

Town of West Hartford Drainage System Evaluation

Phase 2 – Public Meeting

WEST HARTFORD
CONNECTICUT



Cindy Baumann
Joe Laliberte

September 24, 2021



**CDM
Smith®**

Agenda

- Project Overview
- Existing Conditions
- Recommendations
- Costs
- Prioritization: Phase 1 and 2
- Groundwater Study
- Next Steps



Project Overview

Project Timeline

Milone & MacBroom Study: November 2018

- November 2018: Final Report
- Recommendations for Culvert Replacements Along Trout Brook

CDM Smith Drainage Study – Phase 1

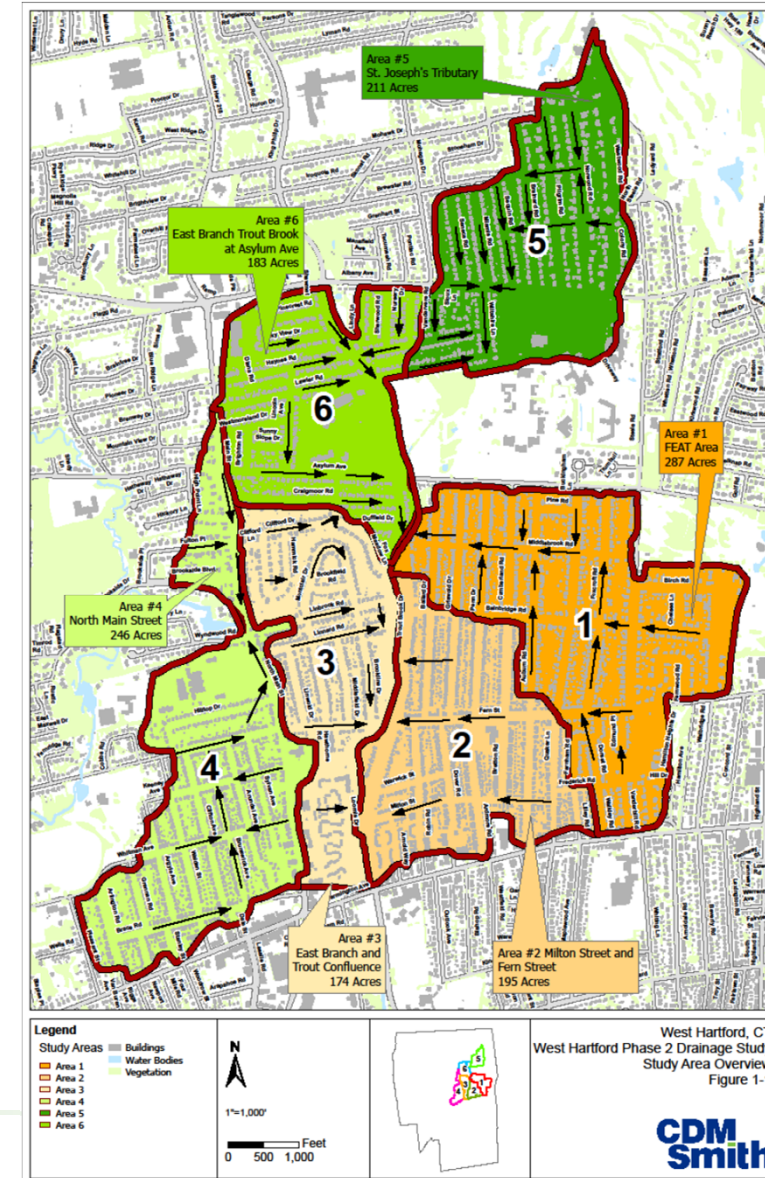
- June 2020: Final Report
- October 2020: Town Council Workshop
- November 23rd & 30th 2020: Public Information Meetings
- Grant Submissions: January 2021
- MDC Coordination: Ongoing

CDM Smith Drainage Study – Phase 2

- January – July 2021: Drainage Study
- July 2021: Draft Report
- September/October 2021: Town Council and Public Information Meeting
- MDC Coordination: Ongoing

Project Area History

- Town project includes six drainage areas
- Significant flooding within the six areas
- Recent significant storm events
 - April and September 2018
 - August 2019
- First Public Meeting – June 2019
- Completed Phase 1 Study (Areas 1 to 3)
- Second Public Meeting – November 2020
- Completed Draft Phase 2 Study (Areas 4 to 6)
- Third Public Meeting – October 2021

