

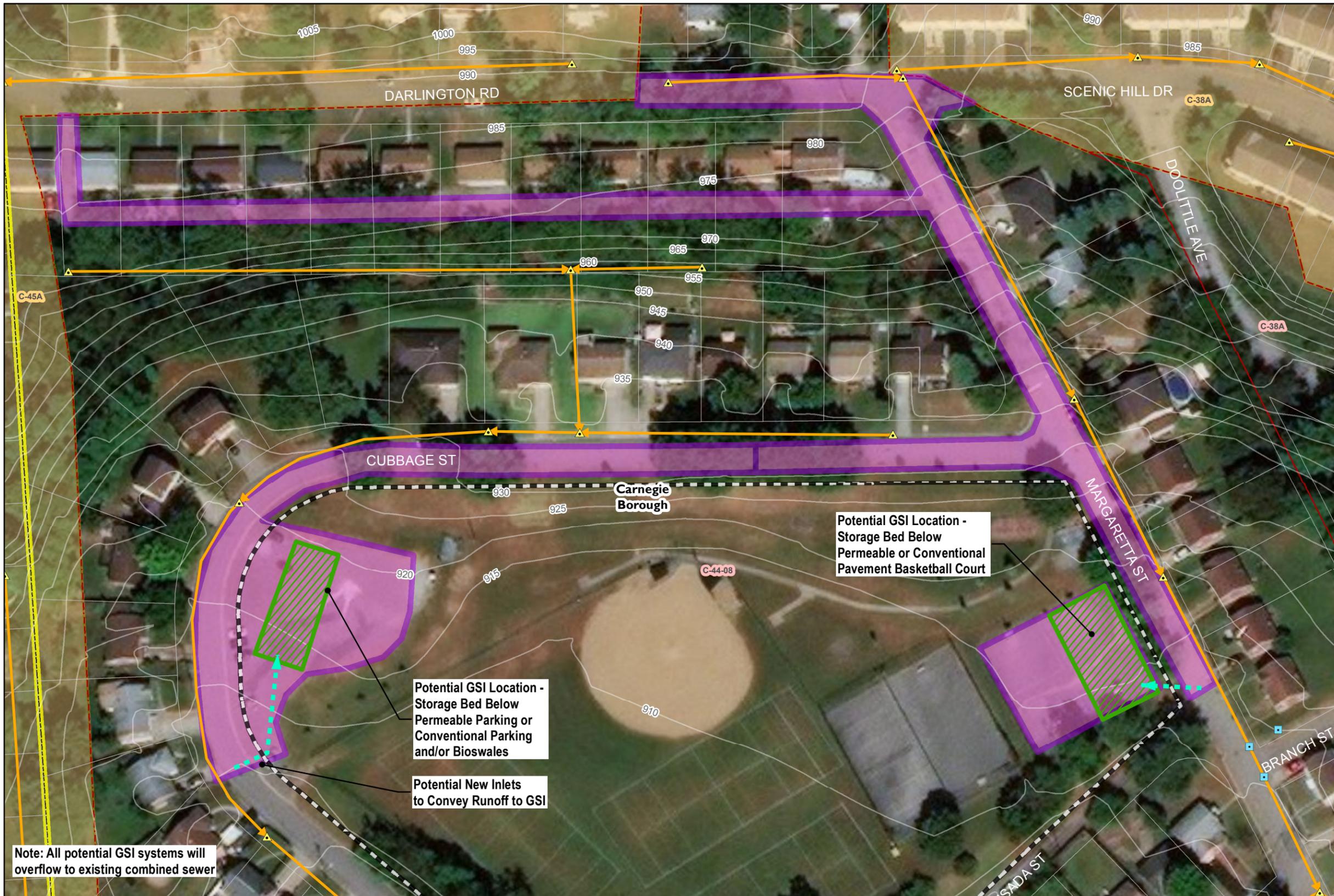
D-2. GSI Concept Plans



**Chartiers Creek
GSI CONCEPT PLAN**

CC-01: Seventh Avenue Park
Carnegie Borough / POC C-44-08

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▨ GSI Footprint
- ▭ Impervious Drainage Area
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)



Potential GSI Location -
Storage Bed Below
Permeable or Conventional
Pavement Basketball Court

Potential GSI Location -
Storage Bed Below
Permeable Parking or
Conventional Parking
and/or Bioswales

Potential New Inlets
to Convey Runoff to GSI

Note: All potential GSI systems will overflow to existing combined sewer

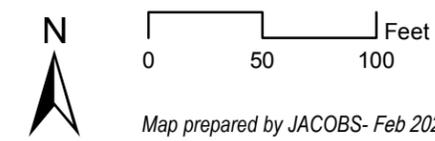
Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

Proposed green stormwater infrastructure (GSI) for Seventh Avenue Park focuses on directing adjacent roadway runoff to the park's existing gravel parking lot and basketball court, improving the surfaces and functions of these features, while intentionally leaving the majority of the park's open space and programming untouched. Roadway runoff can be directed from Cabbage Street via new inlets and piped into a stormwater storage bed below a new parking lot surface consisting of permeable or conventional pavement. If landscape amenities are desired, bioswales can be added to the concept. Roadway runoff from Margaretta Street can be directed into a stormwater storage bed beneath the basketball court (assuming the court is still desired), which can be finished with either a permeable or conventional pavement surface. The GSI could be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
CC-01	Carnegie Borough	1.9	\$660,000	\$460,000	8.5	1,520,000	78%	1,180,000	\$0.56

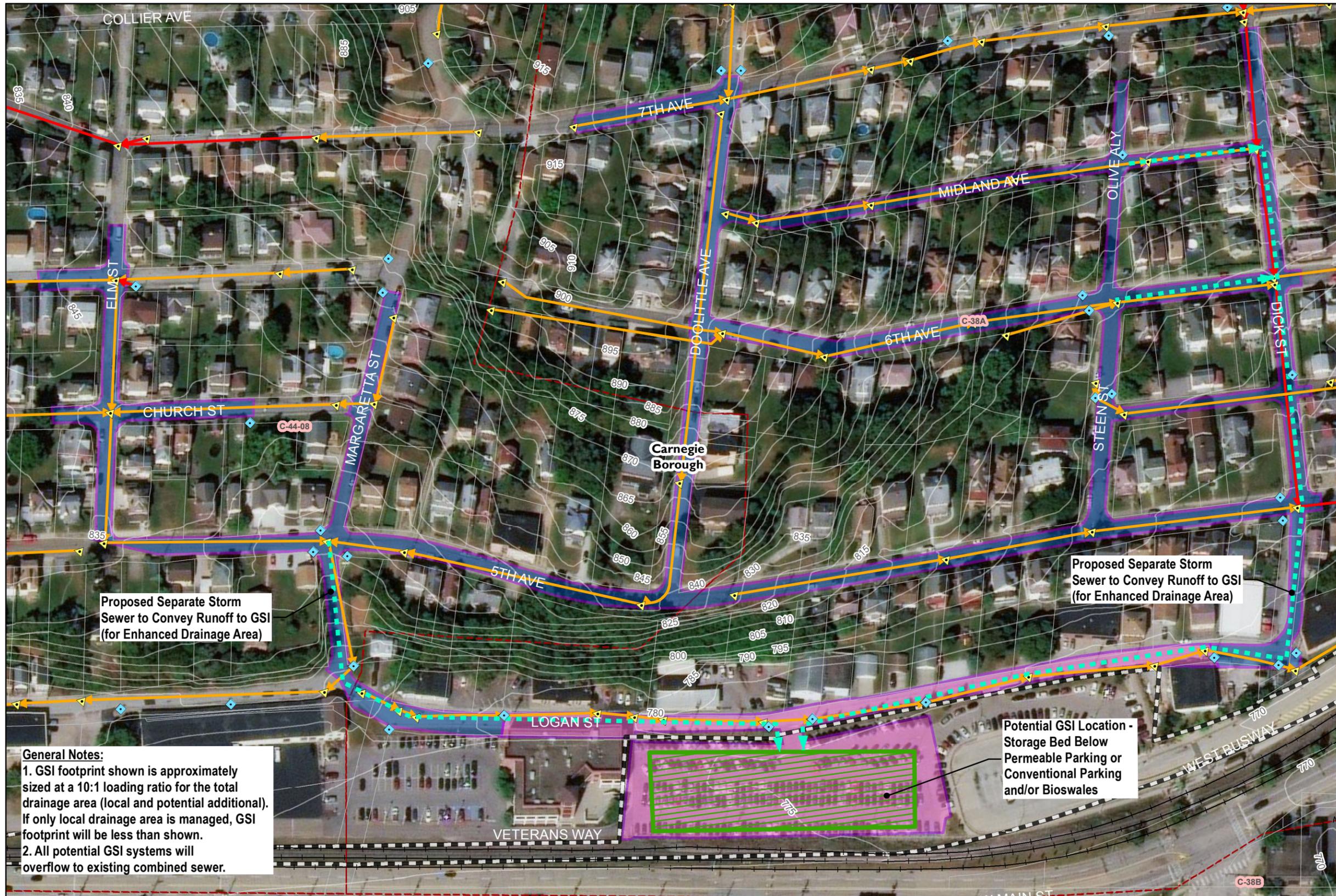
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI





**Chartiers Creek
GSI CONCEPT PLAN**

CC-02: Carnegie Park n Ride
Carnegie Borough / POC C-38A

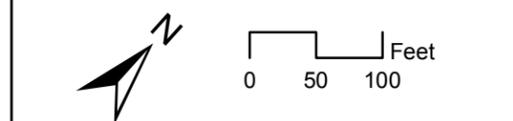


- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and potential additional). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Proposed green stormwater infrastructure (GSI) for the Carnegie Borough Park n Ride site focuses on maximizing stormwater capture by disconnecting a large portion of the adjacent neighborhood from the combined sewer and instead directing runoff via new inlets and new separate storm sewer to the proposed GSI. The proposed GSI can be a stormwater storage bed below a new parking lot surface consisting of permeable or conventional pavement. If landscape amenities are desired, bioswales can also be considered. The GSI could be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered.

Project CC-02 (Parcel Owner: Port Authority of Allegheny County)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.95	\$530,000	\$370,000		1,600,000		780,000	\$0.68
Enhanced Drainage Area	3.64	\$740,000	\$520,000		2,990,000		1,450,000	\$0.51
Project Totals	5.60	\$1,270,000	\$890,000	4.0	4,590,000	49%	2,230,000	\$0.57

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



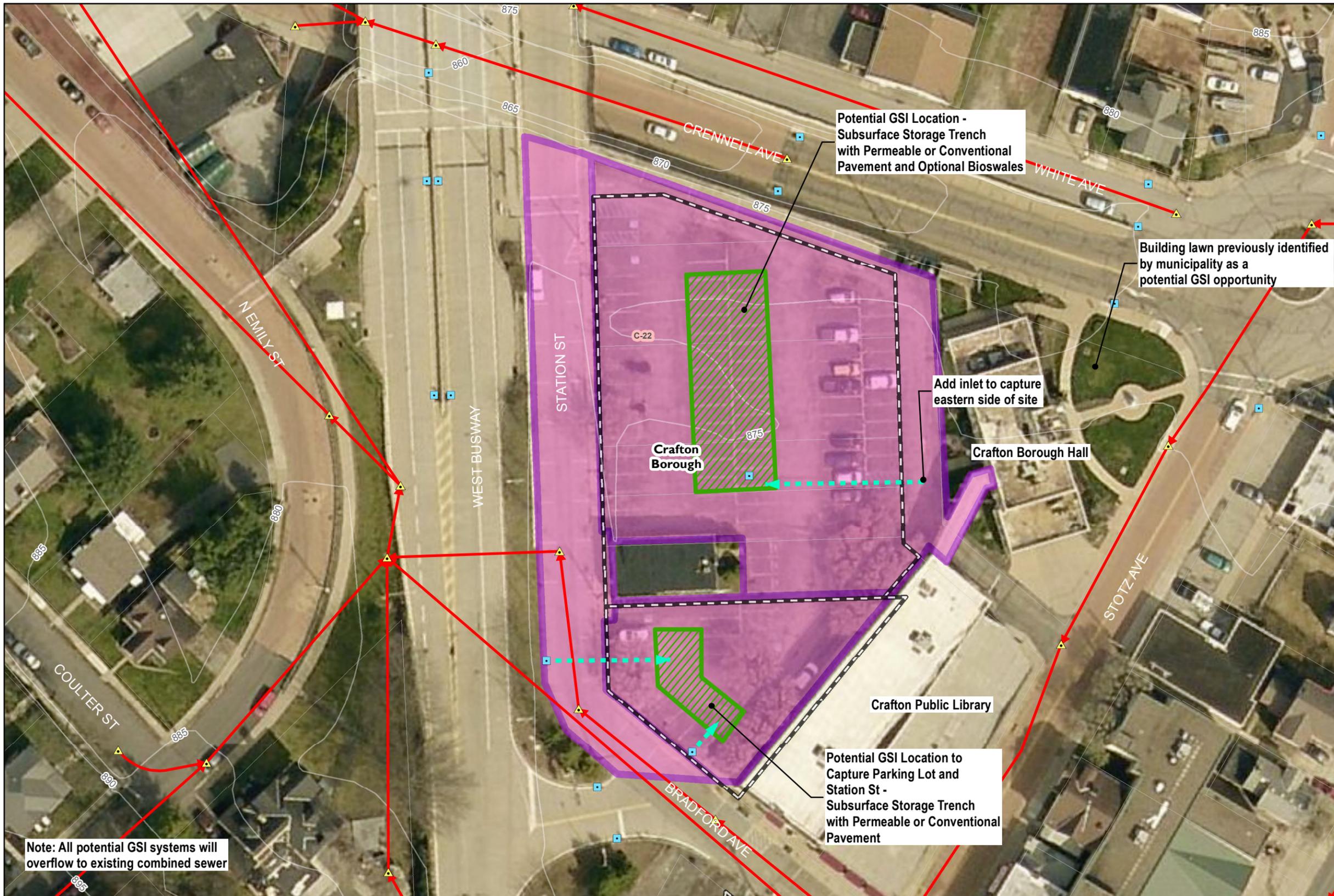
**Chartiers Creek
GSI CONCEPT PLAN**

**CC-10: Port Authority Park and Ride
Crafton Borough / POC C-22**

- Existing Inlets
- ▲ Sewer Structures
- - - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Note: All potential GSI systems will overflow to existing combined sewer

The Port Authority Park and Ride parking lot is a large impervious surface that can be managed with green stormwater infrastructure (GSI). A subsurface storage/infiltration trench can be placed underneath the existing parking stalls and covered with either a permeable or conventional pavement surface. If landscape amenities are desired, small bioretention areas, bioswales, and/or tree trenches can be added to the design. In addition, a portion of Station Street's runoff can be directed into an additional GSI feature in the southern parking area that could be a subsurface storage/infiltration trench with a permeable or conventional pavement surface.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
CC-10	Crafton Volunteer Fire Department	1.1	\$320,000	\$230,000	4.5	940,000	88%	820,000	\$0.39

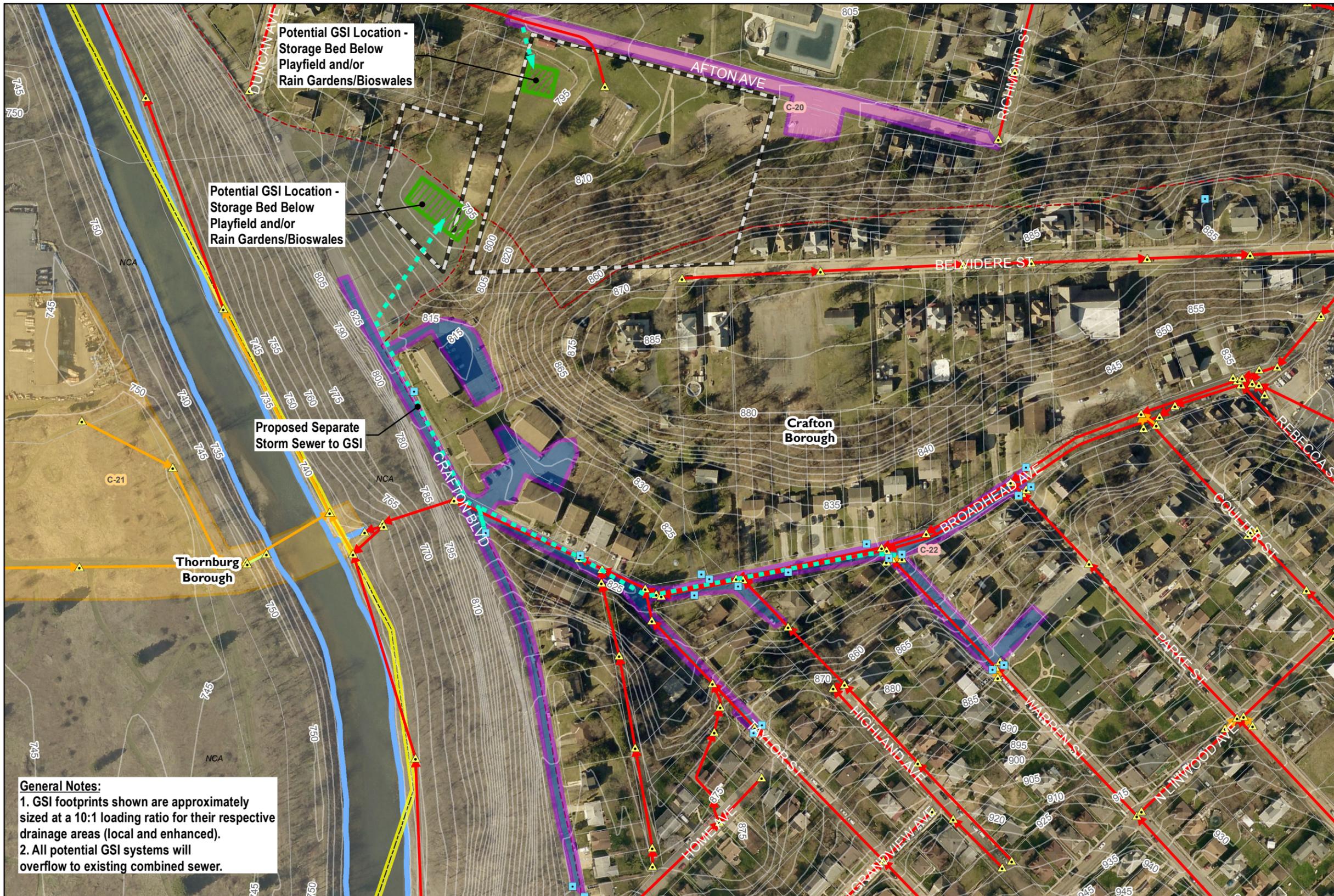
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





**Chartiers Creek
GSI CONCEPT PLAN**

CC-12: Crafton Park
Crafton Borough / POC C-20, C-22



- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

General Notes:
1. GSI footprints shown are approximately sized at a 10:1 loading ratio for their respective drainage areas (local and enhanced).
2. All potential GSI systems will overflow to existing combined sewer.

Proposed green stormwater infrastructure (GSI) for Crafton Park focuses on utilizing the park's open space to manage stormwater runoff from the streets surrounding the park. Directing roadway runoff via new inlets and new separate storm sewers to the proposed GSI features essentially "disconnects" the neighborhood's streets from the combined sewer system and manages stormwater locally. If a low-impact approach is desired, the proposed GSI features can be stormwater storage beds located below the existing playfields. This minimizes disruption to usage of the park's open space and recreational features. If more visible features are desired, a rain garden and/or bioretention can be added as potential GSI features in addition to the stormwater storage beds, which can be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered.

Project CC-12 (Parcel Owner: Crafton Borough)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	0.69	\$170,000	\$120,000		560,000		470,000	\$0.36
Enhanced Drainage Area	2.11	\$400,000	\$280,000		1,730,000		1,450,000	\$0.28
Project Totals	2.79	\$570,000	\$400,000	3.0	2,290,000	84%	1,920,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



Map prepared by JACOBS- Feb 2020



**Chartiers Creek
GSI CONCEPT PLAN**

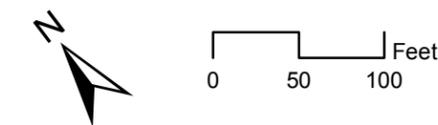
**CC-24: Sto-Rox Junior/Senior HS
Community Field**
Stowe Township / POC C-09

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOsan: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprints shown are approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, the GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The Sto-Rox Junior/Senior High School has opportunities for green stormwater infrastructure (GSI) implementation at both small and large scales. On a large scale, there is the opportunity to direct right-of-way runoff from Rosamond Street, Russellwood Avenue, and Valley Street into a large subsurface storage bed underneath the existing parking lot which can be resurfaced with either permeable or conventional pavement. If landscape amenities are desired, bioswales and/or tree trenches can be added. There is also an opportunity on the northern side of the school for a smaller-scale demonstration GSI opportunity, such as a bioretention area (rain garden) that can manage the adjacent roadway and sidewalks while providing environmental education opportunities and landscape amenities. The proximity to the school provides an excellent opportunity for public education.

Project CC-24 (Parcel Owner: Sto-Rox School District)

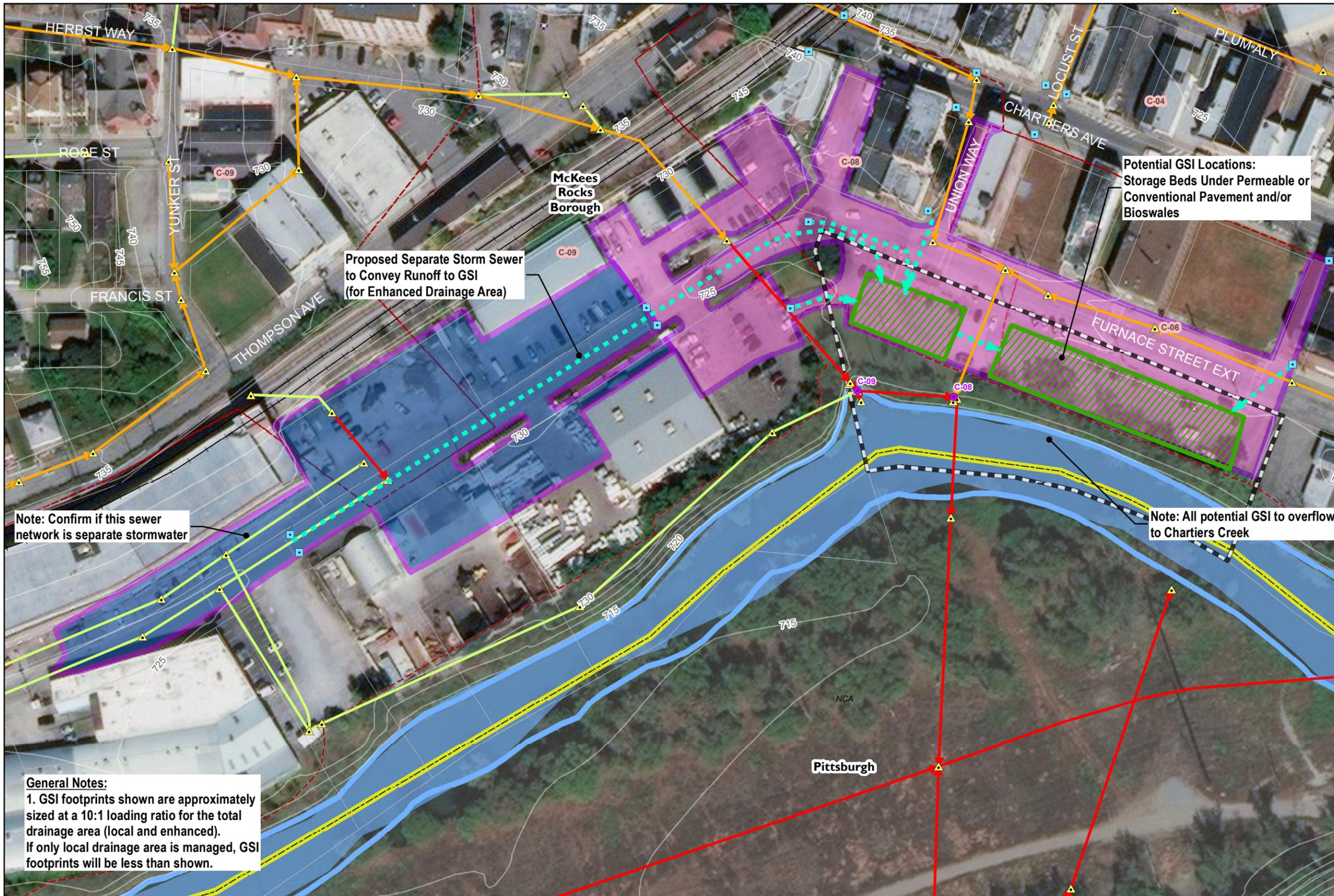
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	3.19	\$810,000	\$570,000		2,620,000		2,310,000	\$0.35
Enhanced Drainage Area	0.74	\$140,000	\$100,000		610,000		540,000	\$0.26
Project Totals	3.93	\$950,000	\$670,000	3.0	3,230,000	88%	2,850,000	\$0.33

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Chartiers Creek
GSI CONCEPT PLAN**

CC-25: Furnace St Parking Lot
McKees Rocks Borough / POC C-06,C-08,C-09



- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Note: Confirm if this sewer network is separate stormwater

Proposed Separate Storm Sewer to Convey Runoff to GSI (for Enhanced Drainage Area)

Potential GSI Locations: Storage Beds Under Permeable or Conventional Pavement and/or Bioswales

Note: All potential GSI to overflow to Chartiers Creek

General Notes:
1. GSI footprints shown are approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprints will be less than shown.

Proposed green stormwater infrastructure (GSI) for the Furnace Street Parking Lot will capture stormwater runoff from Furnace Street Extension and adjacent streets and parking lots and direct it to potential GSI features within the parking lot property. These areas can be disconnected from the existing combined sewer system by installing new inlets and new separate storm sewer along Furnace Street Extension. The potential GSI features can be storage beds under permeable or conventional pavement. If landscape amenities are desired, bioswales can be added to the concept. The GSI could be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered. Given its proximity to the creek, this concept should be closely coordinated with any other proposed sewer separation or GSI for this area.

Project CC-25 (Parcel Owner: McKees Rocks Borough)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.54	\$670,000	\$470,000		2,090,000		1,670,000	\$0.40
Enhanced Drainage Area	2.09	\$410,000	\$290,000		1,720,000		1,380,000	\$0.30
Project Totals	4.64	\$1,080,000	\$760,000	3.5	3,810,000	80%	3,050,000	\$0.35

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Chartiers Creek
GSI CONCEPT PLAN**

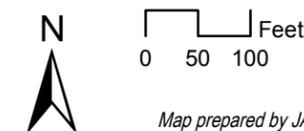
CC-28: Oakwood Park
City of Pittsburgh / POC C-25

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

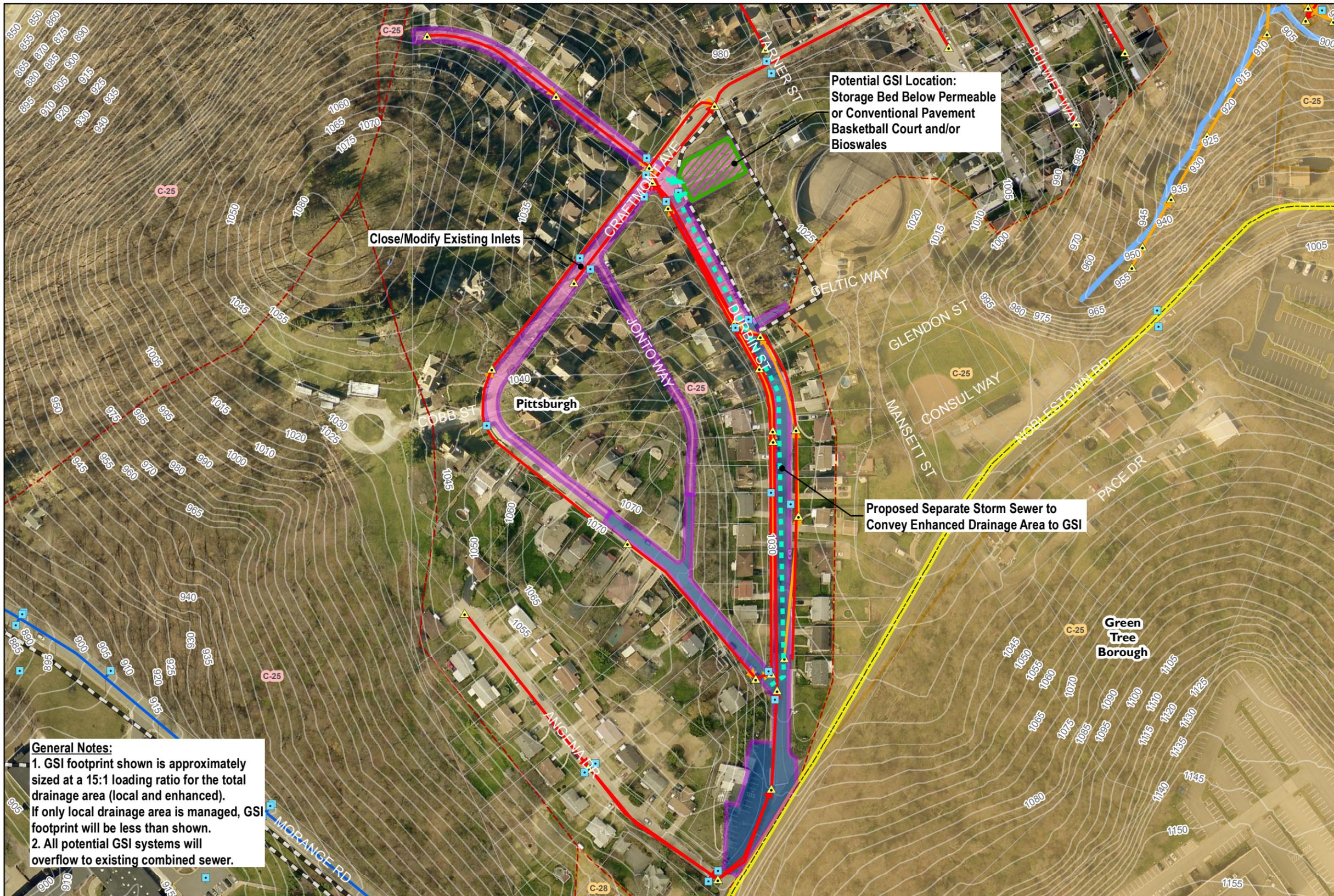
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
PWSA: Existing Inlets, Sewer Pipes

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 15:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Proposed green stormwater infrastructure (GSI) for Oakwood Park will disconnect neighboring streets to the south and west of the park, directing that stormwater runoff via new inlets and new separate storm sewer into proposed GSI features in the park. To maintain the park's current uses and programming, the proposed GSI can be a storage bed located underneath the existing basketball court, assuming the court is still desired. The surface of the basketball court can be restored using either permeable or conventional pavement, and if landscape amenities are desired, bioswales can be included in the concept. The GSI can be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered.

