More Than a Hole in the Ground

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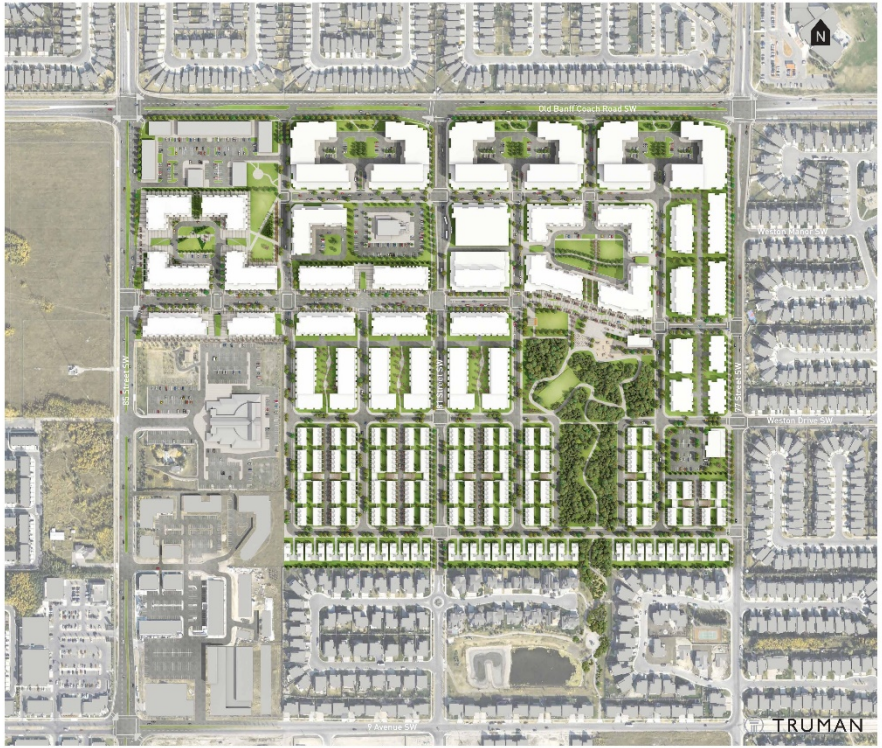
2018 Ohio Stormwater Conference

H 2017

WEST DISTRICT: CONCEPTUAL MASTER PLAN RENDERING

DRAFT - FOR DISCUSSION PURPOSES ONLY (JAN. 2015)

