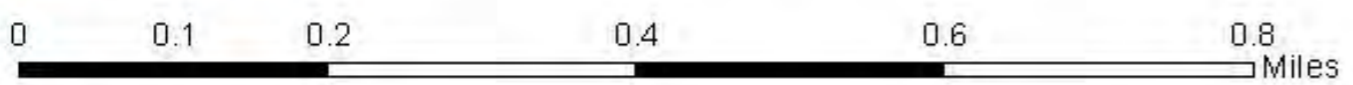




- Walk Route
- TOD Area
- Buffer
- Project
- Active Transit Stops
- Commuter Rail, Northstar Line
- Park & Ride Lots
- Commuter Rail, Northstar



Created: 6/10/2019  
LandscapeLCA3

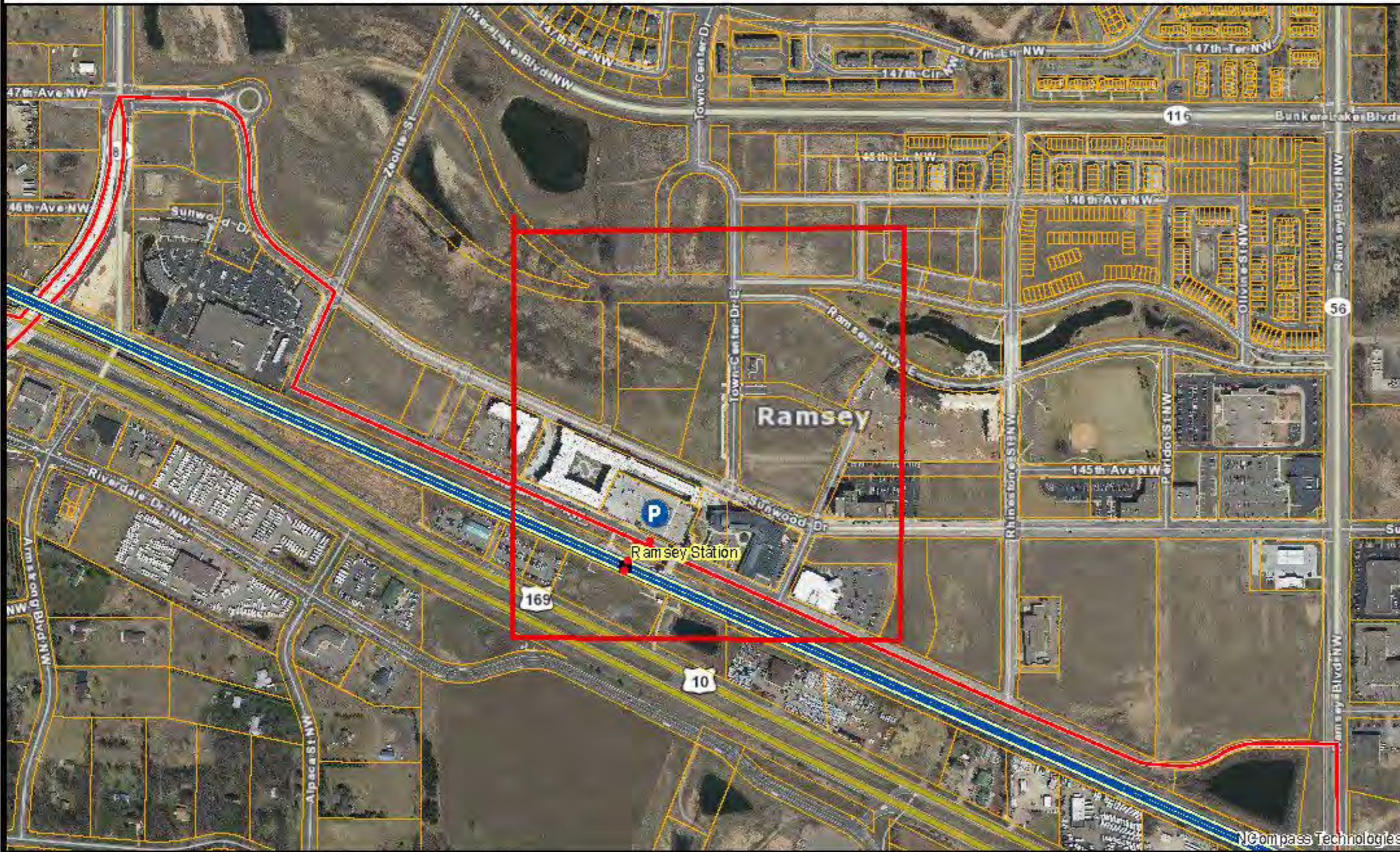


For complete disclaimer of accuracy, please visit  
<http://giswebfile.mnc.state.nc.us/gisfileview/otbe.aspx>

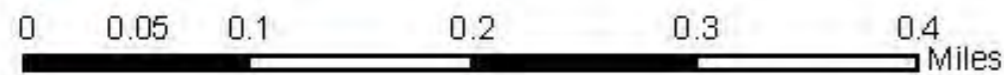


# LCDA OVERVIEW

## Ramsey Downtown District Center Street Improvements



- TOD Area
- Project
- Active Transit Stops
- Commuter Rail, Northstar Line
- Transit Routes (All)
- Parcels
- Northstar Rail



Created: 6/10/2019  
Landscape LCA4

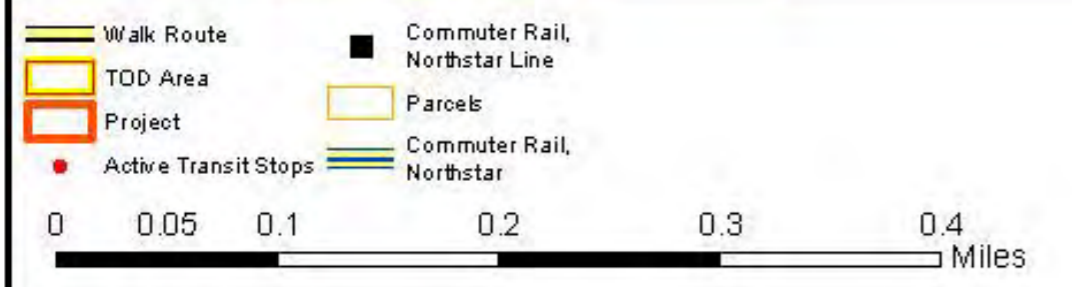
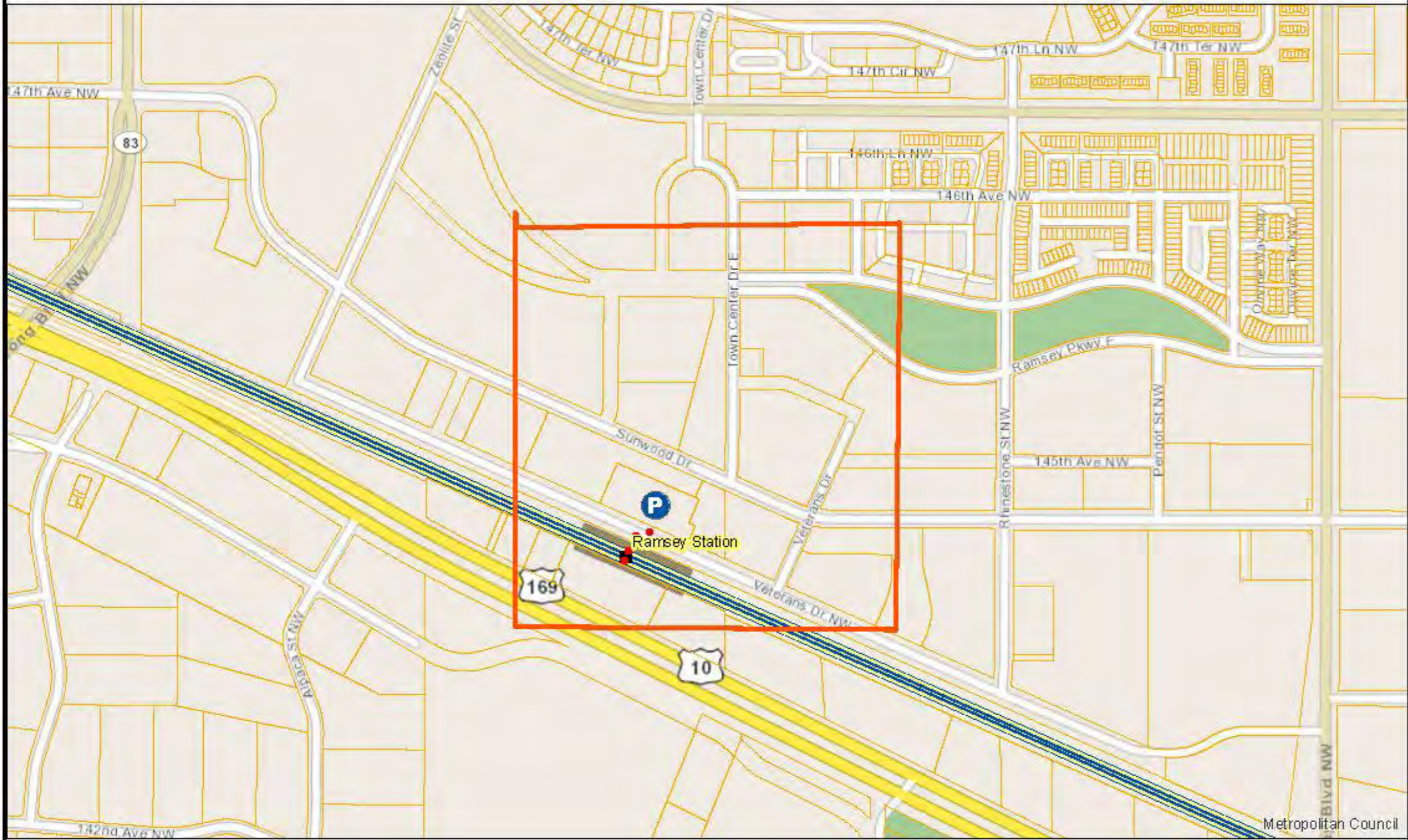