Project CC-28 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.11	\$280,000	\$200,000	—	910,000	—	860,000	\$0.33
Enhanced Drainage Area	1.06	\$200,000	\$140,000	—	870,000	—	830,000	\$0.24
Project Totals	2.17	\$480,000	\$340,000	3.0	1,780,000	95%	1,690,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Chartiers Creek
GSI CONCEPT PLAN**

CC-29: Bishop Canevin School
City of Pittsburgh / POC C-25

- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
PWSA: Existing Inlets, Sewer Pipes

Note: Need to confirm if area is in CSS or already disconnected

Proposed Diversion Structure and Separate Storm Sewer to Convey Runoff to GSI

Potential Additional GSI Location: Bioretention or Bioswales

Potential GSI Location: Storage Bed Below Playfield

Potential DSIR Project Location

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area shown.
2. All potential GSI systems will overflow to existing combined sewer.

The existing sports field at Bishop Canevin School appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have the potential to manage roadway runoff from Morange Road in addition to the school's parking lots. Stormwater runoff could be diverted from Morange Rd. via a new diversion structure and new separate storm sewer, which would direct runoff into a proposed subsurface storage bed below the existing playfield. In addition to the subsurface stormwater feature, a bioretention area and/or bioswales could be included in the concept if landscape amenities are desired. The GSI can be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered. Note that additional investigation will be required to verify the area is combined as the sewer in Morange Rd. is labeled as separate stormwater rather than combined.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	#+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
CC-29	City of Pittsburgh	3.5	\$890,000	\$620,000	3.0	2,890,000	93%	2,690,000	\$0.33

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, #Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



**Chartiers Creek
GSI CONCEPT PLAN**

CC-30: Port Authority Parking Lot
City of Pittsburgh / POC O-13

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
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- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

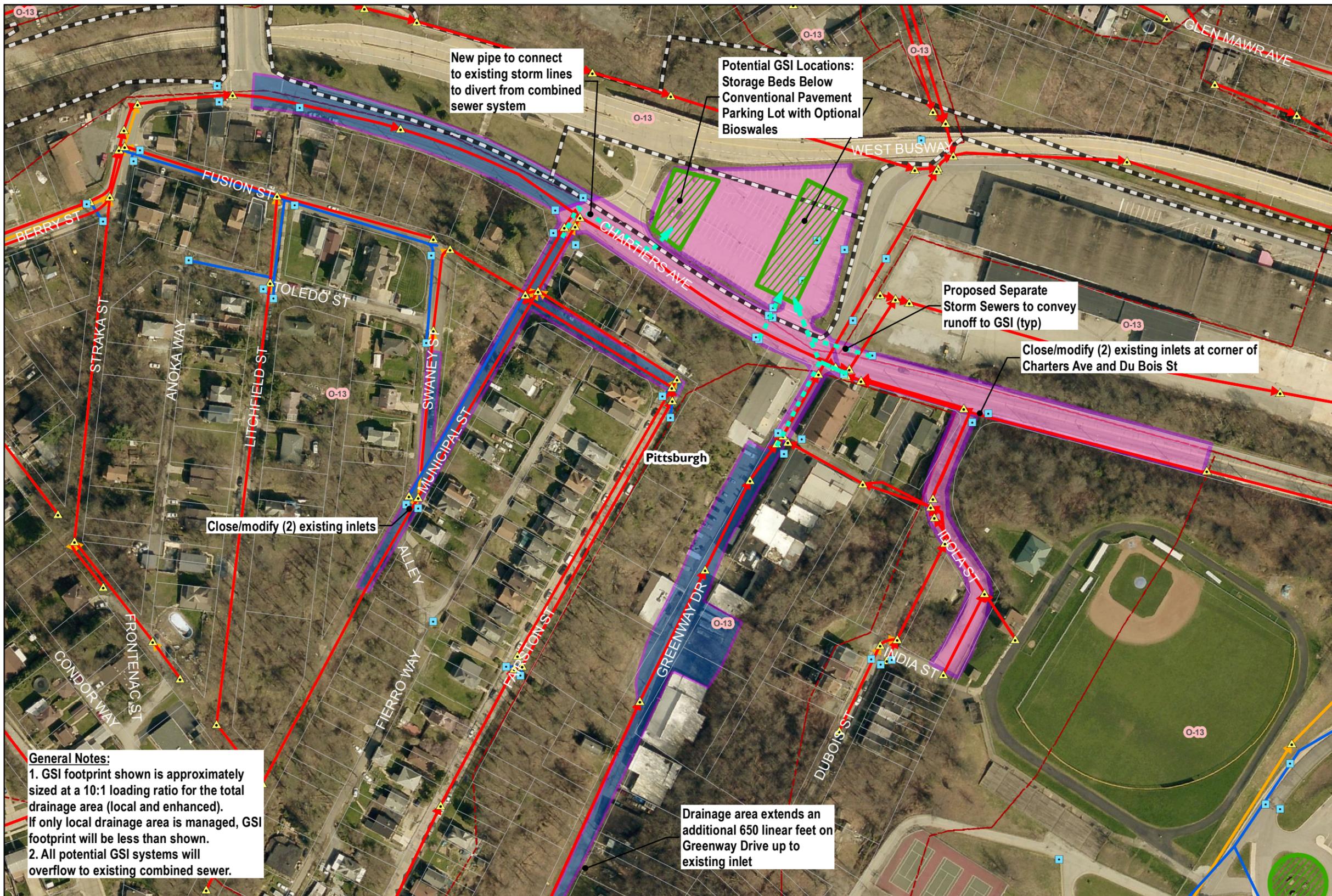
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
PWSA: Existing Inlets, Sewer Pipes

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced).
If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Proposed green stormwater infrastructure (GSI) for the Port Authority Parking Lot on Chartiers Ave has the potential to capture stormwater runoff from Chartiers Ave, Greenway Drive, Municipal St, and several other side streets and direct it to potential GSI features within the parking lot property. The roadways can be disconnected from the existing combined sewer system by installing new inlets and new separate storm sewers. The potential GSI features can be storage beds under conventional pavement. If landscape amenities are desired within the parking lot property, bioswales can be added to the concept. The GSI features could be designed as infiltration and/or slow-release systems, depending on the subsurface conditions encountered. Note that two direct stream inflows have also been confirmed up Greenway Drive.

Project CC-30 (Parcel Owner: Port Authority of Allegheny County)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.92	\$630,000	\$440,000	—	2,390,000	—	1,520,000	\$0.41
Enhanced Drainage Area	2.20	\$360,000	\$250,000	—	1,800,000	—	1,150,000	\$0.31
Project Totals	5.12	\$990,000	\$690,000	1.0	4,190,000	64%	2,670,000	\$0.37

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Chartiers Creek
GSI CONCEPT PLAN**

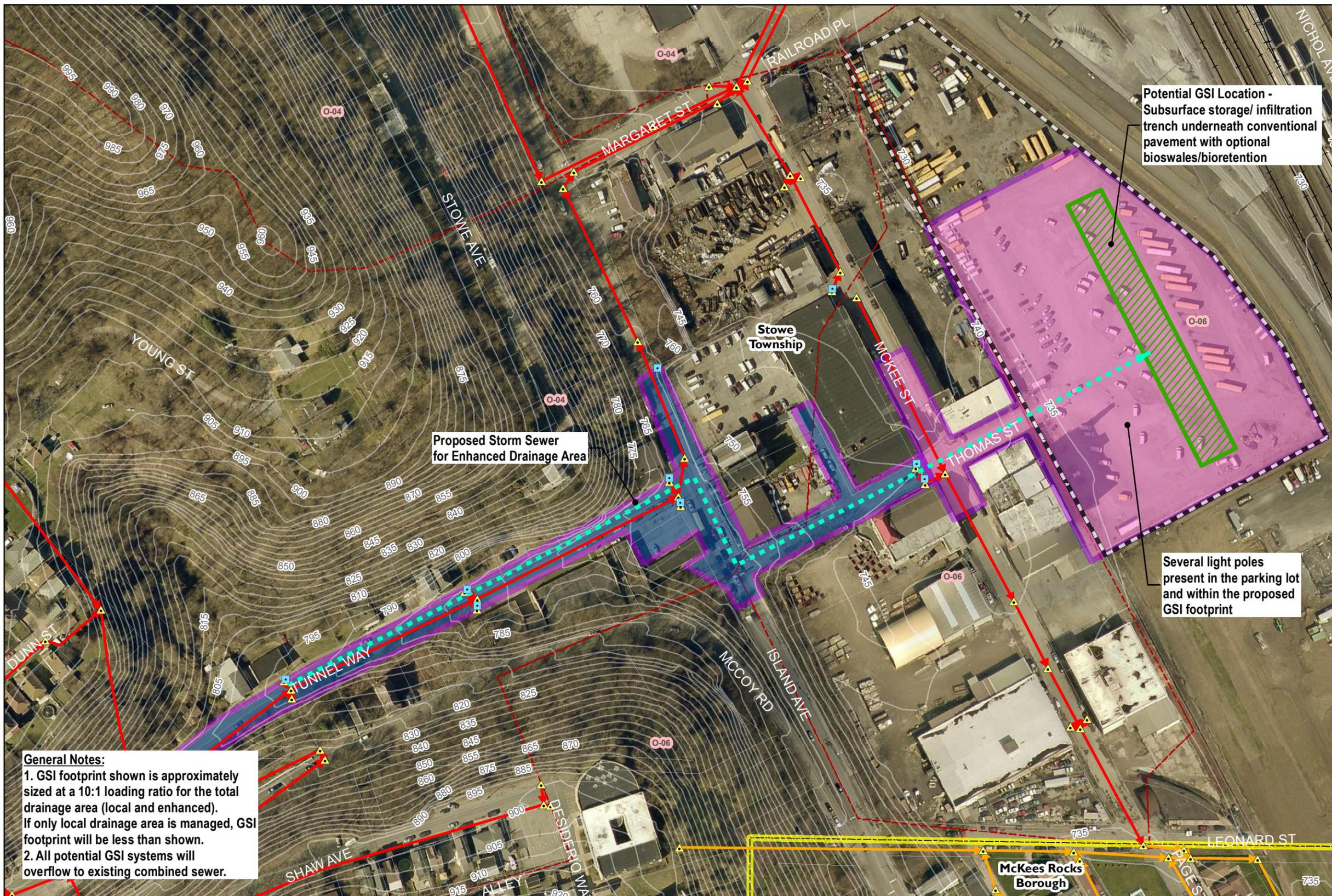
CC-41: School Bus Lot
Stowe Township / POC O-06

- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
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- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The Stowe Township school bus lot is currently a significantly large impervious surface and has the potential to capture and manage stormwater runoff from both the parking lot and adjacent roadways. By adding new storm inlets and storm pipe on Thomas Street and Tunnel Way, the roadway runoff to the west of the site can be disconnected from the combined system and directed to a subsurface stormwater storage bed that can be finished with either a permeable or conventional pavement surface. If landscape amenities are desired, bioswales can be added to the concept. The stormwater storage bed could be designed to avoid conflict with the subsurface foundations of the existing light poles.

Project CC-41 (Parcel Owner: WL Roenigk LP - Private Owner)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	4.97	\$1,070,000	\$750,000		4,080,000		2,530,000	\$0.42
Enhanced Drainage Area	1.77	\$290,000	\$200,000		1,450,000		900,000	\$0.32
Project Totals	6.74	\$1,360,000	\$950,000	1.0	5,530,000	62%	3,430,000	\$0.40

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Chartiers Creek
GSI CONCEPT PLAN**

CC-42: Pittsburgh Classical Academy
City of Pittsburgh / POC O-13

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

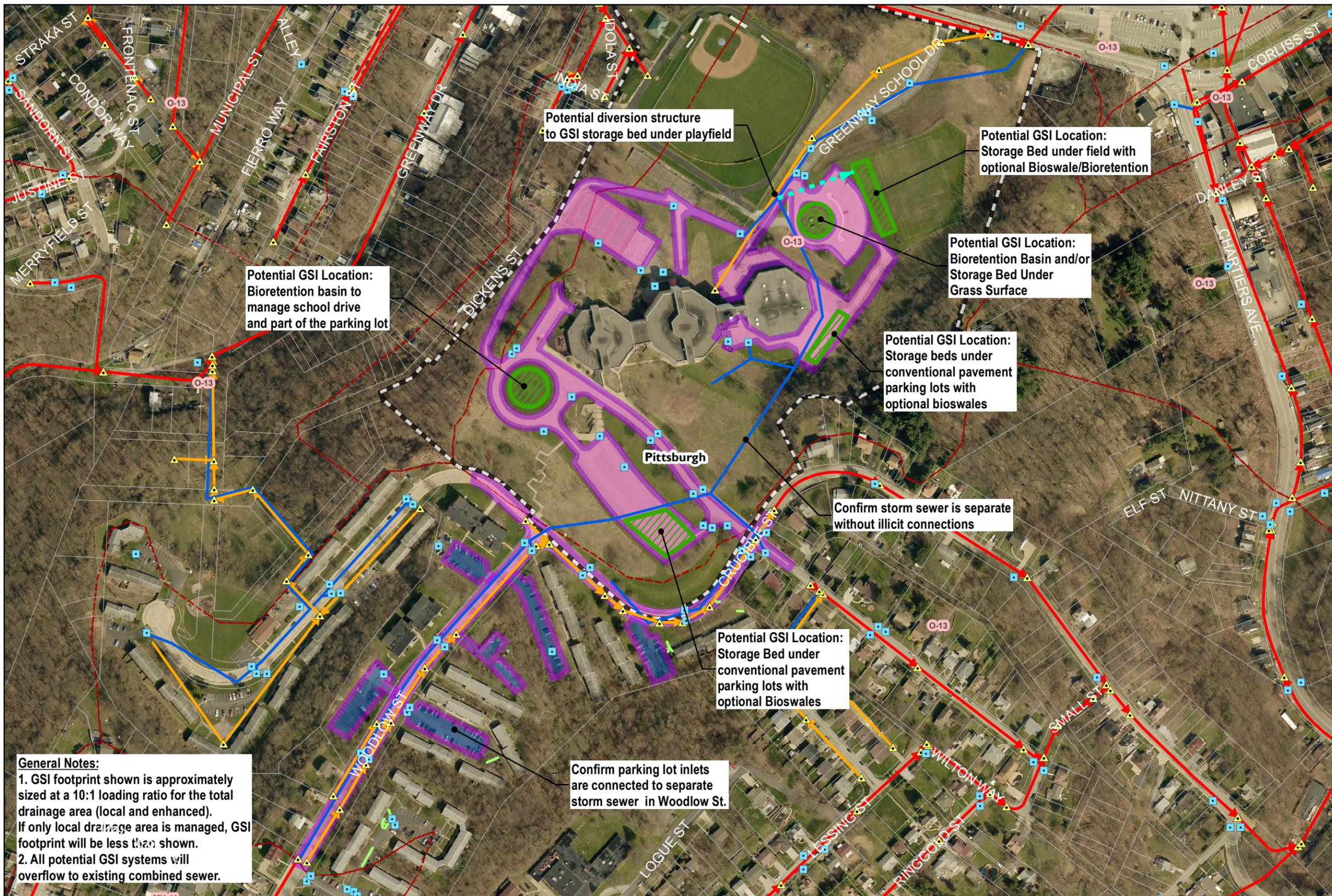
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
PWSA: Existing Inlets, Sewer Pipes

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Proposed green stormwater infrastructure (GSI) at Pittsburgh Classical Academy is intended to manage the roadways and driveways within the school property in addition to several roads and parking lots to the southwest of the school that are shown draining into an existing storm sewer running through the site. Potential GSI features include two storage systems underneath two existing parking lots, which could also feature bioswales if landscape amenities are desired. Additional potential GSI features include a subsurface storage bed underneath the existing sports field and two bioretention basins in existing grass areas. These bioretention basins could feature native flowering perennials and meadow grasses or they could be subsurface storage beds under more traditional turf-grass surfaces. All the GSI features could be designed as infiltration and/or slow-release systems, depending on the subsurface conditions encountered.

Project CC-42 (Parcel Owner: School District of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	6.61	\$1,430,000	\$1,000,000	—	5,430,000	—	3,490,000	\$0.41
Enhanced Drainage Area	1.37	\$220,000	\$160,000	—	1,120,000	—	720,000	\$0.31
Project Totals	7.98	\$1,650,000	\$1,160,000	1.0	6,550,000	64%	4,210,000	\$0.39

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



Lower Ohio/Girty's Run
GSI CONCEPT PLAN

LO-01: Pleasant Ridge Public Housing
Stowe Township / POC O-04



- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

The Pleasant Ridge Public Housing development has the potential for implementing a variety of green stormwater infrastructure (GSI) typologies throughout the site. For example, subsurface storage/infiltration trenches or vegetated bumpouts can be placed in the right-of-way at numerous strategic locations. Small bioretention areas (rain gardens) can be located in open spaces next to each of the various parking lots to manage runoff while also introducing enhanced landscape amenities. Several larger bioretention areas near the development's entrance and along Overlook Place can provide larger capture volumes, while also creating more impactful aesthetic and educational features. Finally, there are additional opportunities to manage the housing development by directing runoff via new storm sewers to a more centralized GSI facility (subsurface storage/infiltration trench or infiltration basin/bioretention system) in one of the open lawn areas to the west.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	#+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
LO-01	Allegheny County Housing Authority	7.0	\$1,970,000	\$1,380,000	4.5	5,760,000	90%	5,190,000	\$0.38

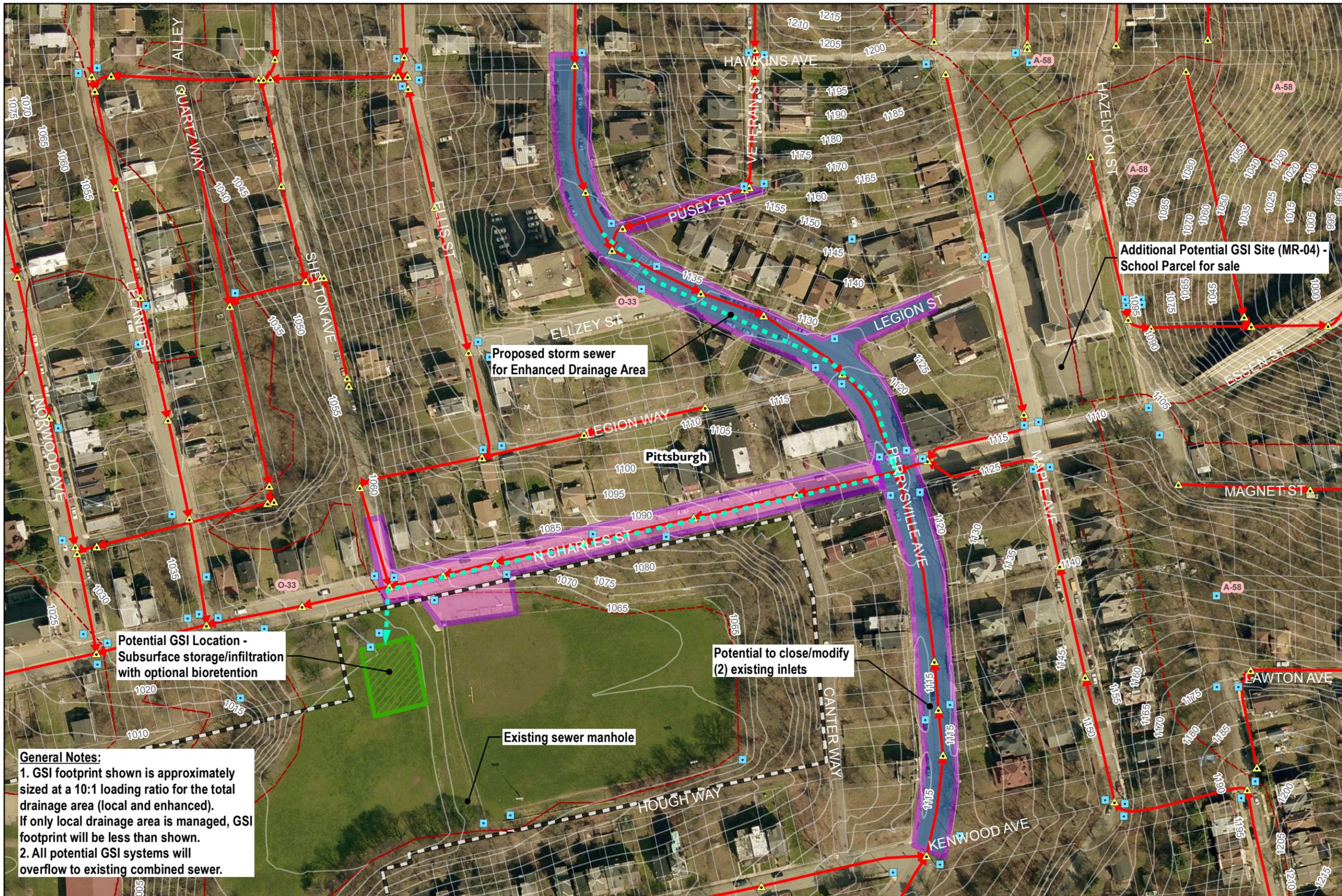
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





**Main Rivers
GSI CONCEPT PLAN**

MR-03: Fowler Playground
City of Pittsburgh/ POC O-33

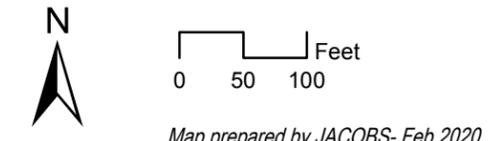


- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ▶ Proposed Separate Storm Sewer
- Sewer Pipes**
- ▶ Combined
- ▶ Sanitary
- ▶ Stormwater
- ▶ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Fowler Playground (located south of N Charles St) is a prime candidate to integrate green stormwater infrastructure (GSI). The proposed GSI feature has the potential to manage roadway runoff from Perrysville Ave, N Charles St, and several additional side streets. Stormwater runoff would be directed via new separate storm sewers into a proposed bioretention system (rain garden) with subsurface storage/infiltration bed just west of the existing playfield. The GSI system could be designed as infiltration and/or slow-release, depending on the subsurface conditions encountered.

Project MR-03 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gallyr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gallyr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	0.84	\$210,000	\$150,000	—	690,000	—	660,000	\$0.32
Enhanced Drainage Area	1.70	\$320,000	\$230,000	—	1,400,000	—	1,340,000	\$0.24
Project Totals	2.54	\$530,000	\$380,000	3.0	2,090,000	96%	2,000,000	\$0.27

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

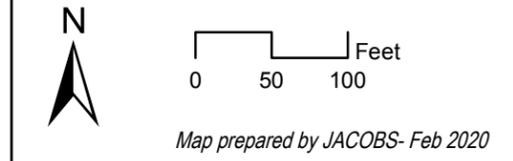
MR-15: Allegheny Commons/East Park
City of Pittsburgh/ POC A-51

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- - - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Proposed storm sewer for enhanced drainage area (typ)

Potential GSI location - subsurface infiltration with optional bioretention

Playground being reconstructed as of May 2019

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The section of Allegheny Commons/East Park located to the west of the intersection of Cedar Ave and Lockhart St appears to be a suitable location for potential green stormwater infrastructure (GSI). Adjacent roadway runoff from East Ohio Street, Cedar Avenue, Union Place, Avery St, and Pressley Street could be directed to the site via new separate storm sewers and managed with a subsurface storage/infiltration trench located under the existing open lawn area and sidewalk. If vegetated surface features are desired, a bioretention area could also be included in the site design (e.g. on the perimeter of the open grass area).

Project MR-15 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.55	\$390,000	\$270,000	—	1,270,000	—	1,180,000	\$0.33
Enhanced Drainage Area	1.46	\$280,000	\$190,000	—	1,200,000	—	1,110,000	\$0.25
Project Totals	3.00	\$670,000	\$460,000	3.0	2,470,000	93%	2,290,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

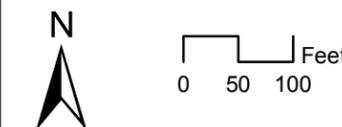
MR-16: Allegheny Commons/West Park Field
City of Pittsburgh/ POC A-48

- GROW Project (ID)
- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

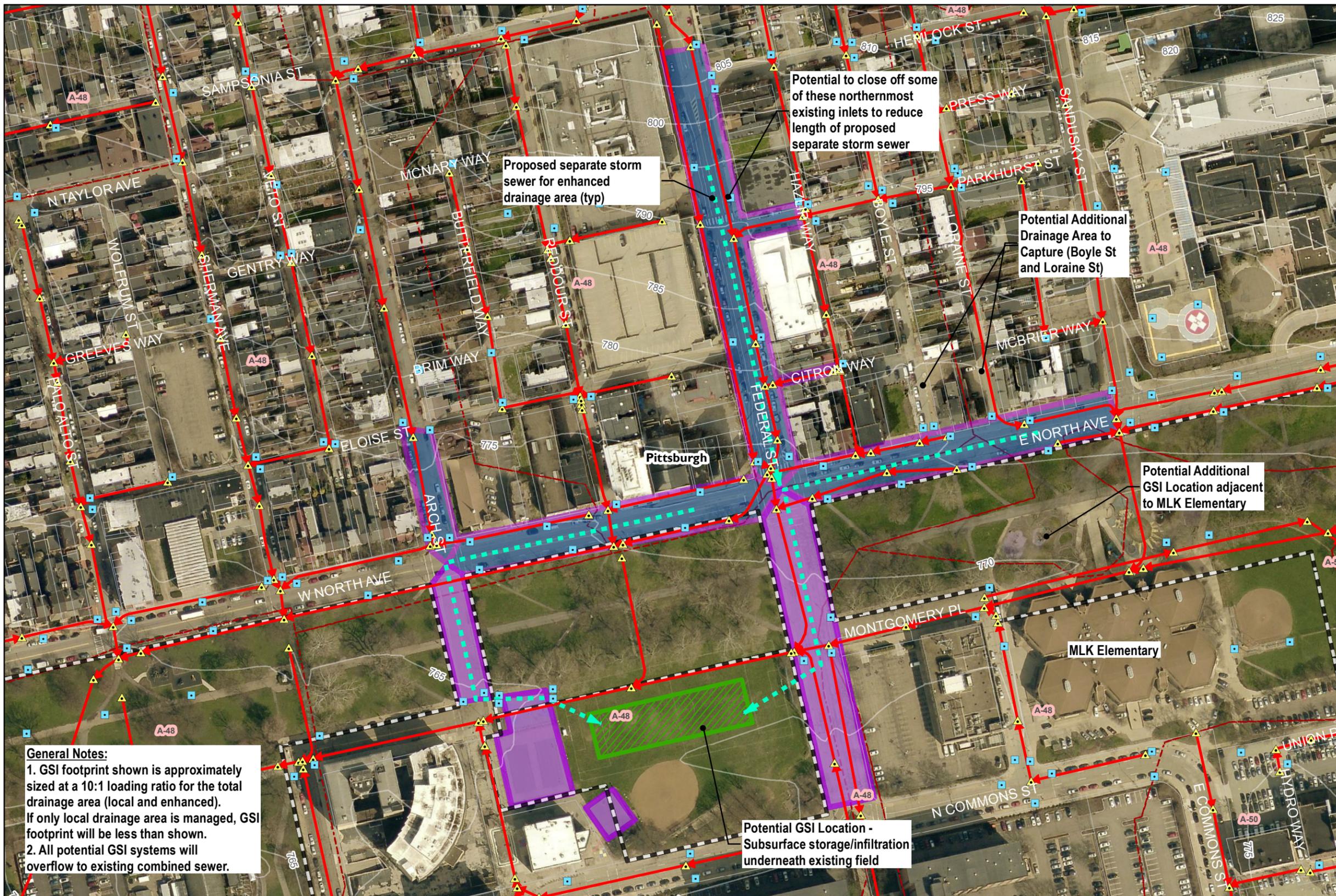
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOsan: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The section of Allegheny Commons/West Park Field located south of North Ave and between Arch and Federal Streets is a prime candidate to integrate green stormwater infrastructure (GSI). The proposed GSI feature has the potential to manage roadway runoff from North Avenue, Federal Street, and Arch Street. Stormwater runoff would be directed via new separate storm sewers into a proposed subsurface storage/infiltration bed below the existing field. The GSI will be designed in a way that will not impact the existing sports field activities.