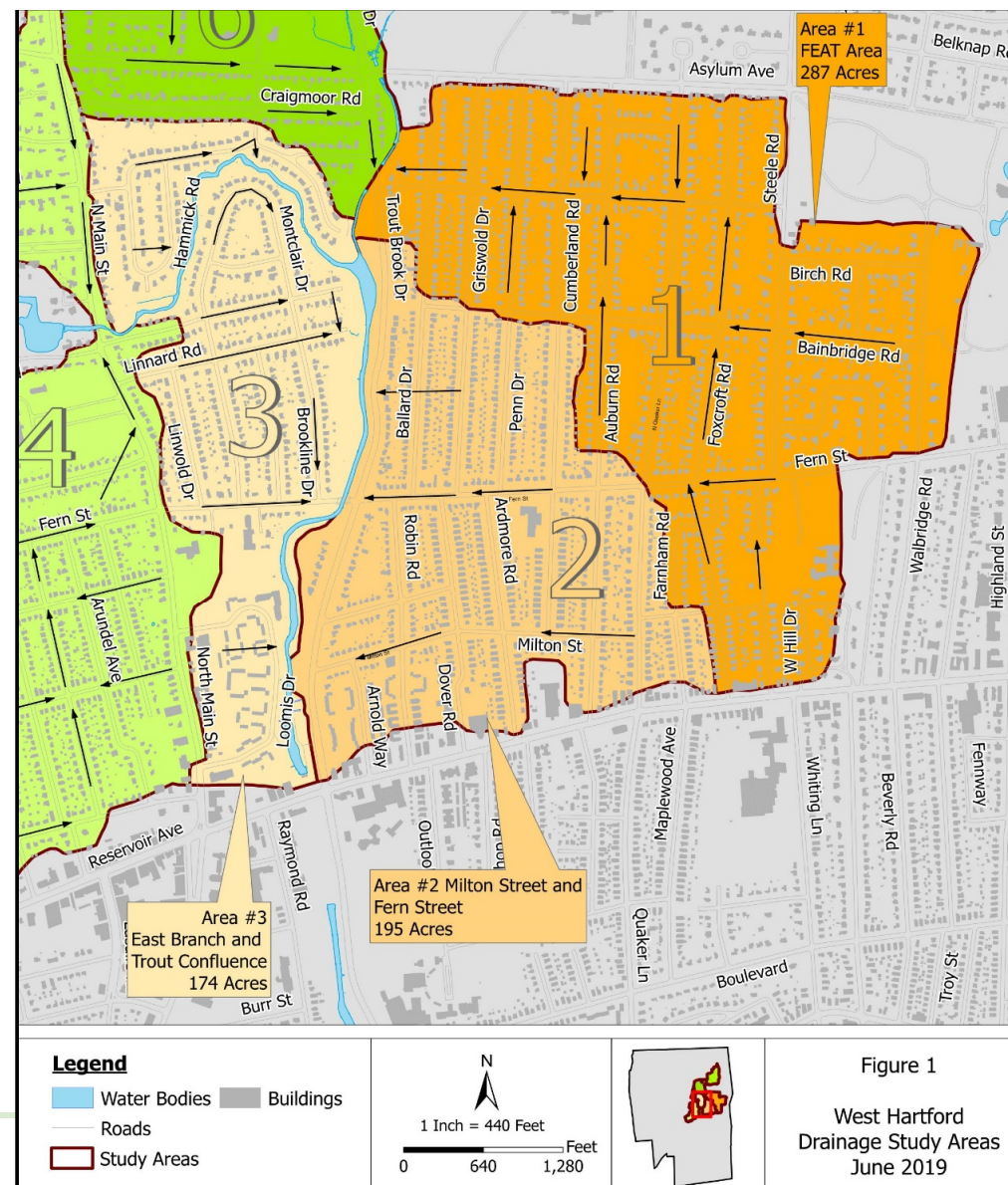


Phase 1

Study completed for Areas 1 to 3

- Collect and review data
- Survey & field work
- Stormwater system modeling
- Alternatives analysis
- Recommendations