For complete disclaimer of accuracy, please visit  
<http://giswebfiles.mn.gov/state/mn/arcgis/faq/new/notice.asp>



# LCDA AERIAL

## Ramsey Downtown District Center Street Improvements



Created: 6/10/2019  
LandscapeLCA1

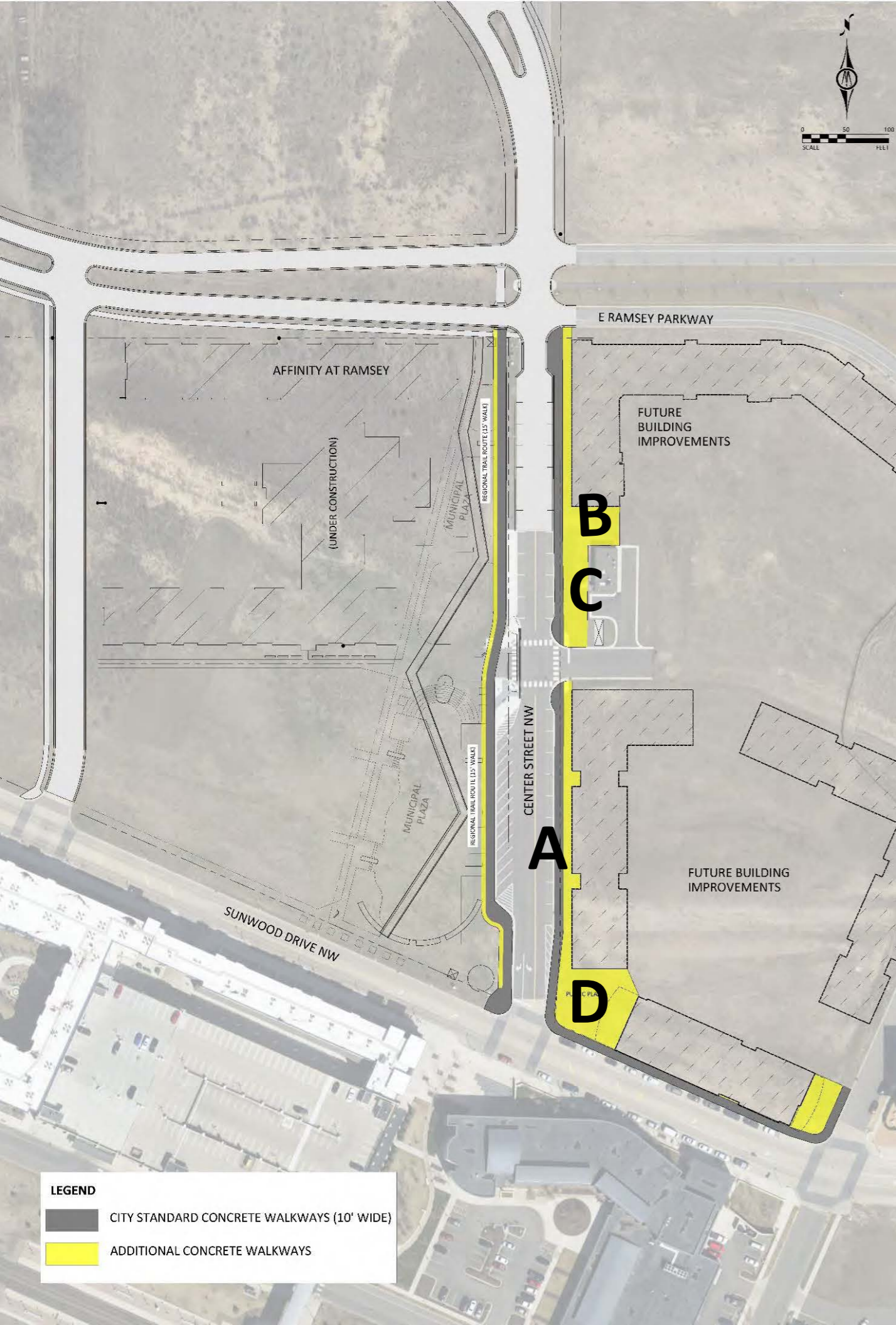


For complete disclaimer of accuracy, please visit  
<http://gisweb.mn.gov/stateinfo/gis/faq/faq.htm#otbe.aspx>



# LCDA PARCEL

## Ramsey Downtown District Center Street Improvements



# Eligible Uses of LCDA Grant Funds

(reference list: 2019 LCDA Application Guide)

## Public Realm + Pedestrian Zone Improvements

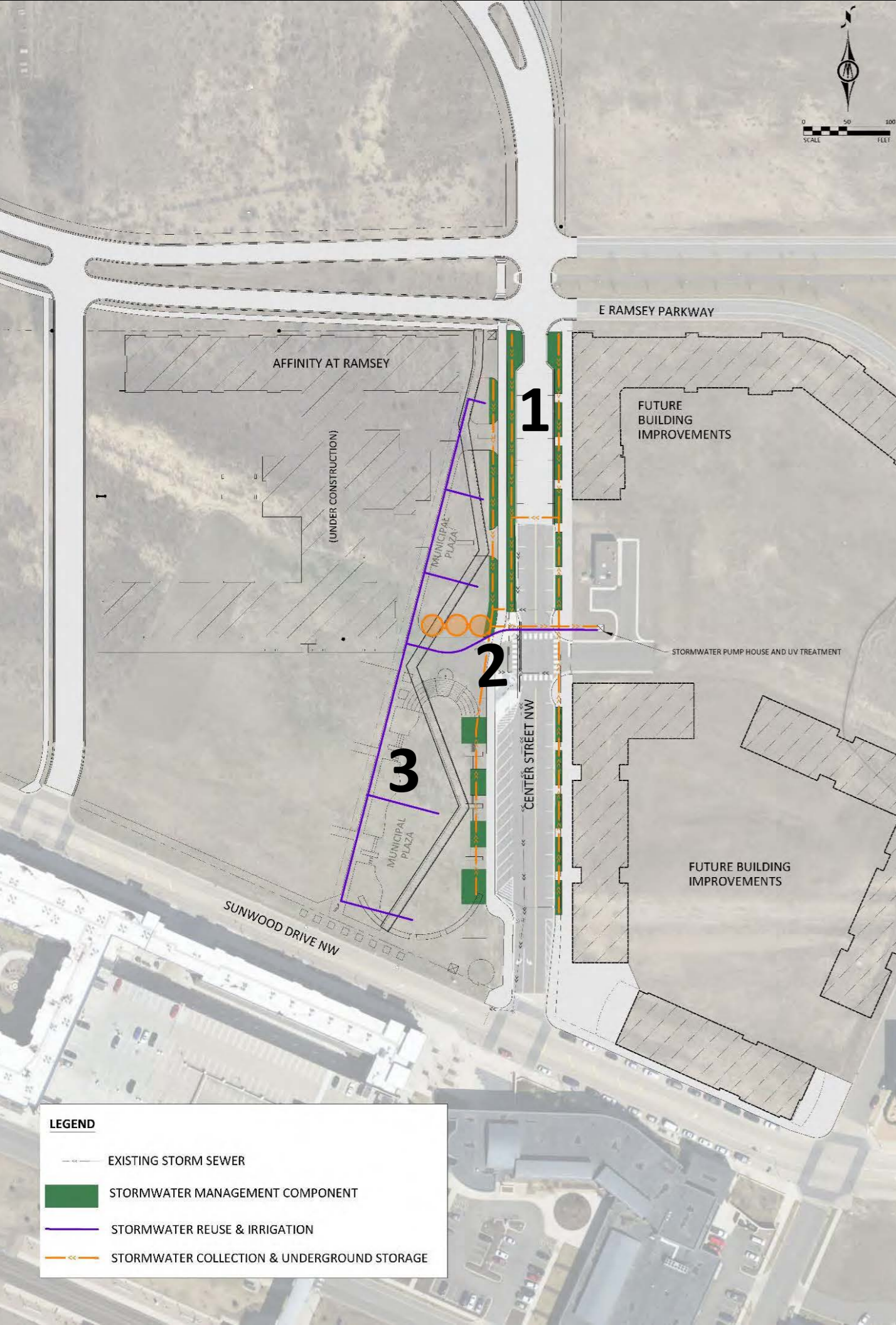
- A** Widened pedestrian zone + pedestrian amenities
- B** Added Pump House Plaza + pedestrian amenities (adjacent to existing Pump House building)
- C** Added roof/canopy solar panels on top of existing Pump House + over the proposed Pump House Plaza
- D** Added Hotel Tap Room Public Plaza + pedestrian amenities (between proposed Community Space + Hotel Tap Room)

‘But-For’ the LCDA Grant Funds (and the very helpful plan review/critique process), we would not have been able to add these ‘above-standard’ public realm amenities, integrated with two critically important development blocks along Center Street in the heart of the Ramsey Downtown District.