Project MR-16 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.65	\$420,000	\$290,000	-	1,350,000	-	1,260,000	\$0.33
Enhanced Drainage Area	3.18	\$600,000	\$420,000	-	2,610,000	-	2,430,000	\$0.25
Project Totals	4.82	\$1,020,000	\$710,000	3.0	3,960,000	93%	3,690,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

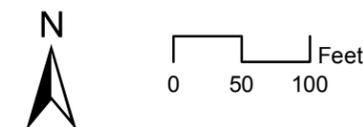
MR-17: Allegheny Commons/West Park
City of Pittsburgh/ POC A-48

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

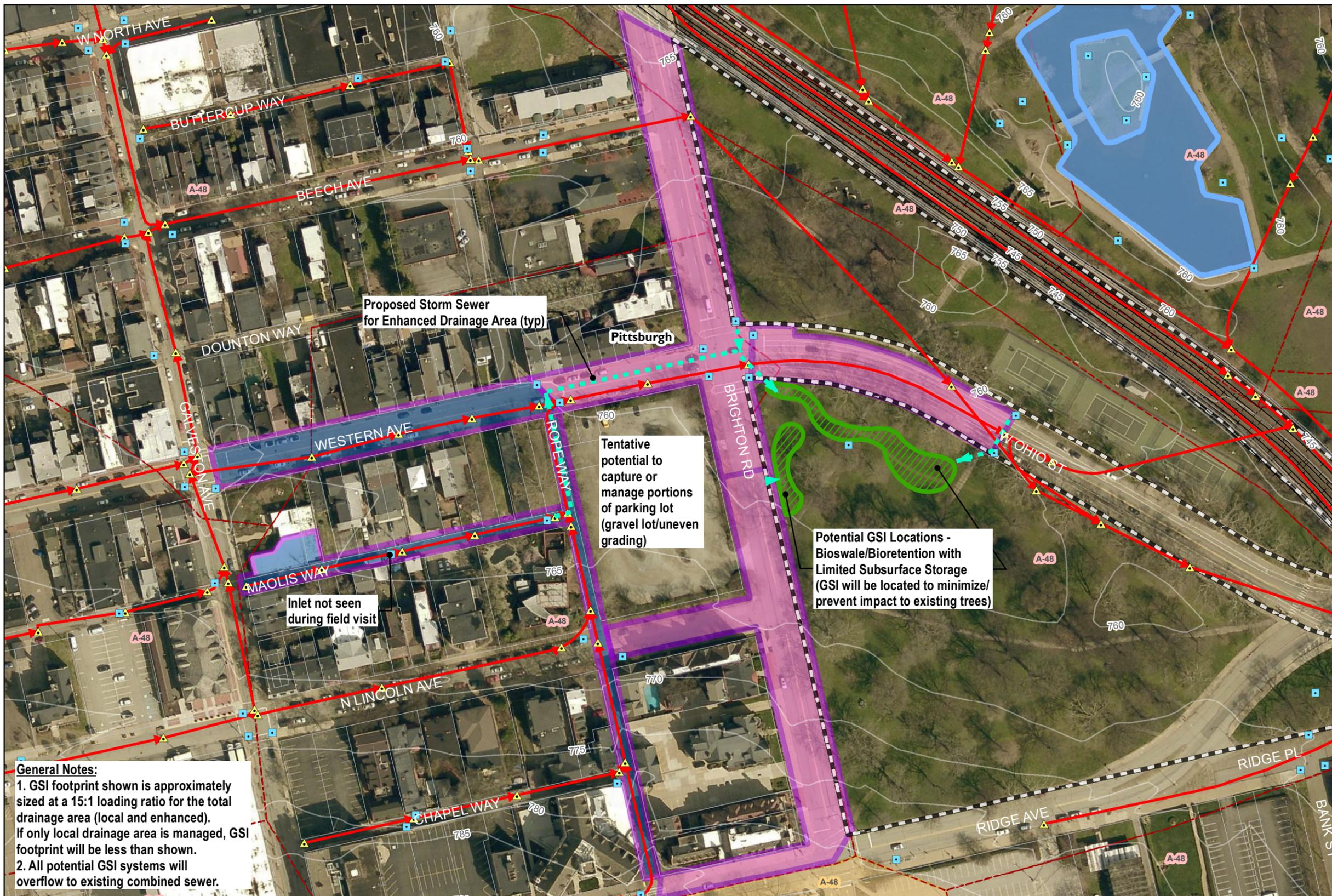
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 15:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The section of Allegheny Commons/West Park located at the corner of W Ohio Street and Brighton Road appears to be a suitable location for potential green stormwater infrastructure (GSI). The proposed GSI features can manage the runoff from Western Avenue, Rope Way, Maolis Way, N Lincoln Ave, Ridge Ave, and Chapel Way, as well as potentially capture the runoff from the nearby parking lot (further investigation will be needed). Stormwater would be directed via new separate stormwater sewers and managed by bioswales/bioretenion areas with limited subsurface storage basins. The potential GSI features will be located to minimize impacts to the large existing trees on site.

Project MR-17 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gallyr overflow reduction)
Local GSI	2.81	\$710,000	\$500,000	—	2,310,000	—	2,240,000	\$0.32
Enhanced Drainage Area	1.13	\$210,000	\$150,000	—	930,000	—	900,000	\$0.23
Project Totals	3.94	\$920,000	\$650,000	3.0	3,240,000	97%	3,140,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

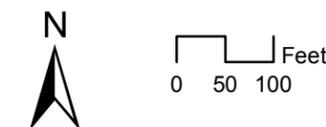
MR-29: Arsenal School
City of Pittsburgh/ POC A-26

- GROW Project (ID)
- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

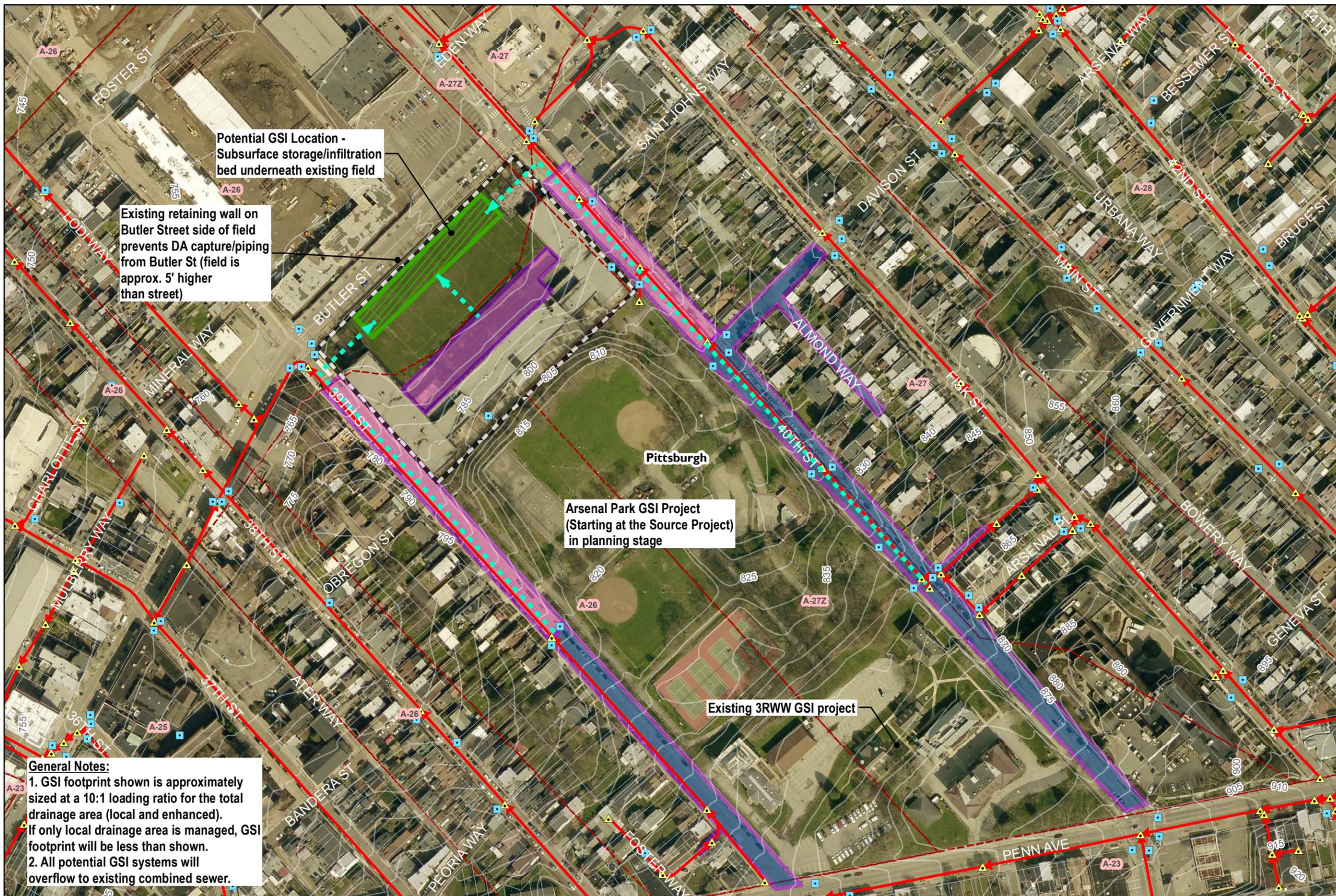
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Arsenal School's existing soccer field, located at 39th and Butler St, appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from 40th St, 39th St, and part of Dawson St and Almond Way. The existing retaining wall on the Butler Street side of the field prevents drainage area capture and piping from Butler Street. Stormwater runoff will be redirected via new separate stormwater sewers into a subsurface storage/infiltration trench underneath the existing field. Once the GSI is constructed, there will be no anticipated impacts to the sports activities above ground.

Project MR-29 (Parcel Owner: Board of Public Education of the School District of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.68	\$420,000	\$300,000	-	1,380,000	-	1,290,000	\$0.33
Enhanced Drainage Area	2.18	\$410,000	\$290,000	-	1,790,000	-	1,670,000	\$0.25
Project Totals	3.86	\$830,000	\$590,000	3.0	3,170,000	93%	2,960,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

MR-32: Friendship Park
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ▶ Proposed Separate Storm Sewer
- Sewer Pipes**
- ▶ Combined
- ▶ Sanitary
- ▶ Stormwater
- ▶ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced).
If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Potential GSI Location -
Subsurface storage/
infiltration trenches
underneath parking lanes
with optional permeable pavement
(typ of 4 around park perimeter)

Potential GSI Location -
Bioretention Areas/Rain Gardens
(typ of 3 throughout park)

Proposed green stormwater infrastructure (GSI) for Friendship Park will manage stormwater runoff from Friendship Ave, S Mathilda St, and S Milvale Ave. Potential GSI features can be located in the right-of-way surrounding the park perimeter and also within the park's property. The new separate stormwater sewers will primarily feed into several proposed subsurface storage/infiltration trenches underneath the existing parking lanes surrounding the park. The trenches can be paved over with permeable pavement for enhanced infiltration. Additional surface runoff can be directed into three proposed bioretention areas/rain gardens within the park. These rain gardens can provide aesthetic value in addition to public environmental education opportunities.

Project MR-32 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	3.70	\$1,140,000	\$800,000	—	3,040,000	—	3,000,000	\$0.38
Enhanced Drainage Area	1.05	\$240,000	\$170,000	—	860,000	—	850,000	\$0.28
Project Totals	4.75	\$1,380,000	\$970,000	6.0	3,900,000	99%	3,850,000	\$0.36

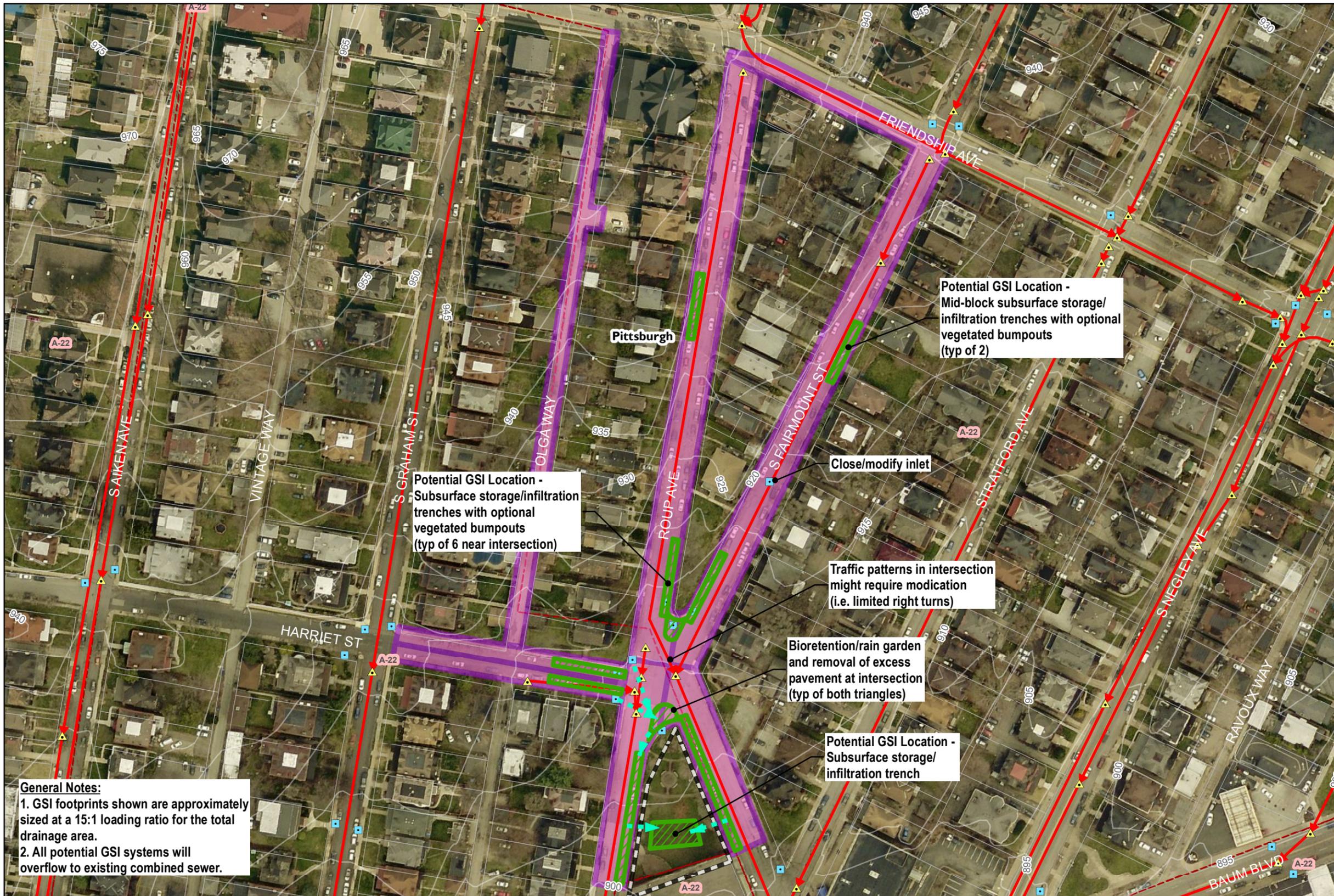
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

MR-33: Baum Grove Parklet
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



General Notes:
 1. GSI footprints shown are approximately sized at a 15:1 loading ratio for the total drainage area.
 2. All potential GSI systems will overflow to existing combined sewer.

Potential GSI Location - Mid-block subsurface storage/infiltration trenches with optional vegetated bumpouts (typ of 2)

Potential GSI Location - Subsurface storage/infiltration trenches with optional vegetated bumpouts (typ of 6 near intersection)

Close/modify inlet

Traffic patterns in intersection might require modification (i.e. limited right turns)

Bioretention/rain garden and removal of excess pavement at intersection (typ of both triangles)

Potential GSI Location - Subsurface storage/infiltration trench

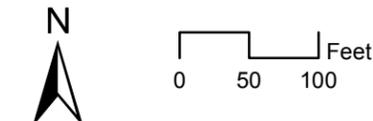
Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Baum Grove Parklet, located at the corner of Roup Ave and S Fairmount St, is a prime candidate for green stormwater infrastructure (GSI). Adjacent roadway runoff from Harriet St, Roup Ave, S Fairmount St, and Olga Way could be captured by proposed subsurface storage/infiltration trenches with optional vegetated bumpouts located in the right-of-way surrounding the parklet. In addition, runoff could be directed to two bioretention/rain gardens located at the ends of both triangles in the Roup Ave/S Fairmount St intersection. This would remove excess pavement but also might require modifications to existing traffic patterns (i.e. limited right turns). Finally, a subsurface storage/infiltration trench could potentially be located underneath the grass in the southern portion of the parklet.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	***Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
MR-33	Friendship Community Group	3.0	\$750,000	\$530,000	3.0	2,440,000	97%	2,370,000	\$0.32

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, ***Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Main Rivers
GSI CONCEPT PLAN**

MR-34: Enright Parklet
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- - - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

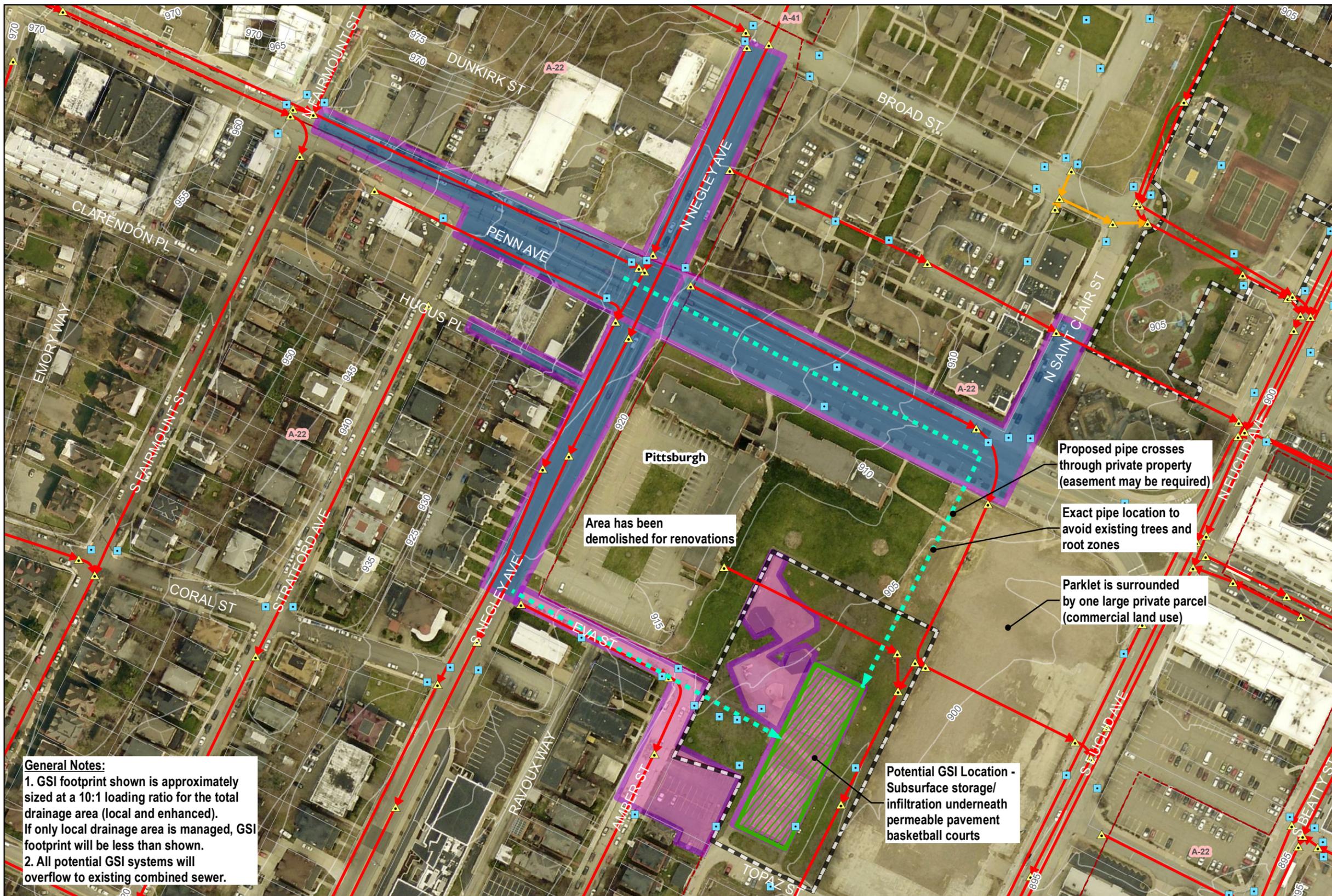
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Enright Parklet, located at the corner of Eva St and Amber St, is a prime candidate for green stormwater infrastructure (GSI). Adjacent roadway runoff from Penn Ave, Negley Ave, Eva St, and portions of additional streets could be directed to the site via new separate stormwater sewers and managed with a subsurface storage/infiltration bed underneath the existing basketball courts. If desired, the basketball courts could be repaved with permeable pavement for enhanced infiltration. As the parklet is surrounded on three sides by a private commercial property, one of the proposed stormwater sewer pipes would need to cross through the private parcel and would therefore likely require an easement to do so.

Project MR-34 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.49	\$380,000	\$260,000	-	1,220,000	-	1,170,000	\$0.32
Enhanced Drainage Area	3.55	\$670,000	\$470,000	-	2,920,000	-	2,790,000	\$0.24
Project Totals	5.04	\$1,050,000	\$730,000	3.0	4,140,000	96%	3,960,000	\$0.27

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

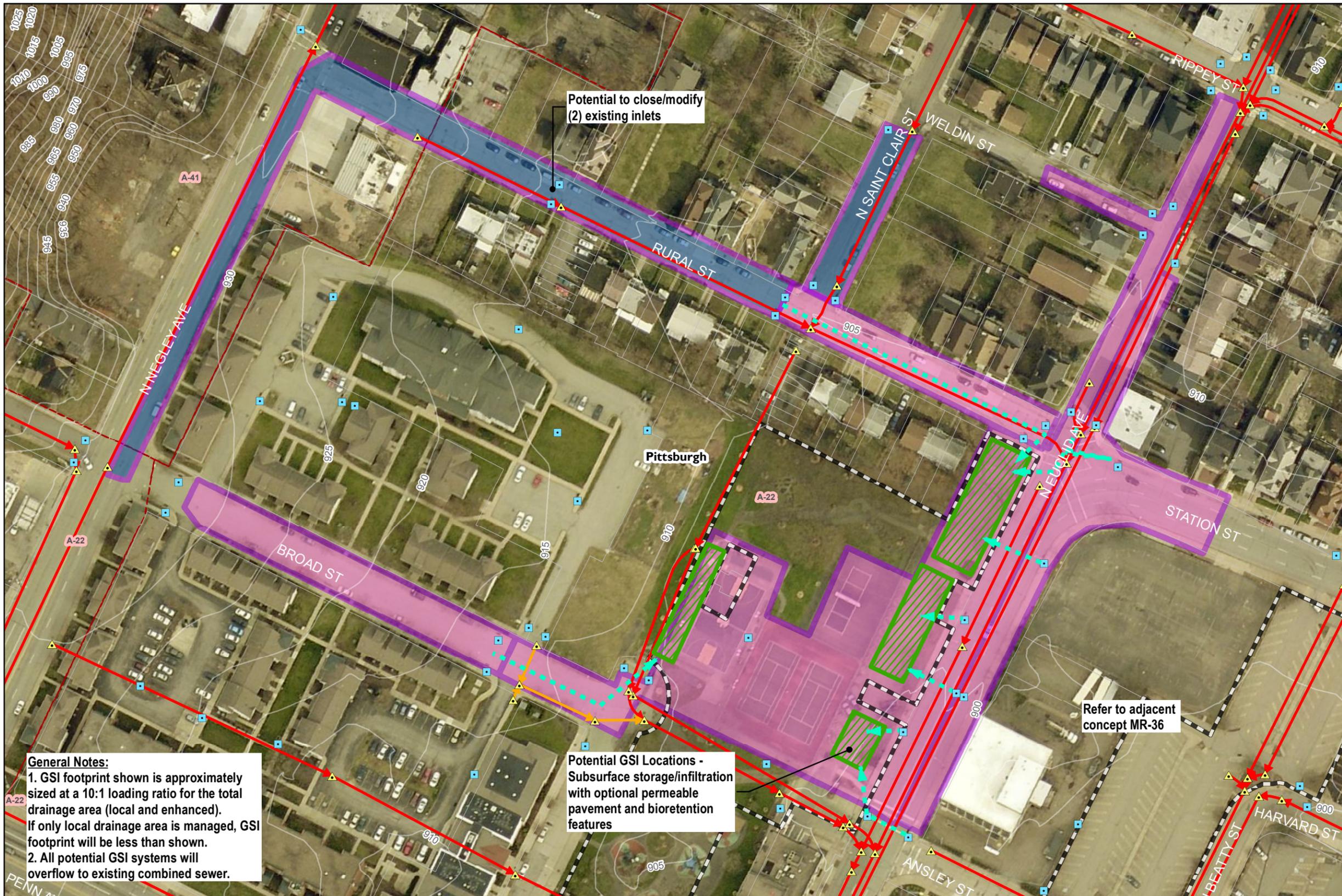
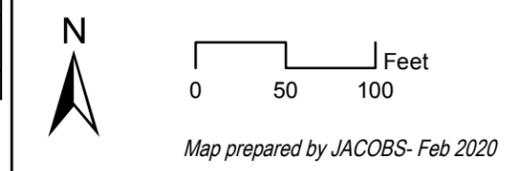
MR-35: Garland Parklet
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Potential GSI Locations - Subsurface storage/infiltration with optional permeable pavement and bioretention features

Refer to adjacent concept MR-36

Proposed green stormwater infrastructure (GSI) for Garland Parklet will capture stormwater runoff from impervious surfaces within the park in addition to runoff from Rural St, N Euclid Ave, Broad St, and several adjacent streets and direct it to potential GSI features within the parklet's property. The new separate stormwater sewers will feed into several subsurface storage/infiltration trenches located within the park. The trenches can then be repaved with permeable pavement for enhanced infiltration and if vegetated areas are desired, bioretention features can be included in the design. Two existing inlets existing on Rural Street could potentially be closed/modified to enhance runoff capture.

Project MR-35 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	3.31	\$840,000	\$590,000	—	2,710,000	—	2,590,000	\$0.32
Enhanced Drainage Area	0.86	\$160,000	\$120,000	—	710,000	—	680,000	\$0.24
Project Totals	4.17	\$1,000,000	\$710,000	3.0	3,420,000	96%	3,270,000	\$0.31

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

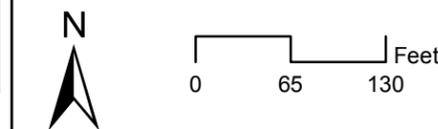
MR-36: Urban Redevelopment Authority Lot
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ▶ Proposed Separate Storm Sewer
- Sewer Pipes**
- ▶ Combined
- ▶ Sanitary
- ▶ Stormwater
- ▶ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

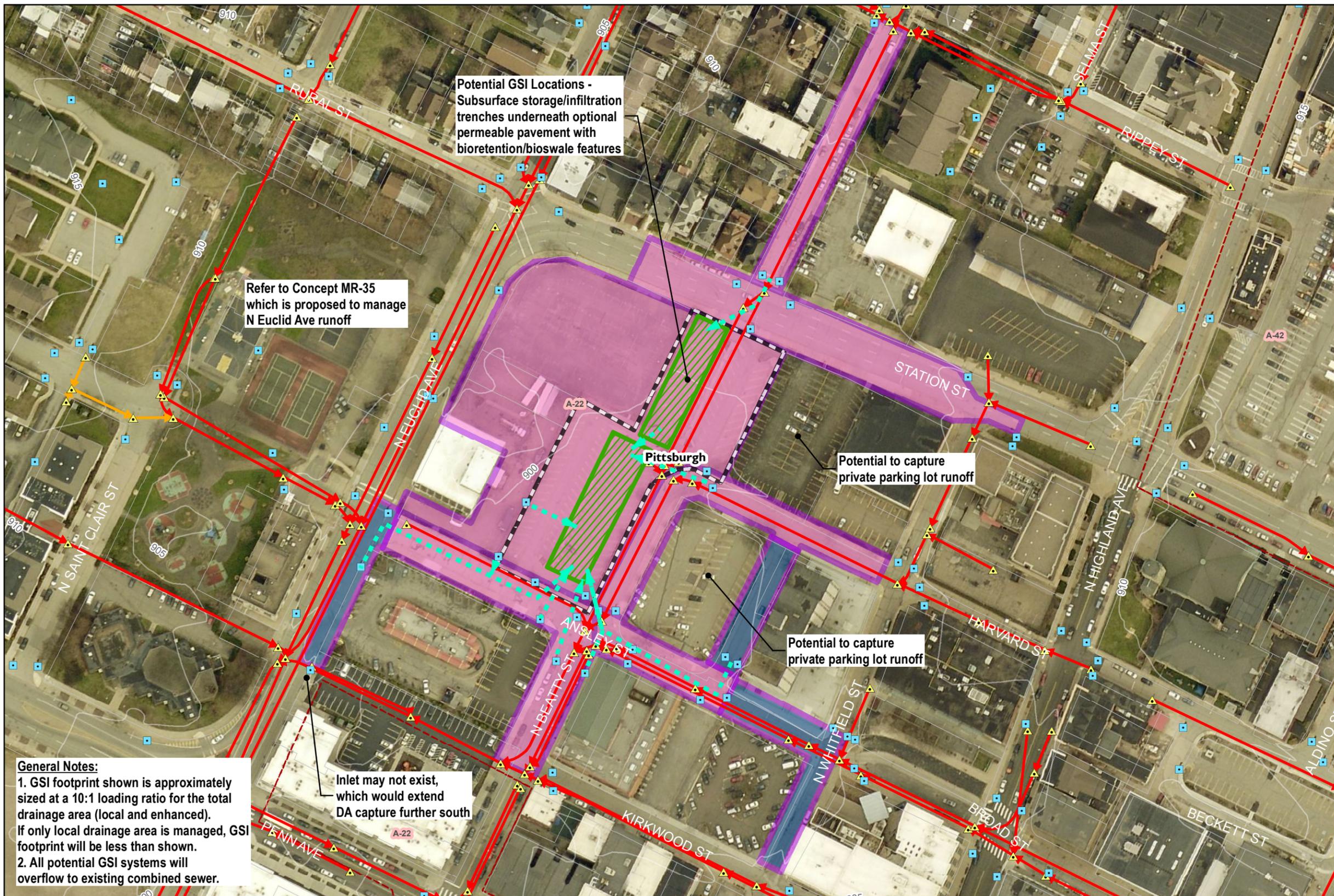
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Inlet may not exist, which would extend DA capture further south

Proposed green stormwater infrastructure (GSI) for the Urban Redevelopment Authority parking lot will capture stormwater runoff from Station St, Harvard St, Ansley St, N Beatty St, and several adjacent streets and direct it to potential GSI features within the parking lot property. There is also potential to capture runoff from two private parking lots to the east of the URA-owned lot. The new separate stormwater sewers will feed into two subsurface storage/infiltration trenches located underneath the existing parking lot. The trenches can then be repaved with permeable pavement for enhanced infiltration and if vegetated features are desired, bioretention and/or bioswales can be included in the design.

