0'

61.0'

SB–33

15' TO START OF FENCE

93.0'

GI–2 PROP MANHOLE, NO. 3

A 266

ITEM 611 – OBSERVATION WELL, AS PER PLAN

GI–4A PROP. MANHOLE, NO. 3, AS PER PLAN

D 267

GI–4 PROP. MANHOLE, NO. 3, AS PER PLAN

EAST 53rd STREET

GI–3A PROP. MANHOLE, NO. 3

SEE STREETSCAPE PLAN SHEETS

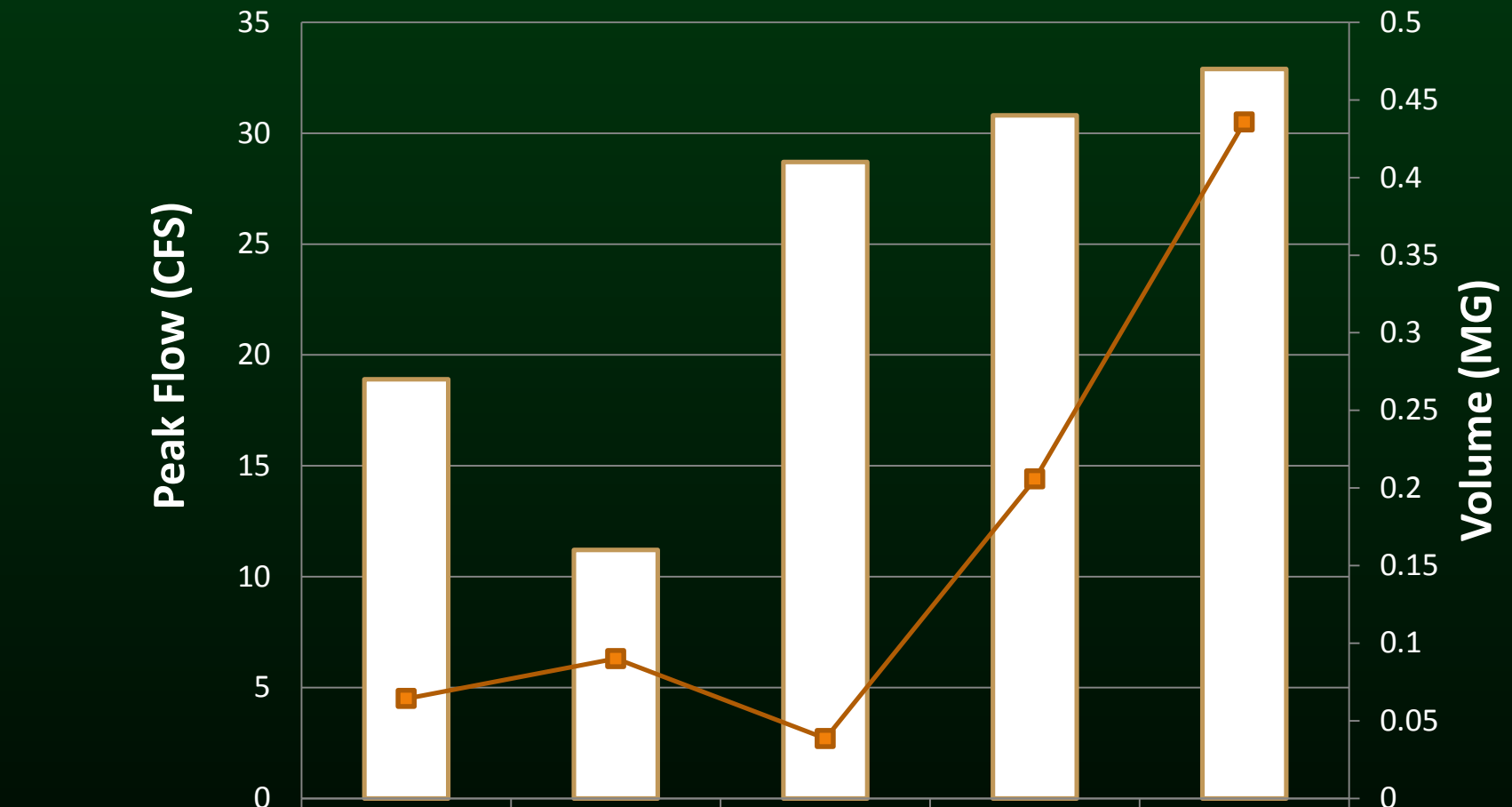
2 262

130+00

N

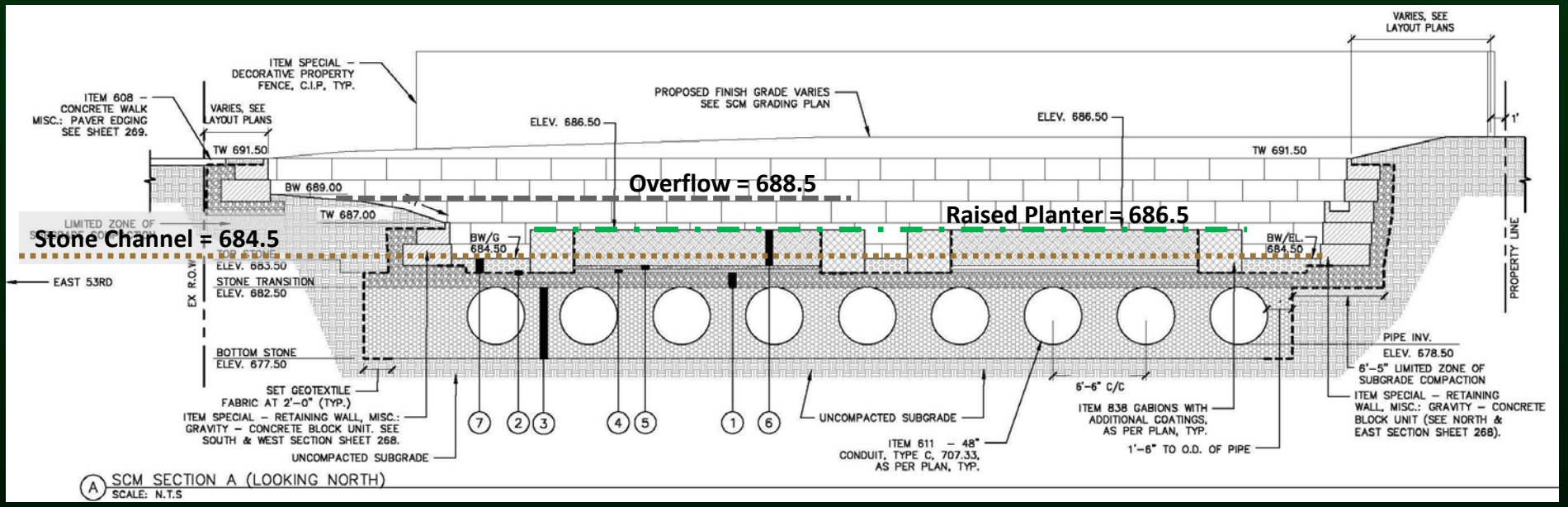
Design: Plan View