	Acre (acres)	Number of Properties	% Area of Town
Area 1 FEAT	270	785	1.9%
Area 2 Milton St	232	510	1.6%
Area 3 Linbrook	174	400	1.2%
Total Area	676	1,695	4.7%

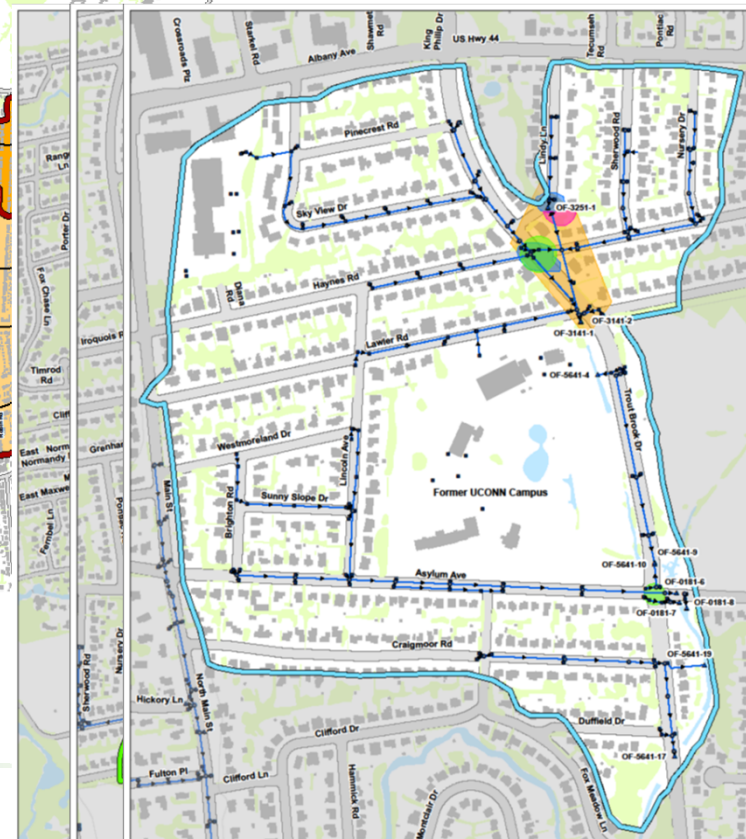
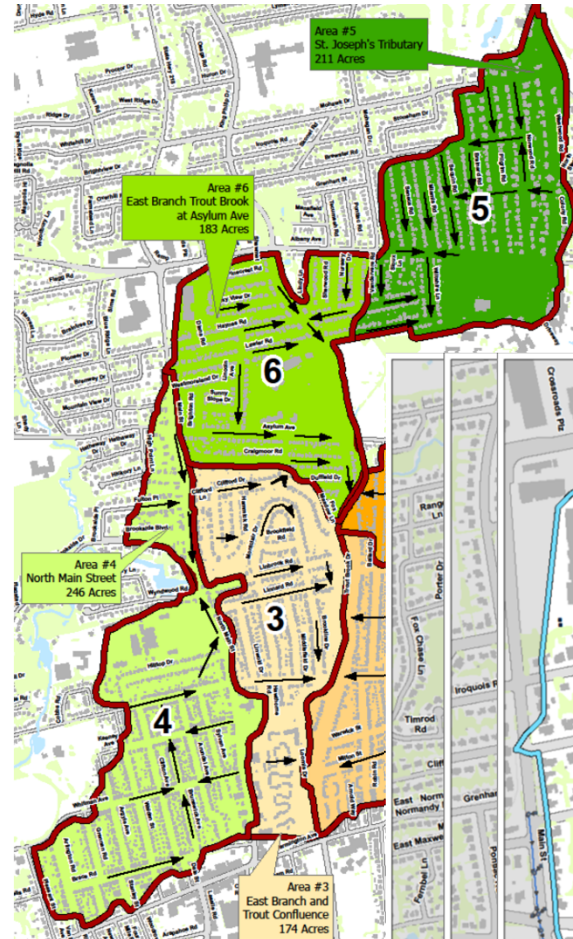