WEST DISTRICT



01 Background and Process

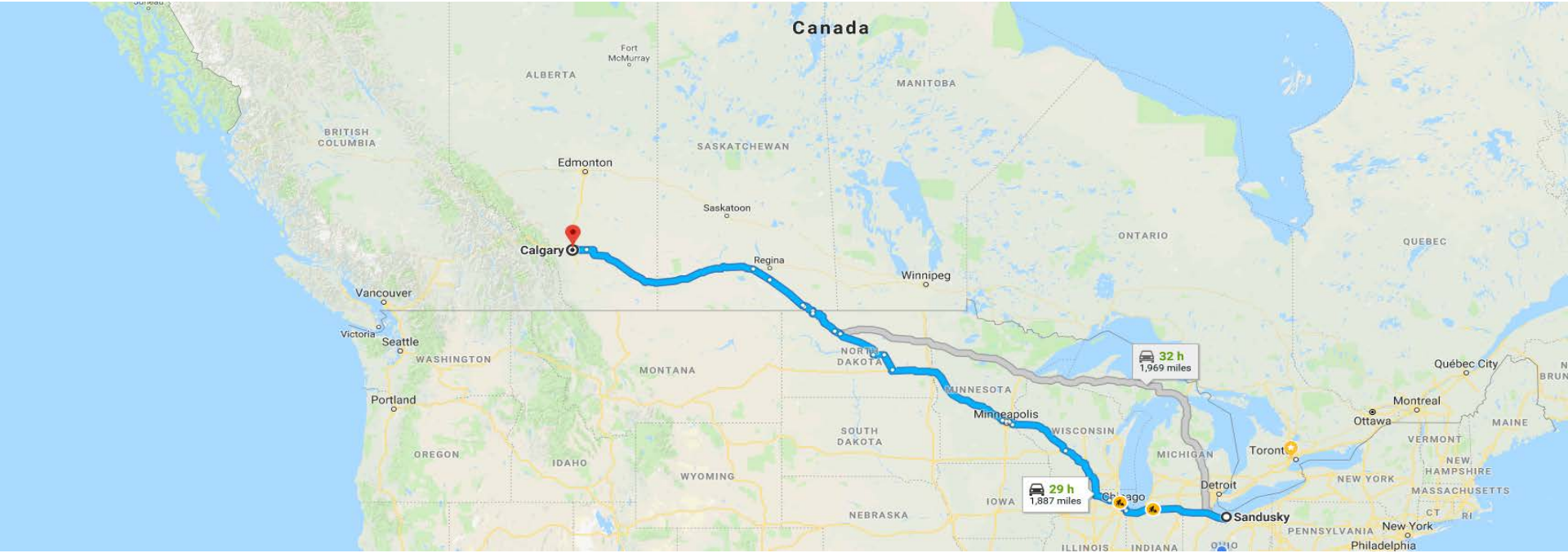
02 Design and Integration

03 The Vision

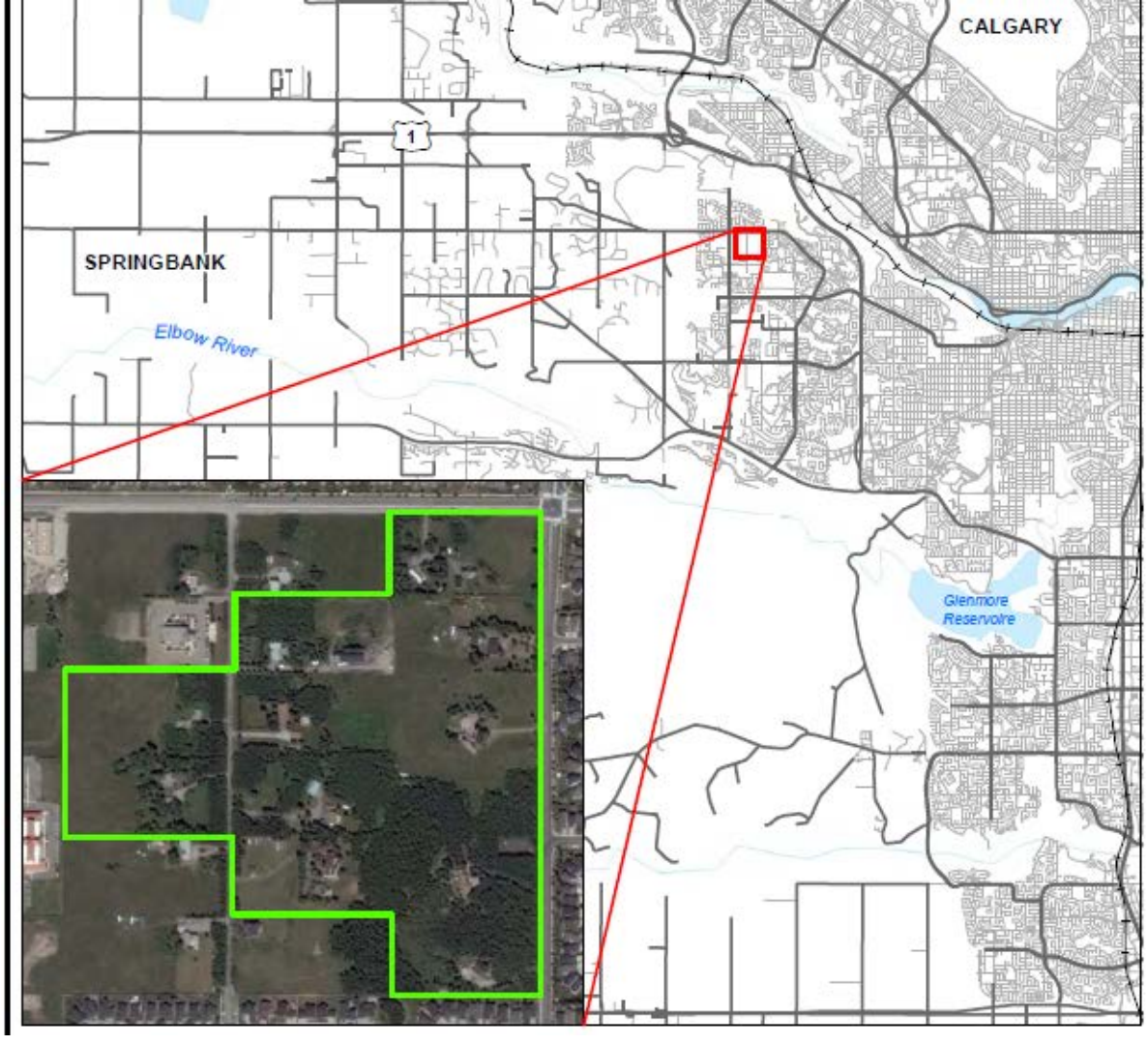
01 Background and Process

Project Stakeholder

- Owner & Client – Truman Development
- Planner – CivicWorks
- Engineer – HDR & UrbanSystems
- Municipality – City of Calgary