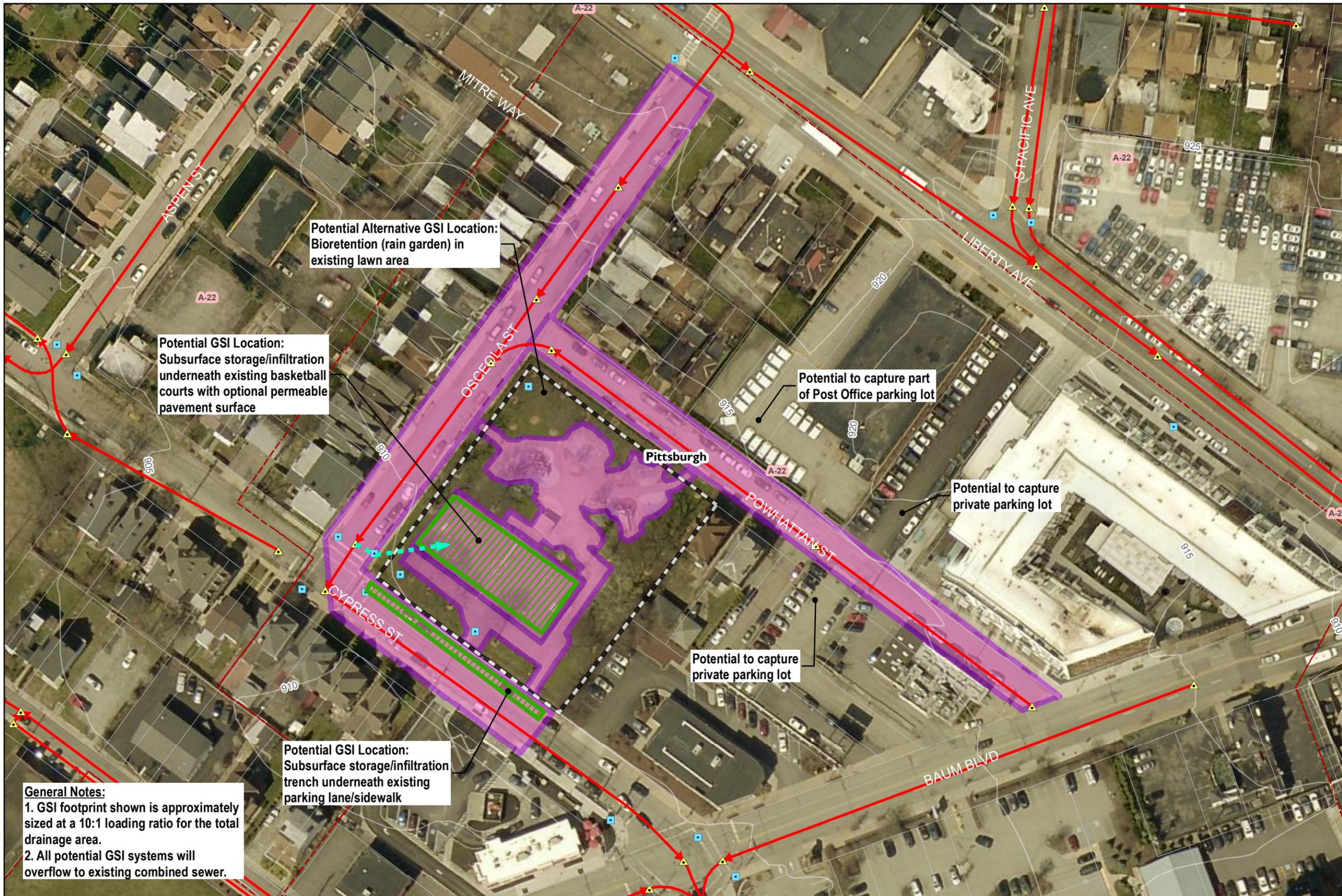
Project MR-36 (Parcel Owner: Urban Redevelopment Authority of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	4.62	\$1,170,000	\$820,000	—	3,800,000	—	3,630,000	\$0.32
Enhanced Drainage Area	0.56	\$110,000	\$70,000	—	460,000	—	440,000	\$0.25
Project Totals	5.19	\$1,280,000	\$890,000	3.0	4,260,000	96%	4,070,000	\$0.31

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

MR-37: Osceola Parklet
City of Pittsburgh/ POC A-22



- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area.
 2. All potential GSI systems will overflow to existing combined sewer.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Osceola Parklet, located at Cypress and Osceola Streets, is a prime candidate for green stormwater infrastructure (GSI). Adjacent roadway runoff from Powhattan St and Osceola St, as well as potential additional runoff from the Post Office parking lot and private parking lots on Powhattan St could be managed with subsurface storage/infiltration trenches located underneath the existing basketball court. The basketball court has the option of being repaved with permeable pavement if desired. In addition, runoff from Cypress St could be managed in a subsurface storage/infiltration trench located underneath the existing parking lane and sidewalk on the southern edge of the park. A potential alternate/additional GSI location could be the existing grass area in the northernmost corner of the park.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
MR-37	City of Pittsburgh	1.7	\$510,000	\$360,000	6.0	1,360,000	97%	1,320,000	\$0.39

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Main Rivers
GSI CONCEPT PLAN**

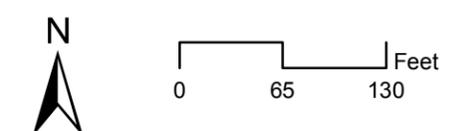
MR-40: Liberty School
City of Pittsburgh/ POC A-22

- GROW Project (ID)
- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

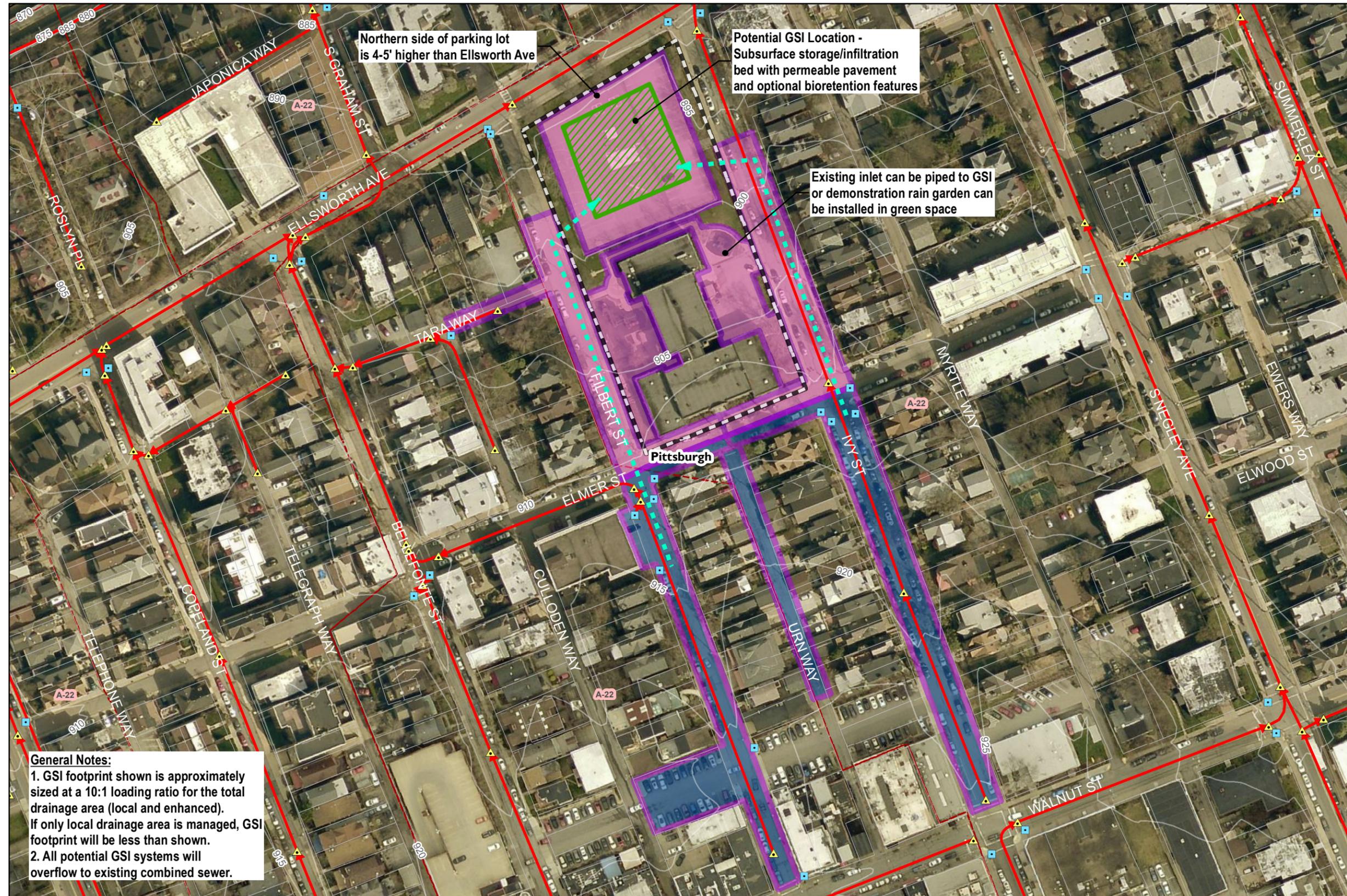
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The existing paved lot at Liberty School, located at Filbert St and Ellsworth Ave, appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from Ivy St, Elmer St, Filbert St, and Urn Way. Stormwater runoff will be redirected via new separate stormwater sewers into a subsurface storage/infiltration bed underneath the lot, which has the option of being repaved with permeable pavement. An existing inlet on the school grounds to the southeast of the lot can either be piped to the GSI feature or a stand-alone rain garden could be located there as an educational/demonstration feature. If additional vegetated features are desired, bioretention areas and/or bioswales could also be included in the primary GSI design.

Project MR-40 (Parcel Owner: Board of Public Education of School District of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.83	\$460,000	\$330,000	—	1,510,000	—	1,410,000	\$0.33
Enhanced Drainage Area	1.19	\$230,000	\$160,000	—	980,000	—	910,000	\$0.25
Project Totals	3.03	\$690,000	\$490,000	3.0	2,490,000	93%	2,320,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

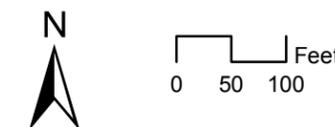
MR-52: Magee Playground
City of Pittsburgh/ POC M-29

- GROW Project (ID)
- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

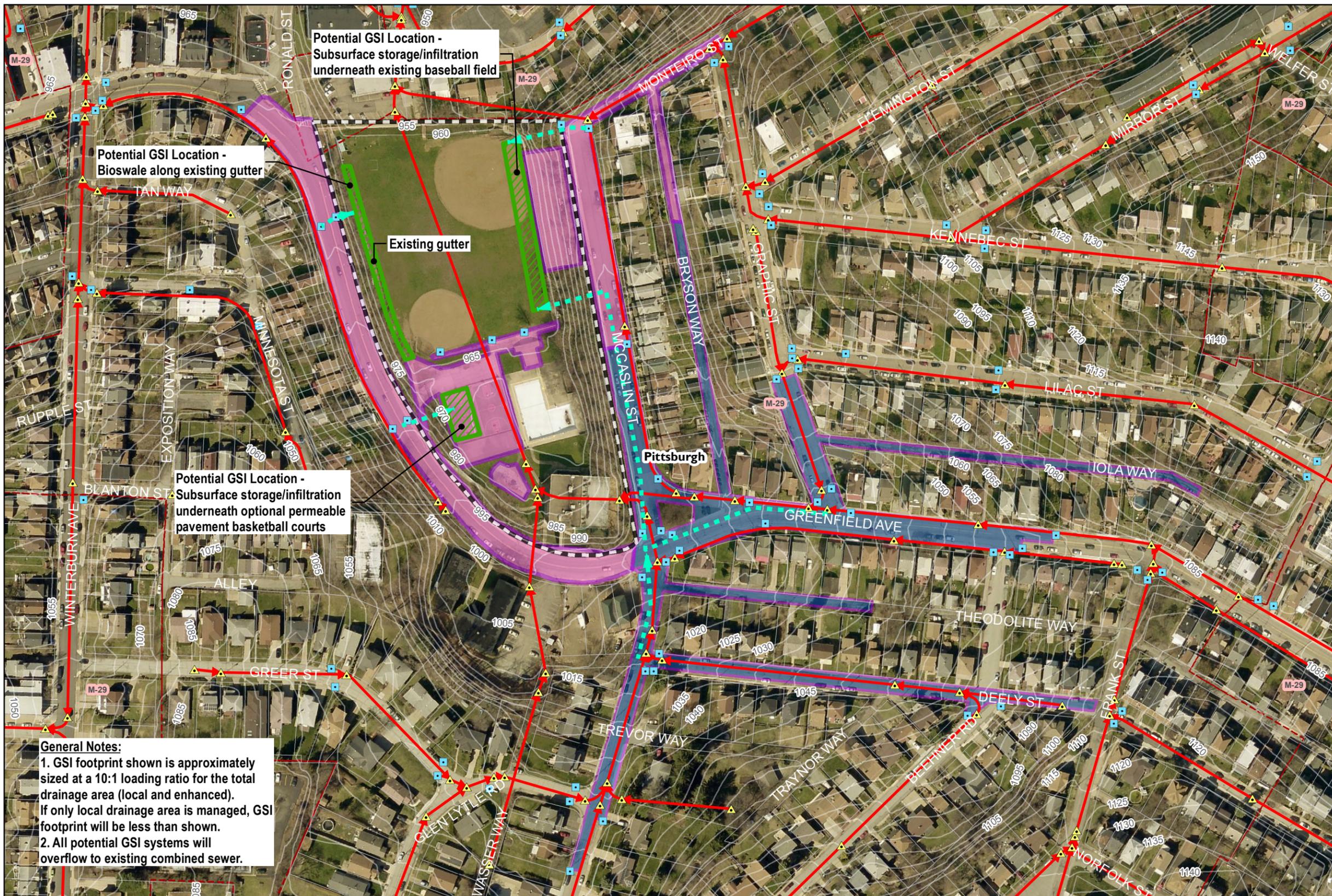
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Magee Playground (located between Greenfield Ave and McCaslin St) is a prime candidate to integrate green stormwater infrastructure (GSI). Adjacent roadway runoff from streets such as Monteiro St, McCaslin St, Greenfield Ave, and Bryson Way could be directed to the site via new separate storm sewers and managed with several subsurface storage/infiltration beds located underneath the baseball field and basketball courts. If desired, the storage/infiltration bed under the basketball courts could be finished with a permeable pavement surface. Finally, a bioswale could be located along the existing gutter on the western edge of the baseball fields to manage a portion of Greenfield Ave.

Project MR-52 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.67	\$680,000	\$470,000	-	2,190,000	-	2,170,000	\$0.31
Enhanced Drainage Area	2.56	\$490,000	\$340,000	-	2,100,000	-	2,080,000	\$0.24
Project Totals	5.23	\$1,170,000	\$810,000	3.0	4,290,000	99%	4,250,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



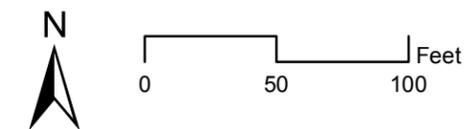
**Main Rivers
GSI CONCEPT PLAN**

MR-55: Magee Phillips K-5 School
City of Pittsburgh/ POC M-16

- GROW Project (ID)
- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



The existing schoolyard and parking lot at the Magee Phillips K-5 School appear to be suitable locations for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from Sarah St, S 19th St, Larkins Way, and Jane St in addition to the parking lot itself. Stormwater runoff from adjacent streets would be redirected via new stormwater sewers into a subsurface storage/infiltration trench placed underneath the parking lot. In addition to the subsurface stormwater feature, permeable pavement over the parking lot and a vegetated bumpout on Sarah St could be included in the concept if desired. It appears that the schoolyard was recently renovated, so GSI implementation would likely be postponed until future renovations are planned.

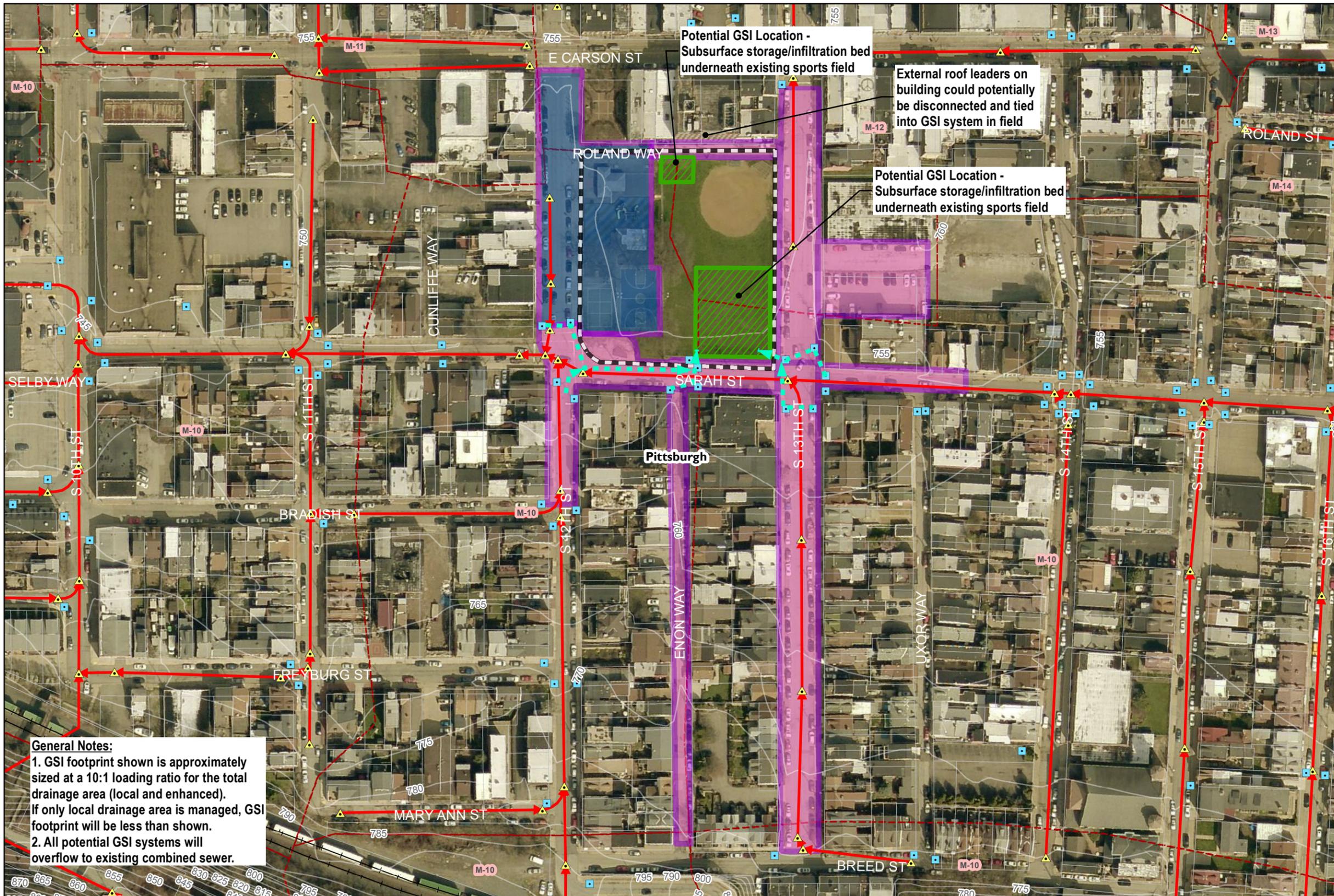
Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
MR-55	Board of Education of School District of Pittsburgh	2.3	\$570,000	\$400,000	3.0	1,850,000	105%	1,940,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Main Rivers
GSI CONCEPT PLAN**

MR-56: Armstrong Playground
City of Pittsburgh/ POC M-10



- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Armstrong Playground (located at the corner of S 13th Street and Sarah St) is a prime candidate to integrate green stormwater infrastructure (GSI). Adjacent roadway runoff from S 13th St, Enon Way, S 12th St, and Sarah St could be directed to the site via new separate storm sewers and managed with a subsurface storage/infiltration bed underneath the existing sports field. A bioswale could be added to the concept if vegetated features are desired. In addition, there is an opportunity to disconnect external roof leaders on a large building north of the playground and direct the runoff into a second smaller subsurface storage/infiltration system in the north end of the playground.

Project MR-56 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gallr overflow reduction)
Local GSI	2.25	\$570,000	\$400,000	—	1,850,000	—	1,780,000	\$0.32
Enhanced Drainage Area	0.89	\$170,000	\$120,000	—	730,000	—	700,000	\$0.24
Project Totals	3.14	\$740,000	\$520,000	3.0	2,580,000	96%	2,480,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Saw Mill Run
GSI CONCEPT PLAN**

SMR-01 Warrington Field
City of Pittsburgh/ POC S-32

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.



- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▨ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- - - Combined Sewer Area
- - - Runoff To Combined Area
- - - Separate Sewer Area
- - - Non-contributing Area (NCA)

Pittsburgh
Proposed storm sewer for enhanced drainage area (typ)

Potential subsurface infiltration/storage trenches beneath recreation center sports field

Additional drainage could be picked up from south side of Warrington Ave but pipe crossings were avoided due to active trolley line

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours

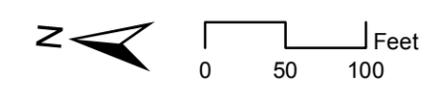
Warrington Field (located between Kingsboro St and E Warrington Ave) appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from adjacent streets to the northwest such as Haberman Ave, Pasadena St, Kingsboro St, Estella Ave, and E Warrington Ave along with additional side streets. The stormwater runoff would be redirected via new separate stormwater sewers into subsurface storage/infiltration trenches placed beneath the recreation center sports field. The location of the GSI would not interfere with the existing sports field programming and would be sited an adequate distance from the existing combined sewer that runs through the field.

Project SMR-01 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.38	\$710,000	\$500,000	-	1,950,000	-	1,690,000	\$0.42
Enhanced Drainage Area	1.57	\$350,000	\$250,000	-	1,290,000	-	1,120,000	\$0.31
Project Totals	3.95	\$1,060,000	\$750,000	5.5	3,240,000	87%	2,810,000	\$0.38

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Saw Mill Run
GSI CONCEPT PLAN**

SMR-02: Knoxville Elem. School
City of Pittsburgh/ POC S-29

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

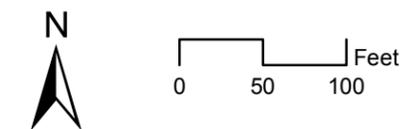


- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020

The existing lawn areas and parking lot at Knoxville Elementary School appear to be suitable locations for potential green stormwater infrastructure (GSI). Proposed GSI features will capture roadway runoff from streets to the northeast such as Georgia Ave, Grimes Ave, Charles St, Michigan Way, and Zara St along with additional side streets. Stormwater will be redirected via new separate stormwater sewers into a bioretention area in the lawn at the northeast corner of the site, a subsurface trench in the existing play area at the northwest corner of the site, and a subsurface storage/infiltration trench in the existing parking lot. If desired, the GSI system in the parking lot can be finished with permeable pavement. The feasibility of GSI implementation depends on future use of the property as the school is currently abandoned.

Project SMR-02 (Parcel Owner: School District of Pittsburgh)

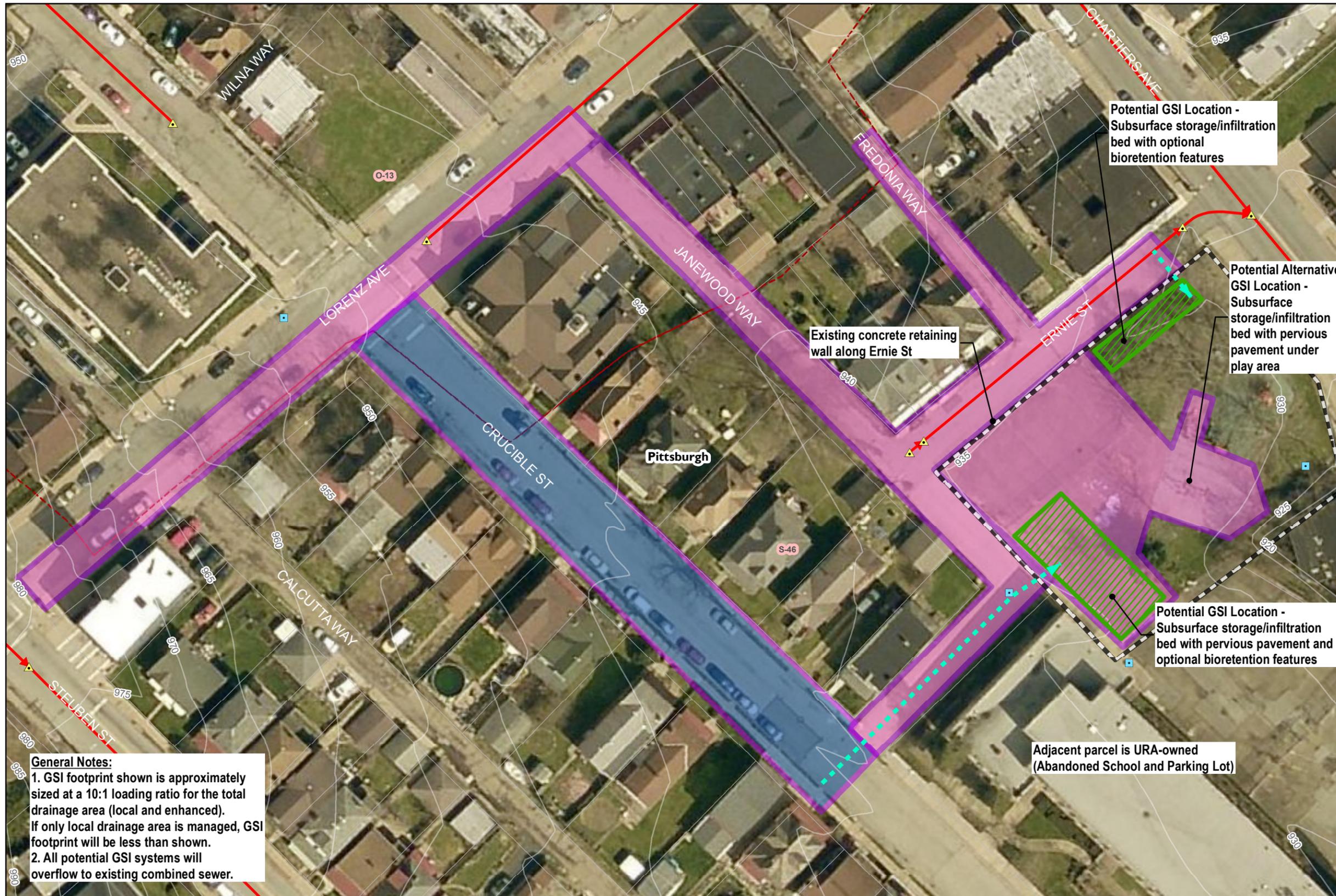
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	3.12	\$930,000	\$650,000	-	2,560,000	-	1,910,000	\$0.49
Enhanced Drainage Area	0.96	\$210,000	\$150,000	-	780,000	-	580,000	\$0.36
Project Totals	4.07	\$1,140,000	\$800,000	5.5	3,340,000	75%	2,490,000	\$0.46

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. *+Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Saw Mill Run
GSI CONCEPT PLAN**

SMR-18: Townsend Parklet
City of Pittsburgh/ POC S-46



- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

Adjacent parcel is URA-owned (Abandoned School and Parking Lot)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Townsend Parklet at Ernie St and Janewood Way, appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from Crucible St, Janewood Way, Ernie St, and part of Lorenz Ave. Stormwater runoff will be redirected via new separate stormwater sewers into two subsurface storage/infiltration trenches located underneath existing paved areas of the playground. The GSI features could be repaved with permeable pavement and if vegetated features are desired, bioretention areas (rain gardens) could also be included in the site design.

Project SMR-18 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	0.86	\$220,000	\$150,000	—	710,000	—	510,000	\$0.43
Enhanced Drainage Area	0.35	\$70,000	\$50,000	—	290,000	—	210,000	\$0.33
Project Totals	1.22	\$290,000	\$200,000	3.0	1,000,000	72%	720,000	\$0.40

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Upper Allegheny
GSI CONCEPT PLAN**

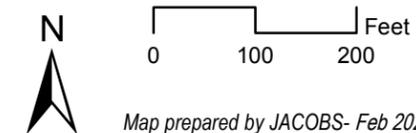
UA-01: Natoli Field
City of Pittsburgh/ POC A-41

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Natoli Field, located at President Way and Antietam St, is a prime candidate for green stormwater infrastructure (GSI). A significant amount of adjacent roadway runoff from the neighborhood to the north of the field (i.e. streets such as Greenwood St, Chislett St, President Way, and Antietam St) could be directed to the site via new separate stormwater sewers and managed with two subsurface storage/infiltration trenches underneath the existing baseball field and underneath the existing parking lot. The parking lot could also be renovated to include permeable pavement for enhanced infiltration.