Design Storm Selection



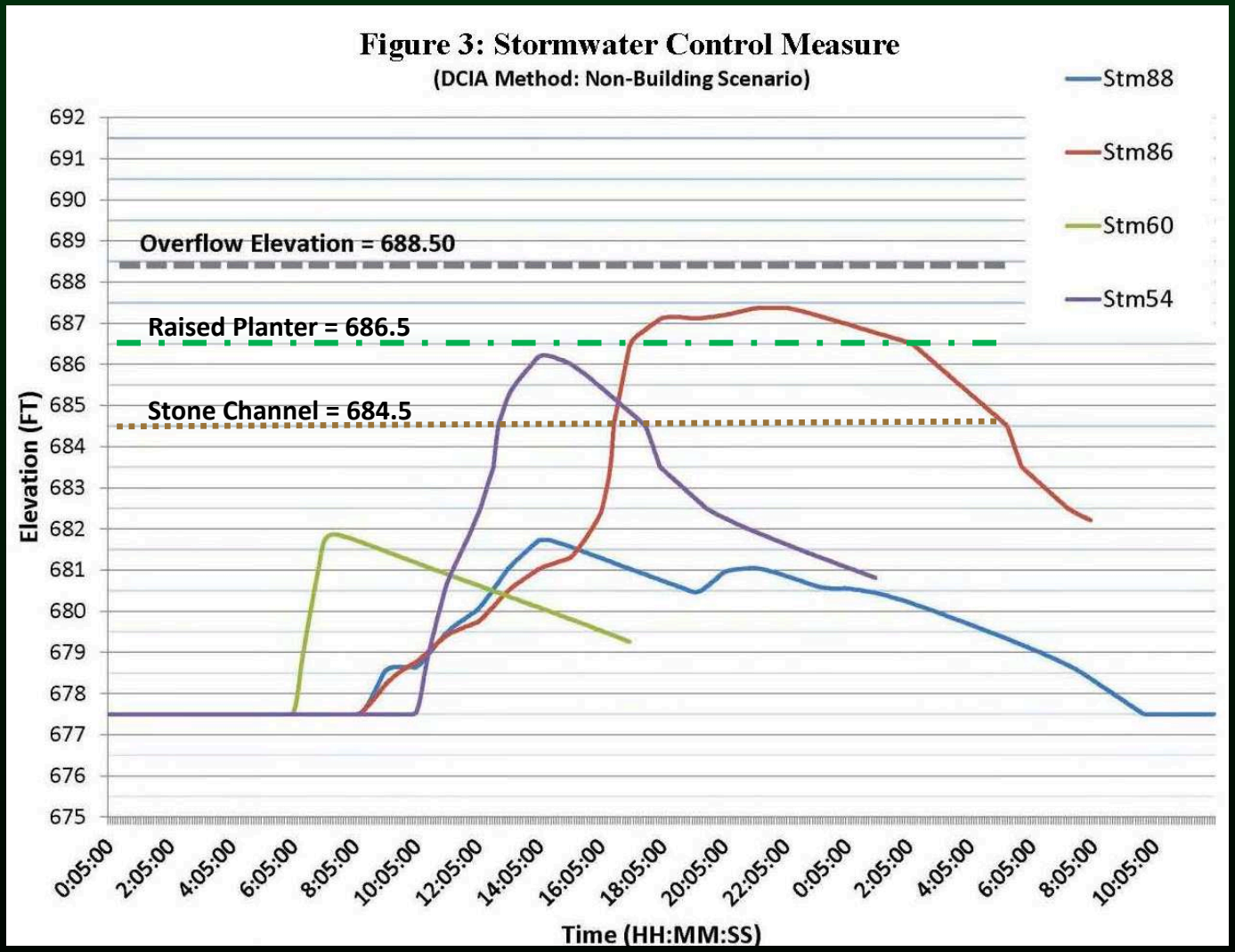
	Storm 54	Storm 60	Storm 86	5yr 6hr (1 hr peak)	5yr 6hr (15 min peak)
Macro Volume	0.27	0.16	0.41	0.44	0.47
Macro Peak	4.5	6.3	2.7	14.4	30.5