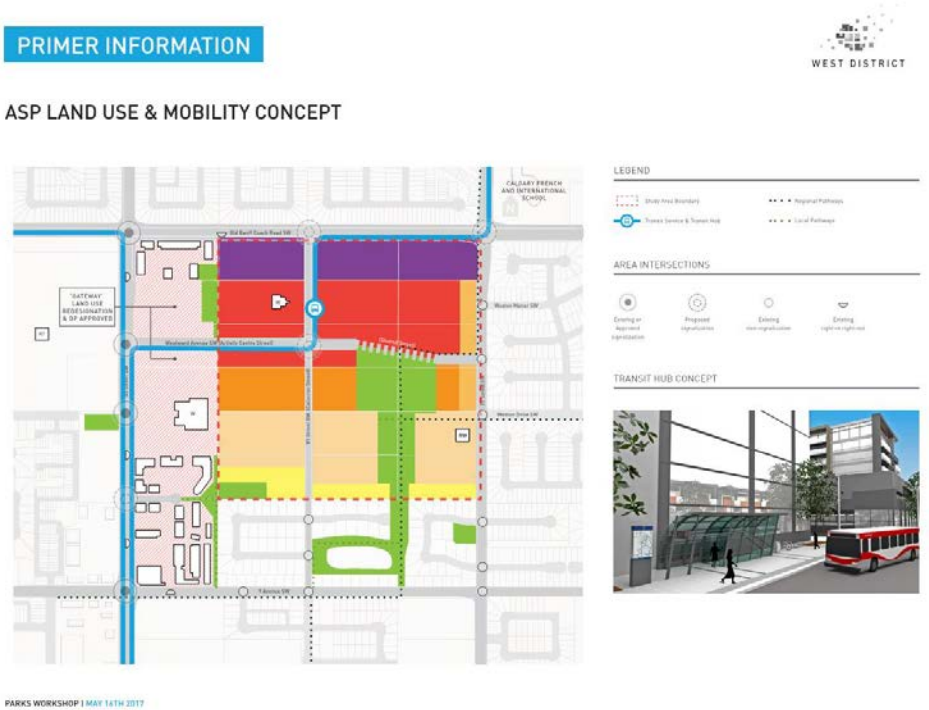


- Map data © Google 2018


CALGARY
1
SPRINGBANK
Elbow River
Glenmore
Reservoire

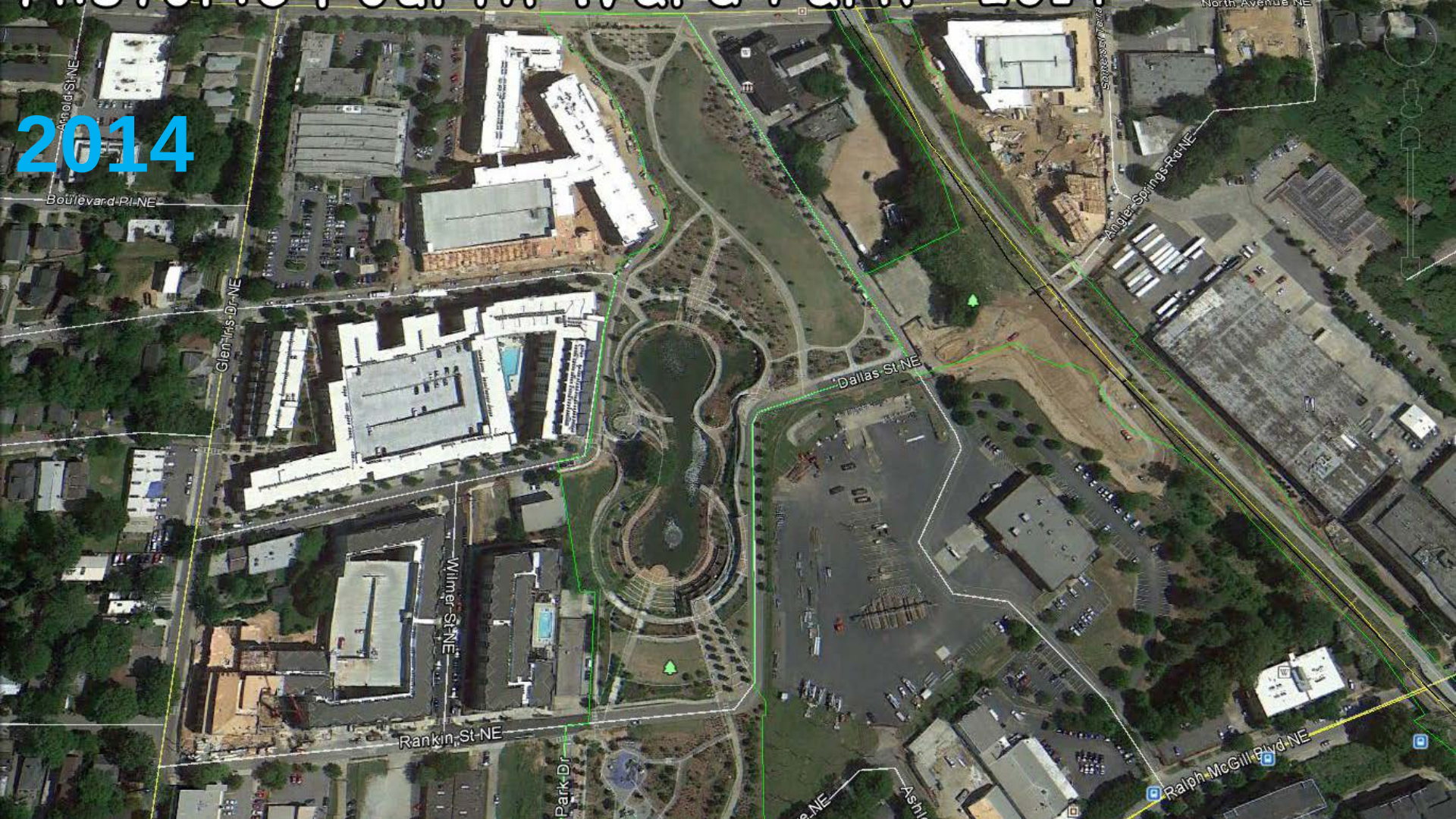
Conceptual Stage

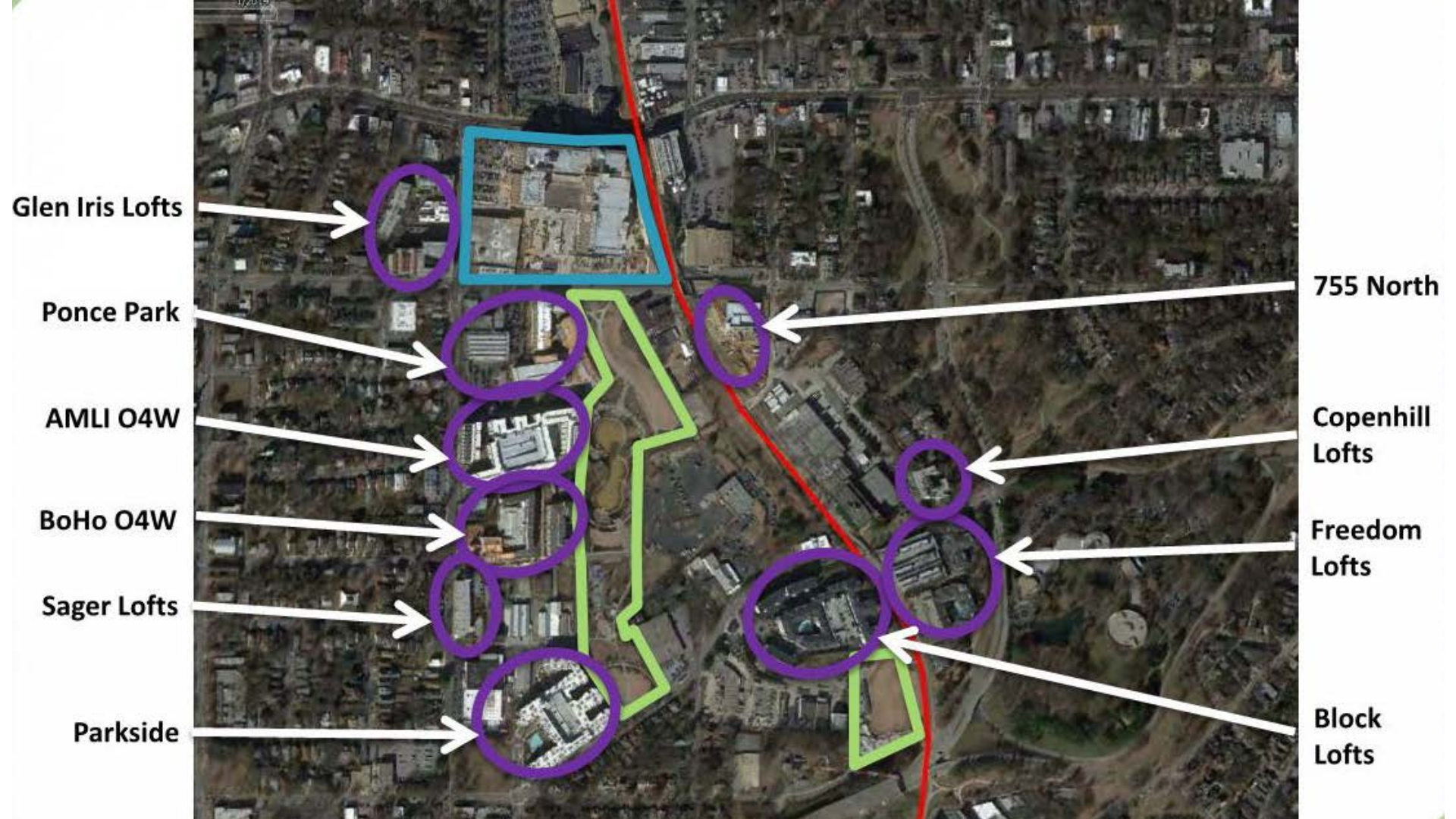
- 1st Idea – Total Infiltration
  - City concerned with groundwater contamination
- 2nd Idea – Pond with Open Space
  - Developer instructed planner to develop comingled open space with pond
    - All developments are required 10% of open space
  - Planner found 4th Ward park, reached out to HDR




historic fourth ward park | atlanta


2008
Arnold St NE
Boulevard Pl NE
Glen Iris Dr NE
Dallas St NE
Wilmer St NE
Rankin St NE
Park Dr
Angier Springs Rd NE
North Avenue NE
Ralph McGill Blvd NE


2014
Boulevard Pl NE
Glen Iris Dr NE
Wilmer St NE
Rankin St NE
Dallas St NE
Angier Springs Rd NE
North Avenue NE
Ralph McGill Blvd NE


Glen Iris Lofts
Ponce Park
AMLI O4W
BoHo O4W
Sager Lofts
Parkside
755 North
Copenhill Lofts
Freedom Lofts
Block Lofts