Project UA-01 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.47	\$370,000	\$260,000	-	1,210,000	-	1,200,000	\$0.31
Enhanced Drainage Area	3.91	\$740,000	\$520,000	-	3,210,000	-	3,170,000	\$0.23
Project Totals	5.38	\$1,110,000	\$780,000	3.0	4,420,000	99%	4,370,000	\$0.25

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

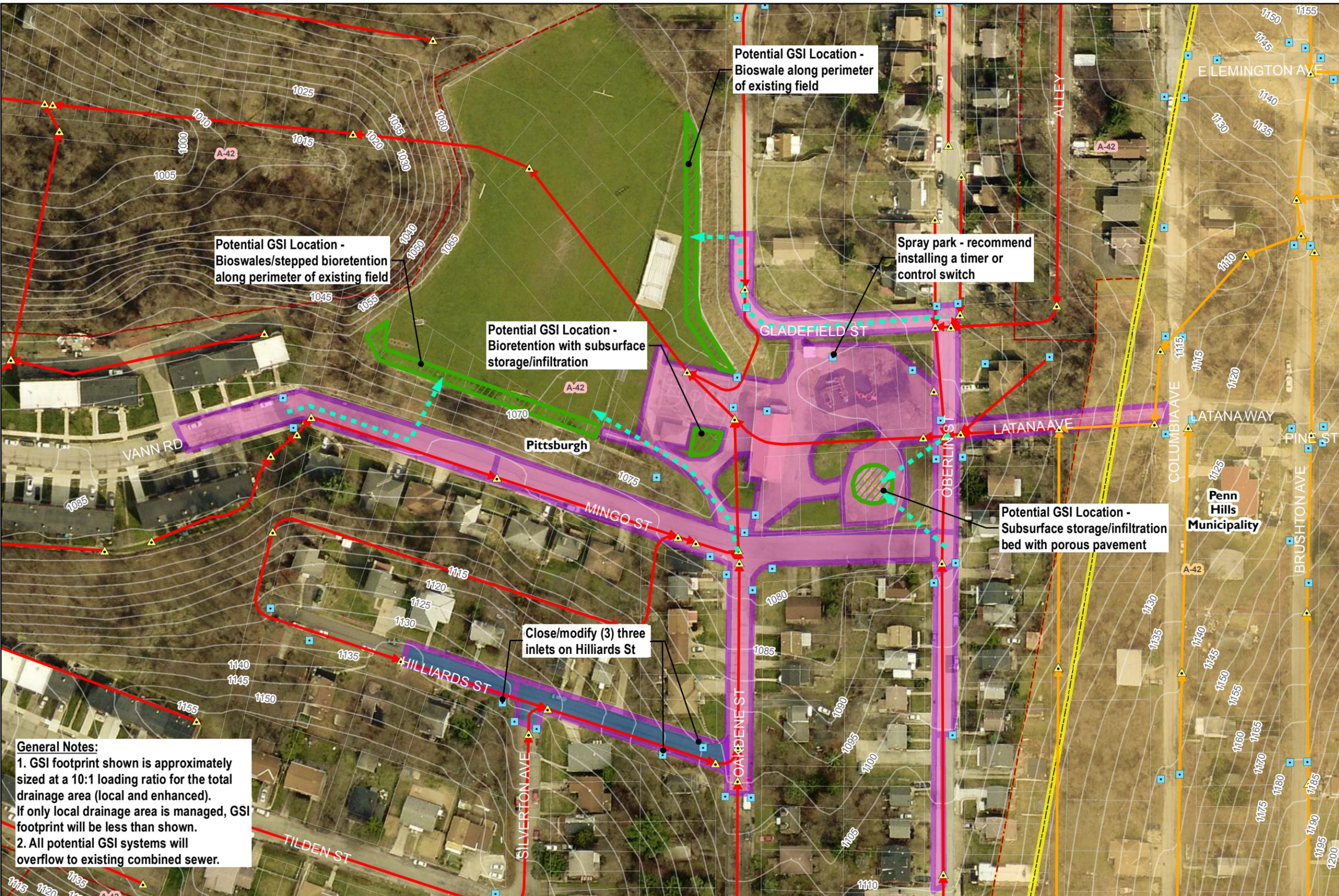
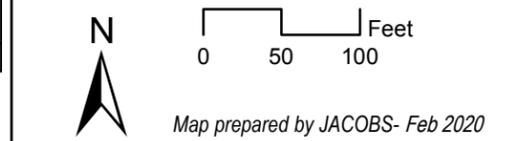
UA-03: Chadwick Playground
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Parcels
- ▭ Municipal Boundary
- ▨ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- - - Combined Sewer Area
- - - Runoff To Combined Area
- - - Separate Sewer Area
- ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Chadwick Playground (located between Mingo St and Gladefield St) is a prime candidate to integrate green stormwater infrastructure (GSI). Adjacent roadway runoff from Latana Ave, Oberlin St, Mingo St, Oakdene St, and Gladefield St could be directed to the site via new separate storm sewers and managed with bioswales located on the eastern and southern perimeters of the existing football field. An additional subsurface storage/infiltration bed with optional permeable pavement could be located within the play area at the southeast corner of the park. It is recommended that a timer or control switch be installed at the existing spray park to minimize the amount of water entering the storm drains at the north of the site.

Project UA-03 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.56	\$790,000	\$550,000	-	2,100,000	-	2,030,000	\$0.39
Enhanced Drainage Area	0.25	\$60,000	\$40,000	-	210,000	-	200,000	\$0.30
Project Totals	2.81	\$850,000	\$590,000	6.0	2,310,000	97%	2,230,000	\$0.38

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

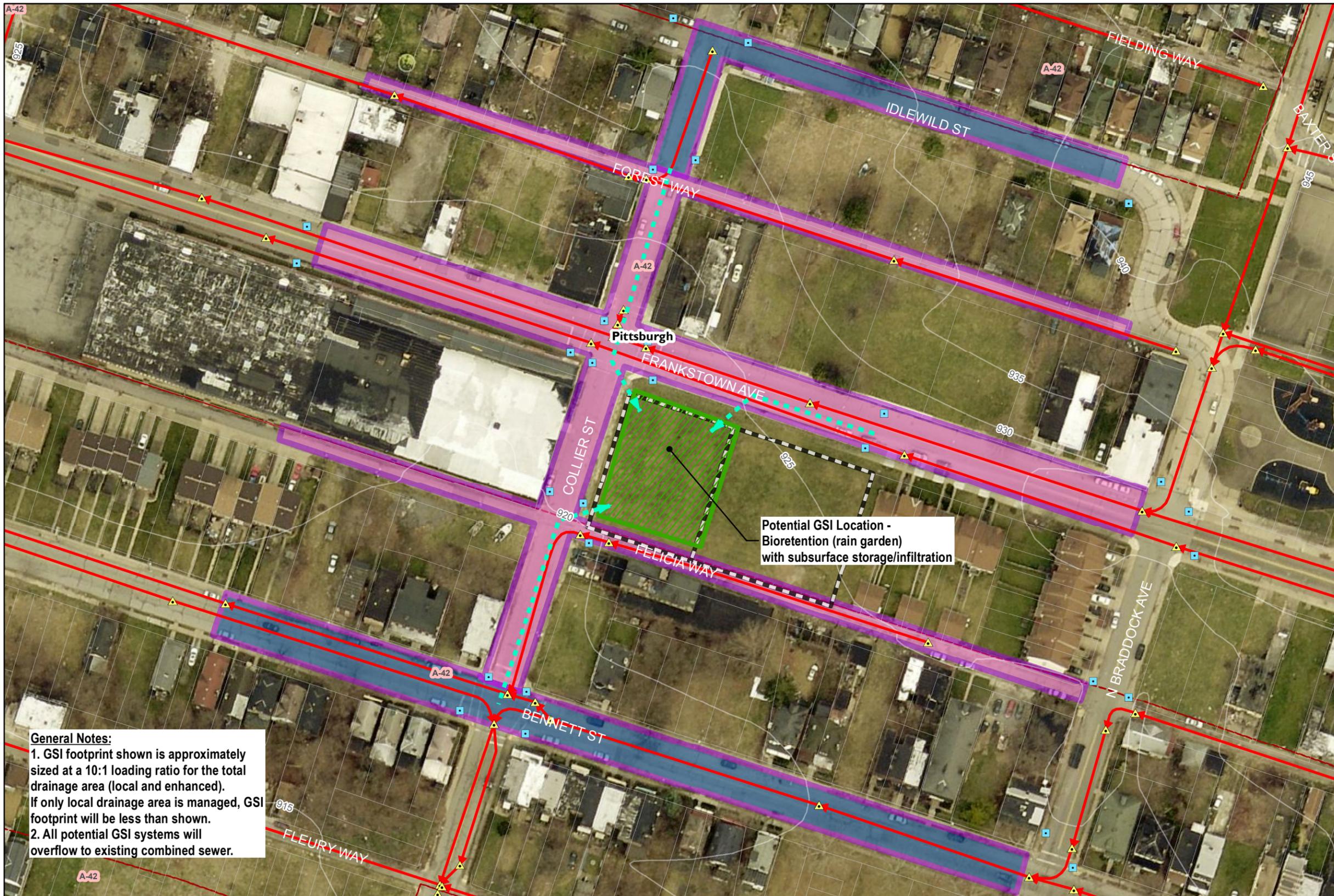
UA-05: G-Tech Strategies Garden
City of Pittsburgh/ POC A-42

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Potential GSI Location -
Bioretention (rain garden)
with subsurface storage/infiltration

The currently vacant URA-owned lot at the corner of Frankstown Ave and Collier St appears to be a promising location for potential green stormwater infrastructure (GSI). Proposed GSI features have the potential to manage roadway runoff from adjacent and surrounding streets including Frankstown Ave, Collier St, Felicia Way, and Bennett St. Stormwater runoff would be redirected via new separate stormwater sewers into a bioretention system (rain garden) with subsurface storage/infiltration beds beneath the garden. The feasibility of GSI implementation depends ultimately on any future redevelopment plans for the site.

Project UA-05 (Parcel Owner: Urban Redevelopment Authority of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.67	\$420,000	\$300,000	—	1,370,000	—	1,340,000	\$0.31
Enhanced Drainage Area	1.07	\$200,000	\$140,000	—	880,000	—	860,000	\$0.23
Project Totals	2.74	\$620,000	\$440,000	3.0	2,250,000	98%	2,200,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



Upper Allegheny
GSI CONCEPT PLAN

UA-06: Crescent Early Childhood Center
City of Pittsburgh/ POC A-42

- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



Note: All potential GSI systems will overflow to existing combined sewer.

The parking lot at the Crescent Early Childhood Center appears to be a suitable location for potential green stormwater infrastructure (GSI). New GSI will complement the existing rain garden project that exists to the north of the parking lot. In addition to managing the parking lot runoff, the GSI features will capture roadway runoff from Seagirt St, Tokay St, Fahnestock St, and portions of several other streets that drain down the hill towards the parking lot. Stormwater runoff will be redirected via new separate storm sewers into a subsurface storage/infiltration bed underneath the existing parking lot with an optional permeable pavement surface. If vegetated features are desired, bioswale features could also be included in the renovated parking lot design. A potential additional location for GSI is the large parking lot to the southwest of the center, where a subsurface storage/infiltration trench with permeable pavement or optional bioswales could be located.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-06	School District of Pittsburgh	2.5	\$680,000	\$480,000	4.0	2,070,000	96%	1,990,000	\$0.34

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



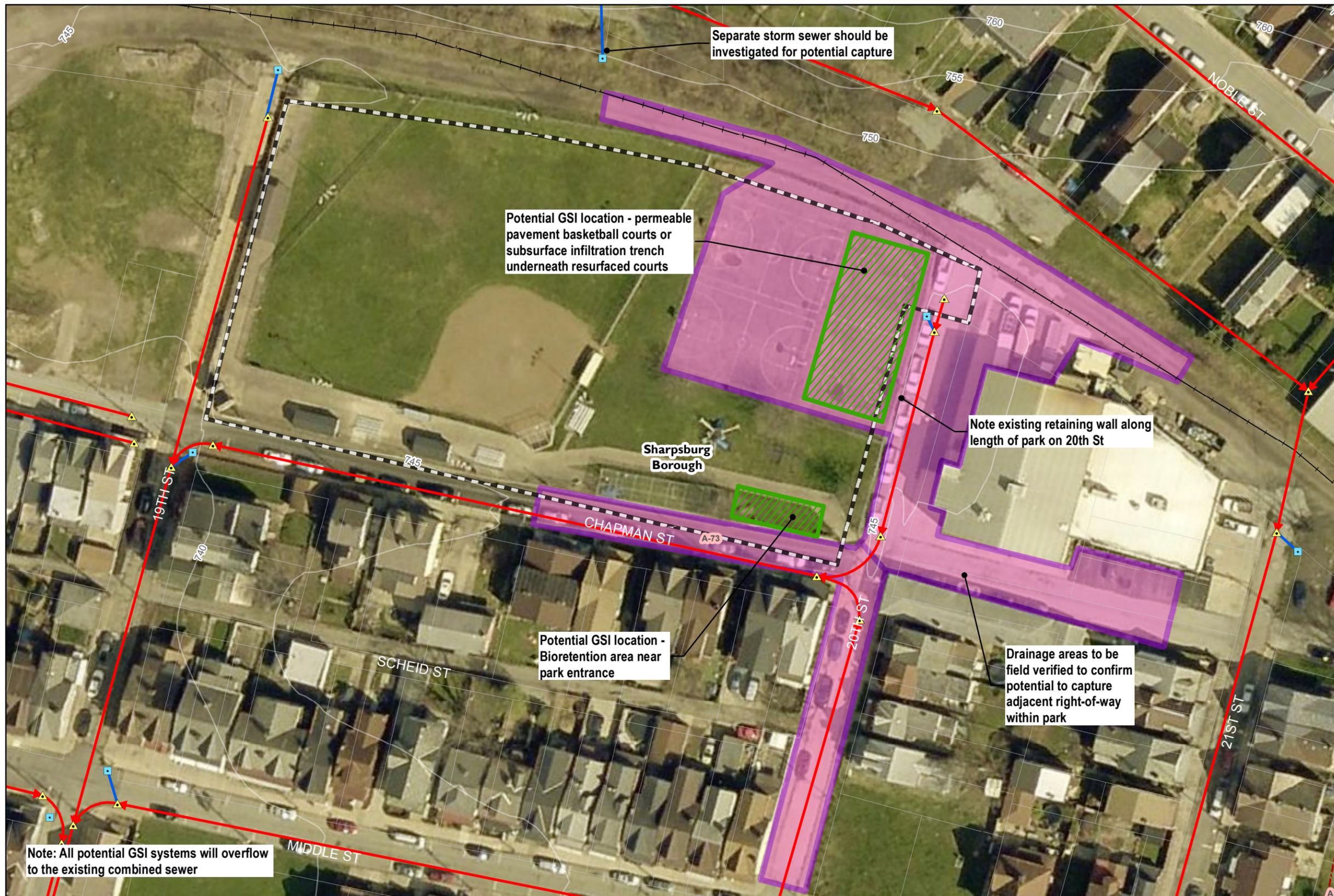
**Upper Allegheny
GSI CONCEPT PLAN**

**UA-12: Heinz Memorial Field
Sharpsburg Borough/ POC A-73**

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

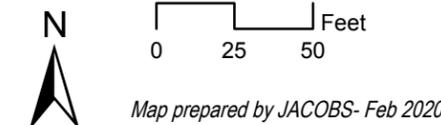
Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Heinz Memorial Field has potential for green stormwater infrastructure (GSI) at several locations to manage the runoff from the site's basketball courts in addition to right-of-way runoff from 20th Street, Chapman Street, and the alley to the north of the park. A subsurface stone storage trench can be located strategically underneath the easternmost play courts, with the option for either a permeable or conventional pavement surface. In addition, a bioretention area (rain garden) can be located near the park entrance at the corner of 20th and Chapman to manage the adjacent ROW runoff while also providing an educational opportunity and landscape amenity. The new GSI should be sited to avoid damaging any large existing trees on site and must take the retaining wall on 20th Street into consideration when determining how to direct runoff onto the site.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-12	Sharpsburg Borough	1.1	\$270,000	\$190,000	3.0	870,000	100%	870,000	\$0.31

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



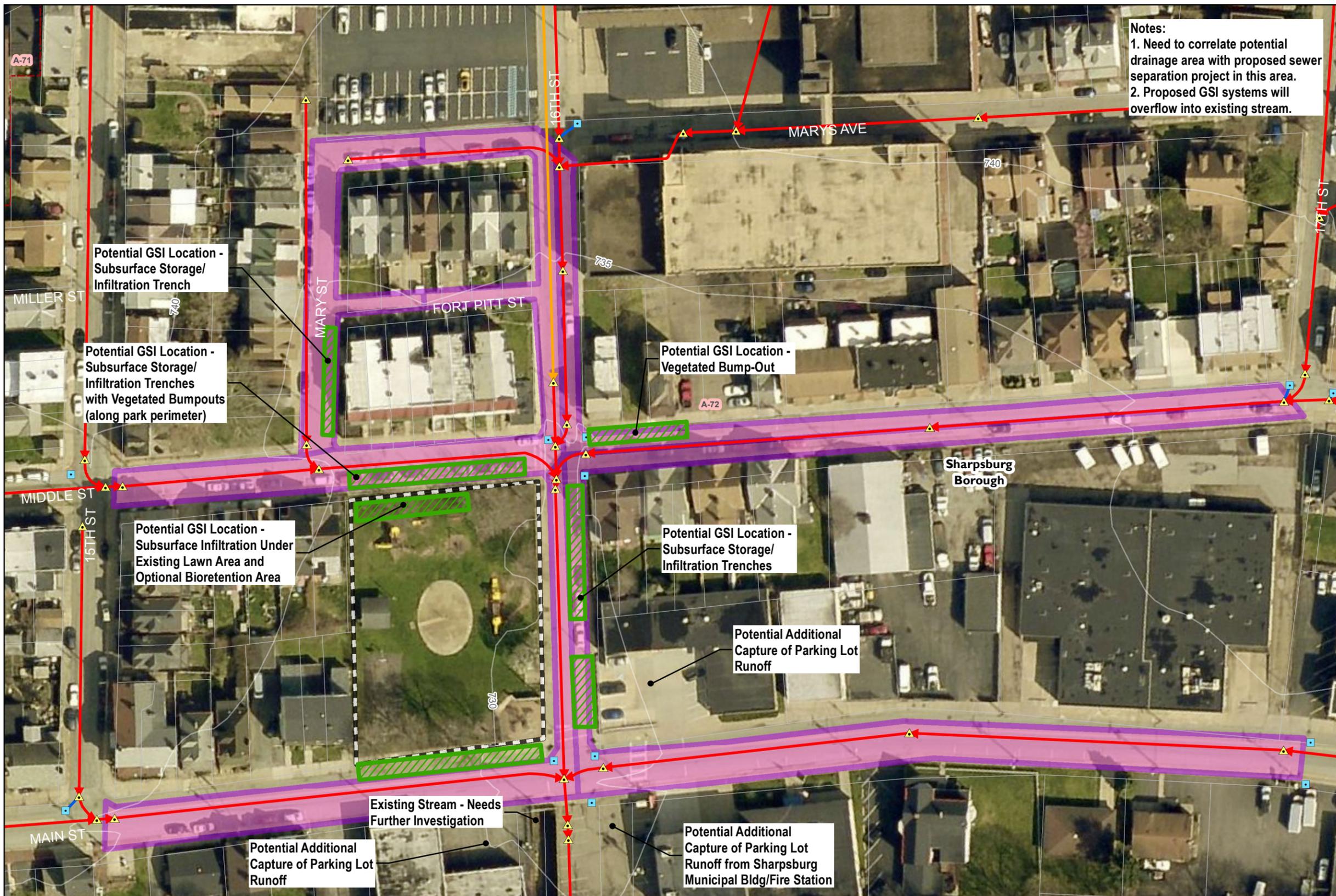


Upper Allegheny
GSI CONCEPT PLAN

UA-13: Marion Gerardi Memorial Park
Sharpsburg Borough/ POC A-72

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

Notes:
1. Need to correlate potential drainage area with proposed sewer separation project in this area.
2. Proposed GSI systems will overflow into existing stream.



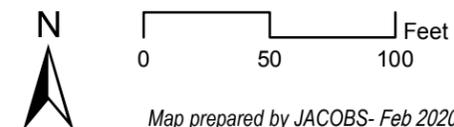
Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

Marion Gerardi Memorial Park presents the opportunity to manage adjacent right-of-way runoff within the park parcel in addition to opportunities to introduce traffic-calming GSI features along the perimeter of the park. Inside the park, a subsurface stormwater storage trench can be strategically sited underneath the existing open lawn area without disturbing the existing large trees or play areas. If landscape amenities are desired, a bioretention area (rain garden) or bioswale can be included. Along the perimeter of the park, on Main Street, 16th Street, and Middle Street, subsurface stormwater trenches with vegetated bumpouts can be placed to capture roadway runoff and slow traffic, creating a safer walking environment for pedestrians.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-13	Sharpsburg Borough	1.5	\$380,000	\$270,000	3.0	1,240,000	101%	1,260,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





**Upper Allegheny
GSI CONCEPT PLAN**

UA-15: Sharps Terrace
Sharpsburg Borough/ POC A-70

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



Potential GSI Location -
Subsurface storage/infiltration
trench to capture parking lot runoff
and portion of adjacent roof runoff*
(optional permeable pavement
parking spaces)

Potential to capture rear building roof runoff
(would require modifications to existing downspouts
to reroute them to front of buildings)

Potential GSI Location -
Subsurface storage/infiltration
trench to capture parking lot runoff
and portion of adjacent roof runoff*
(optional permeable pavement
parking spaces)

Note: Proposed GSI systems will
overflow to existing combined sewer

* Capturing the roof runoff requires
modifications to the existing building
downspouts to disconnect them from
the existing combined sewer system
and reroute to subsurface storage trench

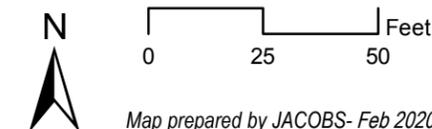
Proposed green stormwater infrastructure (GSI) at the Sharps Terrace housing development focuses primarily on siting GSI features in the existing parking lot to manage not only the parking lot runoff but also potentially capture a portion of the residential roof runoff. In the parking lot, subsurface stormwater storage/infiltration trenches can be sited underneath the existing parking stalls and repaved with either a permeable or conventional pavement surface. If possible, the existing residential roof downspouts can be disconnected from the existing combined sewer system and instead directed to the new GSI features.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-15	Allegheny County Housing Authority	0.6	\$150,000	\$110,000	3.0	490,000	109%	540,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

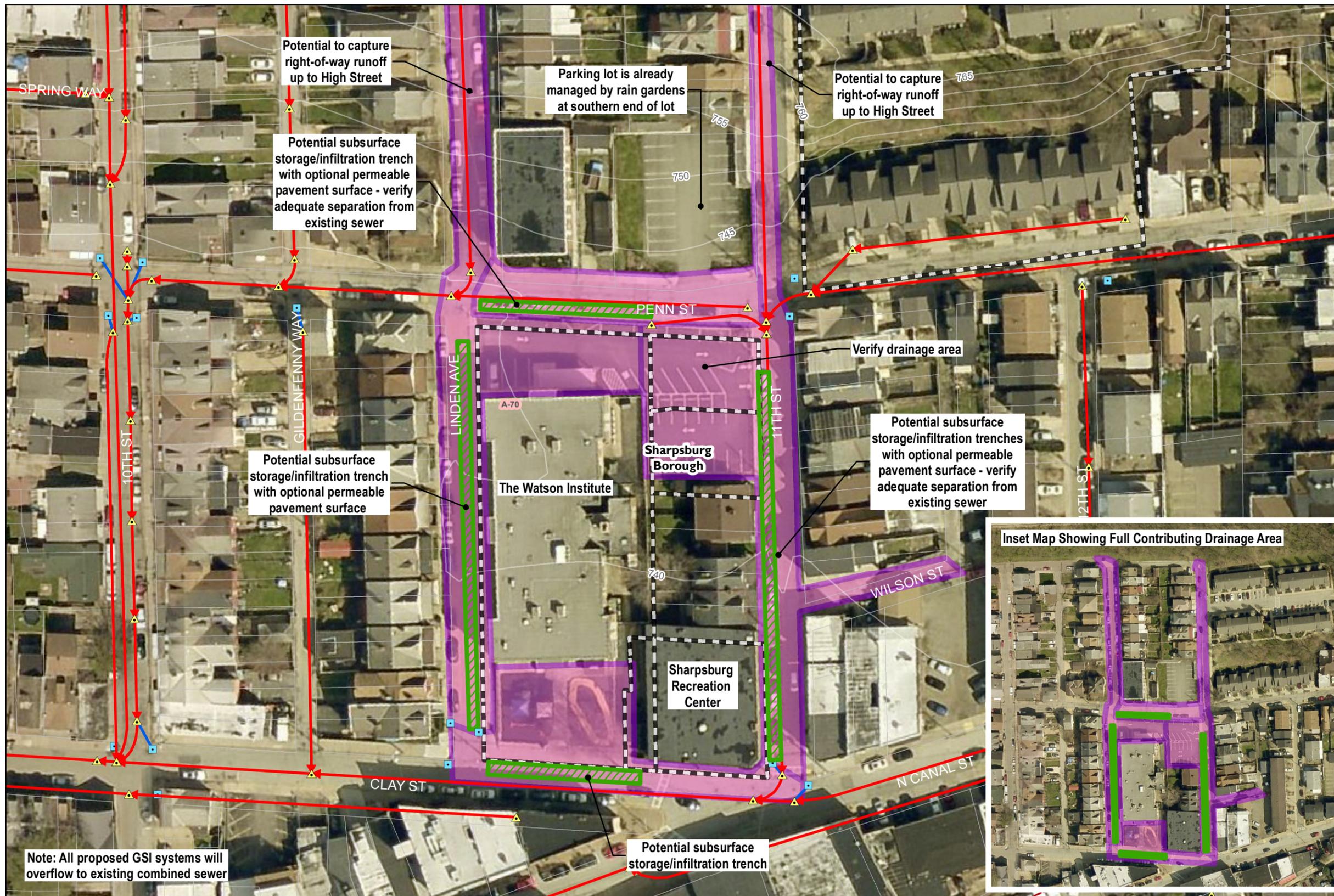




Upper Allegheny
GSI CONCEPT PLAN

UA-16: The Watson Institute
Sharpsburg Borough/ POC A-70

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



Note: All proposed GSI systems will overflow to existing combined sewer

The Watson Institute school is situated at a relative topographic low point, with the potential to manage runoff from Linden Ave, 11th Street, and Clay Street. The school's parking lot has been renovated recently, so instead of locating green stormwater infrastructure on site, the GSI features can be located in adjacent roadways. Subsurface storage/infiltration trenches can be located in the parking and travel lanes on Linden Ave, Penn St, and 11th Street, with optional permeable paver surfaces. These systems have the potential to capture runoff flowing down from the intersections with High Street. A subsurface storage/infiltration trench on Clay Street has the potential to manage the school's playground, which slopes down towards Clay Street. The proximity to the school provides an excellent opportunity for public education.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-16	The Watson Institute	1.4	\$350,000	\$240,000	3.0	1,130,000	109%	1,240,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



Upper Allegheny GSI CONCEPT PLAN

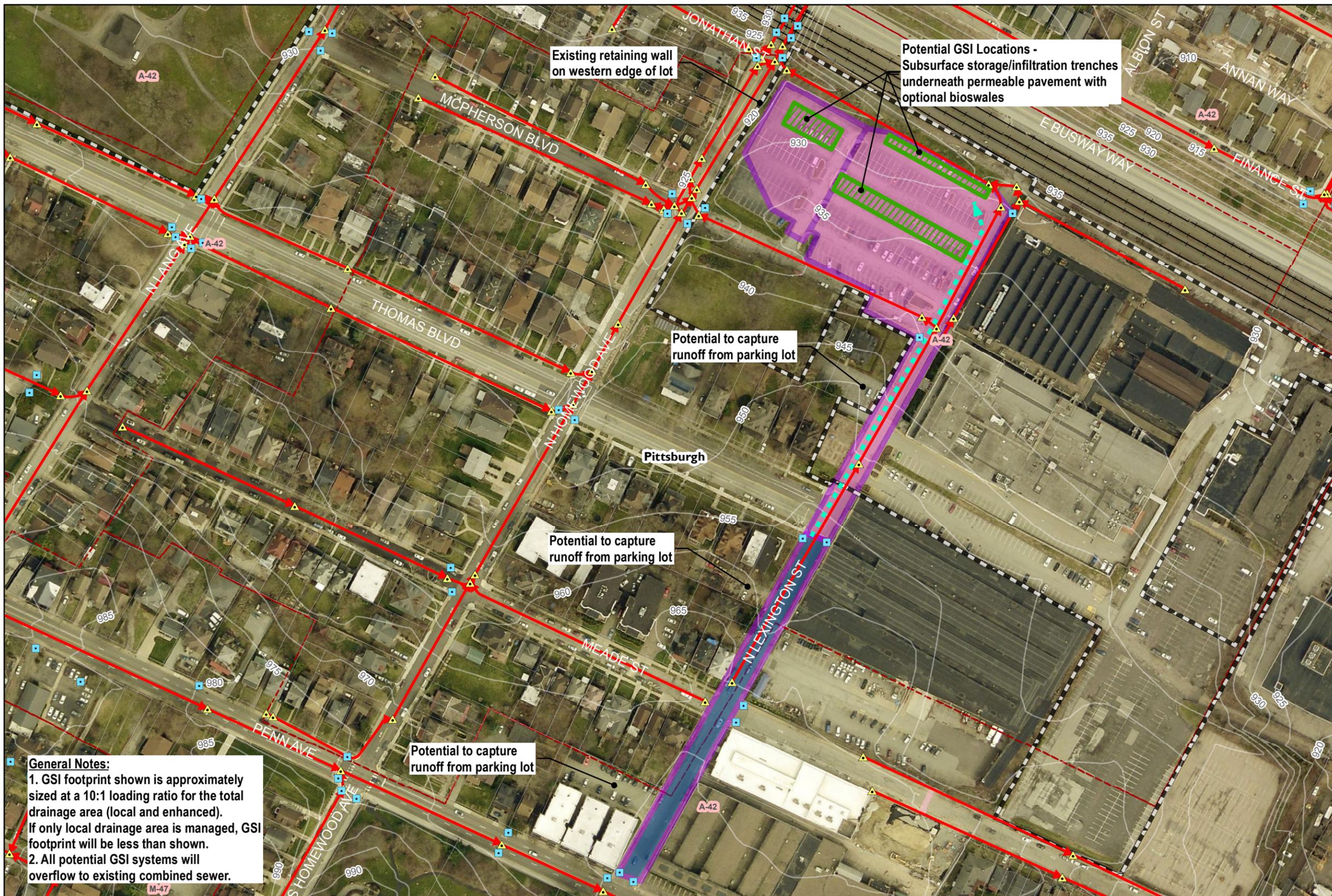
UA-21: Urban Redevelopment Authority
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