Phase 2

Study completed for Areas 4 to 6

- North Main Street Area
- St Joseph's Tributary Area
- East Branch of Trout Brook Area

	Acre (acres)	Number of Properties	% Area of Town
Area 4 N. Main St	246	736	1.7%
Area 5 St Joseph's	183	386	1.3%
Area 6 EB Trout Brook	287	391	2.0%
Total Area	716	1,513	5.0%

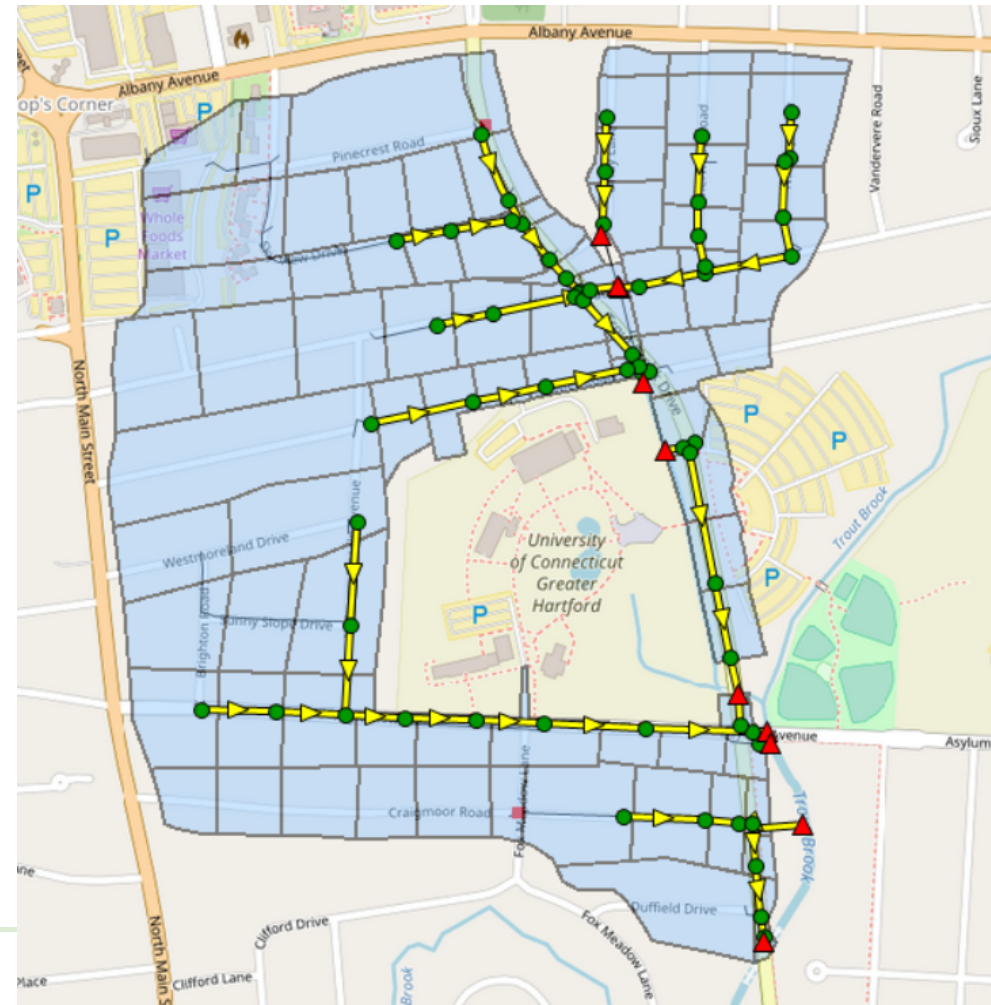




Existing Conditions

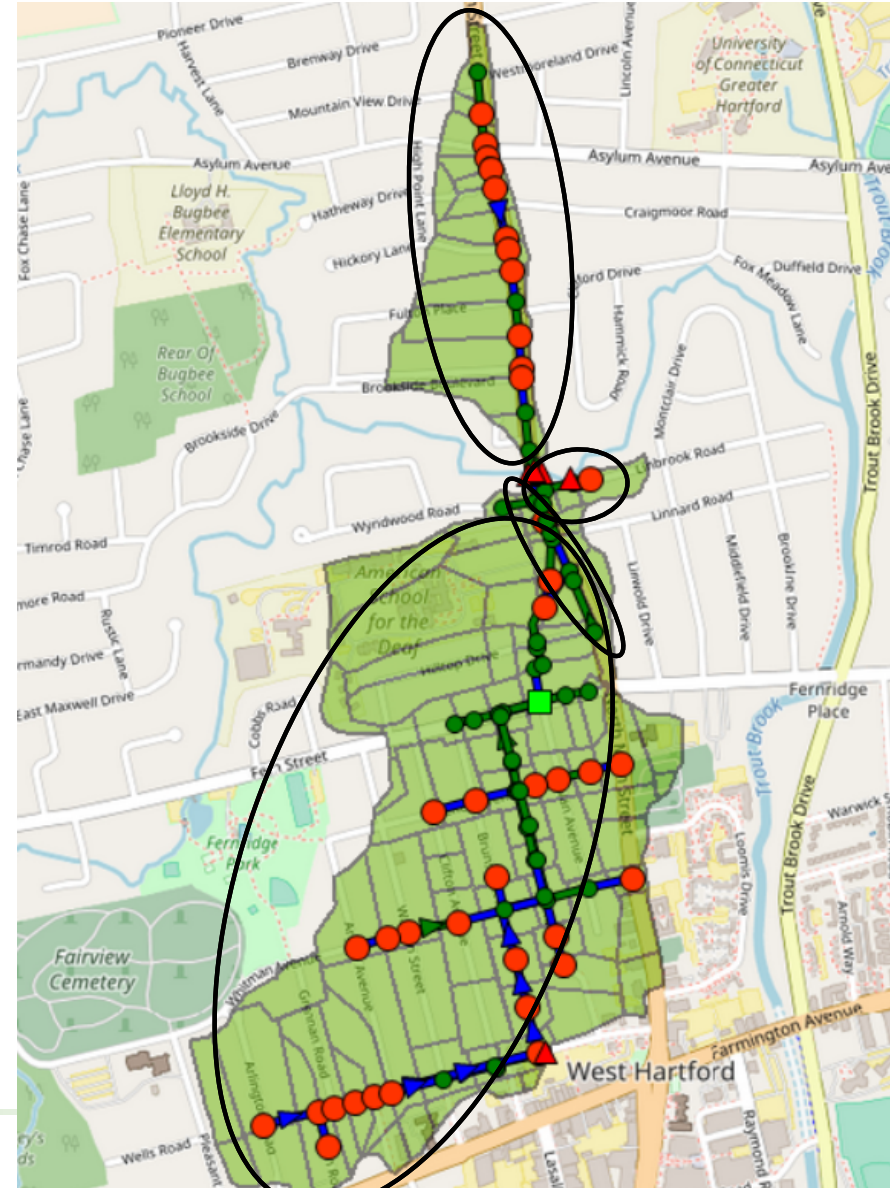
Drainage Model Development

- Performed supplemental survey
- Developed models of 15 drainage systems that discharge to Trout Brook
- Modeled a 10 year design storm (10% chance of occurring in a given year)
- Model Validation using historical storm events



Overview – Area 4

- Total Area: 249 acres
- 4 Systems:
 - North Main Street (North)
 - Linbrook Road
 - North Main Street (South)
 - Arundel Avenue
- One flow split on the property of the American School for the Deaf