# GRANT REQUESTED ACTIVITIES PLAN

## 1 – PUBLIC REALM

Ramsey Downtown District  
Center Street Improvements



## Eligible Uses of LCDA Grant Funds

(reference list: 2019 LCDA Application Guide)

### Site Integrated Stormwater Management

- 1** Stormwater catchment/filtration basins;  
Landscaping – integrated with filtration basins
- 2** Stormwater collection + underground storage  
(within Center Street right-of-way + Municipal Plaza)
- 3** Stormwater Reuse + irrigation system  
(within Center Street right-of-way + Municipal Plaza)

‘But-For’ the LCDA Grant Funds (and the very helpful plan review/critique process), we would not have been able to add these ‘above-standard’ stormwater management system components, integrated with two critically important development blocks along Center Street in the heart of the Ramsey Downtown District.

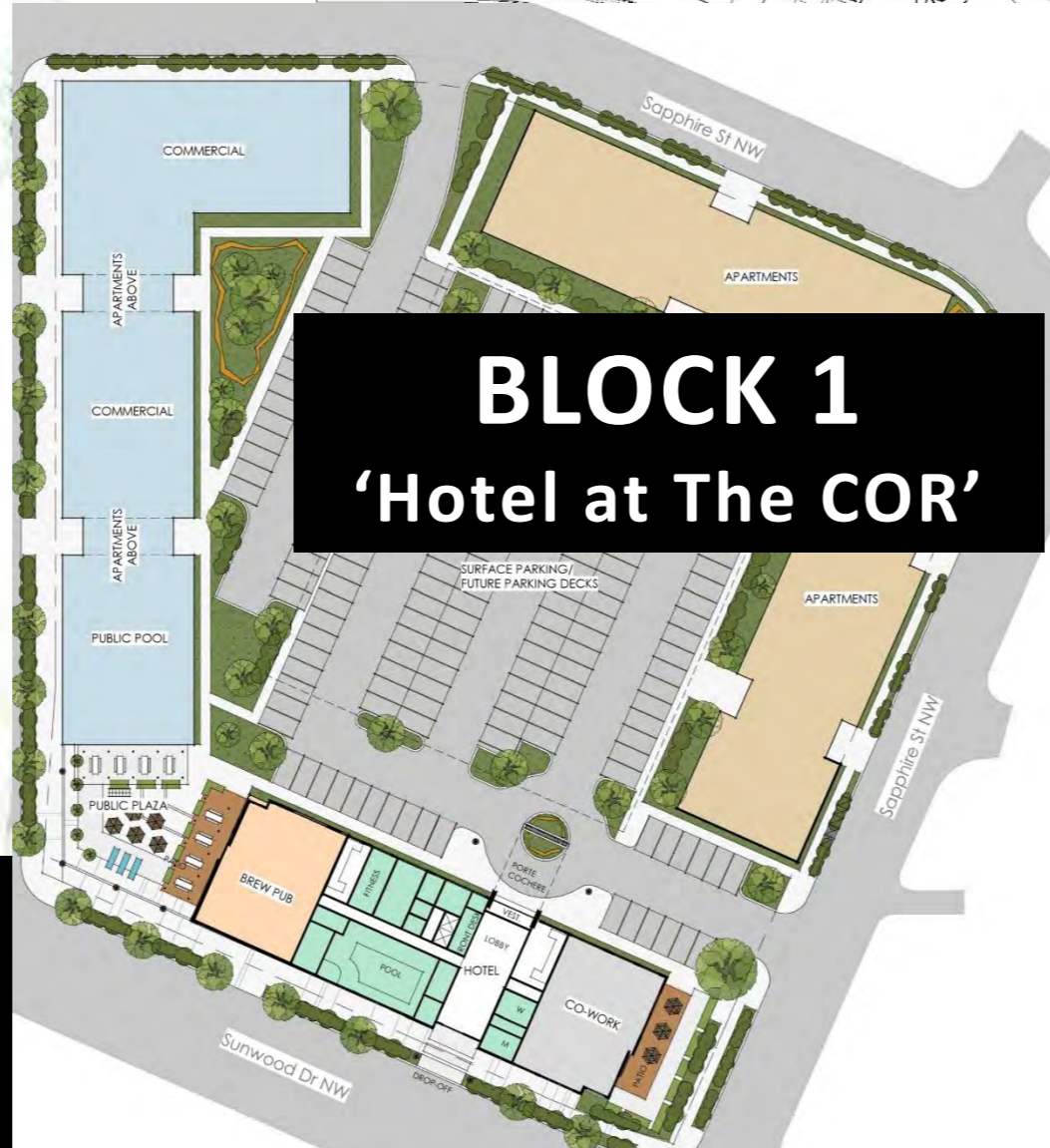
# GRANT REQUESTED ACTIVITIES PLAN 2 – STORMWATER MANAGEMENT

Ramsey Downtown District  
Center Street Improvements

**BLOCK 2**  
**The Sapphire Apartments**

Existing  
Pump House

PARKING INFORMATION:  
118 UNITS X2 = 236 PARKING STALLS REQUIRED  
PROVIDED ATTACHED GARAGES = 30  
PROVIDED DETACHED GARAGES = 52  
PROVIDED SURFACE PARKING STALLS = 154  
TOTAL PARKING STALLS PROVIDED = 236



**BLOCK 1**  
**'Hotel at The COR'**

**Proposed  
Municipal Plaza**



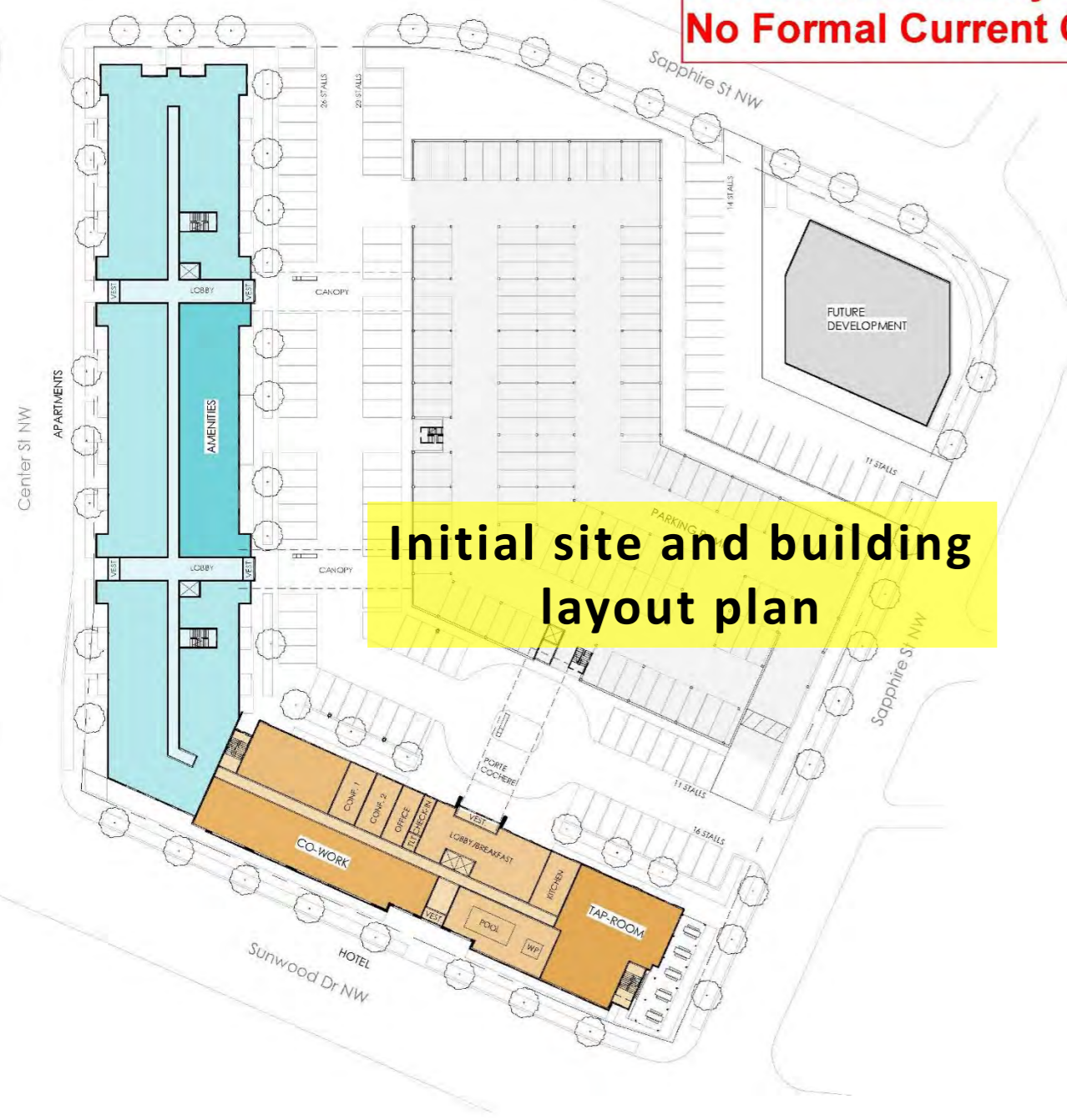
Center Street

Sunwood Drive

**SITE PLAN**  
**DEVELOPMENT CONTEXT**

Ramsey Downtown District  
Center Street Improvements

Not an Official City Plan  
No Formal Current Code



Initial site and building layout plan



Apartment units over two-story townhouses fronting Sapphire Street

Apartment units over first floor commercial/community space

Proposed site and building layout plan:  
+ added public plaza  
+ added flex-use community space  
+ stormwater management system  
+ active ground-floor uses  
+ widened pedestrian zone  
(based on LCDA review/comment)