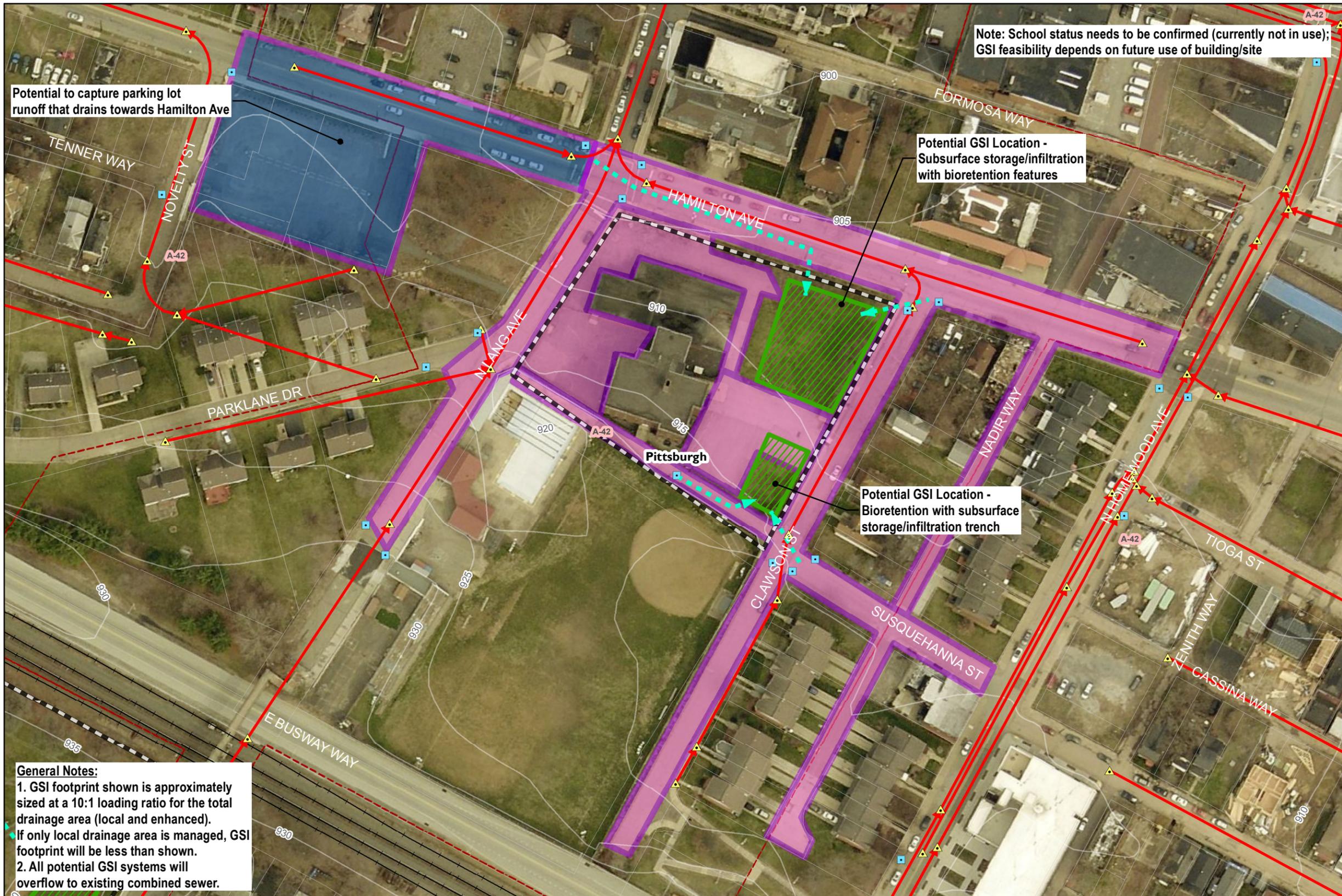
The URA-owned parking lot located at the corner of McPherson Blvd and N Homewood Ave appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage the majority of the parking lot runoff in addition to several blocks of roadway runoff from N Lexington St. Stormwater runoff will be redirected via new separate stormwater sewers into subsurface storage/infiltration trenches in the parking lot with an optional permeable pavement surface. If vegetated areas are desired, bioswale features could also be included in the parking lot redesign.



Upper Allegheny
GSI CONCEPT PLAN

UA-22: Homewood Montessori School
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)



General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced).
 If only local drainage area is managed, GSI footprint will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

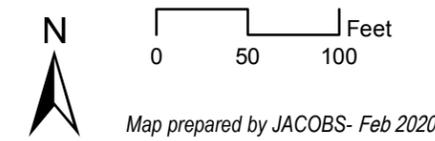
Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

The existing lawn areas and parking lot at Homewood Montessori School are prime candidates for integration of green stormwater infrastructure (GSI). Adjacent roadway runoff from Susquehanna St, Clawsow St, Hamilton Ave, and several other adjacent streets could be directed to the site via new separate stormwater sewers and managed with subsurface storage/infiltration beds and bioretention features (rain gardens). The feasibility of GSI implementation will depend on the future use of the school building/site as it is currently not in use.

Project UA-22 (Parcel Owner: Urban Redevelopment Authority of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.58	\$650,000	\$460,000	—	2,120,000	—	2,060,000	\$0.32
Enhanced Drainage Area	1.05	\$200,000	\$140,000	—	870,000	—	850,000	\$0.24
Project Totals	3.64	\$850,000	\$600,000	3.0	2,990,000	97%	2,910,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





**Upper Allegheny
GSI CONCEPT PLAN**

UA-23: Westinghouse Park
City of Pittsburgh/ POC A-42

- Existing Inlets
 - ▲ Sewer Structures
 - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- ▭ Project Parcel Boundary
 - ▭ Parcels
 - ▭ Municipal Boundary
 - ▭ GSI Footprint
 - ▭ Impervious Drainage Area (Local)
 - ▭ Impervious Drainage Area (Enhanced)*
 - ▭ Surface Water
 - ▭ Combined Sewer Area
 - ▭ Runoff To Combined Area
 - ▭ Separate Sewer Area
 - ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Westinghouse Park (located at the corner of Thomas Blvd and N Lang Ave) is a prime candidate for the integration of green stormwater infrastructure (GSI). Adjacent roadway runoff from N Murtland St, N Lang Ave, McPherson Blvd, Thomas Blvd, and Meade Pl could be directed to the site via new separate stormwater sewers and managed with bioretention features (rain gardens) that have subsurface storage/infiltration beds. One of the bioretention features could be located within the existing depression on the east side of the park, near the intersection of McPherson Blvd and N Lang Ave. A second smaller GSI system could be located at the western side of the park, near the intersection of McPherson Blvd and N Murtland St.

Project UA-23 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.52	\$380,000	\$270,000	—	1,250,000	—	1,220,000	\$0.31
Enhanced Drainage Area	2.80	\$530,000	\$370,000	—	2,300,000	—	2,240,000	\$0.24
Project Totals	4.31	\$910,000	\$640,000	3.0	3,550,000	97%	3,460,000	\$0.26

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

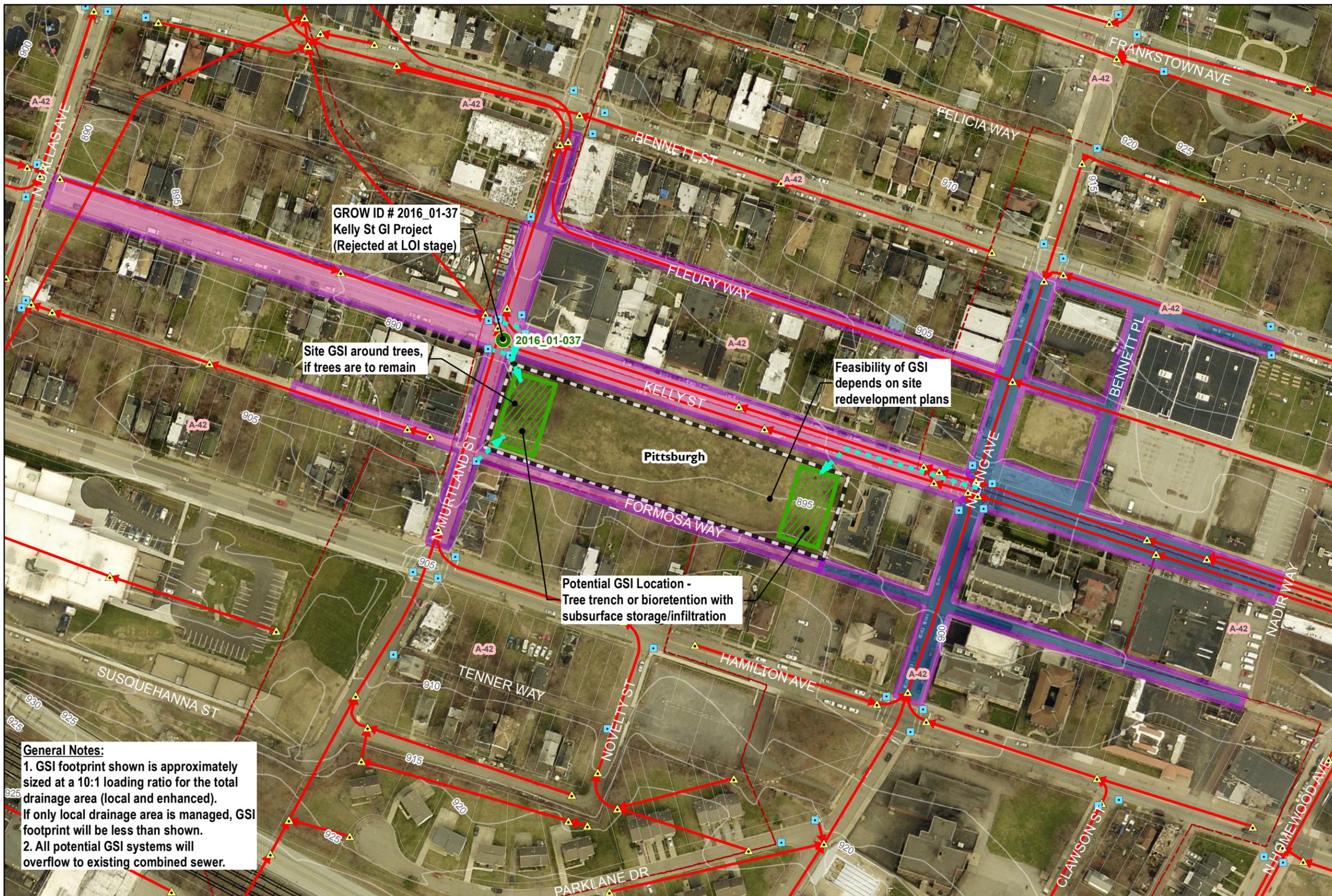
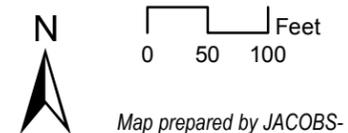
UA-24: Urban Redevelopment Authority
City of Pittsburgh/ POC A-42

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The URA-owned vacant lot at the corner of Kelly St and N Murtland St appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from N Lang Ave, Kelly St, Formosa Way, N Murtland St, and several additional side streets. Stormwater runoff will be redirected via new separate stormwater sewers into either tree trenches or bioretention (rain garden) features that have subsurface storage/infiltration beds. The feasibility of GSI implementation will depend on any potential redevelopment plans for the site.

Project UA-24 (Parcel Owner: Housing Authority City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.52	\$640,000	\$450,000	-	2,070,000	-	2,010,000	\$0.32
Enhanced Drainage Area	1.87	\$360,000	\$250,000	-	1,540,000	-	1,500,000	\$0.24
Project Totals	4.39	\$1,000,000	\$700,000	3.0	3,610,000	97%	3,510,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

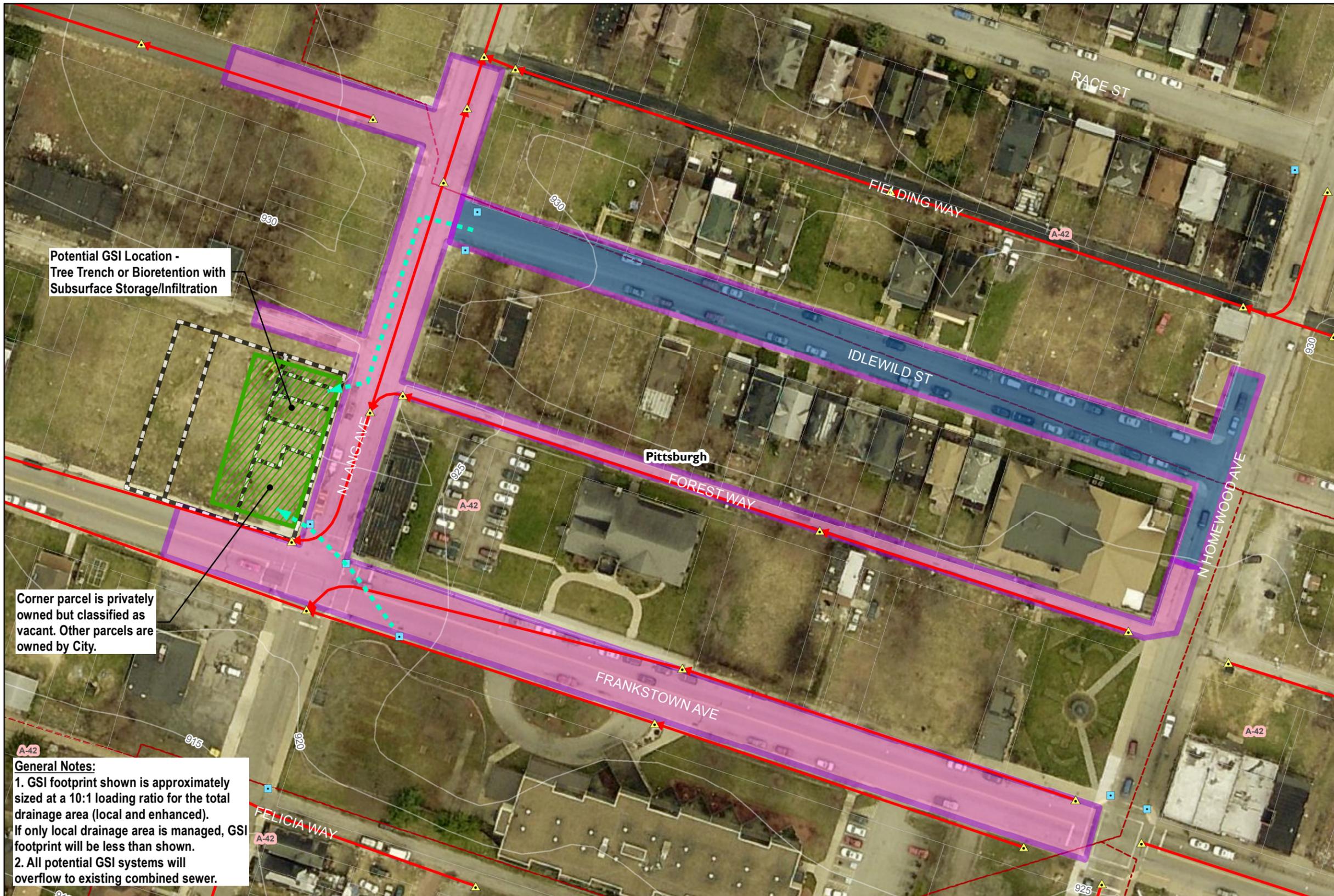
UA-25: City Vacant Lot
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- - - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Potential GSI Location -
Tree Trench or Bioretention with
Subsurface Storage/Infiltration

Corner parcel is privately
owned but classified as
vacant. Other parcels are
owned by City.

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Project UA-25 (Parcel Owner: City of Pittsburgh/Private Owner)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	†Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.38	\$350,000	\$240,000	—	1,130,000	—	1,100,000	\$0.32
Enhanced Drainage Area	0.59	\$110,000	\$80,000	—	490,000	—	480,000	\$0.23
Project Totals	1.97	\$460,000	\$320,000	3.0	1,620,000	97%	1,580,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, †Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

The City-owned vacant lot at the corner of N Lang Ave and Frankstown Ave appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from N Lang Ave, Frankstown Ave, Forest Way, and Idlewild St. Stormwater runoff will be redirected via new separate stormwater sewers into a tree trench or bioretention feature (rain garden) with a subsurface storage/infiltration bed. The feasibility of GSI implementation depends ultimately on any future redevelopment plans for the site.



**Upper Allegheny
GSI CONCEPT PLAN**

UA-27: Westinghouse Academy
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



Potential GSI Location -
Subsurface storage/infiltration
trench underneath existing football field

Confirm whether portions of N. Lang St
actually drain onto east and west streets

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area shown. If only some of the drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The existing football field at Westinghouse Academy is a prime candidate for green stormwater infrastructure (GSI) due to its topographic location downhill from many surrounding residential streets. Adjacent roadway runoff from adjacent streets including Belmar St, Kedron St, Hermitage St, N Murtland St, Monticello St, and additional streets could be directed to the site via new separate stormwater sewers and managed with a large subsurface storage/infiltration trench underneath the field. After construction, the subsurface storage/infiltration trench would not impact the current use of the field.

Project UA-27 (Parcel Owner: Board of Public Education of the School District of Pittsburgh)

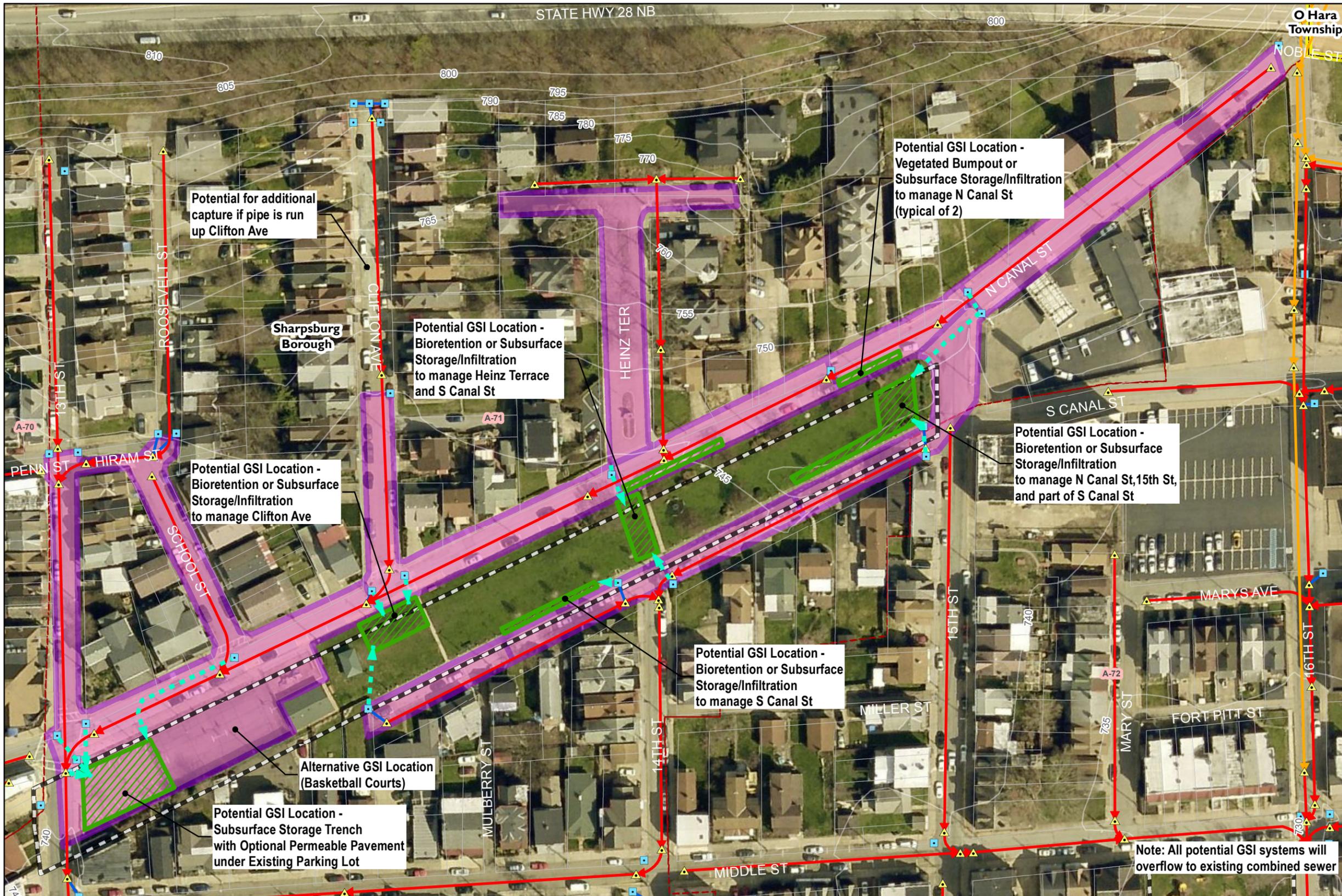
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	2.05	\$520,000	\$360,000	-	1,680,000	-	1,650,000	\$0.32
Enhanced Drainage Area	5.15	\$980,000	\$690,000	-	4,230,000	-	4,160,000	\$0.24
Project Totals	7.20	\$1,500,000	\$1,050,000	3.0	5,910,000	98%	5,810,000	\$0.26

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

UA-29: Kennedy Park
Sharpsburg Borough/ POC A-71



- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

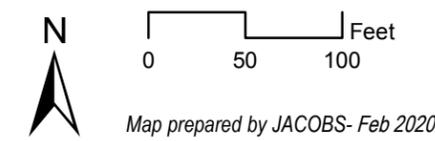
Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

Kennedy Park has significant potential for GSI implementation due to its location and large expanse of open space. In the park, there are multiple opportunities to place small bioretention areas (rain gardens) with subsurface storage trenches to manage adjacent Canal St runoff in addition to several other streets that drain down towards the park. By installing short segments of new storm pipe at strategic locations, a larger potential contributing drainage area can be conveyed across N Canal Street and directed into the park. Vegetated bumpouts on N. Canal can manage roadway runoff while also slowing down traffic. The new GSI features should be sited in a way that does not impede existing park programming and available gathering space for festivals and events. In the parking lot to the west of the park, a subsurface storage trench can be located underneath the existing parking spaces with either a permeable or conventional pavement surface.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-29	Sharpsburg Borough	2.7	\$670,000	\$470,000	3.0	2,190,000	109%	2,390,000	\$0.28

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

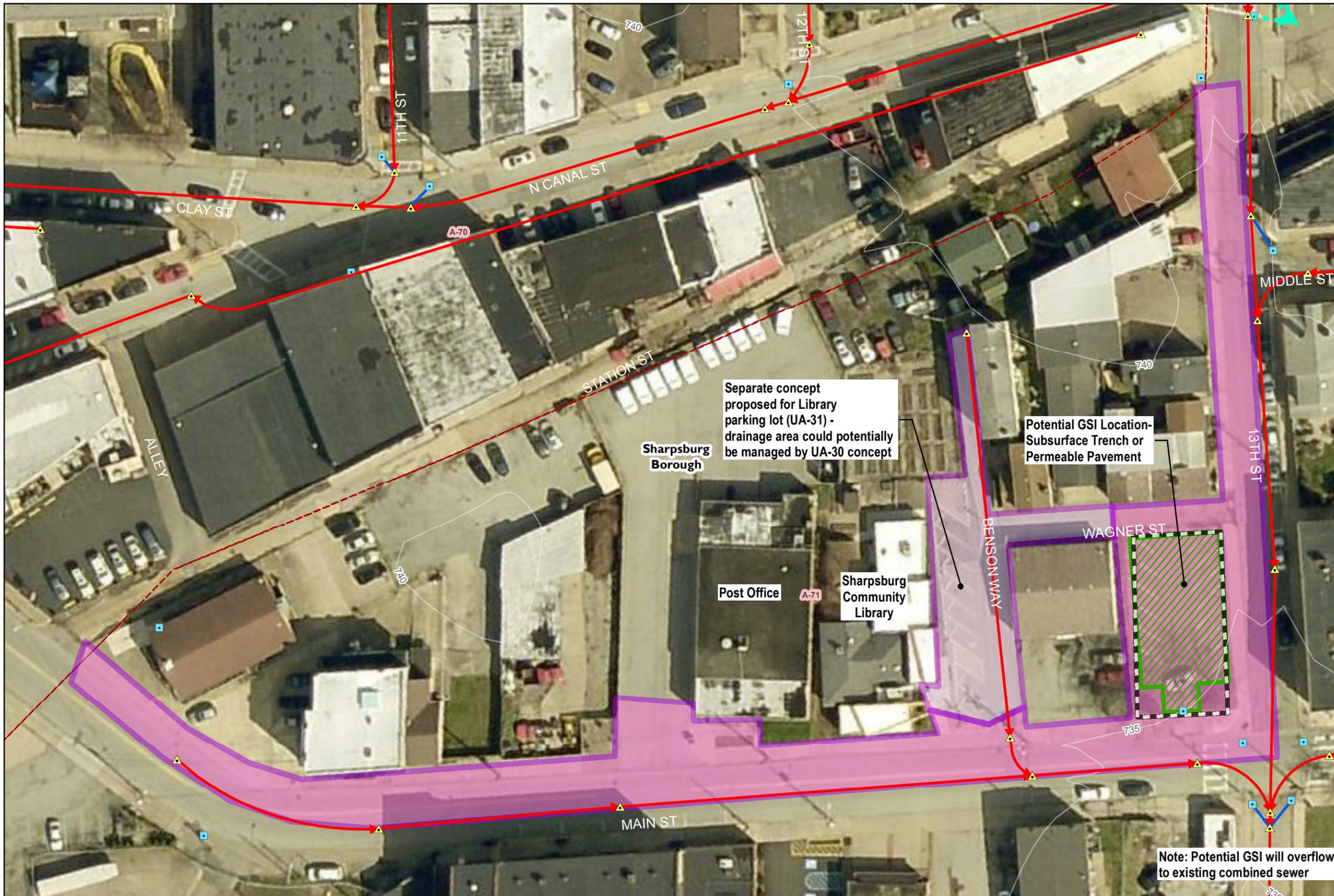




**Upper Allegheny
GSI CONCEPT PLAN**

UA-30: Municipal Parking Lot
Sharpsburg Borough/ POC A-71

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Municipal Boundary
- ▨ GSI Footprint
- Impervious Drainage Area
- Surface Water
- - - Combined Sewer Area
- - - Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



Separate concept proposed for Library parking lot (UA-31) - drainage area could potentially be managed by UA-30 concept

Potential GSI Location-Subsurface Trench or Permeable Pavement

Note: Potential GSI will overflow to existing combined sewer

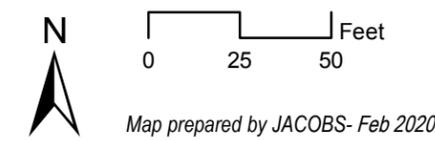
Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

The municipal parking lot at the corner of Main St and 13th St presents an opportunity to manage the immediate parking lot runoff in addition to a portion of both Main St and 13th St. A subsurface storage/infiltration trench can be installed underneath the parking lot and finished with a permeable or conventional pavement surface. The two large existing trees at the southern end of the lot should be preserved. New inlets can be added near the intersection of Main St and 13th St to convey the roadway runoff into the subsurface system in the parking lot. The proximity to the library and post office provide an excellent opportunity for public education.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-30	Sharpsburg Borough	0.7	\$170,000	\$120,000	3.0	540,000	109%	590,000	\$0.29

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

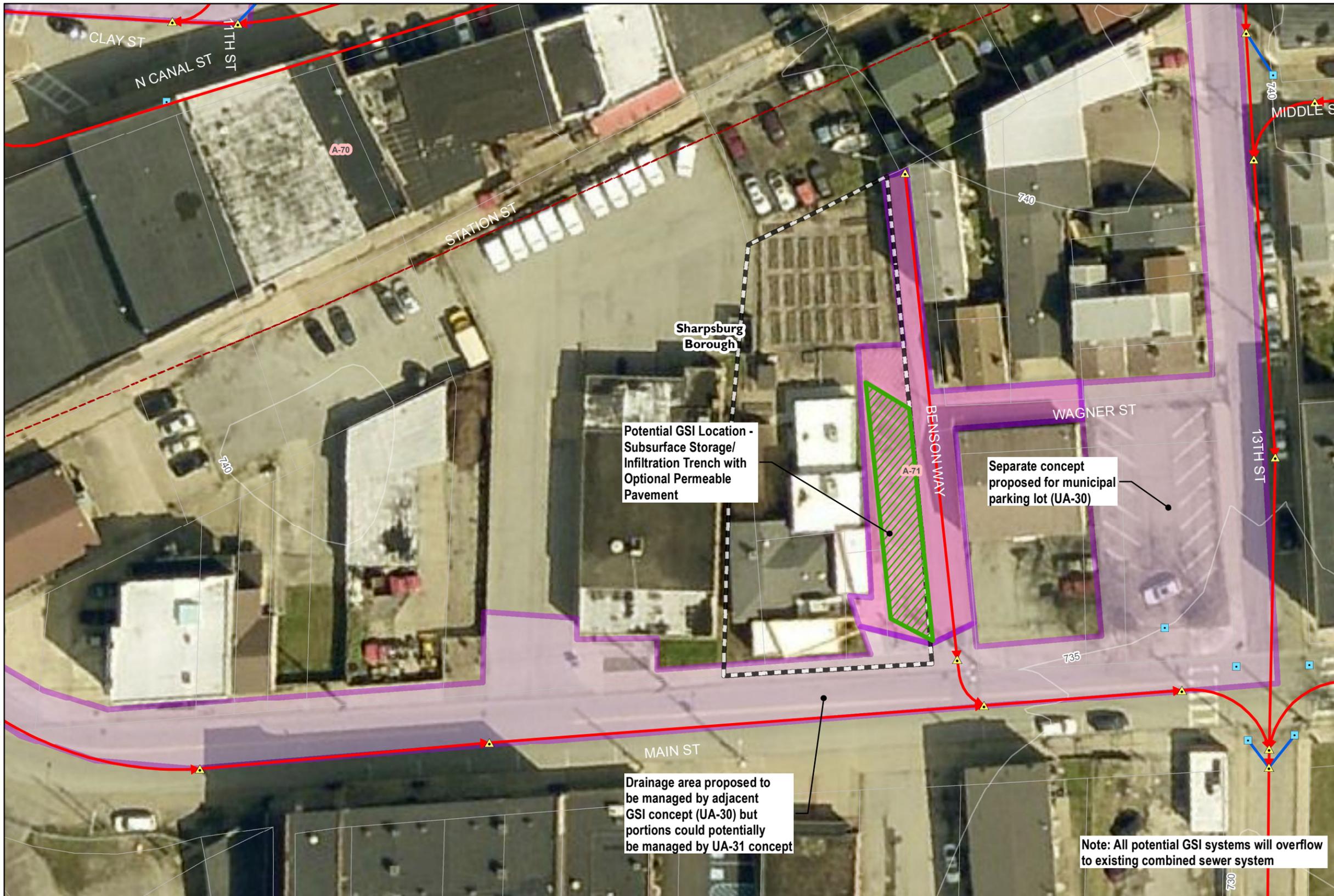




**Upper Allegheny
GSI CONCEPT PLAN**

UA-31: Sharpsburg Library/Garden
Sharpsburg Borough/ POC A-71

- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



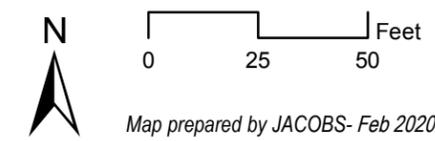
Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

The Sharpsburg Library site has potential for green stormwater infrastructure implementation. A subsurface storage/infiltration trench can be placed beneath the diagonal parking spaces to the east of the library building and finished with a permeable or conventional pavement surface. This system could manage runoff from Benson Way and Wagner Street, while leaving the existing community garden untouched. The proximity to the library and post office provide an excellent opportunity for public education. Note that the drainage area for UA-31 could also be potentially managed by the municipal parking lot GSI Concept (UA-30).