Design: Typical Year HGL

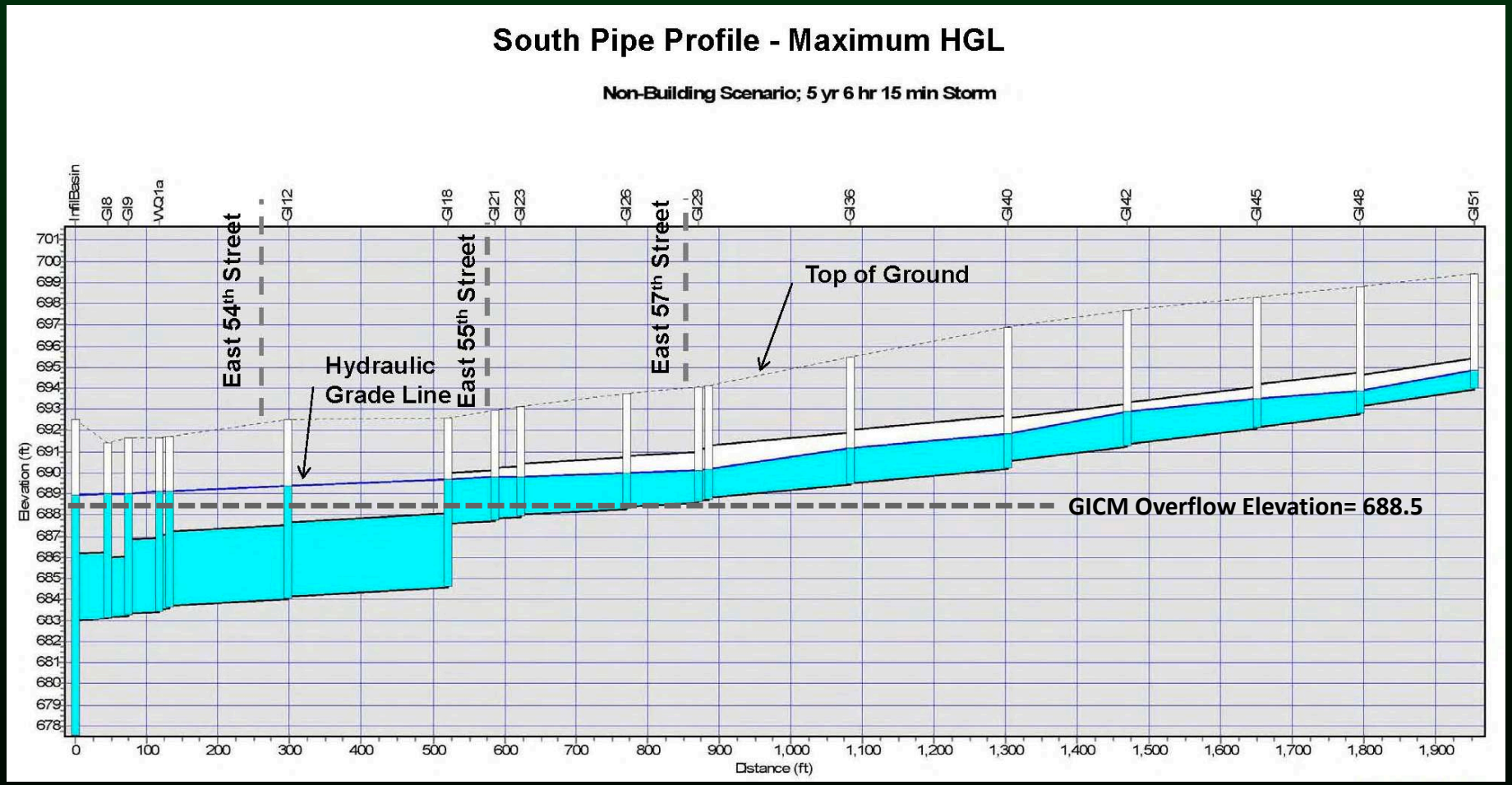


- Overflow Structure Elevation
- Planting Elevation/Plant Selection/Soil
- Stone/Pipe Storage Volume

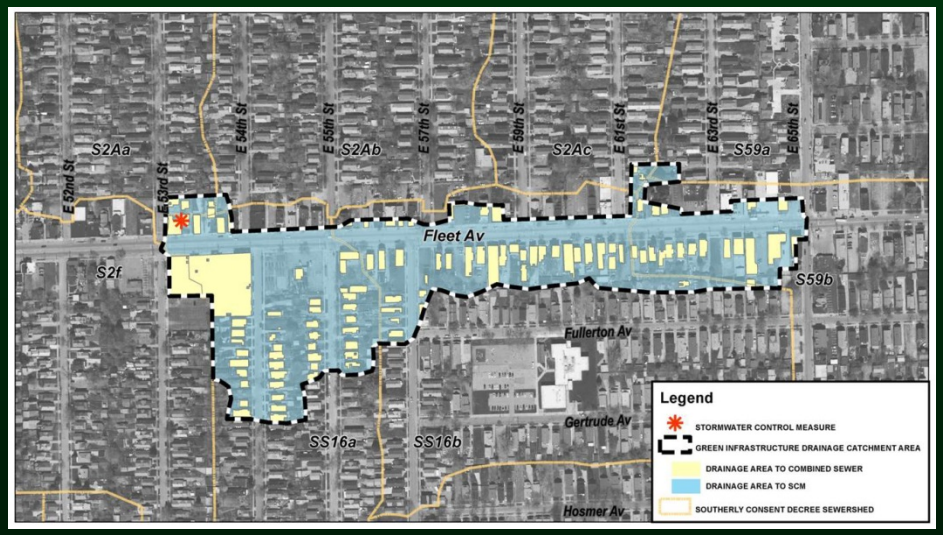
DESIGN: Typical Year HGL



DESIGN: Storm Sewer HGL



DESIGN: H/H Design Summary



GI Project Cost	$2.1 M
Annual Stormwater Capture:	4.7 MG
TY CSO Reduction:	0.8 MG
No. of TY "Overflows" to Exist. Combined Sewer:	NONE

- Captures and Offloads Typical Year Storms
- 5-year Design Storm for Pipe Network
- Coordination with Landscape for frequency of inundation