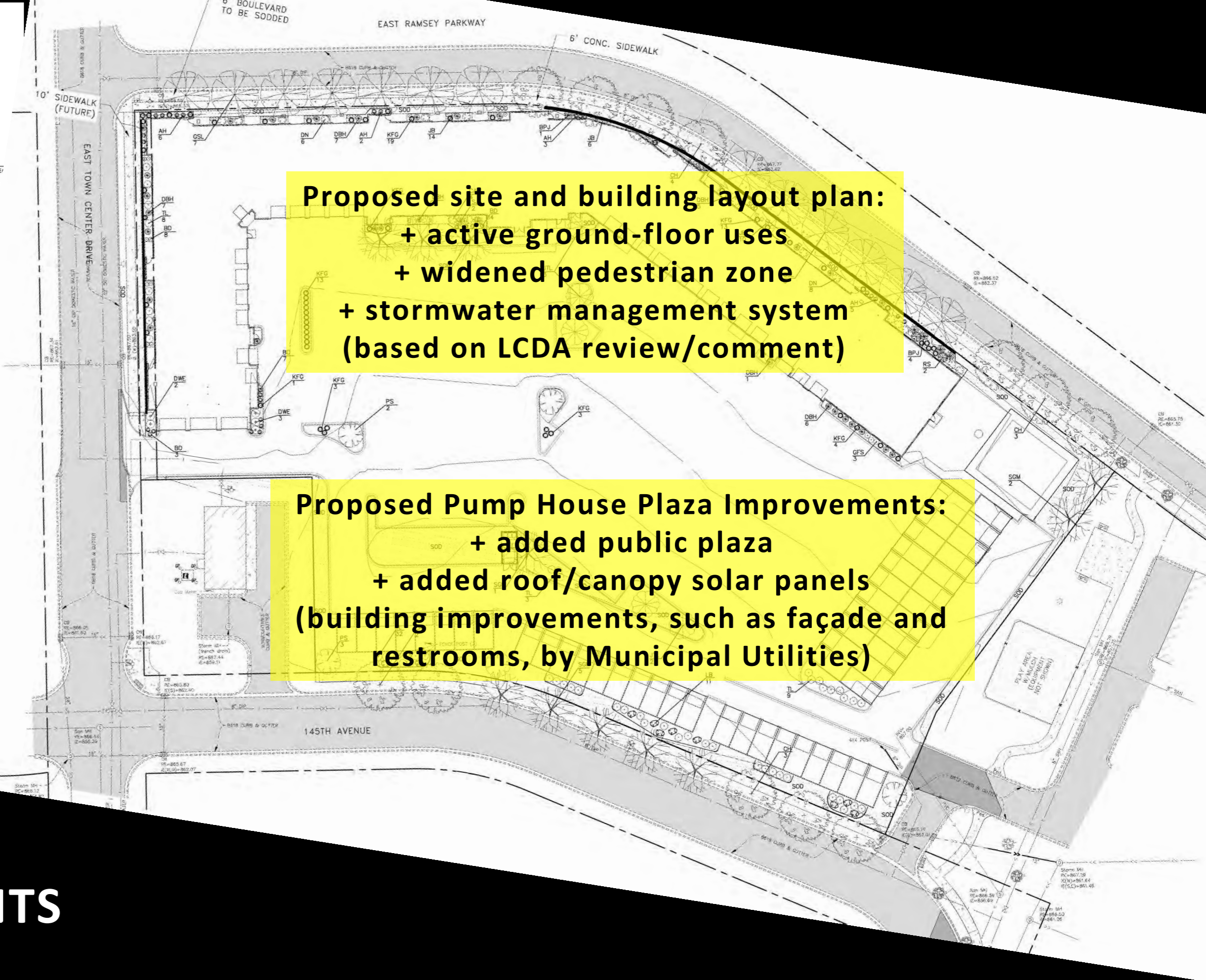
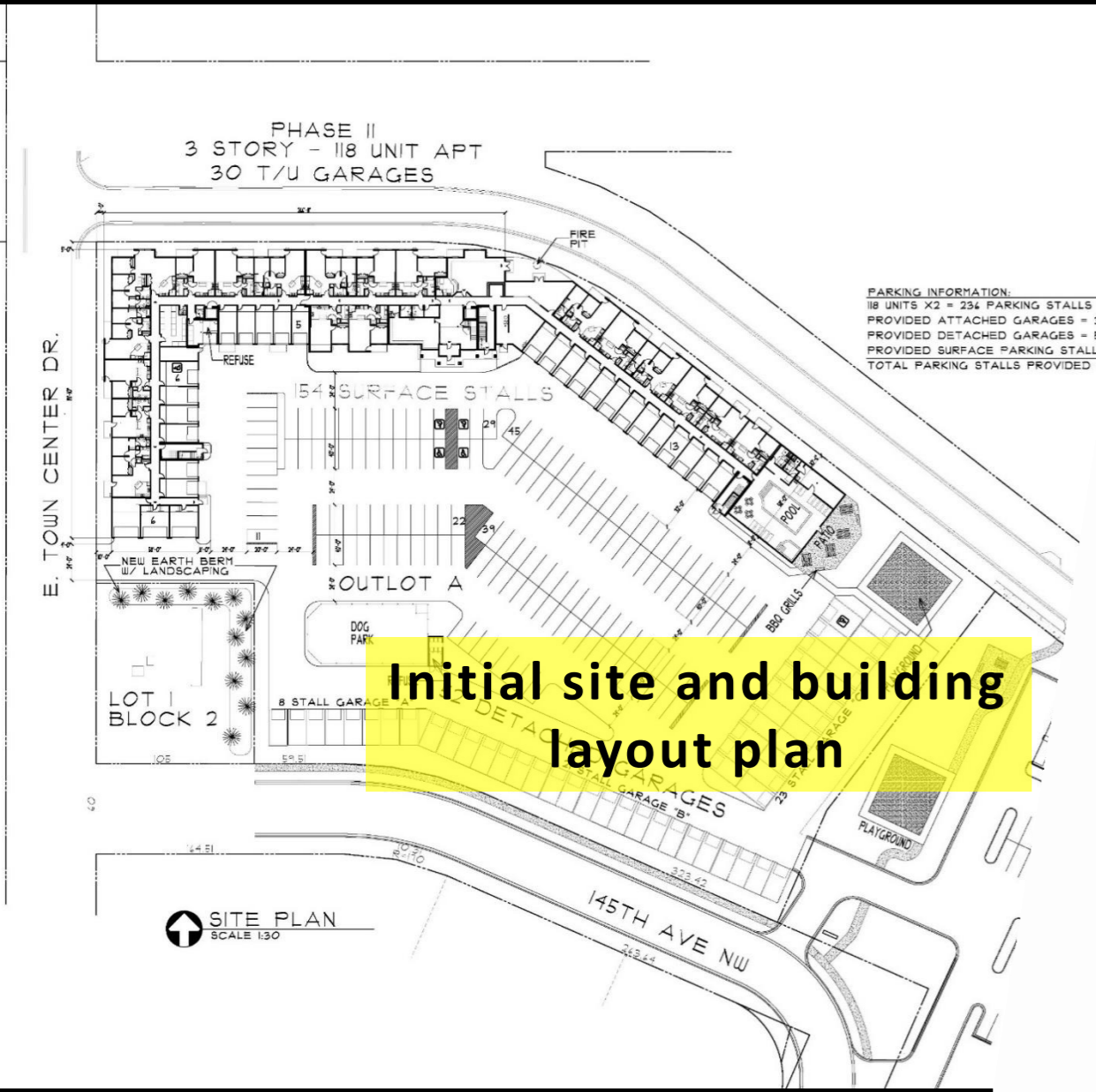
community space