HDR FOURTH WARD PARK PRECEDENT

WEST DISTRICT

PARKS WORKSHOP | MAY 16TH 2017

Calgary Development Process

High-level collaboration between City and Developer prior to design phase

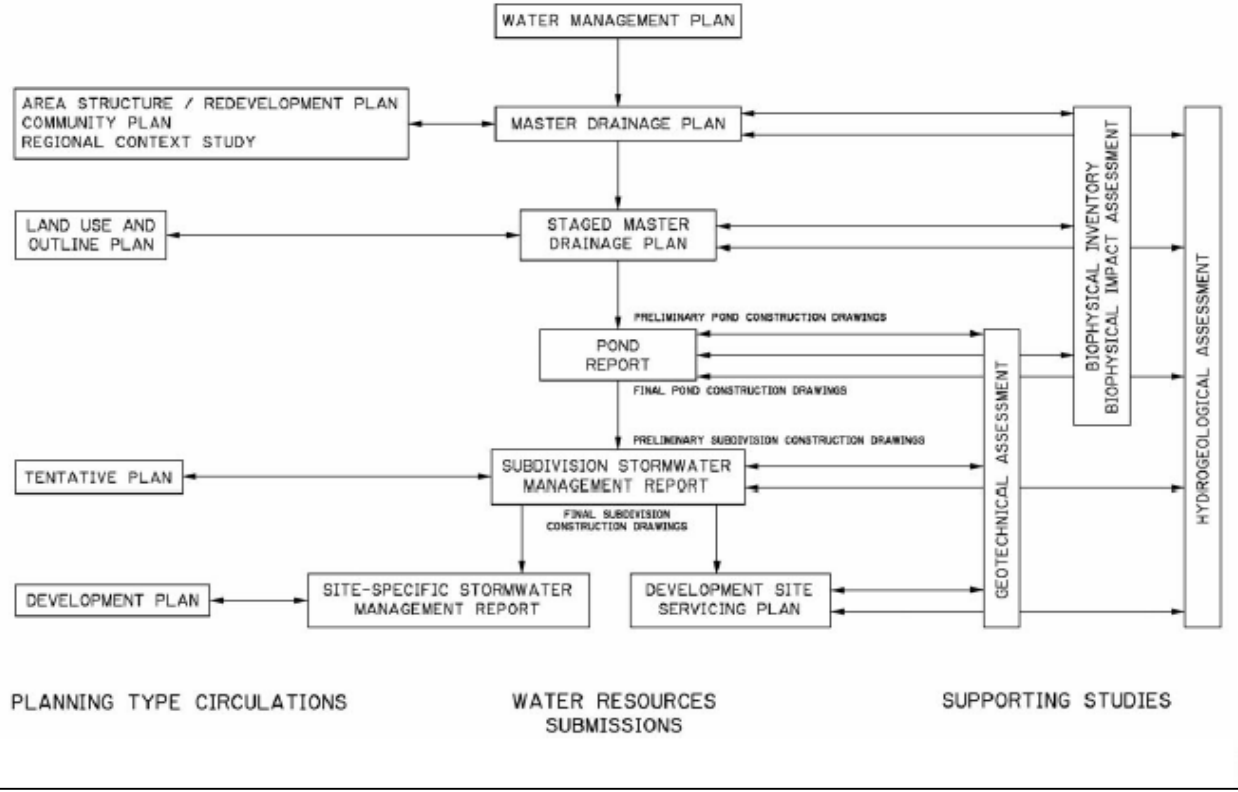
Conceptual Design

Development Progression

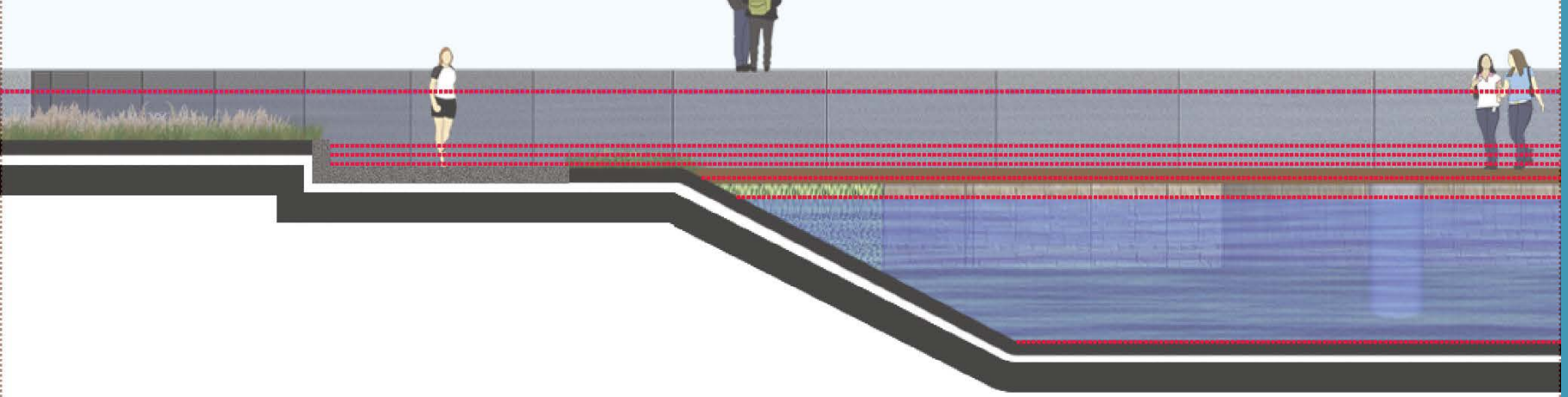
- Hand-in-hand process with the City
- Developer pays for City staff time
- Formalized submittals
- “Final Design” during conceptual stage
- Ensures early investment by developer does not go to waste.
- Master Drainage Plan (MDP)
- Staged Master Drainage Plan (SMDP)
- Pond Report

eports are required to establish a technical backup that demonstrates the v
f proposals, and will ultimately provide the basis for detailed design. Specifi
ewer and drainage concerns must be addressed at an appropriate and incr
evel of detail as the planning and development proceed. *Figure 1-4* illustrate
lanning process.

Figure 1-4: Stormwater Management Planning



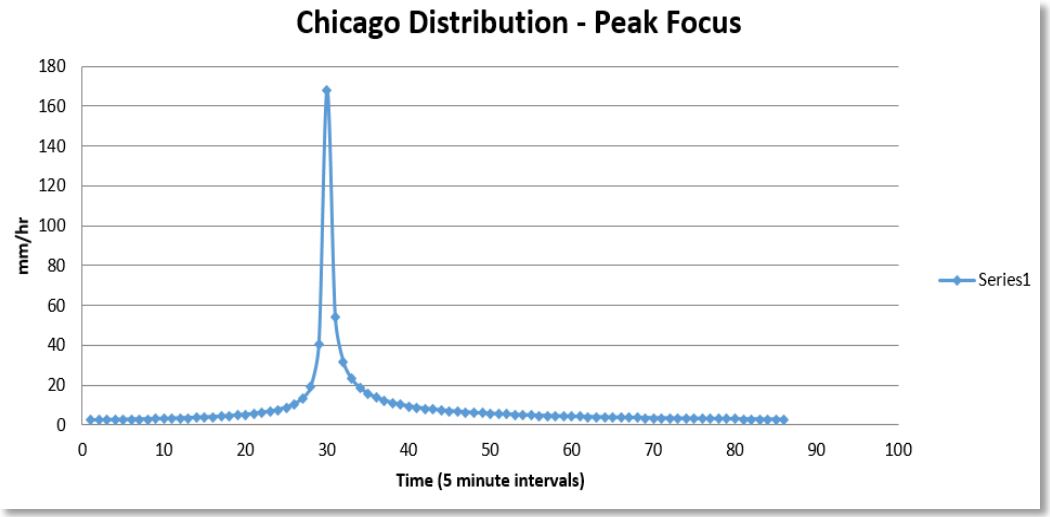
- Source: – City of Calgary, Water Resources, Stormwater Management & Design Manual 2011