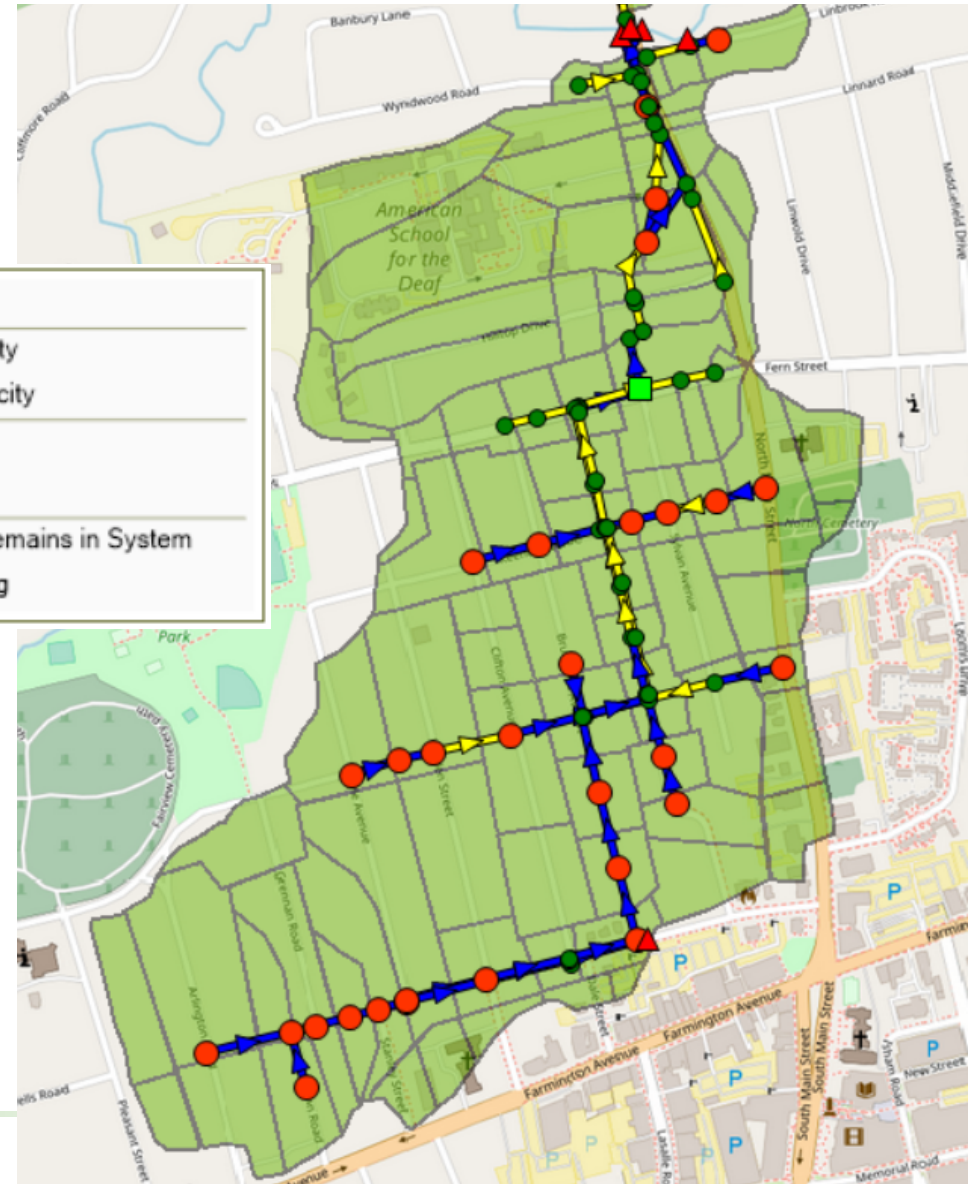
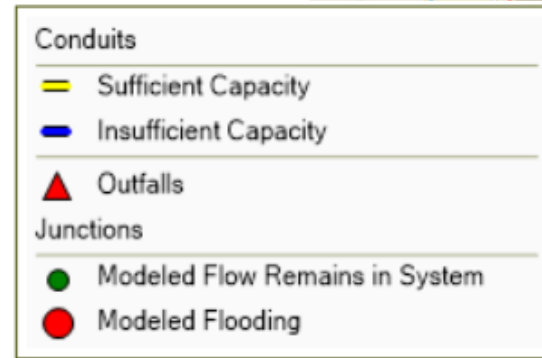


Area 4 - Arundel Avenue System

Existing Conditions
10-year SCS Storm

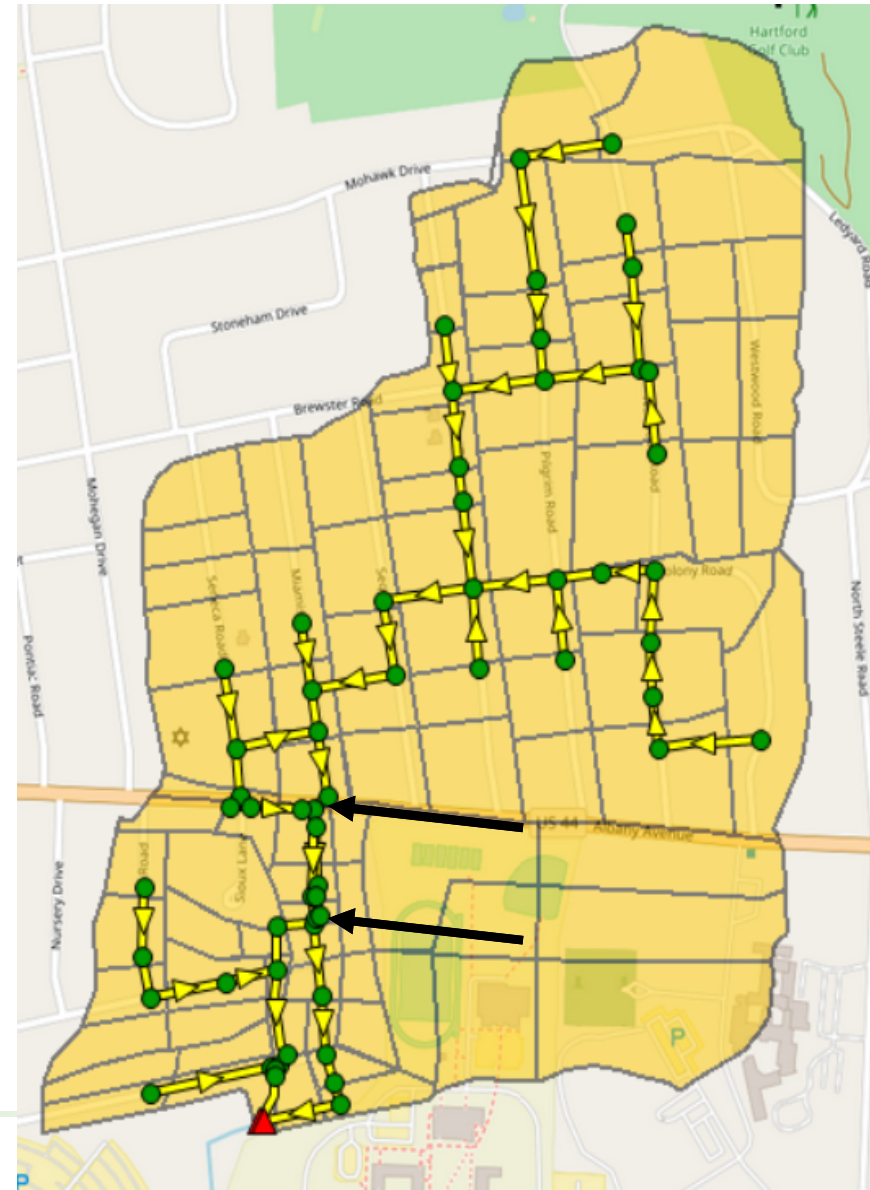
Significant flooding along:

- Brace Road
- Brunswick Avenue
- Whitman and Keeney Avenues
- North Main Street near Trout Brook



Overview - Area 5

- Total Area: 205 acres
- All one drainage system
- Average Imperviousness: 29%
- Average Sub-catchment Slope: 0.9%
- Flow split:
 1. Albany Avenue/Wiltshire Lane
 2. Wiltshire Lane/Cross-Country

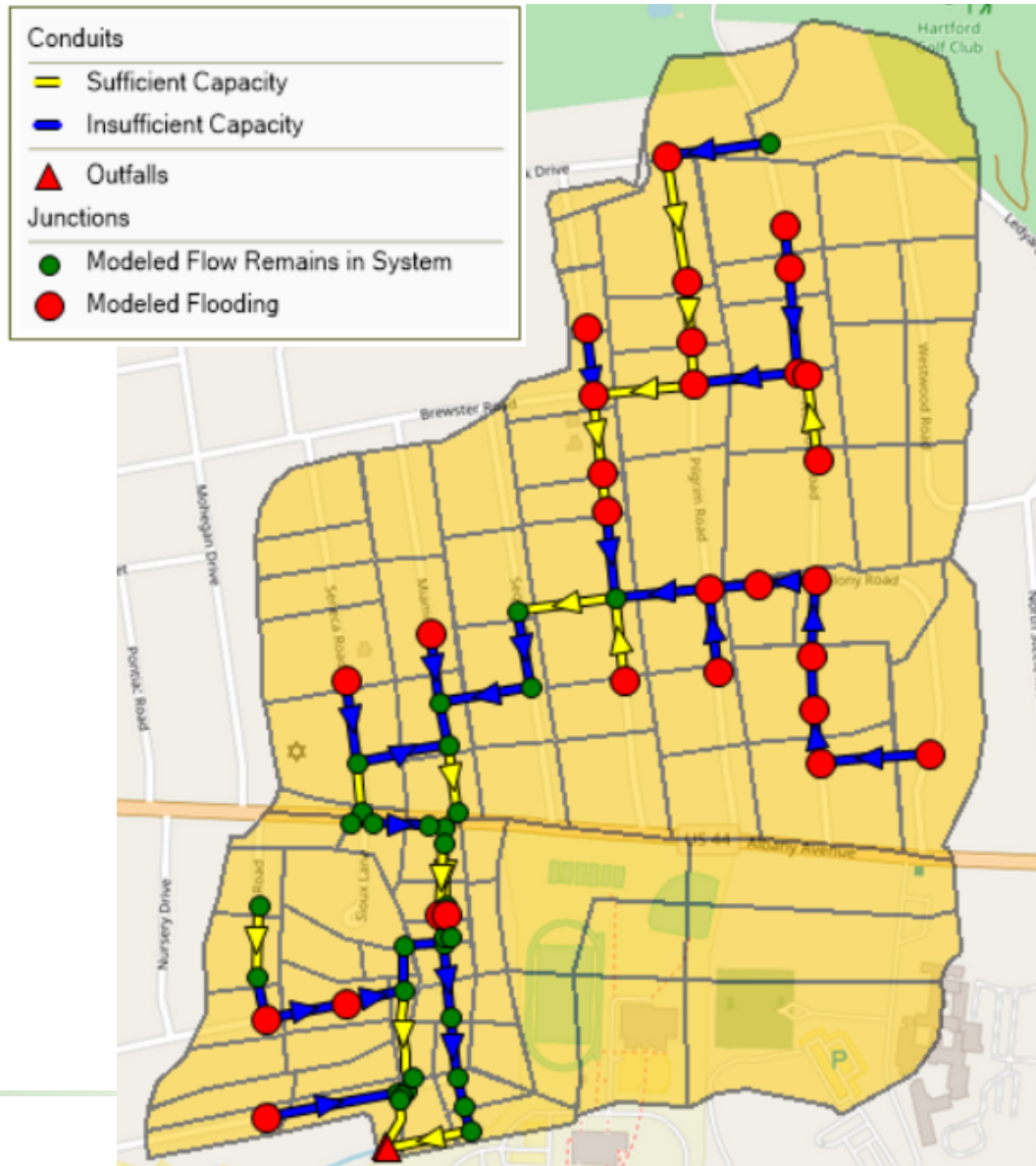


Area 5 – St Joseph's Tributary