Hotel

# SITE PLAN – BLOCK 1

## ‘Hotel at The COR’

Ramsey Downtown District  
Center Street Improvements



**SITE PLAN – BLOCK 2**  
**THE SAPPHIRE APARTMENTS**  
Ramsey Downtown District  
Center Street Improvements

**The Waterfront  
(proposed new park)**



**Municipal Plaza  
(proposed new park)**

**Proposed New  
Development**

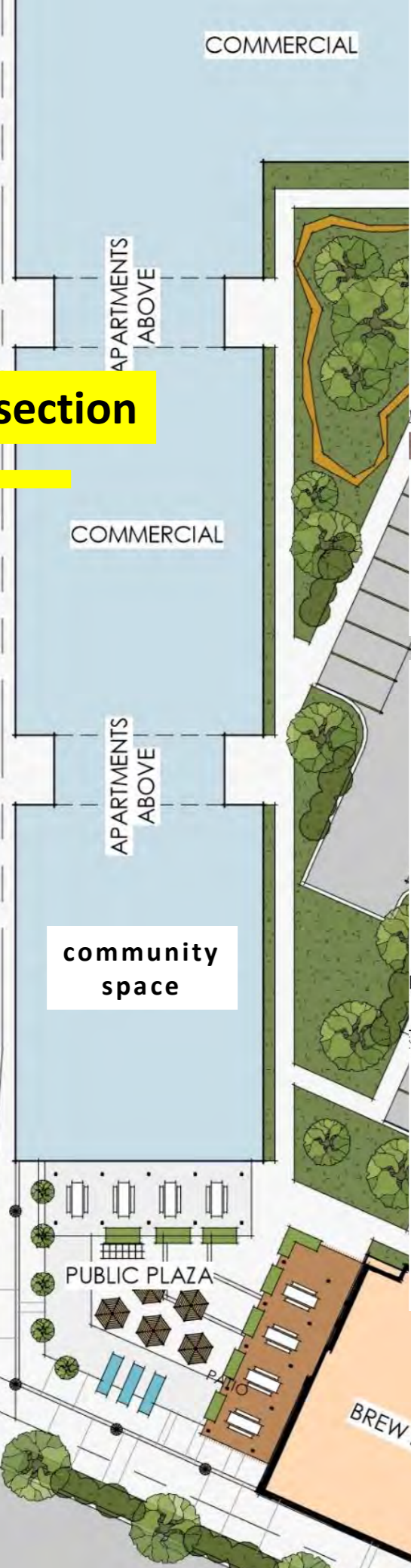
**North Star  
Commuter Rail  
Station**

**Ramsey City Hall**

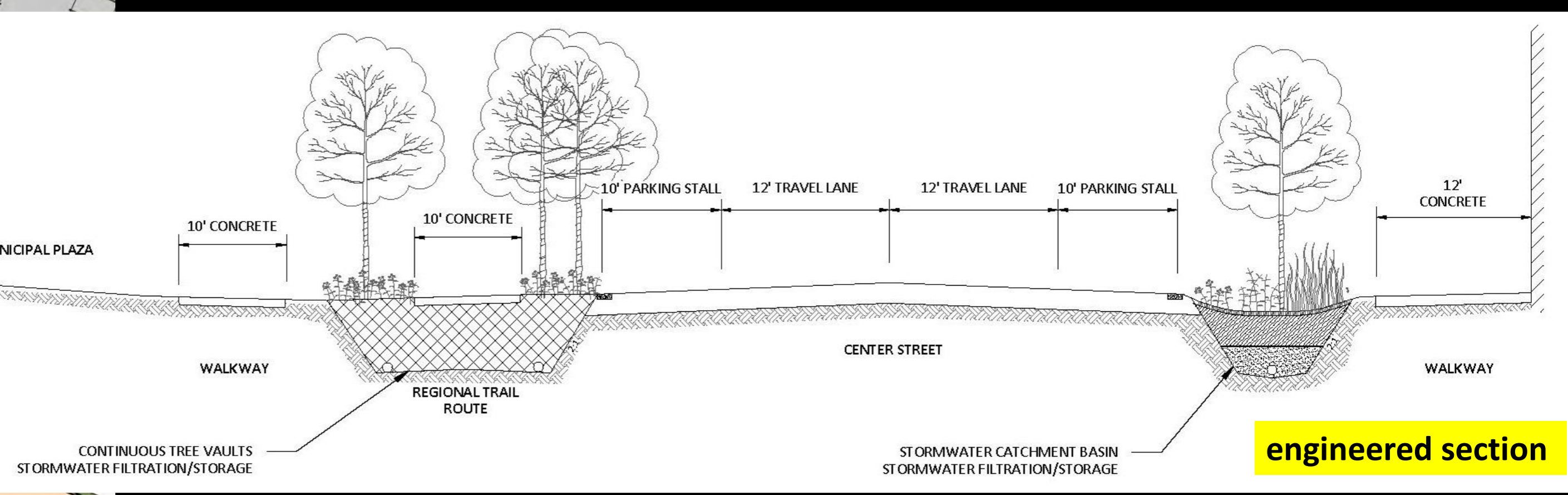
**PUBLIC REALM  
CONTEXT PLAN**  
Ramsey Downtown District  
Center Street Improvements