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UA-31	Sharpsburg Borough	0.1	\$40,000	\$30,000	3.0	120,000	109%	130,000	\$0.31

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





Upper Allegheny
GSI CONCEPT PLAN

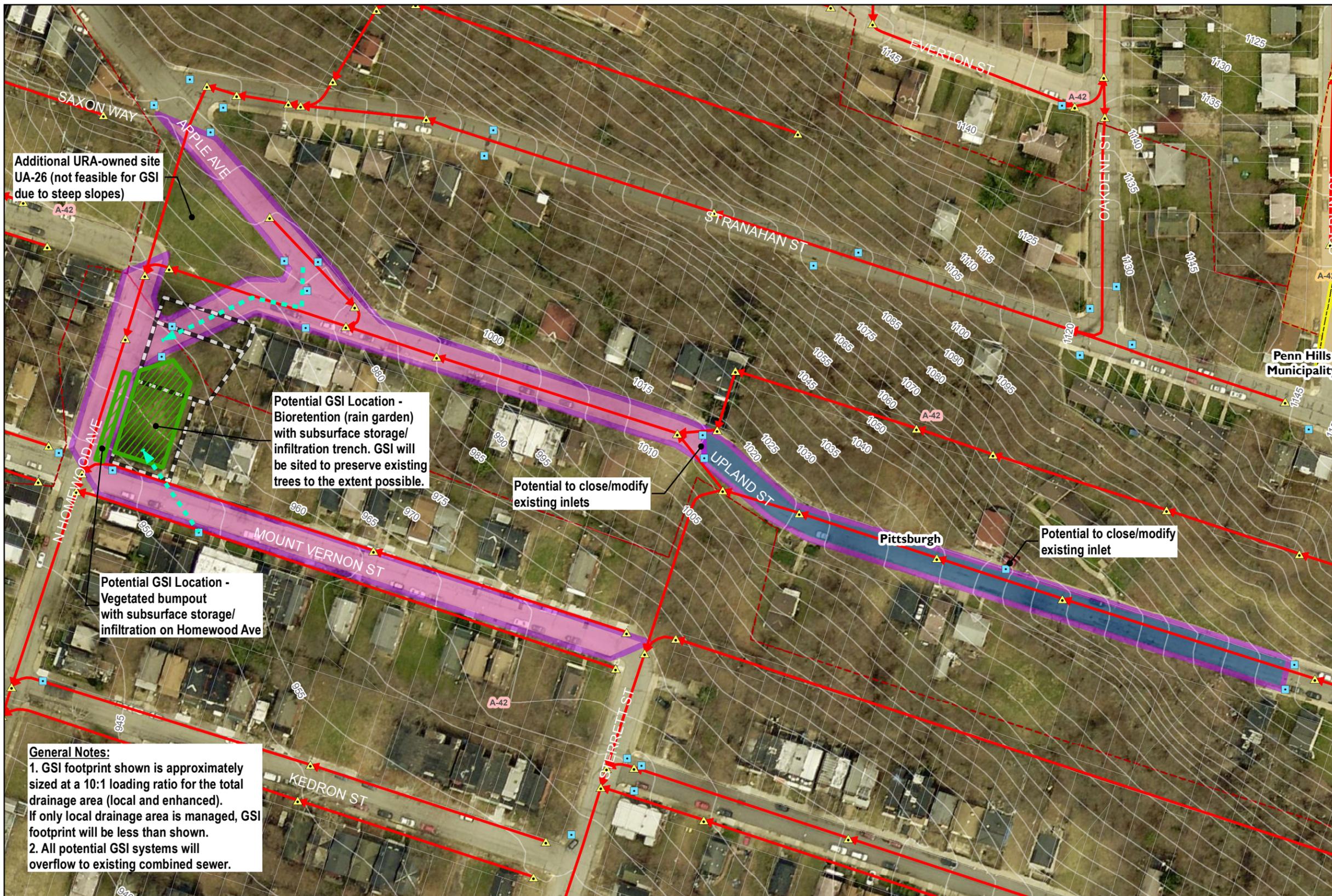
UA-34: Urban Redevelopment Authority Lot
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOsan: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The Urban Redevelopment Authority lot located at the corner of Mount Vernon St and N Homewood Ave, is a prime candidate for green stormwater infrastructure (GSI). Adjacent roadway runoff from N Homewood Ave, Apple Ave, Upland St, and Mount Vernon St could be directed to the site via new separate storm sewers and managed by a rain garden with a subsurface storage/infiltration trench. In addition, a vegetated bumpout with subsurface storage/infiltration can be located in the right-of-way on N Homewood Ave immediately to the west of the site. The GSI within the parcel can be designed to preserve existing trees to the extent possible. There is also potential to close/modify several existing inlets on Upland Street to enhance drainage area capture.

Project UA-34 (Parcel Owner: Urban Redevelopment Authority of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gallyr overflow reduction)
Local GSI	1.29	\$350,000	\$250,000	—	1,060,000	—	1,100,000	\$0.32
Enhanced Drainage Area	0.49	\$100,000	\$70,000	—	400,000	—	420,000	\$0.24
Project Totals	1.78	\$450,000	\$320,000	4.0	1,460,000	104%	1,520,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

UA-35: Paulson Playground
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

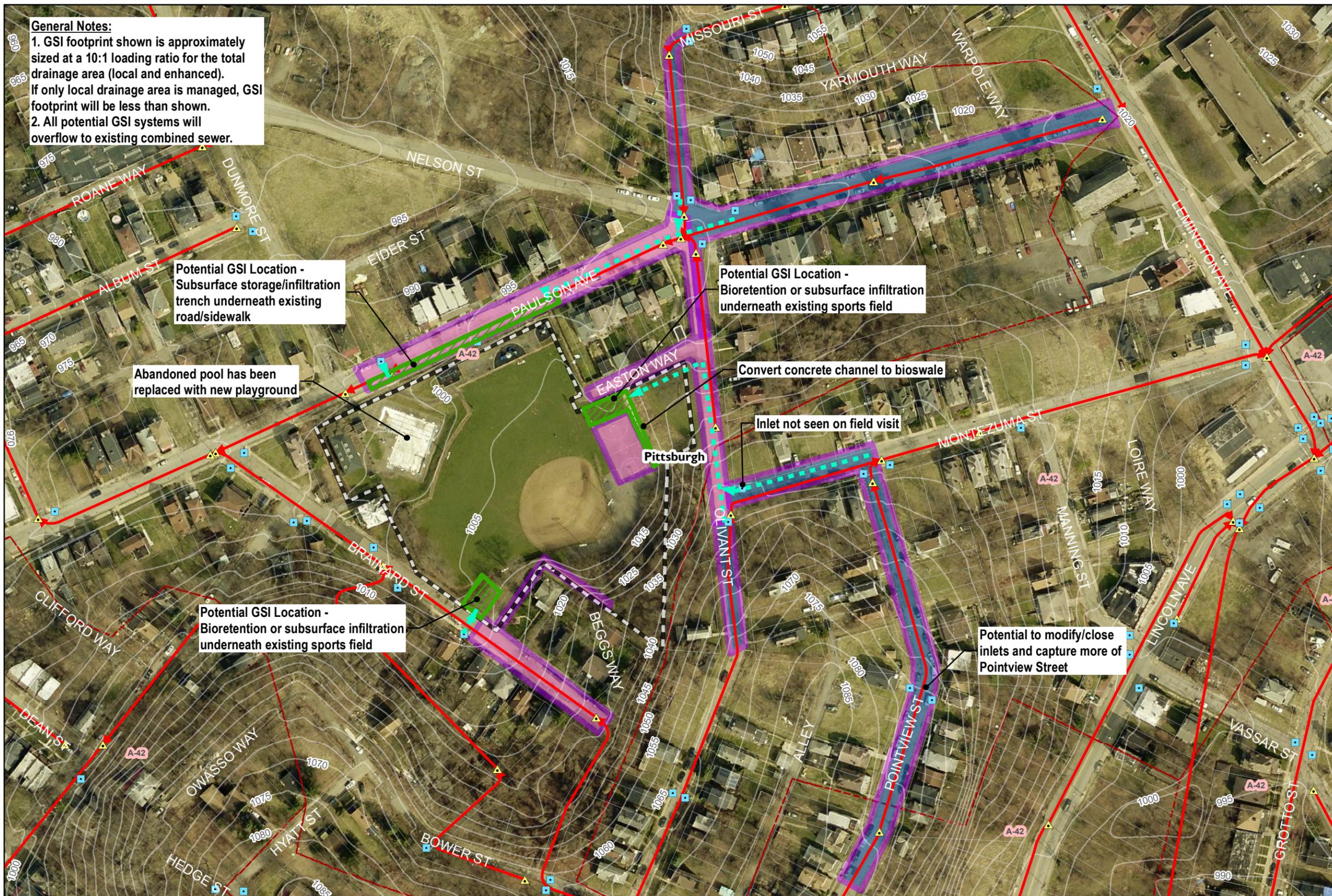
Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:

1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.



Proposed green stormwater infrastructure (GSI) for Paulson Playground will capture stormwater runoff from many of the adjacent streets to the northeast, including Paulson Ave, Olivant St, and Easton Way. Stormwater runoff will be directed via new separate storm sewers into potential GSI features on the perimeter and within the park property, such as a subsurface storage/infiltration trench located underneath the existing parking lane and sidewalk on Paulson Ave. In addition, a bioretention feature can be sited within the park, next to the existing basketball courts. The existing concrete channel can be converted into a bioswale that drains to the bioretention area. Finally, a small portion of Brainard St and Beggs Way to the south of the park can be managed with a bioretention area or subsurface trench located within the existing field. There is also potential to close/modify two existing inlets on Pointview Street to enhance runoff capture.

Project UA-35 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	†Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.10	\$280,000	\$200,000	—	910,000	97%	—	\$0.32
Enhanced Drainage Area	1.49	\$280,000	\$200,000	—	1,220,000	97%	—	\$0.24
Project Totals	2.59	\$560,000	\$400,000	3.0	2,130,000	97%	2,060,000	\$0.27

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. †Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI



**Upper Allegheny
GSI CONCEPT PLAN**

UA-37: Mellon Park and Lyndhurst Green
City of Pittsburgh/ POC A-42

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



Potential to close/modify additional inlets and expand DA and GSI accordingly (i.e. additional permeable pavement parking lanes/subsurface trenches on Beechwood Blvd)

General Notes:
 1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Proposed green stormwater infrastructure (GSI) for Mellon Park and the adjacent Lyndhurst Green will capture stormwater runoff from Lyndhurst Dr, Beechwood Blvd, 5th Ave, and several additional streets and direct it to potential GSI features. Two bioretention areas can be located near the northeastern and southern corners of the park to capture adjacent roadway runoff. Subsurface storage/infiltration trenches with optional permeable pavement surfaces can be placed under existing parking lanes on Beechwood Blvd on the eastern edge of the park. Lyndhurst Green is a prime site for bioretention features (rain gardens). There is also potential to close/modify additional existing inlets on Beechwood Blvd to expand the potential drainage area. If additional drainage area is captured, this could be managed with more permeable pavement parking lanes/subsurface trenches on Beechwood Blvd.

Project UA-37 (Parcel Owner: City of Pittsburgh)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	3.69	\$940,000	\$660,000	—	3,030,000	—	2,570,000	\$0.37
Enhanced Drainage Area	1.44	\$270,000	\$190,000	—	1,180,000	—	1,000,000	\$0.27
Project Totals	5.13	\$1,210,000	\$850,000	3.0	4,210,000	85%	3,570,000	\$0.34

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



**Upper Monongahela
GSI CONCEPT PLAN**

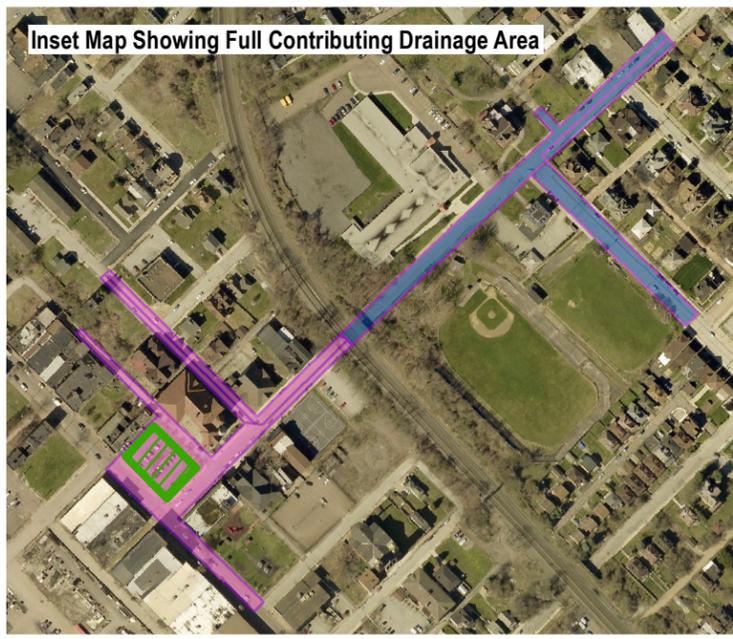
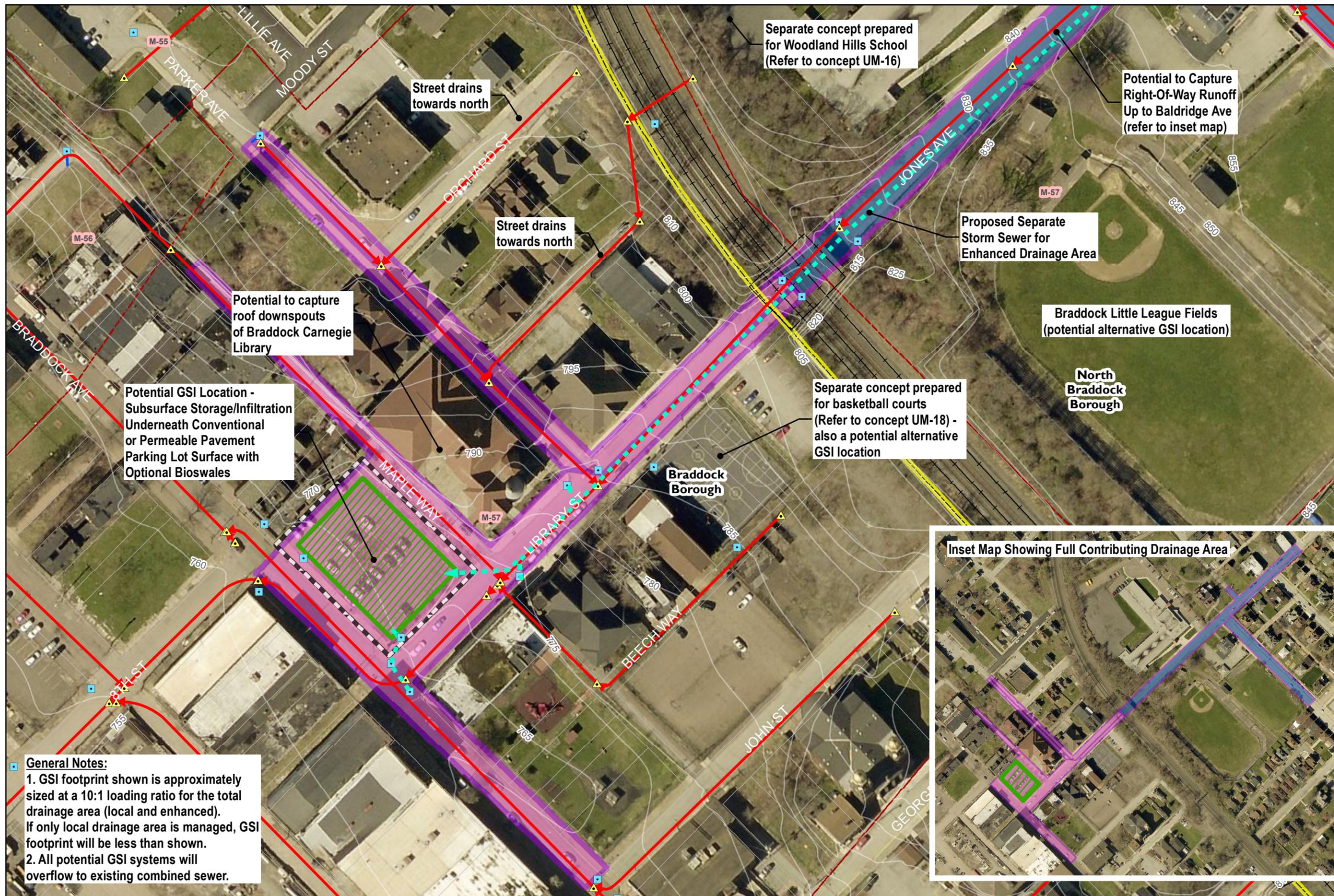
UM-19: Library/Parking Lot
Braddock Borough/ POC M-57

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The library parking lot at the corner of Braddock Ave and Library Street has significant potential for managing stormwater runoff from the lot and from adjacent streets to the northeast. A subsurface stormwater storage bed can be installed in the existing parking lot with either a permeable or conventional pavement surface. If additional landscape amenities are desired, bioswales can be added to the parking lot redesign. By installing a new storm pipe and inlets along Library Street and Jones Avenue potentially as far as Baldrige Ave, the entire right-of-way can be disconnected from the existing combined sewer and instead managed at the library parking lot. The proximity to the library, basketball courts, and school provide an excellent opportunity for public education.

Project UM-19 (Parcel Owner: Braddock Borough)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.71	\$430,000	\$300,000		1,400,000		1,370,000	\$0.31
Enhanced Drainage Area	1.34	\$250,000	\$180,000		1,100,000		1,070,000	\$0.23
Project Totals	3.05	\$680,000	\$480,000	3.0	2,500,000	98%	2,440,000	\$0.28

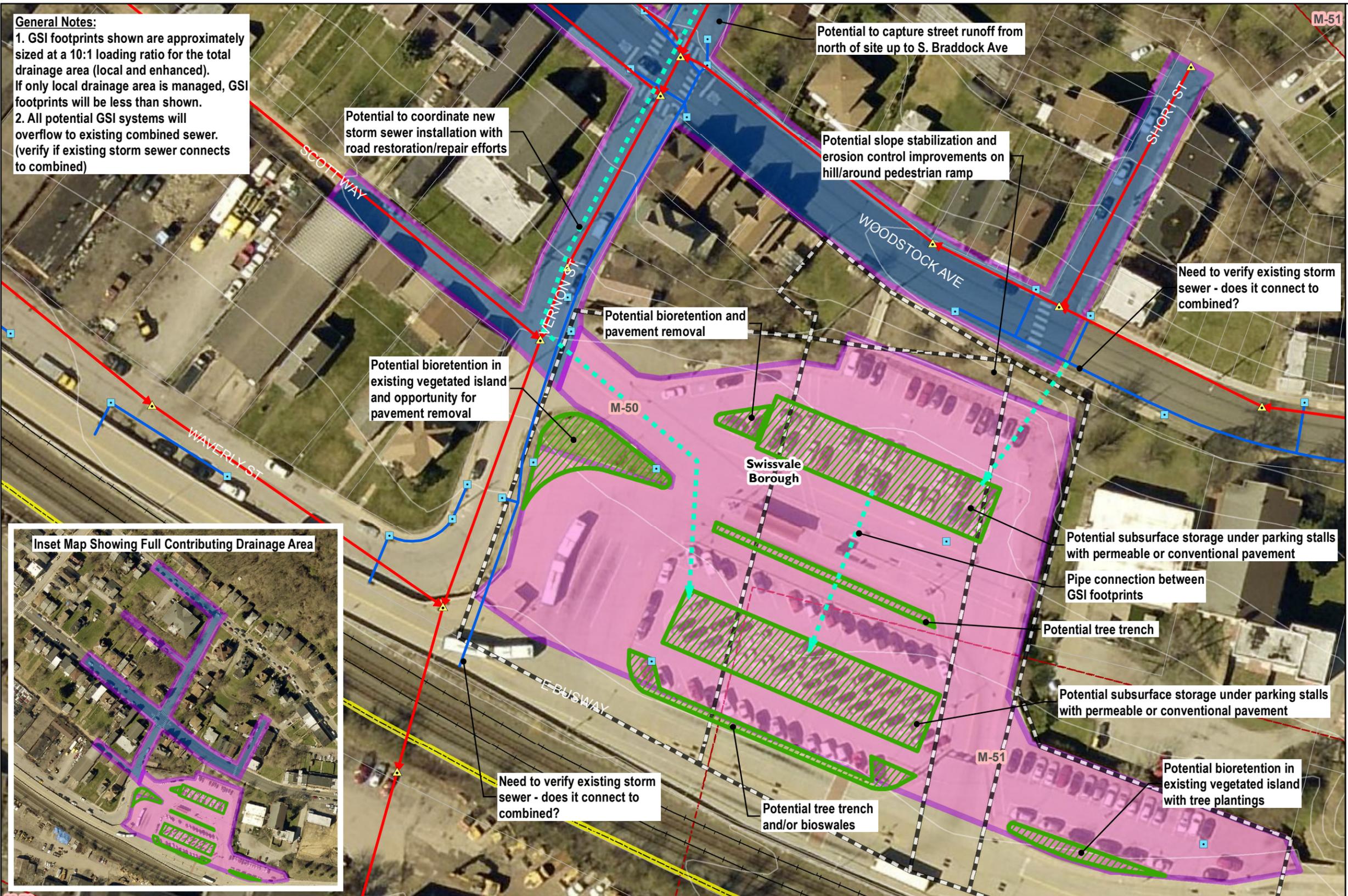
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, ***Efficiency based on construction cost for stand-alone GSI



Upper Monongahela
GSI CONCEPT PLAN

UM-23: Swissvale Park and Ride
Swissvale Borough/ POC M-50

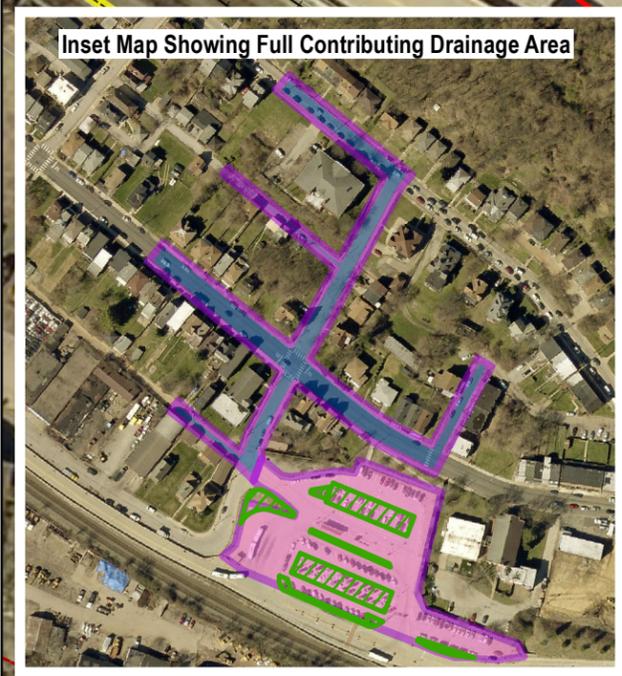
General Notes:
1. GSI footprints shown are approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprints will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer. (verify if existing storm sewer connects to combined)



- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours

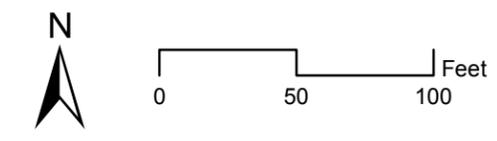


Proposed green stormwater infrastructure (GSI) for the Swissvale Park and Ride features a combination of surface and subsurface stormwater management technologies that can be incorporated into the existing parking lot layout. In addition to managing the immediate site's runoff, adjacent roadway runoff can be directed from Vernon St via new inlets and piped into a stormwater storage bed below a new parking lot surface consisting of permeable or conventional pavement. If landscape amenities are desired, tree trenches and/or bioswales can be added to the concept. There are several opportunities for pavement removal in addition to slope stabilization and erosion control improvements. The GSI could be designed as an infiltration and/or slow-release system, depending on the subsurface conditions encountered.

Project UM-23 (Parcel Owner: Port Authority of Allegheny County)								
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gallyr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gallyr)	**Cost Efficiency (\$/gallyr overflow reduction)
Local GSI	2.09	\$590,000	\$410,000		1,720,000		1,420,000	\$0.42
Enhanced Drainage Area	1.69	\$360,000	\$250,000		1,390,000		1,140,000	\$0.32
Project Totals	3.79	\$950,000	\$660,000	4.5	3,110,000	82%	2,560,000	\$0.37

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. *+Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.





**Upper Monongahela
GSI CONCEPT PLAN**

UM-25: Hawkins Village
Rankin Borough/ POC M-51



Potential to manage building rooftops in addition to roadways and parking lots

Potential GSI Location- Subsurface Storage/Infiltration Trench Underneath Existing Open Lawn with Optional Bioretention (GSI will overflow to existing sewer)

Sewer type, size, depth and condition information to be confirmed in order to verify that it can be connected to GSI. If existing sewer is combined then new separate storm pipes would be required.

- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

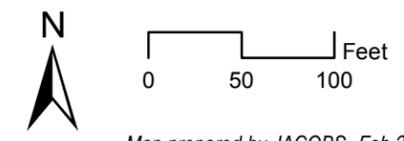
Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

Hawkins Village is a 157-unit affordable housing community that has the potential for green stormwater infrastructure (GSI) implementation. A large subsurface storage/infiltration trench can be located underneath the existing ballfield at the eastern end of the site. It appears that the entire housing development (roadways, parking lots, and building rooftops) drains to one sewer network, which could be disconnected from the existing combined system and redirected to drain into the proposed storage/infiltration trench. If landscape amenities are desired, bioretention areas can be added to the concept. Note that more information about the existing sewer system is needed to verify that this proposed GSI concept is feasible. If the existing sewer is combined, then new separate storm pipes would be required.

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UM-25	Allegheny County Housing Authority	5.4	\$1,360,000	\$950,000	3.0	4,400,000	93%	4,090,000	\$0.33

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI





**Upper Monongahela
GSI CONCEPT PLAN**

UM-31: E 7th and McClure Parking Lot
Homestead Borough/ POC M-45

Potential GSI Location -
Subsurface Storage/Infiltration
Trench Underneath Permeable or
Conventional Pavement with
Bioswales/Tree Trenches

Proposed Storm Sewer
(GROW #2018_01-017)

Proposed Storm Sewer
for Enhanced Drainage Area

2018_01_017

Drainage from west side of
E 7th Ave can be managed
by UM-31 or UM-33

Potential to capture additional
drainage area in coordination
with Proposed Storm Sewer
(GROW #2018_01-017)

Refer to
Concept UM-32

Refer to
Concept UM-33

General Notes:
1. GSI footprint shown is approximately
sized at a 10:1 loading ratio for the total
drainage area (local and enhanced).
If only local drainage area is managed, GSI
footprint will be less than shown.
2. All potential GSI systems will
overflow to existing combined sewer.