02 Design and Integration

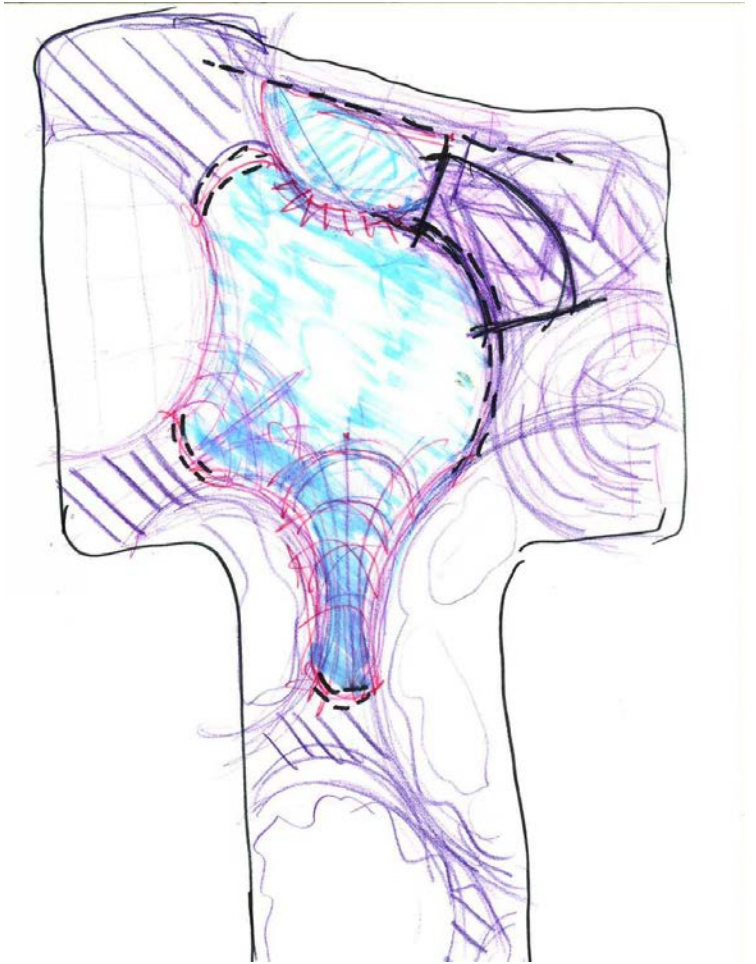
Rainfall

- 500 Year Rainfall Event, 24 Hour Duration
  - 111.3 millimeters
  - 4.38 inches
- Chicago Distribution
- Design for 100-year storm, potentially 500-year storm



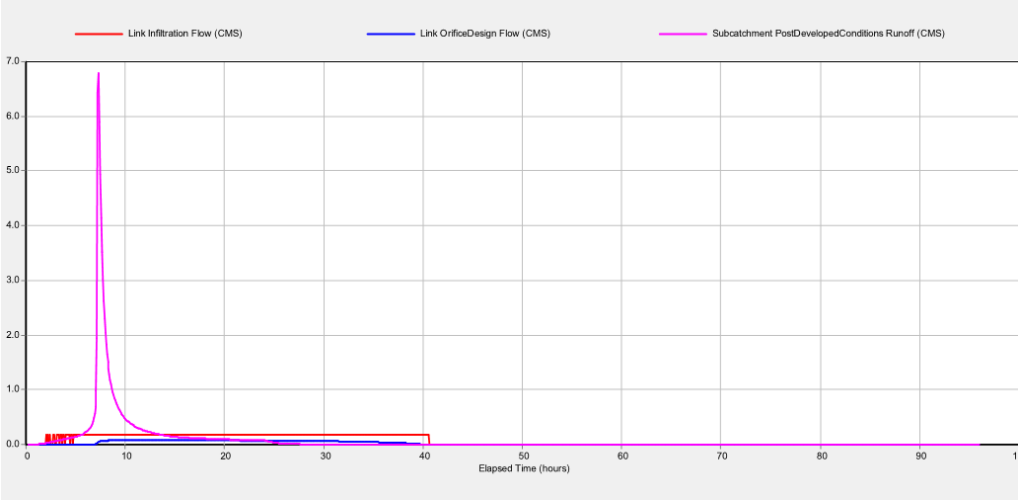
Wet Pond Design Criteria

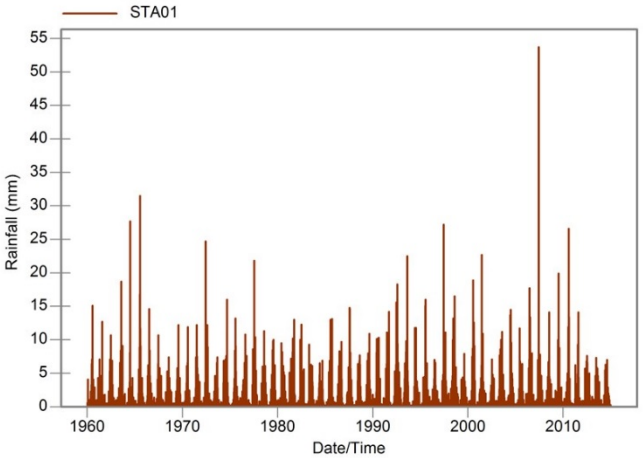
- Wet Pond
  - 2.5 L/s/ha (0.22 cfs/ac) allowable unit area release rate (UARR)
  - Store volume discharging no higher than the UARR
  - 2-3 (6.56 – 9.84-ft) meter deep permanent pool
  - 1 (3.28-ft) meter minimum active storage depth
  - 0.3 meter freeboard (~1 foot)
- Design Storm
  - 100-year design storm with emergency overflow, 500-year with no overflow
  - Continuous modeling, statistical evaluation to determine 100-year storage from 55-years of data
  - Most conservative volume of runoff is to be design volume.



Modeling Approach

- Single Event Analysis – EPASWMM
  - Green-Ampt Method requested
  - Design storms from City of Calgary Stormwater Manual
- Continuous Modeling – PCSWMM
  - Green-Ampt Method requested
  - 55-years of rainfall (1960-2014)
  - Ave 416 mm/yr (16.3-in/yr)
  - Largest event >100-yr, 72 mm (2.83-in)
  - Daily Temperature Data
- Statistical Evaluation - HYFRAN



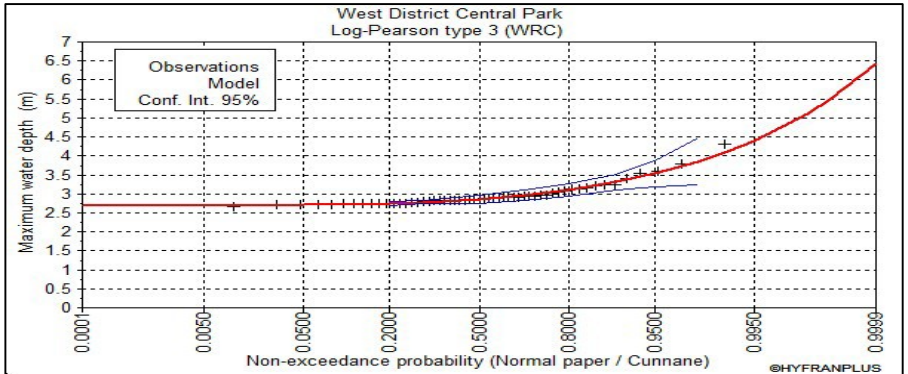


Wet Pond Design

Site Specific Hydrologic Results

- 32.8 hectares (81.0 acres)
- 82 L/s release rate (2.89 cfs)
- 21,233 Cubic Meters – 100-year Design Storm (17.2 ac-ft)
- 22,400 Cubic Meters – 100-year Statistical Evaluation (18.2 ac-ft)
- 24,670 Cubic Meters – Continuous Modeling Maximum Volume (20.0 ac-ft)
- 27,890 Cubic Meters – 500-year Design Storm Volume – Total Volume of Pond Storage (22.6 ac-ft)

Uncontrolled Peak Flow	Maximum Allowable Outflow
148 cfs	2.89 cfs



Public Outreach

- Amphitheatre
- Splash Pad
- Lower Plaza Fountain/Skating Rink
- Restaurant
- Playgrounds
- Orchard
- Community Garden
- Lawn Space
- Preserve Native Aspen Stands

6.3.2.26 Public Education

It is the responsibility of the developer to provide an educational brochure on wet ponds during the marketing of an area that includes a wet pond. The purpose of the brochure is to educate residents about:

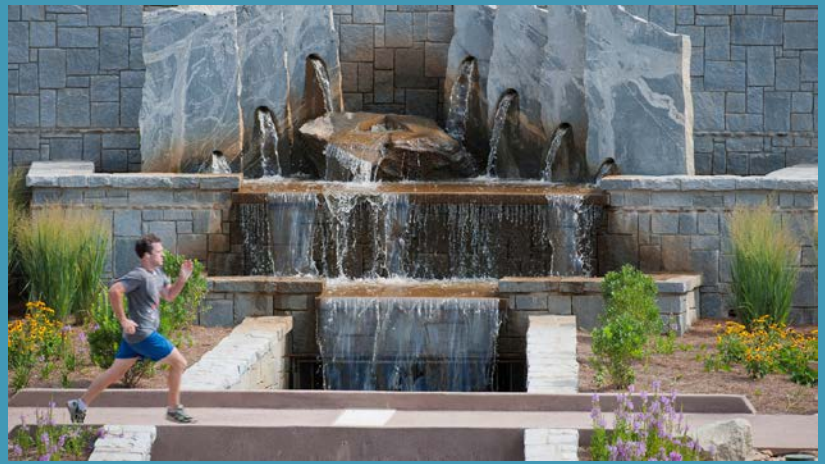
- The specific function of wet ponds.
- The water quality inherent with the function of the pond and the impact of water quality resulting from fertilizers (which indirectly feeds into the sewer system by surrounding residents).
- Permitted recreational uses.
- Maintenance concerns and the potential for increased maintenance charges to residents to increase the level of maintenance deemed necessary.

03 The Vision

THE CONCEPT

CENTRAL PARK

DATE: MAY 2017



Location of pond’s technical components:

- in-flow locations
- outlet structures
- emergency overflow

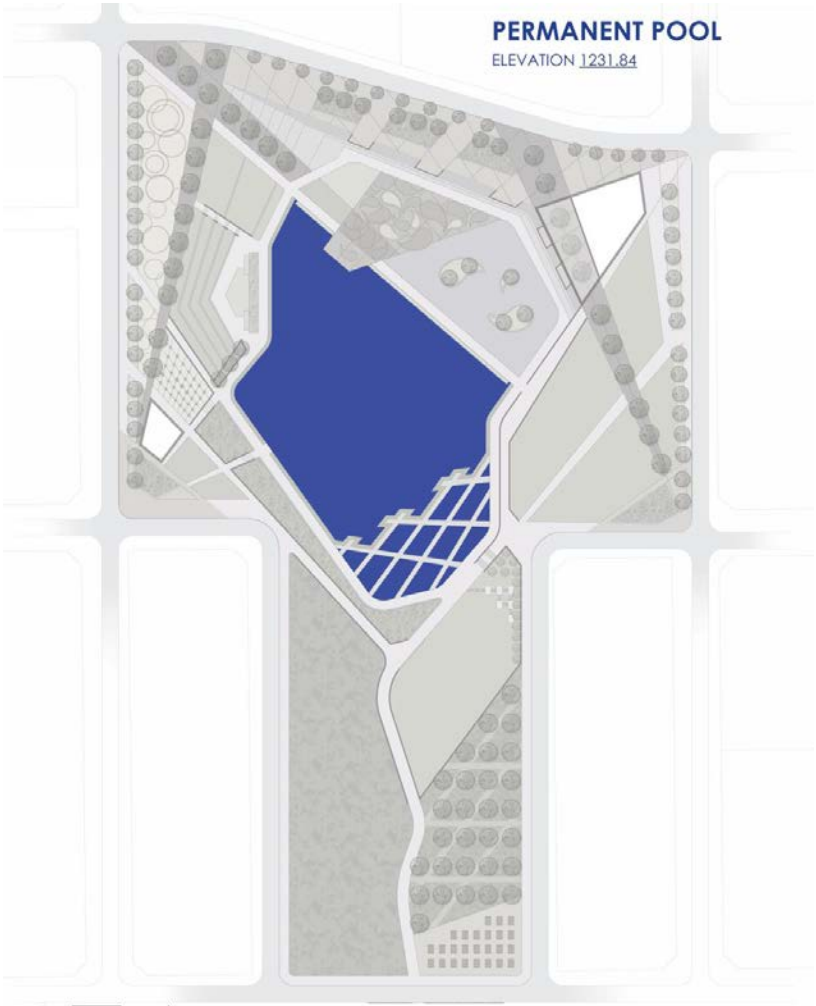
Park, Meet Pond

Wet Pond and Stormwater Park

- Approach for protecting park functionality
  1. Utilized continuous modeling to determine historical frequencies of park inundation
  2. Designed elevation of features to the 24-hour design storm for safety
- Developer and City created unique goals for the park functionality.
  - Perimeter Walkway – 2 Year
  - Amphitheatre – 10-year
  - Lower Plaza – 50-year
  - 500-year does not impact adjacent building foundations