street cross-section

Center St NW



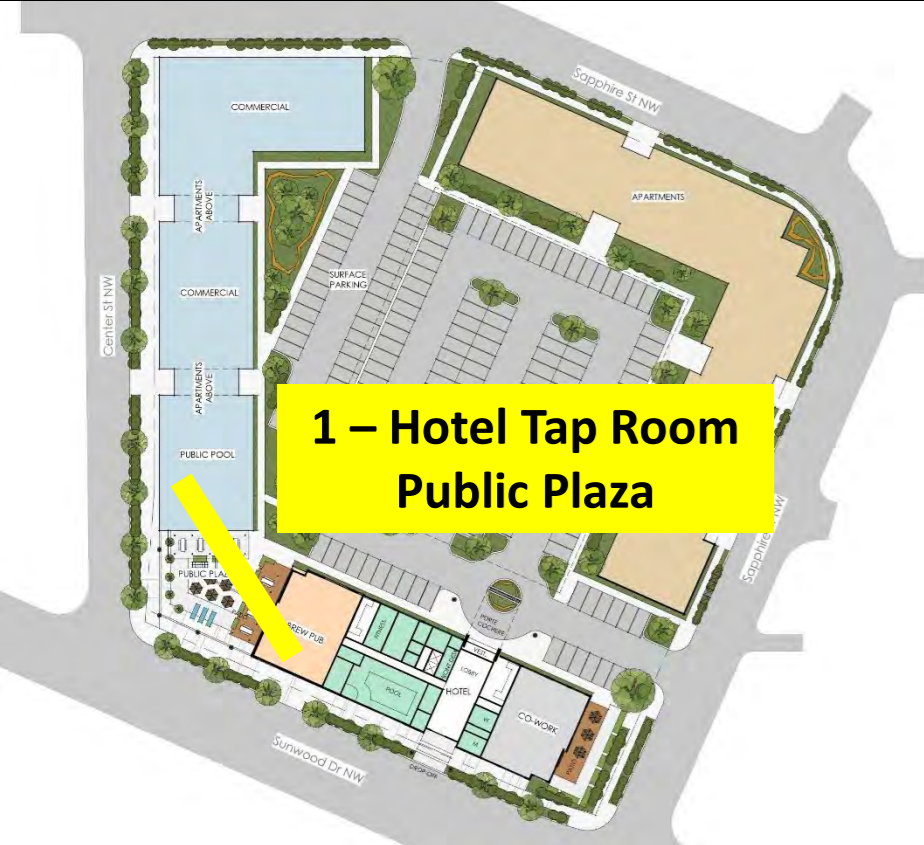
illustrative section



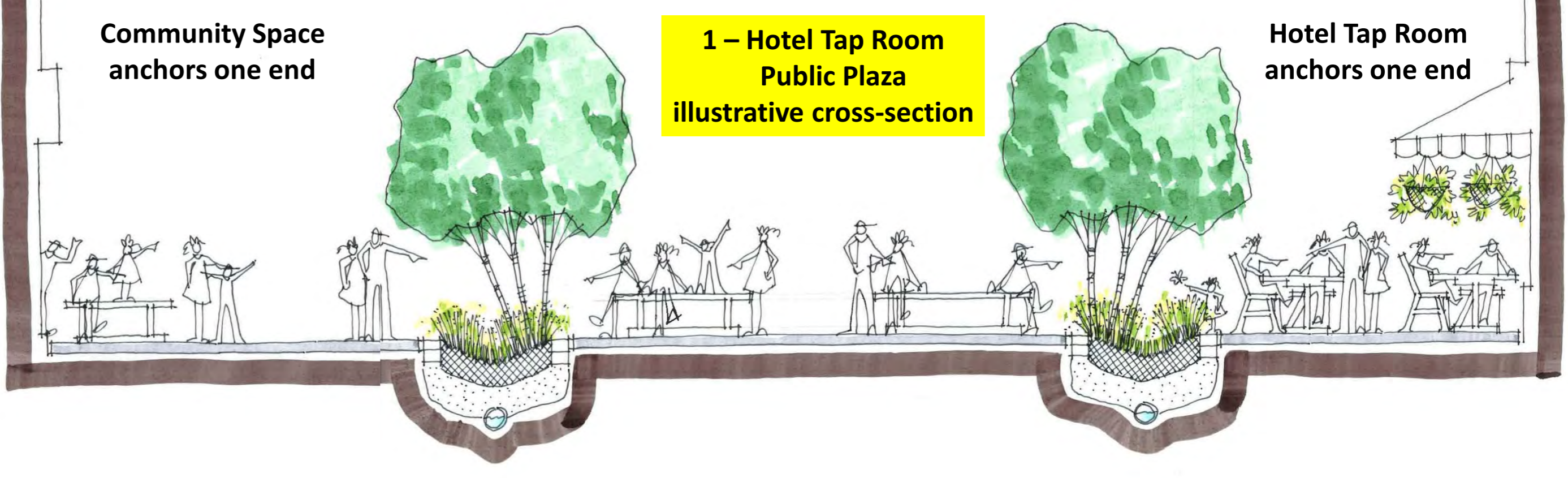
engineered section

# SECTIONS – CENTER STREET

Ramsey Downtown District  
Center Street Improvements



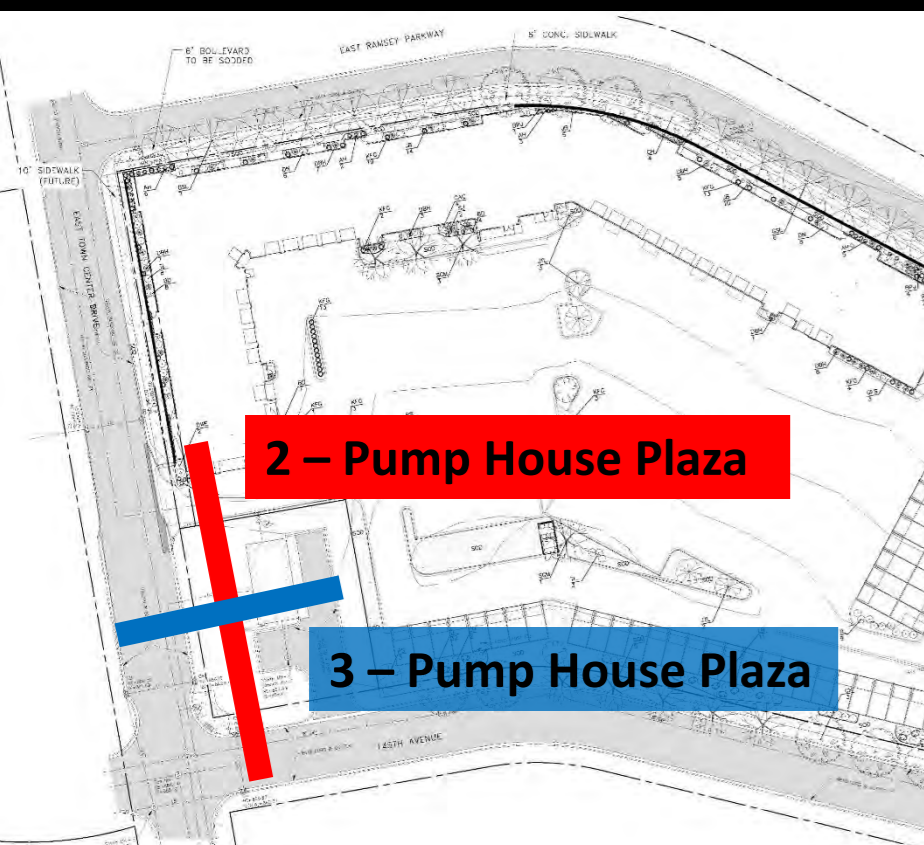
**1 – Hotel Tap Room  
Public Plaza**



Community Space  
anchors one end

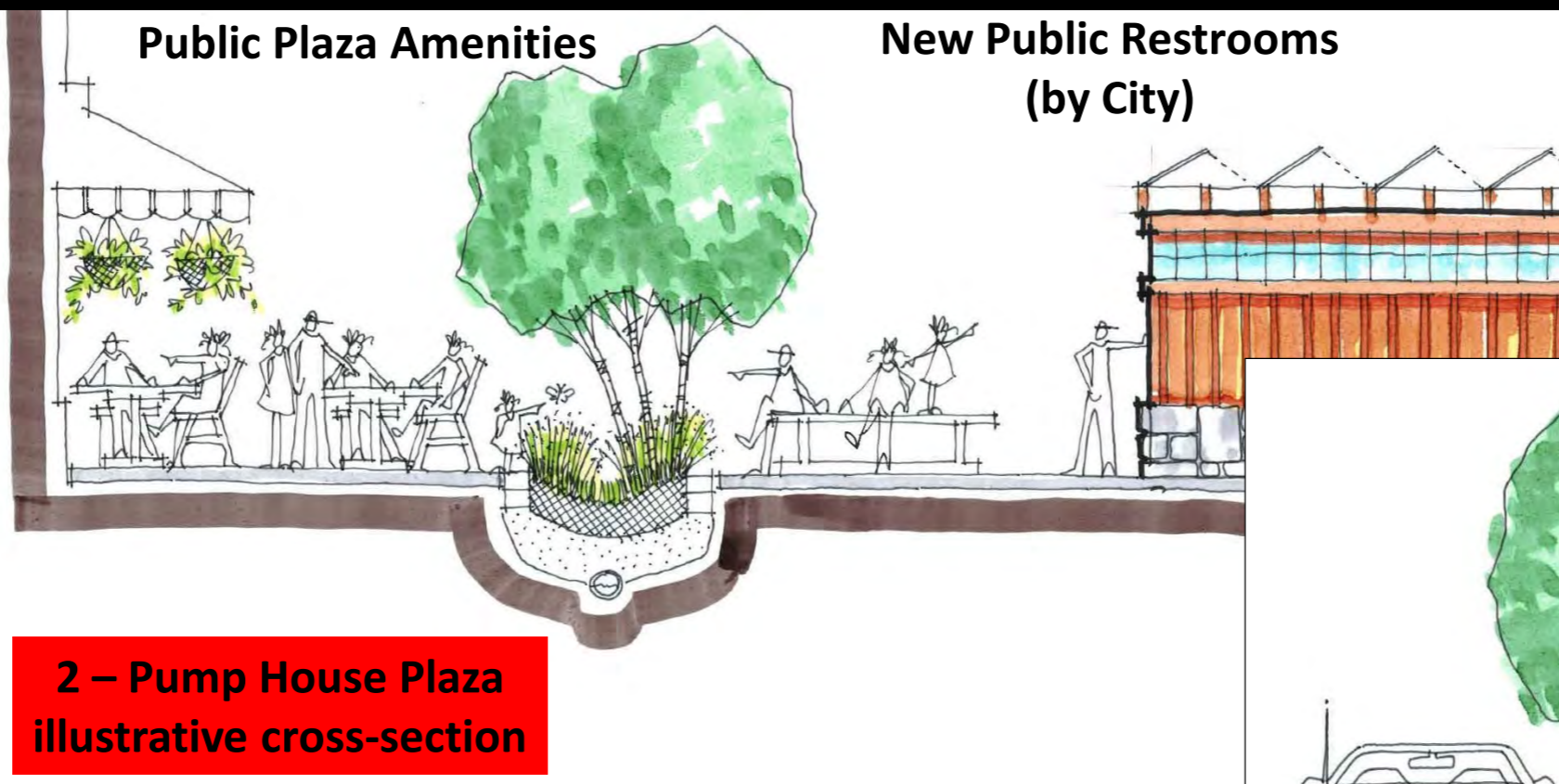
**1 – Hotel Tap Room  
Public Plaza  
illustrative cross-section**