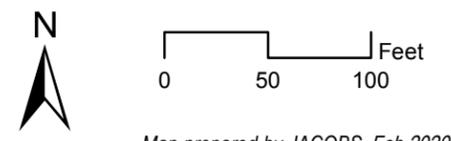
The municipal parking lot at the corner of McClure and E 7th Avenue presents an opportunity to integrate green stormwater infrastructure (GSI) into any future work in the parking lot or as a stand-alone GSI retrofit. The existing concrete lot could be retrofitted with a subsurface stone storage/infiltration trench and then repaved with conventional or permeable pavement. If landscape amenities are desired, bioswales or tree trenches could be added around the lot perimeter and between the parking lot rows. Due to its topographic location, the lot has the potential to manage a significant portion of the streets to the south and southwest, especially if a new storm sewer is added on McClure St.

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- ▶ Proposed Separate Storm Sewer
- Sewer Pipes**
- ▶ Combined
- ▶ Sanitary
- ▶ Stormwater
- ▶ Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundaries
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020

Project UM-31 (Parcel Owner: Homestead Borough Parking Authority)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	*+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.54	\$390,000	\$270,000		1,270,000		1,170,000	\$0.33
Enhanced Drainage Area	1.27	\$240,000	\$170,000		1,040,000		960,000	\$0.25
Project Totals	2.81	\$630,000	\$440,000	3.0	2,310,000	92%	2,130,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI



Upper Monongahela
GSI CONCEPT PLAN

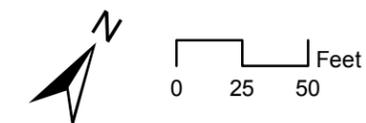
UM-32: 7th and Ann NW Parking Lot
Homestead Borough/ POC M-45

- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▭ GSI Footprint
- ▭ Impervious Drainage Area (Local)
- ▭ Impervious Drainage Area (Enhanced)*
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

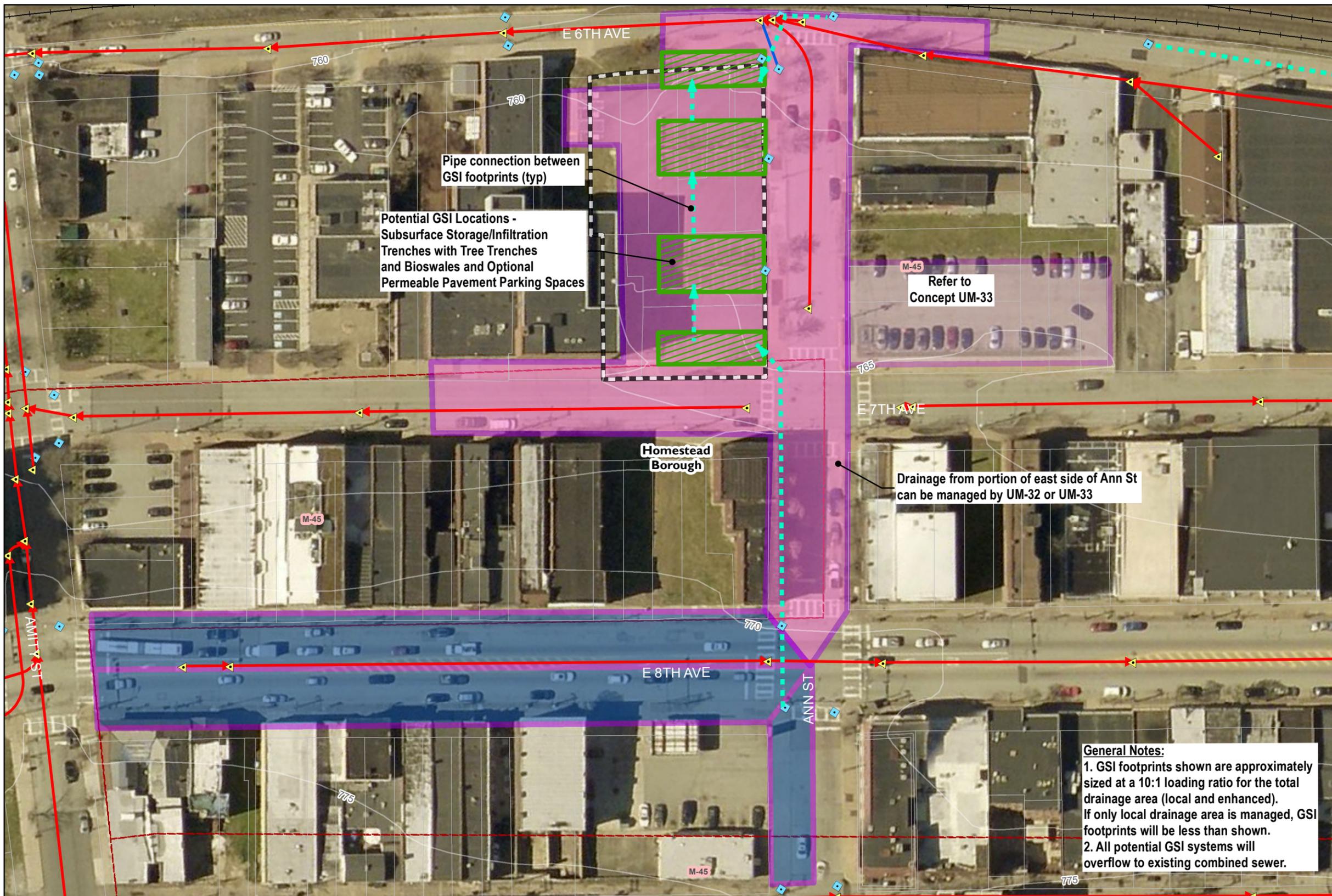
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



General Notes:
1. GSI footprints shown are approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprints will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

The municipal parking lot at the northwest corner of Ann St and E 7th Avenue presents an opportunity to integrate green stormwater infrastructure (GSI) into any future work in the parking lot or as a stand-alone GSI retrofit. A series of hydraulically connected subsurface stone storage/infiltration trenches can be sited underneath the six rows of parking stalls and then repaved with conventional or permeable pavement. Bioswales and/or tree trenches can be added into the existing green strips to add landscape amenities and enhance the parking lot and streetscape aesthetics. This site has the potential to manage portions of Ann St, E 7th Ave, and E 8th Ave with the addition of new storm inlets and a new storm sewer on Ann St.

Project UM-32 (Parcel Owner: Redevelopment Authority of Allegheny County)

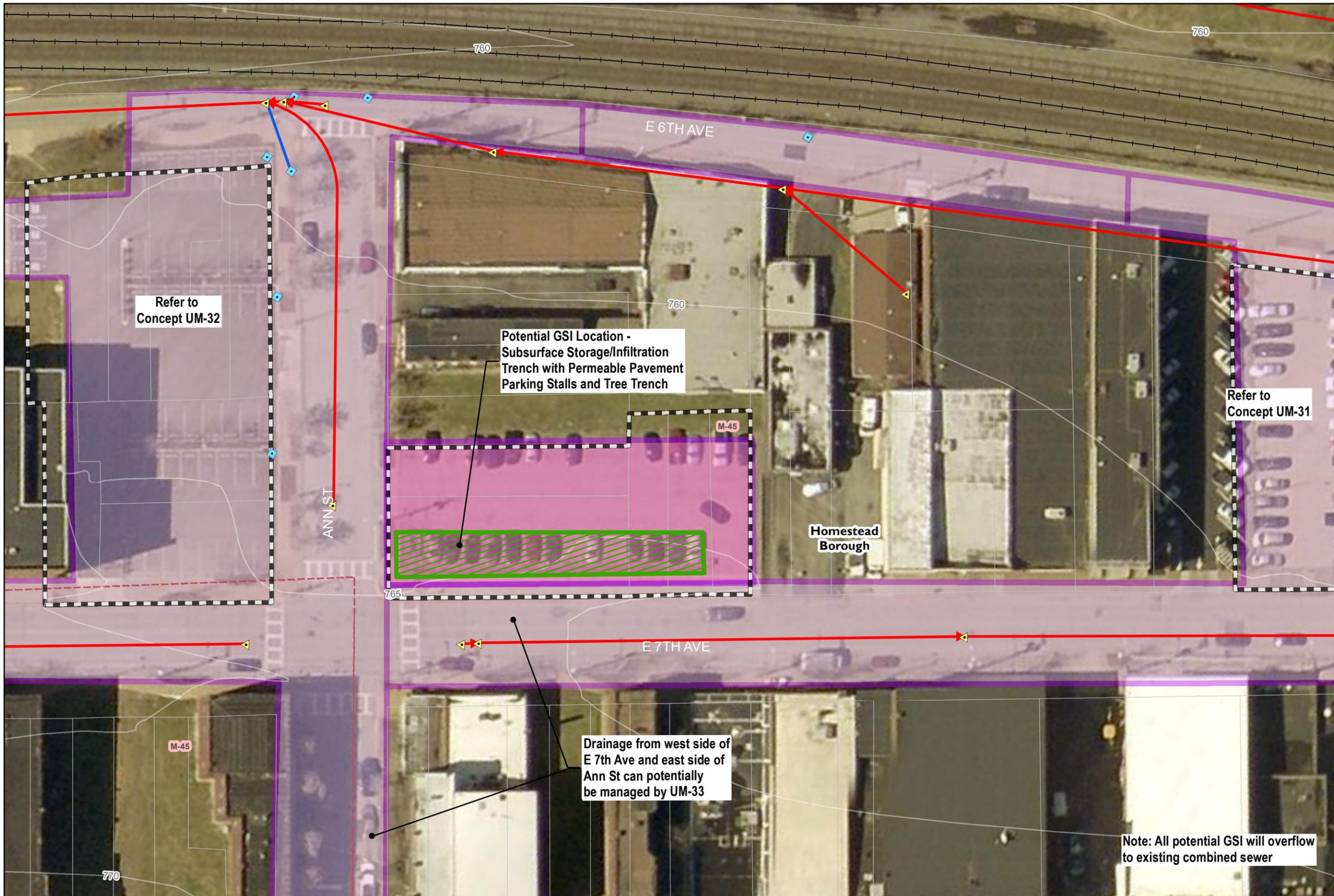
	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.43	\$360,000	\$250,000		1,180,000		1,090,000	\$0.33
Enhanced Drainage Area	0.95	\$180,000	\$130,000		780,000		720,000	\$0.25
Project Totals	2.38	\$540,000	\$380,000	3.0	1,960,000	92%	1,810,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, ***Efficiency based on construction cost for stand-alone GSI



**Upper Monongahela
GSI CONCEPT PLAN**

**UM-33: 7th and Ann NE Parking Lot
Homestead Borough/ POC M-45**



- Existing Inlets
- ▲ Sewer Structures
- ➔ Proposed Separate Storm Sewer
- Sewer Pipes**
- ➔ Combined
- ➔ Sanitary
- ➔ Stormwater
- ➔ Other Sewer Type
- ▭ Project Parcel Boundary
- ▭ Parcels
- ▭ Municipal Boundary
- ▨ GSI Footprint
- ▭ Impervious Drainage Area
- ▭ Surface Water
- ▭ Combined Sewer Area
- ▭ Runoff To Combined Area
- ▭ Separate Sewer Area
- ▭ Non-contributing Area (NCA)

Refer to
Concept UM-32

Potential GSI Location -
Subsurface Storage/Infiltration
Trench with Permeable Pavement
Parking Stalls and Tree Trench

Refer to
Concept UM-31

Homestead
Borough

Drainage from west side of
E 7th Ave and east side of
Ann St can potentially
be managed by UM-33

Note: All potential GSI will overflow
to existing combined sewer

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes,
Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available
in GIS, so all existing sewer system information may
not be shown on this map.

The municipal parking lot at the northeast corner of Ann St and E 7th Avenue presents an opportunity to integrate green stormwater infrastructure (GSI) into any future work in the parking lot or as a stand-alone GSI retrofit. A subsurface stone storage/infiltration trench can be sited underneath the southern row of parking stalls and then repaved with conventional or permeable pavement. A bioswale or tree trench can be added into the existing green strip to add landscape amenities and enhance the streetscape aesthetics. Additional roadway runoff from portions of both Ann St and E 7th Ave could be managed on the site with the addition of new storm inlets and storm pipe but is currently proposed to be more cost-effectively managed by the adjacent parking lots (Concepts UM-31 and UM-32).

Project ID	Parcel Owner	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
UM-33	Homestead Borough Parking Authority	0.3	\$80,000	\$50,000	3.0	240,000	92%	220,000	\$0.36

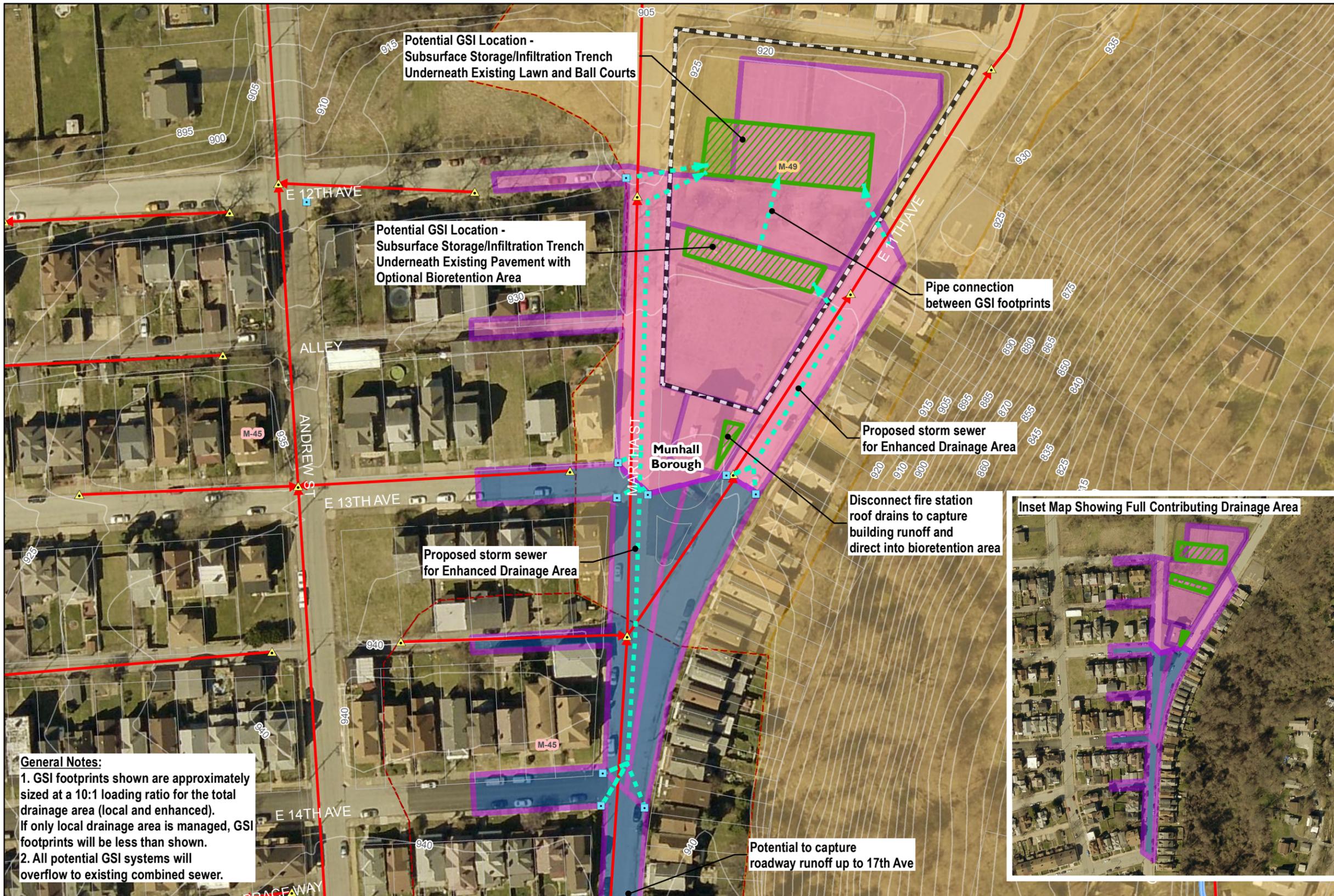
*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





Upper Monongahela
GSI CONCEPT PLAN

UM-35: Munhall Fire Playground
Munhall Borough/ POC M-49



- Existing Inlets
- Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes
 - Combined
 - Sanitary
 - Stormwater
 - Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)



General Notes:
 1. GSI footprints shown are approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprints will be less than shown.
 2. All potential GSI systems will overflow to existing combined sewer.

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
 ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
 Allegheny County: Parcel Data, Contours
 JACOBS: Existing Inlets

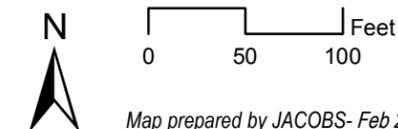
Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

The playground located north of the Munhall Fire Station is a prime candidate for green stormwater infrastructure (GSI) implementation. Adjacent roadway runoff from Martha Street, E 11th Ave, and several cross-streets could be managed in various GSI features sited in the existing playground area and field to the north of the fire station. The GSI features can be subsurface storage/infiltration trenches that would not affect any existing activities or programming above ground, or if landscape amenities are desired, then optional bioswales or bioretention areas can be added to the concept. The GSI implementation could occur as part of larger playground renovations. In addition, a small rain garden can be placed next to the fire station to manage the building roof runoff.

Project UM-35 (Parcel Owner: Munhall Borough)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	+Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	1.93	\$490,000	\$340,000		1,590,000		1,400,000	\$0.35
Enhanced Drainage Area	1.14	\$220,000	\$150,000		930,000		820,000	\$0.27
Project Totals	3.07	\$710,000	\$490,000	3.0	2,520,000	88%	2,220,000	\$0.32

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. +Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI





**Upper Monongahela
GSI CONCEPT PLAN**

UM-36: Vacant Lot
Braddock Borough/ POC M-51

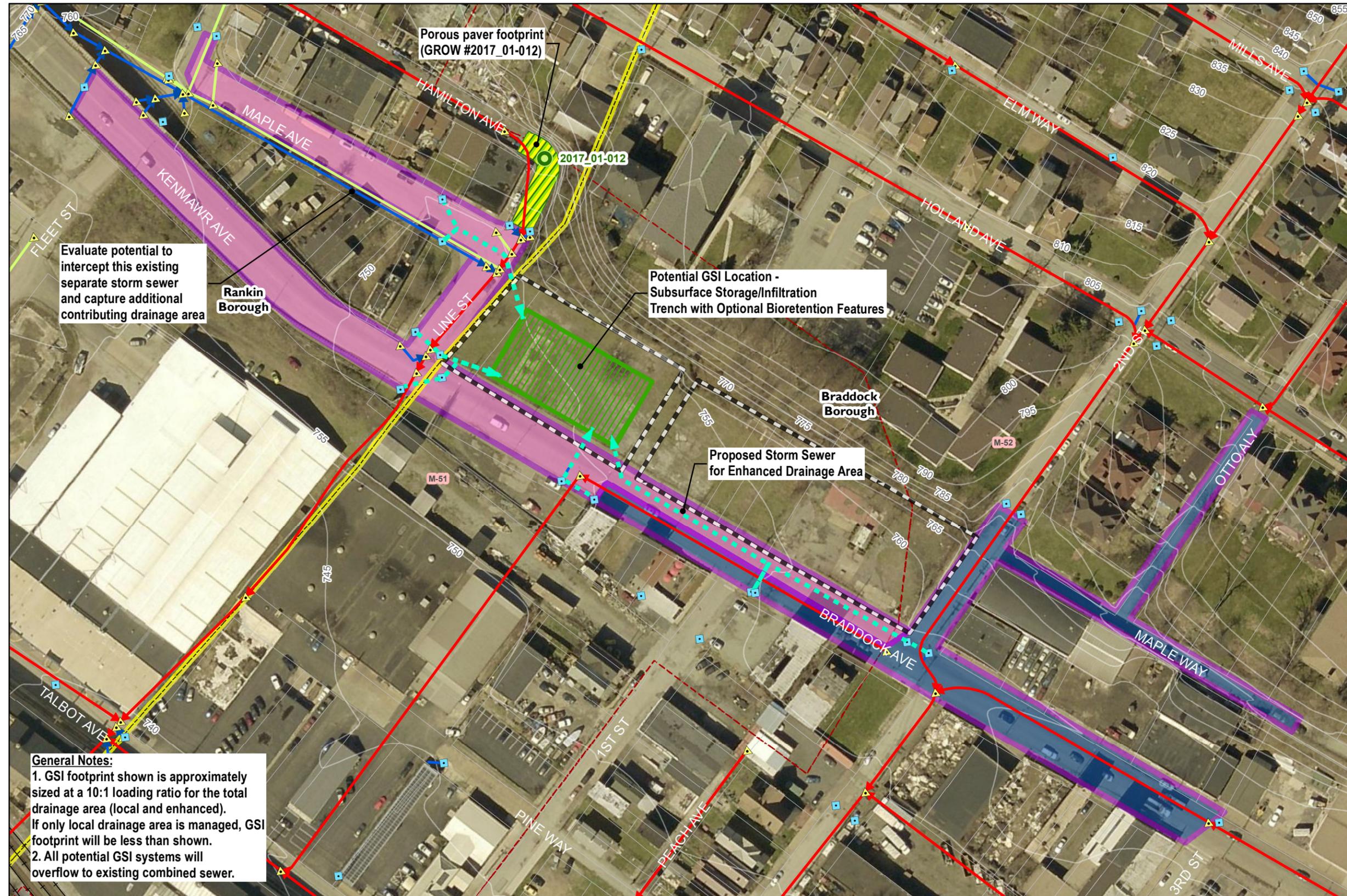
- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOsan: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.

Map prepared by JACOBS- Feb 2020



Evaluate potential to intercept this existing separate storm sewer and capture additional contributing drainage area

Rankin Borough

Potential GSI Location - Subsurface Storage/Infiltration Trench with Optional Bioretention Features

Braddock Borough

Proposed Storm Sewer for Enhanced Drainage Area

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Project UM-36 (Parcel Owner: Redevelopment Authority of Allegheny County)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gallyr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gallyr)	**Cost Efficiency (\$/gallyr overflow reduction)
Local GSI	1.36	\$350,000	\$240,000		1,120,000		1,040,000	\$0.34
Enhanced Drainage Area	0.94	\$180,000	\$130,000		770,000		720,000	\$0.25
Project Totals	2.31	\$530,000	\$370,000	3.0	1,890,000	93%	1,760,000	\$0.30

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%. **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction. **Efficiency based on construction cost for stand-alone GSI

The currently vacant lot at the corner of Braddock Ave and Line St is a prime opportunity to integrate green stormwater infrastructure (GSI) with any planned redevelopment activities. A subsurface storage/infiltration trench can be located underneath the existing pavement/lawn area and has the potential to manage runoff from Braddock Ave, Kenmawr Ave, Maple Ave, Otto Alley, Hamilton Ave, and Line St. Roadway runoff can be directed to the GSI feature by installing a new storm sewer along Braddock Ave and smaller portions of pipe across Line St or potentially by intercepting the sewer mapped as separate storm along Maple Ave (if feasible). Depending on the potential redevelopment plans for the site, the GSI can be designed to efficiently integrate with site improvements and include optional bioretention features with or without trees or include permeable paving as well.



**Upper Monongahela
GSI CONCEPT PLAN**

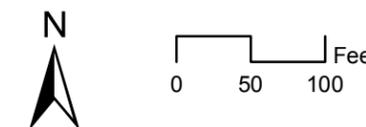
UM-43: Blair St Park
City of Pittsburgh/ POC M-37

- GROW Project (ID)
- Existing Inlets
- ▲ Sewer Structures
- - - Proposed Separate Storm Sewer
- Sewer Pipes**
- Combined
- Sanitary
- Stormwater
- Other Sewer Type
- Project Parcel Boundary
- Parcels
- Municipal Boundary
- GSI Footprint
- Impervious Drainage Area (Local)
- Impervious Drainage Area (Enhanced)*
- Surface Water
- Combined Sewer Area
- Runoff To Combined Area
- Separate Sewer Area
- Non-contributing Area (NCA)

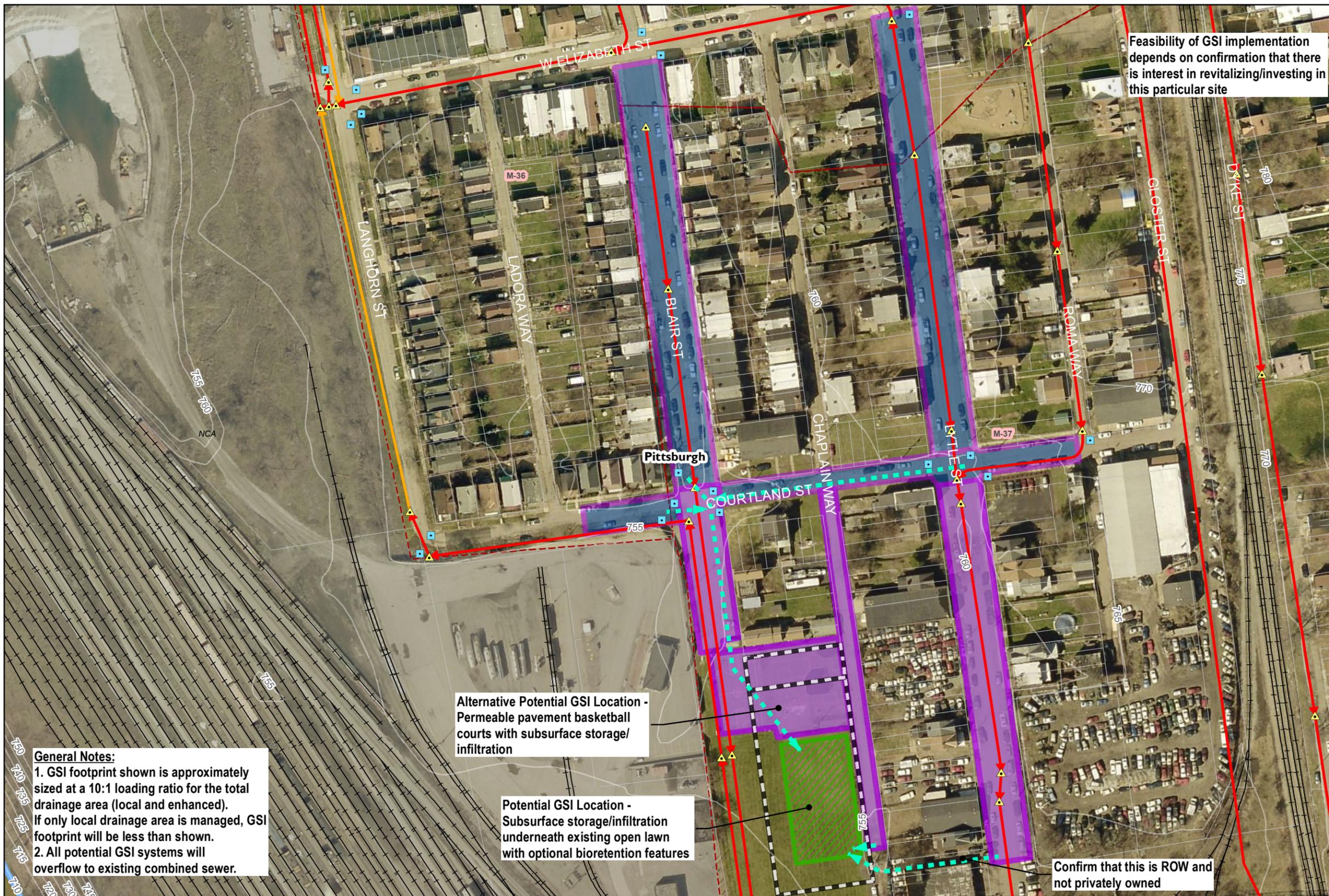
*Enhanced drainage areas show potential additional capture that can be conveyed to proposed GSI footprints via the installation of new separate storm sewers which often result in significant increases in cost-efficient runoff capture.

Data Sources:
ALCOSAN: Sewer Structures, Sewer Pipes, Subcatchments
Allegheny County: Parcel Data, Contours
JACOBS: Existing Inlets

Note that limited sewer data information is available in GIS, so all existing sewer system information may not be shown on this map.



Map prepared by JACOBS- Feb 2020



Feasibility of GSI implementation depends on confirmation that there is interest in revitalizing/investing in this particular site

General Notes:
1. GSI footprint shown is approximately sized at a 10:1 loading ratio for the total drainage area (local and enhanced). If only local drainage area is managed, GSI footprint will be less than shown.
2. All potential GSI systems will overflow to existing combined sewer.

Alternative Potential GSI Location - Permeable pavement basketball courts with subsurface storage/infiltration

Potential GSI Location - Subsurface storage/infiltration underneath existing open lawn with optional bioretention features

Confirm that this is ROW and not privately owned

The existing open grassy field area at Blair Street Park appears to be a suitable location for potential green stormwater infrastructure (GSI). Proposed GSI features have potential to manage roadway runoff from Lyle St, Courtland St, Chaplain Way, and Blair St. Stormwater runoff will be redirected via new separate stormwater sewers into a subsurface storage/infiltration bed underneath the lawn. If vegetated areas are desired, bioretention features (rain gardens or bioswales) could also be included in the site design. The feasibility of GSI implementation depends on whether there is interest in investing in the revitalization of the park as it appears to be unused and overgrown with little usage.

Project UM-43 (Parcel Owner: City of Pittsburgh)

	Impervious Area Captured (ac)	*Construction Cost for Stand-alone GSI	**Construction Cost for Integrated GSI	Relative Constraint Score	Runoff Capture (gal/yr)	Overflow Reduction Efficiency (ORE)	CSO Reduction (gal/yr)	**Cost Efficiency (\$/gal/yr overflow reduction)
Local GSI	0.81	\$170,000	\$120,000	-	660,000	-	620,000	\$0.27
Enhanced Drainage Area	2.20	\$360,000	\$250,000	-	1,810,000	-	1,690,000	\$0.21
Project Totals	3.01	\$530,000	\$370,000	1.0	2,470,000	94%	2,310,000	\$0.23

*Costs are planning-level estimates with an expected accuracy range of -25% to +50%, **Integrating GSI with other planned site improvements is assumed to result in a 30% cost reduction, **Efficiency based on construction cost for stand-alone GSI