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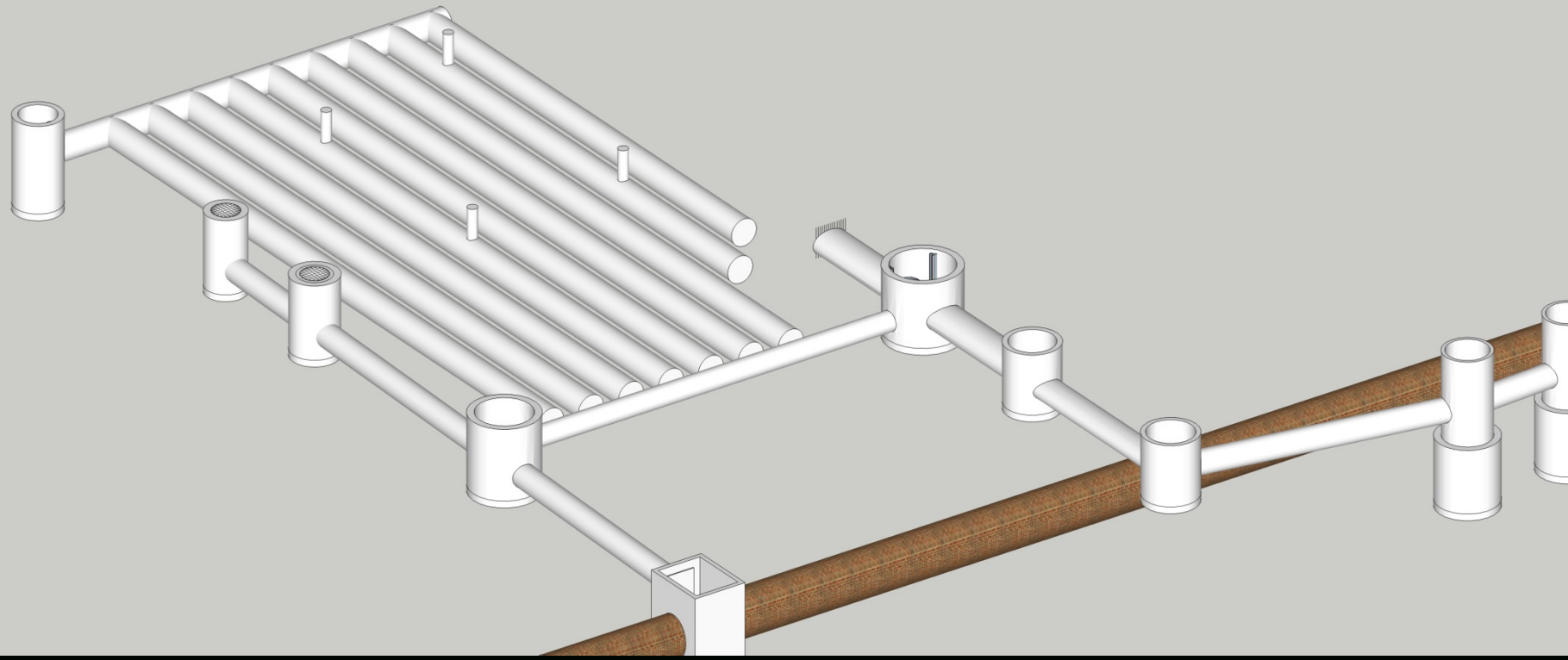
Anatomy of the Basin