Hotel Tap Room  
anchors one end



**2 – Pump House Plaza**

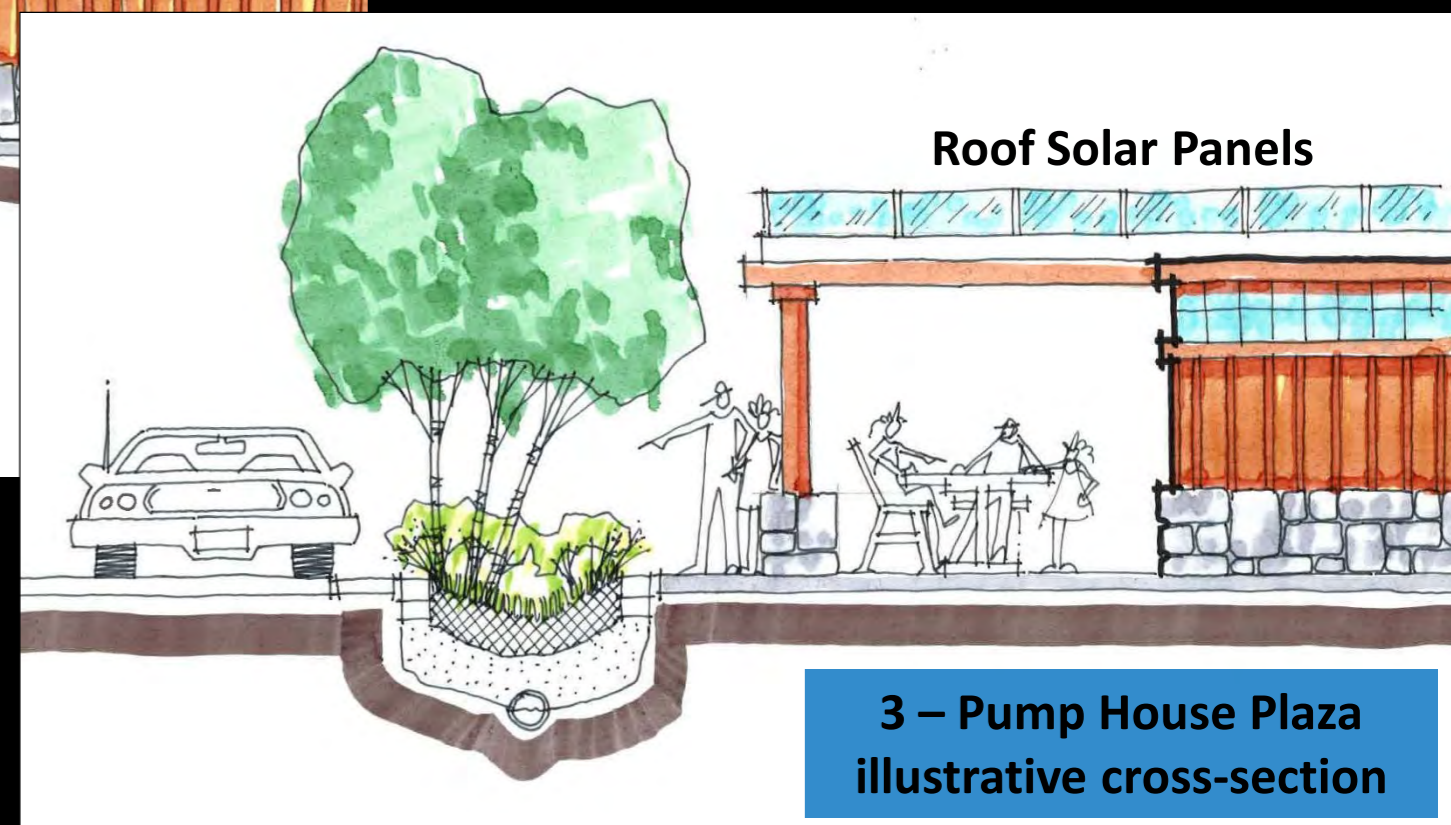
**3 – Pump House Plaza**



Public Plaza Amenities

New Public Restrooms  
(by City)

**2 – Pump House Plaza  
illustrative cross-section**

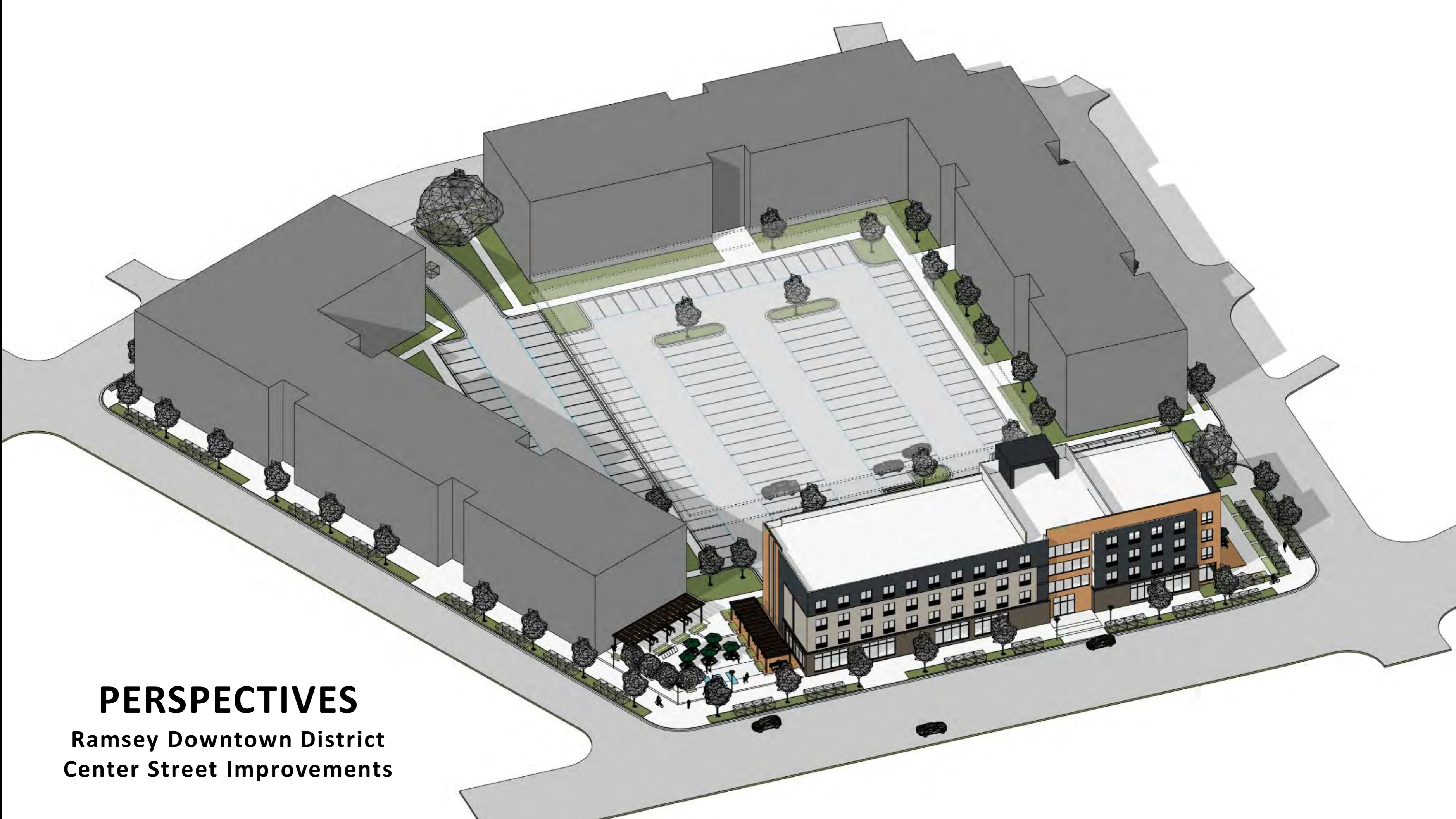


Roof Solar Panels

**3 – Pump House Plaza  
illustrative cross-section**

# SECTIONS – Public Plazas

Ramsey Downtown District  
Center Street Improvements



# PERSPECTIVES

Ramsey Downtown District  
Center Street Improvements



**PERSPECTIVES**  
Ramsey Downtown District  
Center Street Improvements



**PERSPECTIVES**  
Ramsey Downtown District  
Center Street Improvements



**BEFORE PHOTO**  
Ramsey Downtown District  
Center Street Improvements

June 25, 2019

RE: Technical Memorandum  
2019 Municipal Plaza and Center Street Concept Stormwater Reuse  
City of Ramsey, MN

Bolton & Menk, Inc has completed a preliminary study that analyzes the feasibility of integrating stormwater reuse for irrigation of the proposed Municipal Plaza in conjunction with Center Street Improvements. The reuse system envisioned will include best management practices to collect and treat runoff, storage tanks to store the runoff, and a pump station and piping to convey the reuse water to the irrigation areas. The pump station will include pumps, a control system to monitor flow and pressure, and a treatment unit and self-flushing filter to protect the public from potential pathogens in the stormwater. The site analyzed for the stormwater reuse system includes Center Street Northwest from East Ramsey Parkway to Sunwood Drive Northwest.

**Current Conditions**

The COR Area of Ramsey is under active development. Since its inception, regional stormwater management has been constructed to maintain stormwater discharge rates to the undeveloped condition and provide water quality and volume control to meet state and local standards. Therefore, the development area surrounding Center Street was planned to discharge into a trunk storm sewer system, sized for the 100-year storm (7.1" in 24 hours) to the regional collection system.