PERMANENT POOL

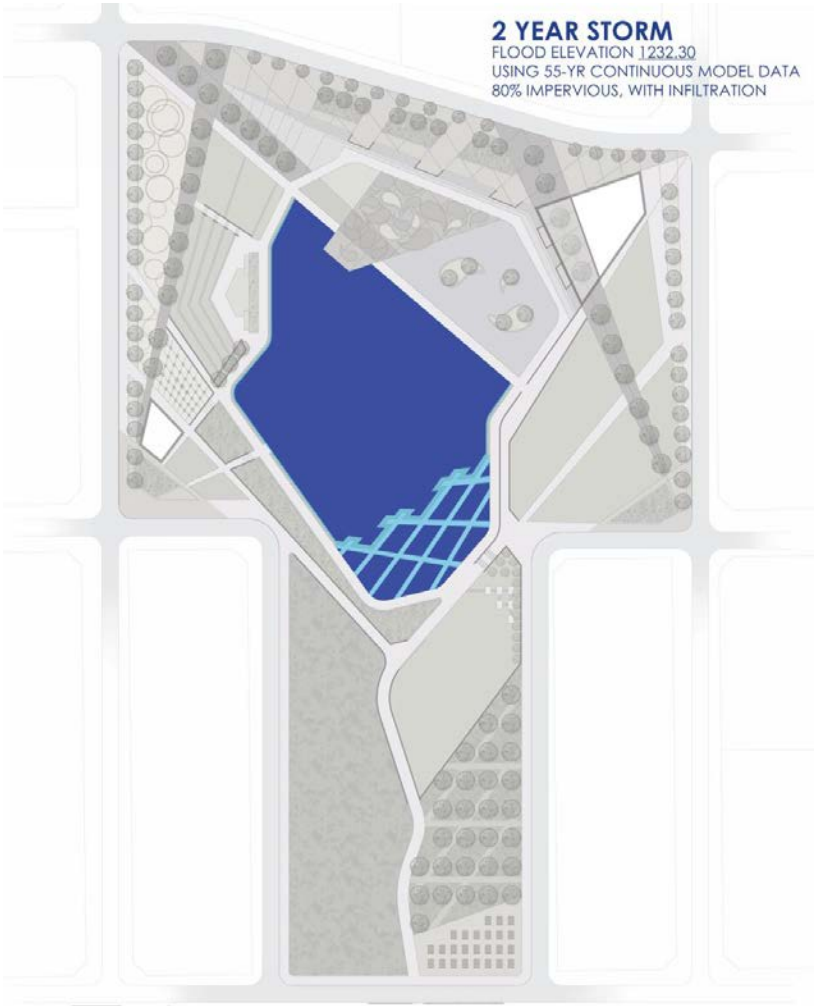
ELEVATION 1231.84



0 50 100

2 YEAR STORM

FLOOD ELEVATION 1232.30
USING 55-YR CONTINUOUS MODEL DATA
80% IMPERVIOUS, WITH INFILTRATION



0 50 100

5 YEAR STORM

FLOOD ELEVATION 1232.58
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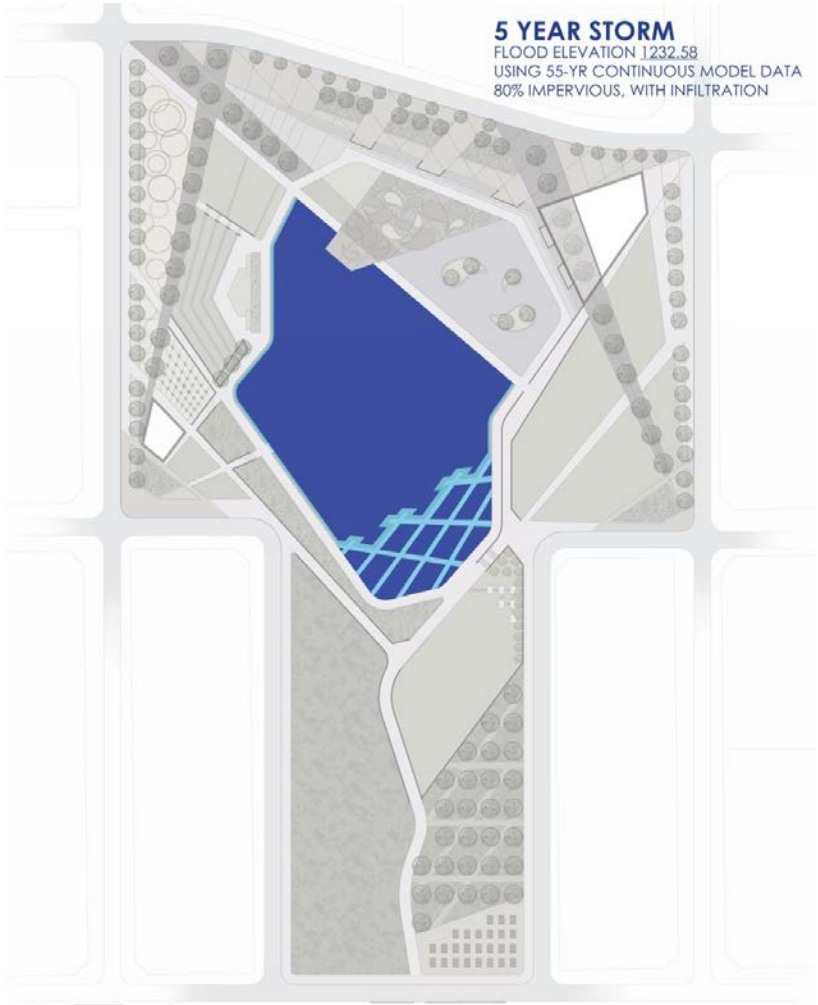
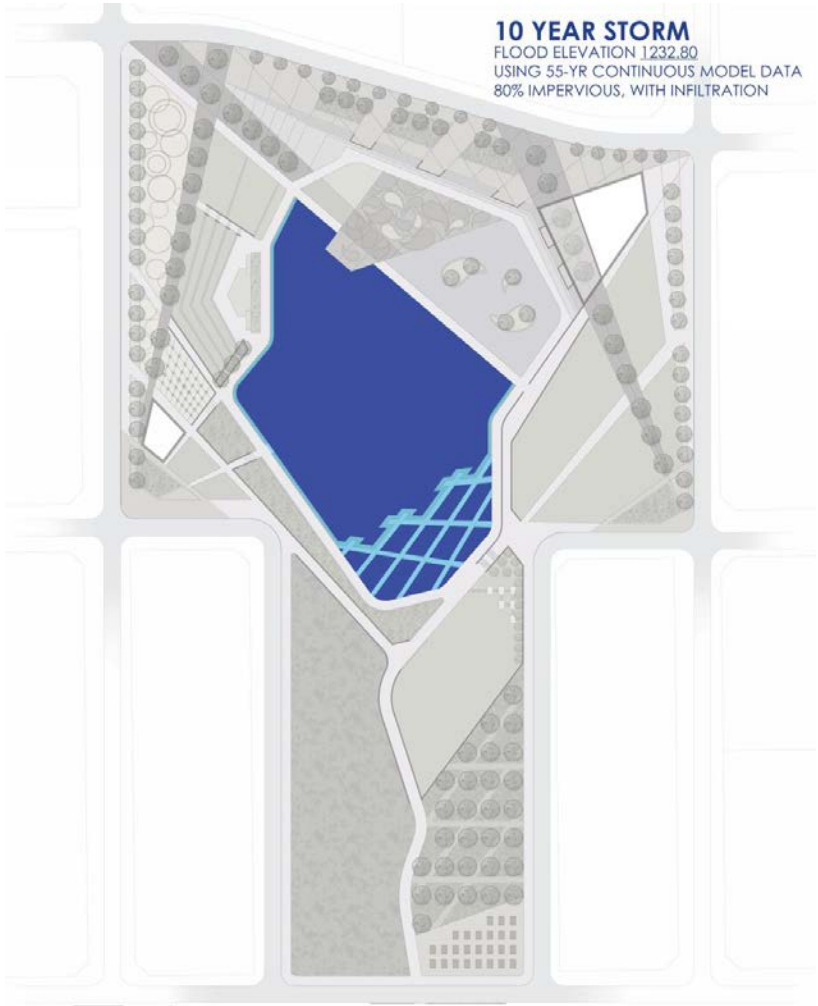
80% IMPERVIOUS, WITH INFILTRATION