Pre-Construction

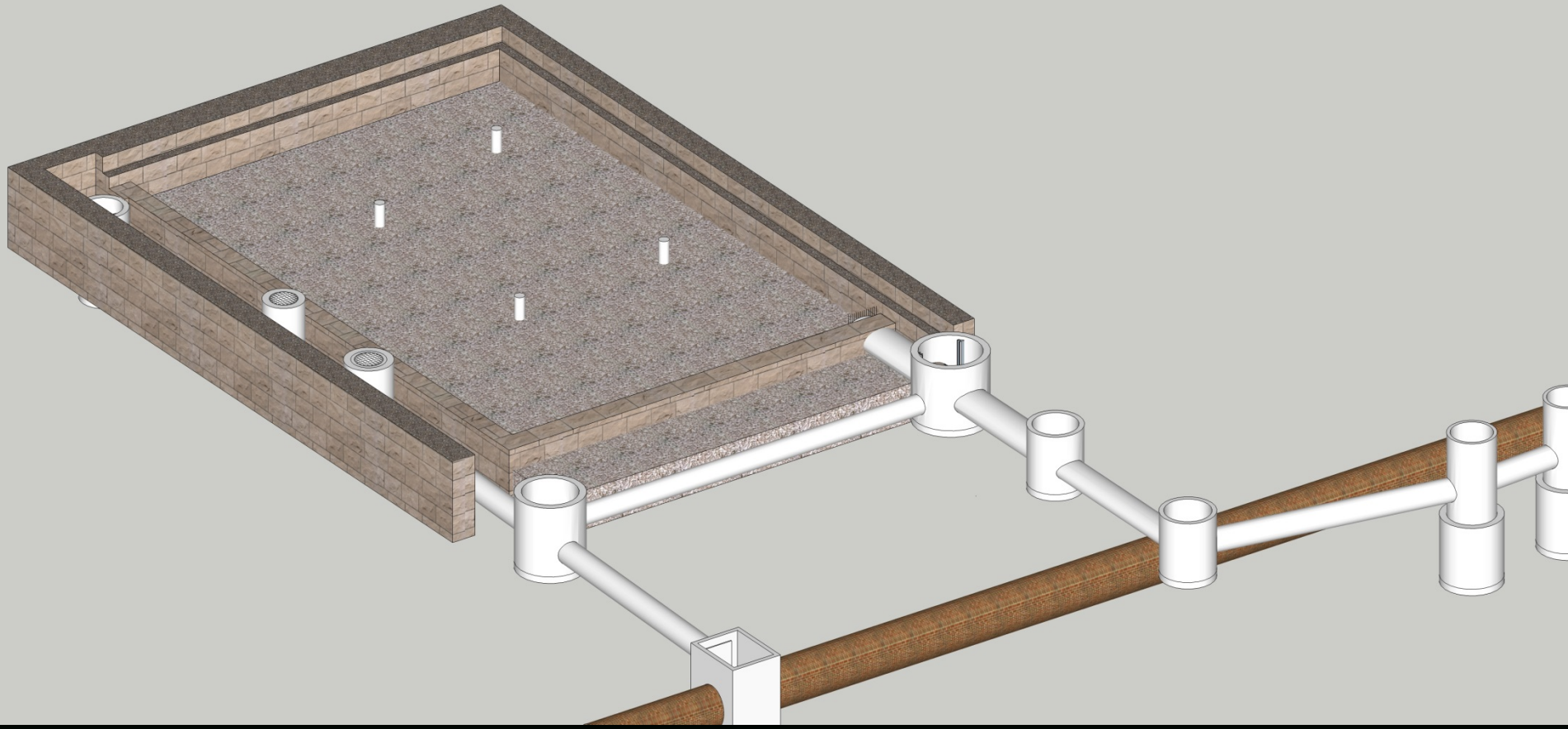
Anatomy of the Basin

Pipe Network



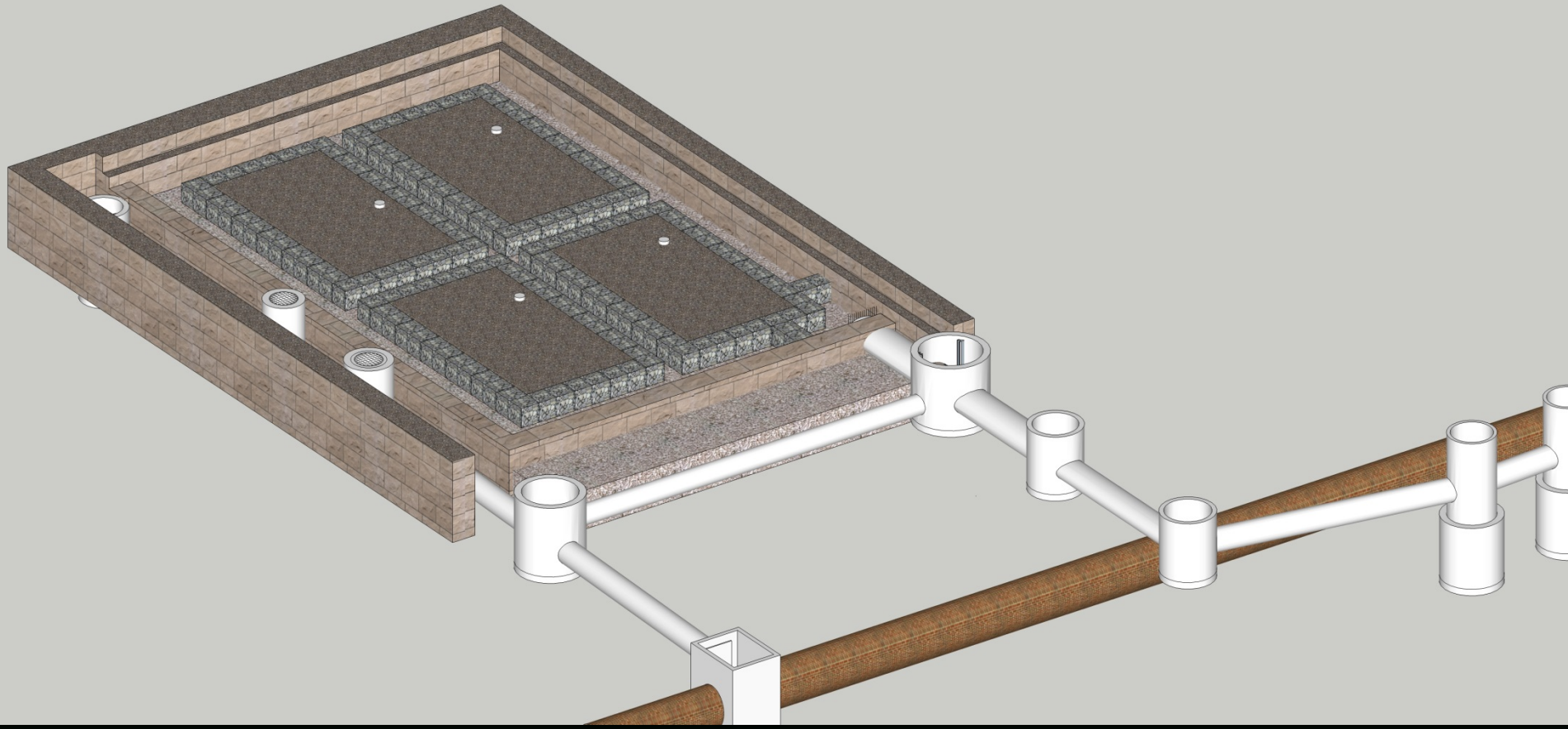
Anatomy of the Basin

Stone and Walls



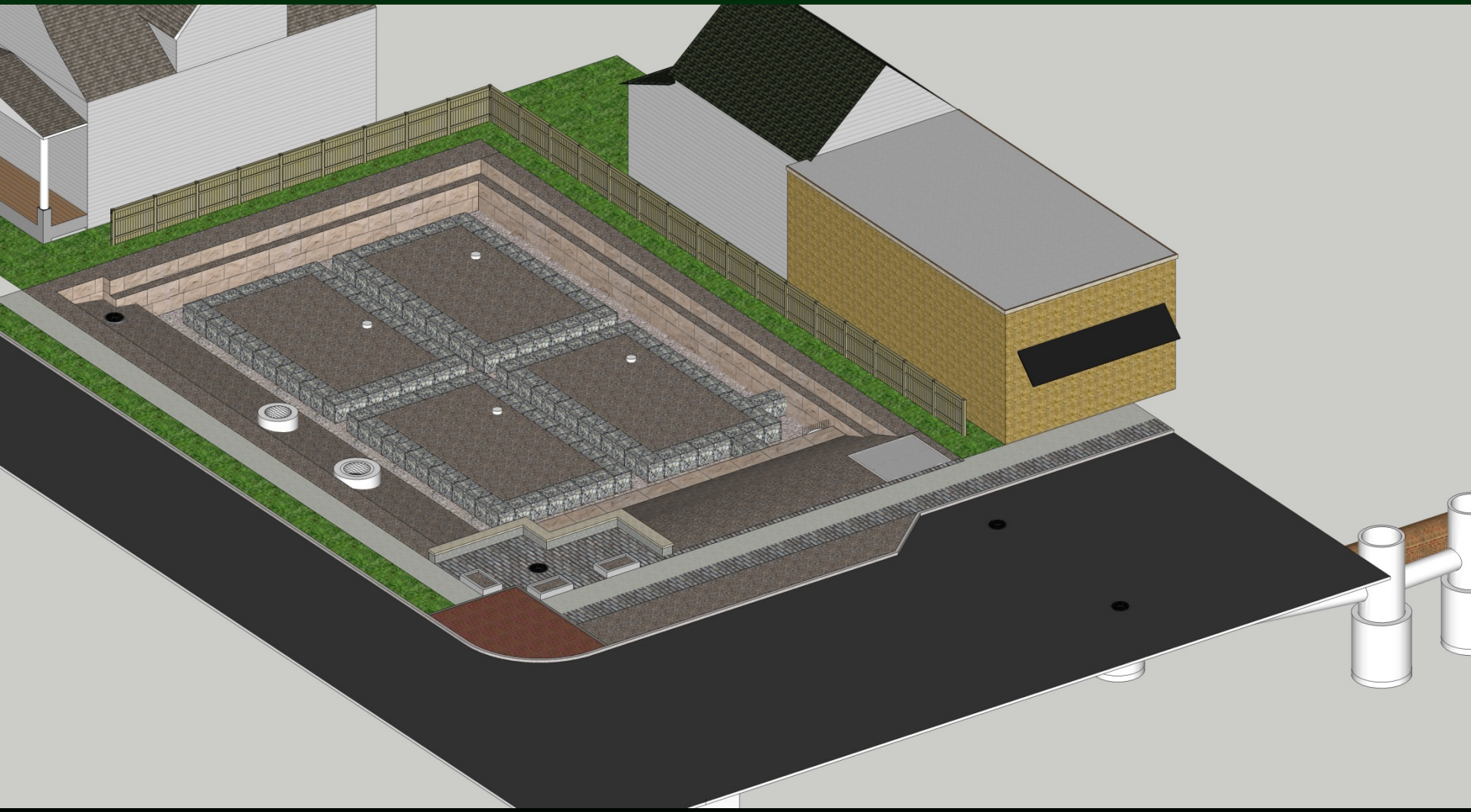
Anatomy of the Basin

Raised Planters



Anatomy of the Basin

Surface



Anatomy of the Basin

Enhancements

GICM Functional Design

Creating a Neighborhood Amenity with Multiple/Co-Benefits:

- Capturing Typical Year rainfall
- CSO Reduction
- Improving Livability
- Reducing Heat Island Effect
- Providing Habitat
- Cultivating Public Education
- Groundwater Recharge