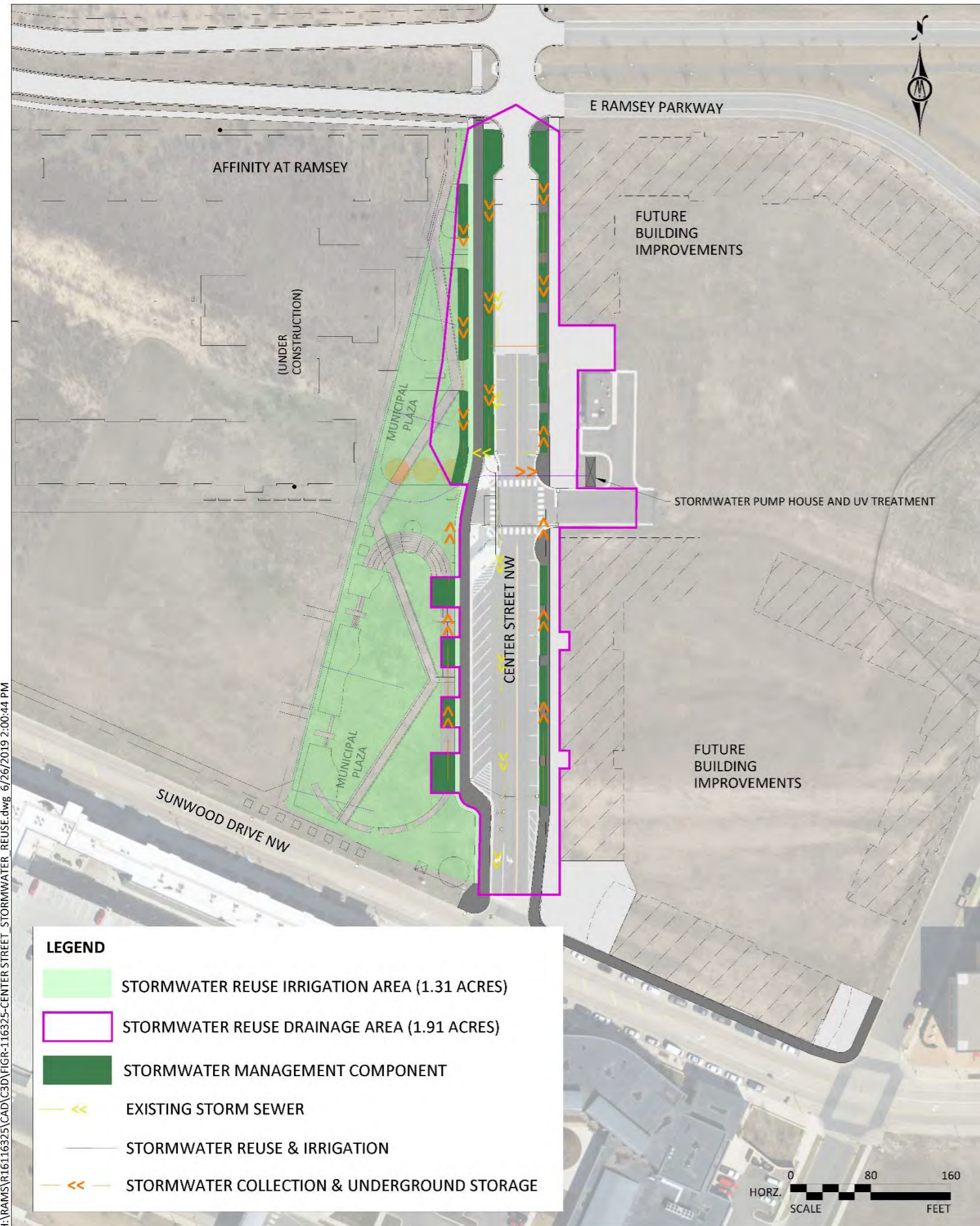
The area surrounding Center Street NW is largely undeveloped, but is proposed to include commercial businesses including the Affinity at Ramsey building, which is currently under construction near the Southwest quadrant of Center Street NW and E Ramsey Parkway. Affinity at Ramsey is responsible for their own stormwater requirements and none of their site was considered for collection in the stormwater reuse system. Additional multi-family residential and mixed-use facilities will also be constructed adjacent to the corridor, also assumed to discharge into the Center Street trunk storm sewer independent of the proposed Center Street treatment and stormwater reuse system.

Center Street NW is currently paved with concrete curb and gutter on each side. Each side of the road includes a driving lane and a parking lane. A 10' path runs along the west side of the road. Drainage patterns run from north to south and stormwater runoff is currently captured by catch basins that route the water offsite to the south.

**Proposed Conditions**

Municipal Plaza is a proposed 1.7-acre green space accessible to the public. Municipal Plaza will be located on the west side of Center Street NW from E Ramsey Parkway to Sunwood Drive NW. The east side of Center Street NW is proposed commercial/residential buildings. The site resides in the City's moderate vulnerability Drinking Water Supply Management Area (DWSMA) and the emergency response area. Therefore, traditional infiltration practices are prohibited.

Bolton & Menk is an equal opportunity employer.



H:\RAMS\16116325\CAD\FIGR-116325-CENTER STREET STORMWATER REUSE.dwg 6/26/2019 2:00:44 PM

# STORMWATER MANAGEMENT PLAN

## Ramsey Downtown District Center Street Improvements

**Preliminary Roadway Runoff Treatment**

The majority of the stormwater runoff will be generated from Center Street NW and the sidewalks on either side of the road. Stormwater runoff is proposed to be collected and treated by a combination of tree vaults and rain gardens located in the boulevard and on either side of the road. It is assumed that the runoff would drain directly into each of the raingardens and tree vaults through surface capture systems (i.e. curb cuts, ribbon curb, pretreatment structures, et). Granular filter media will be used for treatment and a perforated underdrain will connect the tree vaults and raingardens and route all the stormwater to the storage tanks.

**Preliminary Stormwater Reuse System**

Water collected and stored within the storage tanks will discharge via gravity flow to the pump house wet well, where it will be filtered and treated. The reuse water will be disinfected using UV treatment to address any fecal coliform, pathogens or other health concerns related to use of reuse water for irrigation.

The assumed operating season for the irrigation systems is a 26-week period; beginning April 1st and extending through September 30th. The Metropolitan Council Stormwater Reuse Guide Water Balance Tool for Constant Irrigation Demand was used to determine the percent of time over the assumed 26-week irrigation season that the stormwater reuse system would be functional while operating within the assumed conditions. The tool assumes 1" of water over the irrigable area per week is required for adequate vegetation growth and health. The method uses historic rainfall data spanning 31 years to determine the functionality of the stormwater reuse system within the 26-week pumping period.

Exhibit 1 summarizes the preliminary reuse system sizing. The "Irrigation Season" is assumed to be weeks 13 to 39 of the year, or approximately April 1 to September 30. In the calculator, these fields are used to look up weekly average rainfall to estimate the total potential volume of runoff that could be used for irrigation and how often we get 1 inch or more rain. Narrowing or widening the irrigation season changes the irrigation demand. The "Weeks that Flows Must be Augmented" and "Weeks that Reuse System will Meet Demand" cells cover the total period of record (837 weeks, or 16 years). So, 10% of the weeks (85 weeks) during the entire period of record result in a tank volume and rainfall volume less than the demand for that week.

According to the reuse calculator, there will be enough captured stormwater water in approximately 90% of the pumping season weeks to apply 1-inch per week of water over the assumed 1.31-acre turf irrigation area (57,206 sq. ft.). The calculator provides a preliminary need of 454,00 gallons required to apply 1-inch per week during the irrigation season. Since rainfall contributes to that total, as well as stored water in that tank, the total required volume per year does not translate to the size of the tank required. Instead, the volume of the tank can be modified to target an irrigation efficiency. Therefore, the storage tank or tanks should be approximately 150,000 gallons in size to irrigate with stormwater for 90% of the year. Additional irrigation to meet the 1-inch demand, should the City choose to irrigation at that rate, would need to be supplemented with potable sources.

SOURCE Site Data			
Impervious Area	83,417	square feet	
Impervious Area	1.91	acres	
USE Demand Data			
Irrigation Area	57,206	square feet	
Irrigation Area	1.31	acres	
Irrigation Season	13	39	week number
Storage Data			
Storage Provided	150,000	gallons	
Total Storage Required	454,037	gallons	%
Weeks that Flows Must be Augmented	85	weeks	10.2%
Weeks that Reuse System will Meet Demand	752	weeks	89.8%

Exhibit 1: Excerpt from the Met Council Reuse Water Balance Tool.

**Footprint Considerations**

The storage volume could be a single concrete vault or multiple fiberglass underground units. Given the size of individual cisterns, plastic is not available. Fiberglass tanks generally are available up to 50,000 gallons in size. A 50,000-gallon tank has dimensions of approximately 68 feet long with a 12-foot diameter. Three tanks, with space between, could fill a footprint of approximately 5,000 square feet. Concrete vaults can be sized to fit multiple footprint sizes. If a maximum active depth of water in the vault of 8' is assumed, the footprint would be approximately 2,500 square feet.



Exhibit 2: Example concrete vault storage tank (StormTrap).



Exhibit 3: Example underground fiberglass storage tanks (Xerxes).

**Additional Considerations**

A simplified estimate of stormwater runoff expected from the street section was assembled to ensure the watershed can produce enough runoff to adequately fill the tanks. Table 1 is a summary expected runoff volumes for a variety of events. A rainfall event producing between 3.6 and 4.3 inches in 24 hours (5-year to 10-year return interval) can completely fill the tank.

Table 1: Summary of expected runoff volumes.

Rainfall Event	Rainfall Depth (IN)	Runoff Volume (CF)	Runoff Volume (GA)
1" Event	1.00	5,500	41,140
1-Year	2.46	14,700	109,956
2-Year	2.86	17,600	131,648
5-Year	3.58	22,700	169,796
10-Year	4.26	27,500	205,700

During final design, additional hydraulic information will be provided to provide an effective high flow bypass system. In other words, if the tank is full and the City experiences a 100-year rainfall event, there will be adequate bypass capacity to reduce local flooding and protect the tank(s). Also, since the COR trunk storm sewer system is already designed to accommodate a 100-year rainfall event with discharge to regional flood storage areas, the bypass system will effectively mimic the originally designed scenario. In between events when irrigation is occurring, or the tanks is being filled, there will be hydraulic relief on the trunk system and volume control provided.

Since the reuse water will pass through a filter and UV treatment system, the impact to groundwater resources through the infiltration of irrigation water is expected to be very minimal. Impacts to groundwater resources in the ERA are not anticipated.

Sincerely,

**Bolton & Menk, Inc.**

**Timothy J. Olson, PE, CFM**  
 Water Resources Project Manager

# STORMWATER MANAGEMENT CALCULATIONS

Ramsey Downtown District  
 Center Street Improvements