0 50 100

10 YEAR STORM

FLOOD ELEVATION 1232.80
USING 55-YR CONTINUOUS MODEL DATA
80% IMPERVIOUS, WITH INFILTRATION



0 50 100

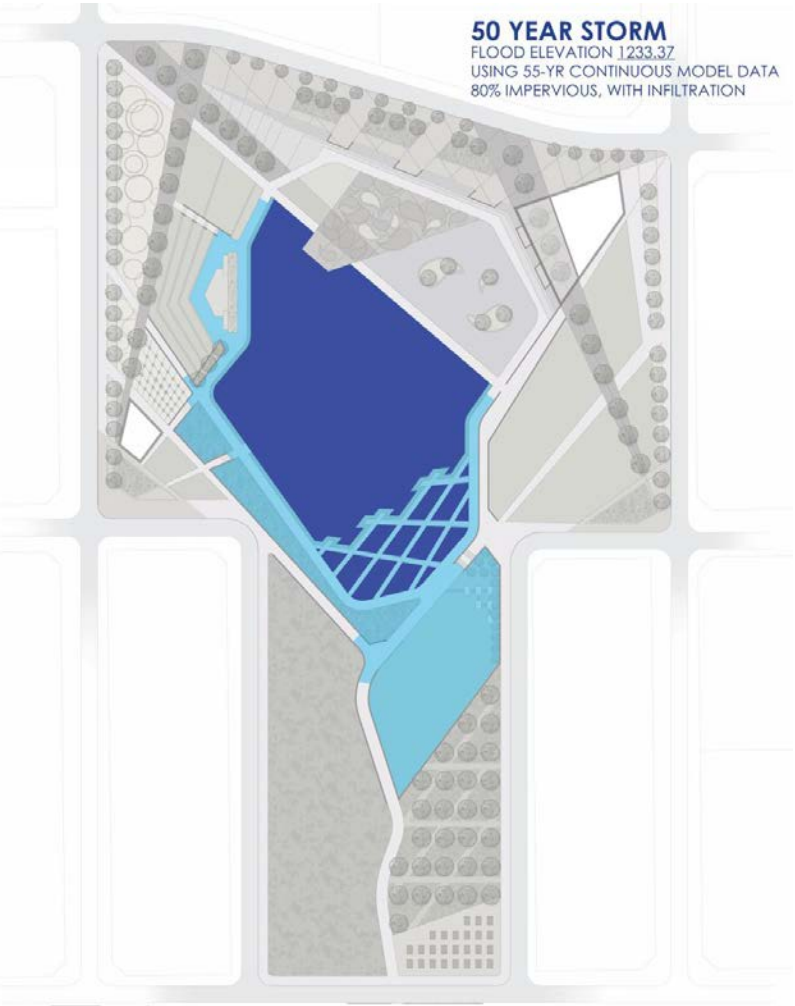
10 YEAR STORM

FLOOD ELEVATION 1232.80
USING 55-YR CONTINUOUS MODEL DATA
80% IMPERVIOUS, WITH INFILTRATION

0 50 100

50 YEAR STORM

FLOOD ELEVATION 1233.37
USING 55-YR CONTINUOUS MODEL DATA
80% IMPERVIOUS, WITH INFILTRATION



0 50 100

100 YEAR STORM

FLOOD ELEVATION 1233.64
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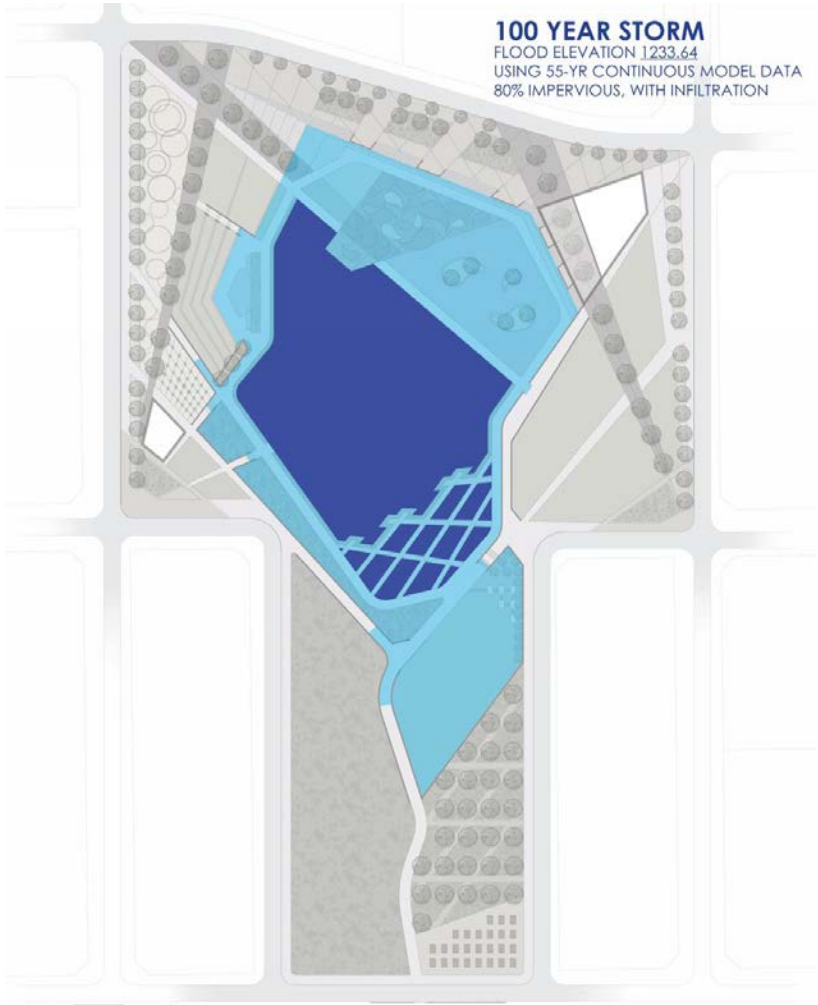
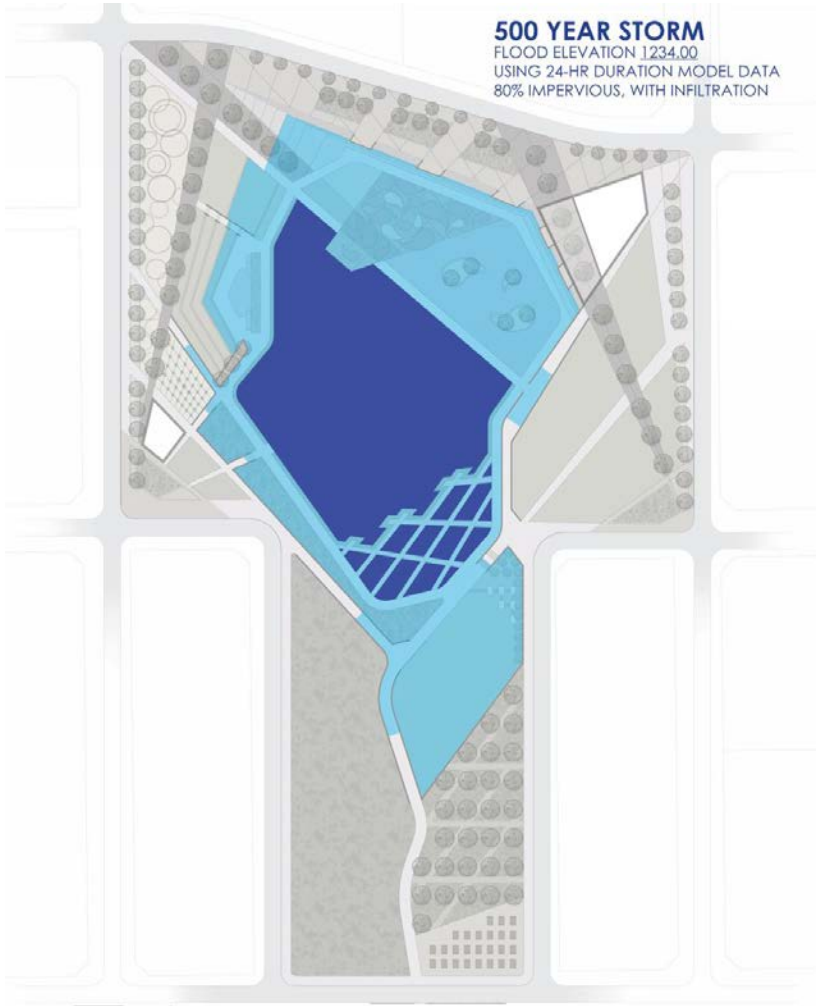


0 50 100

500 YEAR STORM

FLOOD ELEVATION 1234.00
USING 24-HR DURATION MODEL DATA
80% IMPERVIOUS, WITH INFILTRATION



0 50 100

west district central park | calgary

Infiltration

- Utilizing subsurface infiltration to approximately double pond discharge, in order to meet level of service requirements for the park.
- Gravelly soils, providing 2.77 $m^3/day/m^2$ infiltration rate
- 0.176 cm/s infiltration outflow (6.25 cfs)

Water Quality

- End-of-pipe treatment - Primary
- Littoral Shelf - Secondary
- Boardwalk Wetlands - Secondary

Status and Next Steps

- City reviewing design
- Infiltration gallery design
- Water quality analysis
- Maintenance plan
- Final model

Questions?

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