- Reducing Carbon Dioxide
- Community Amenity

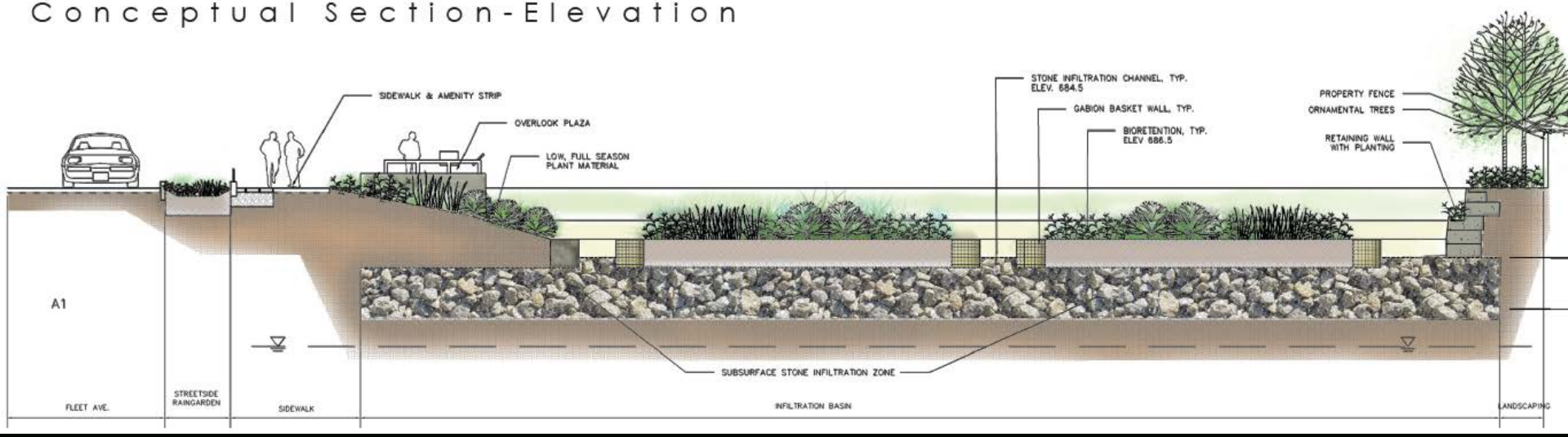
GICM Aesthetic Design

- Create a lush, vibrant public space
- Create a natural landscape within a structured framework
- Provide community access that promotes engagement

Why Plants and Soil?

- Short and Long term Infiltration
- Interception and Evapotranspiration
- Nutrient Removal
- Decreased hydrologic flow can increase TSS Sequestration
- Soil Mix: 30% Sand / 20% Organic / 50% Silt & Clay

Conceptual Section-Elevation



Plant Selection and Design


Celebration Maple


Autumn Brilliance Serviceberry


Washington Hawthorn


Knock-Out Rose


Green Velvet Boxwood


Grey Owl Juniper


Karl Foerster Reed Grass


Day Lilies (Various Cultivars)


Purple Coneflower


Purple Dome Aster


Great Blue Lobelia


Iris (Various Cultivars)

Project Costs and Schedule

Total Project Costs	$8.7 million
GI Project Costs	$2.0 million

Design	Nov 2012 – Dec 2013
Construction	Jul 2014 – April 2017
GI Basin Construction	Jun 2015 – April 2017

Construction

Construction

Construction

Construction

Construction

Construction

Construction

Construction

Construction

Questions

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