Existing Conditions
10-year SCS Storm

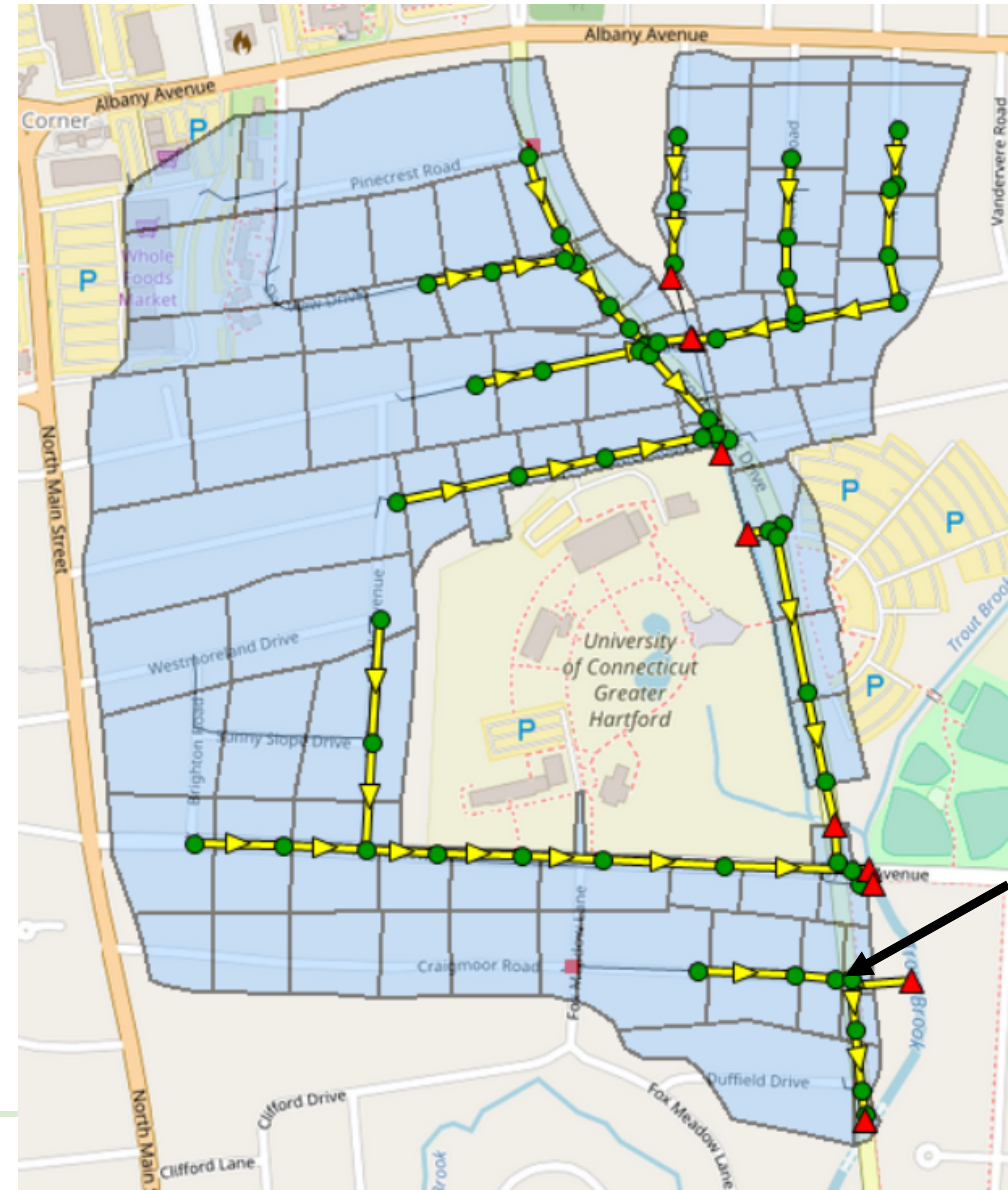
Significant flooding along:

- Brainard Road
- Sequin Road
- Norwood and Colony Roads
- Wiltshire Lane
- Haynes Road
- Lawler Road



Area 6 - Overview

- Total area: 143 acres
- 10 drainage systems
- Average Imperviousness: 45%
- Average Sub-catchment Slope: 1.3 %
- Flow split at Trout Brook Drive and Craigmore Road

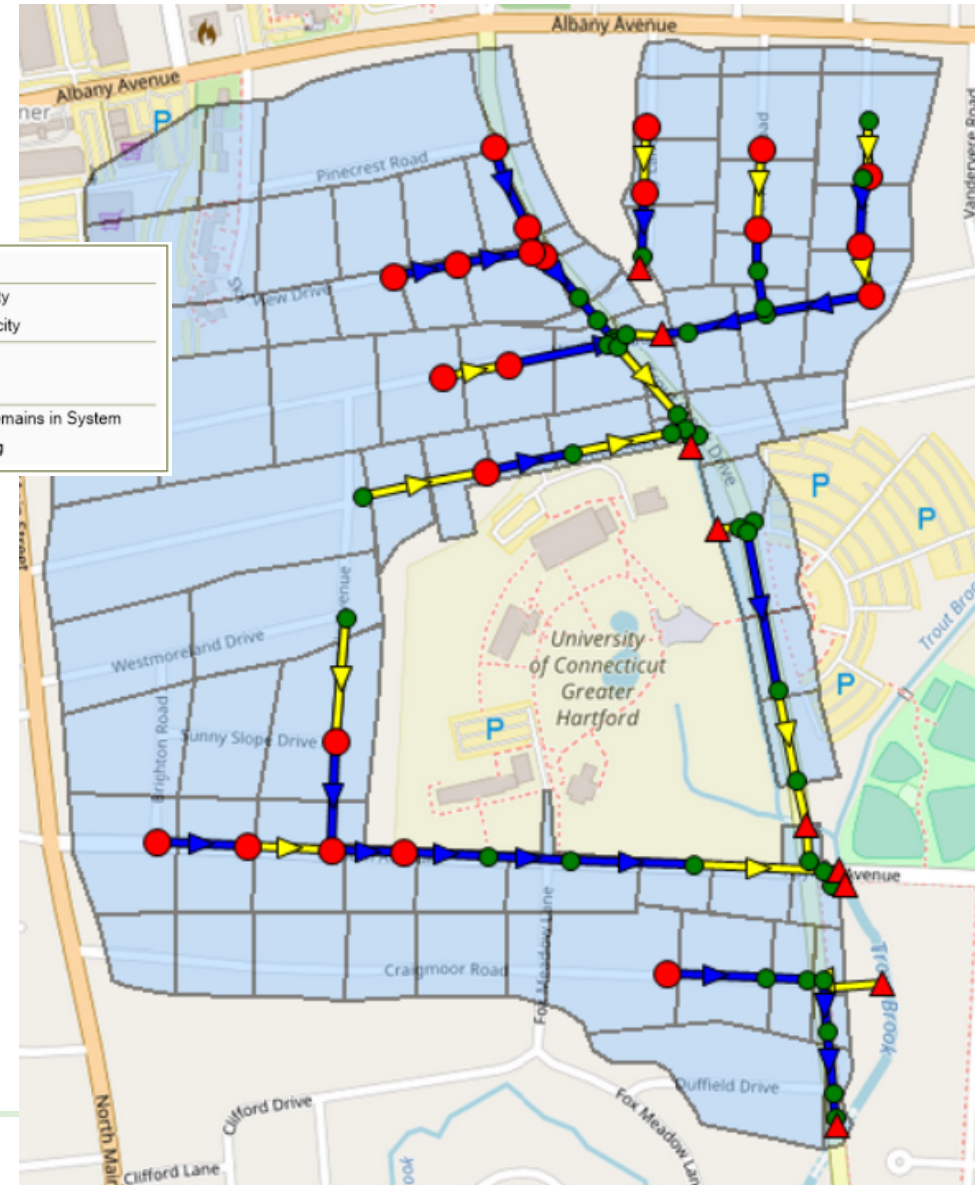
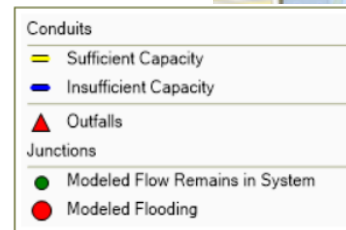


Area 6 – Trout Brook Drive

Existing Conditions 10-year SCS Storm

Significant flooding along:

- Craigmoor Road
- Asylum Avenue
- Trout Brook Drive
- Lawler Road
- Haynes Road
- Lindy Lane



Drainage Systems with Modeled Flooding

Area	Outfall	Location	10-yr Design Storm	Tropical Storm Lee	2018 Storms	August 2019 Storm
4	OF-3836-4	North Main Street (North)	√	√	√	√
4	OF-3836-5	North Main Street (South)				
4	OF-3232-1	Linbrook Road (West)	√			
4	OF-3836-3	Arundel Avenue	√	√	√	√
5	OF-3141-3 OF-3141-4	St. Joseph's Tributary	√	√	√	√
6	OF-3251-1	Lindy Lane	√			
6	MH-2601-003	Haynes Road (East)	√			√
6	OF-3141-1	Lawler Road (West)	√	√	√	√
6	MH-3141-001	Lawler Road (East)				
6	OF-5641-4	Trout Brook Drive at UConn (North)				
6	OF-5641-9	Trout Brook Drive at UConn (Middle)				
6	OF-5641-10	Trout Brook Drive at UConn (South)				
6	OF-0181-6	Asylum Avenue and Lincoln Avenue	√	√	√	√
6	OF-0181-7	Asylum Avenue at Trout Brook Drive				
6	OF-5641-17 OF-5641-19	Craigmoor Road	√			

Private Inflow Removal

- Approximately 600 total buildings have been identified for private inflow disconnections within all three project areas (shown in green)
- Approximately 38% of the properties need to be disconnected
- Several areas within Areas 4 and 5 have not had building inspections by MDC
- Could be additional properties that have not been inspected



Collector Drainage Systems

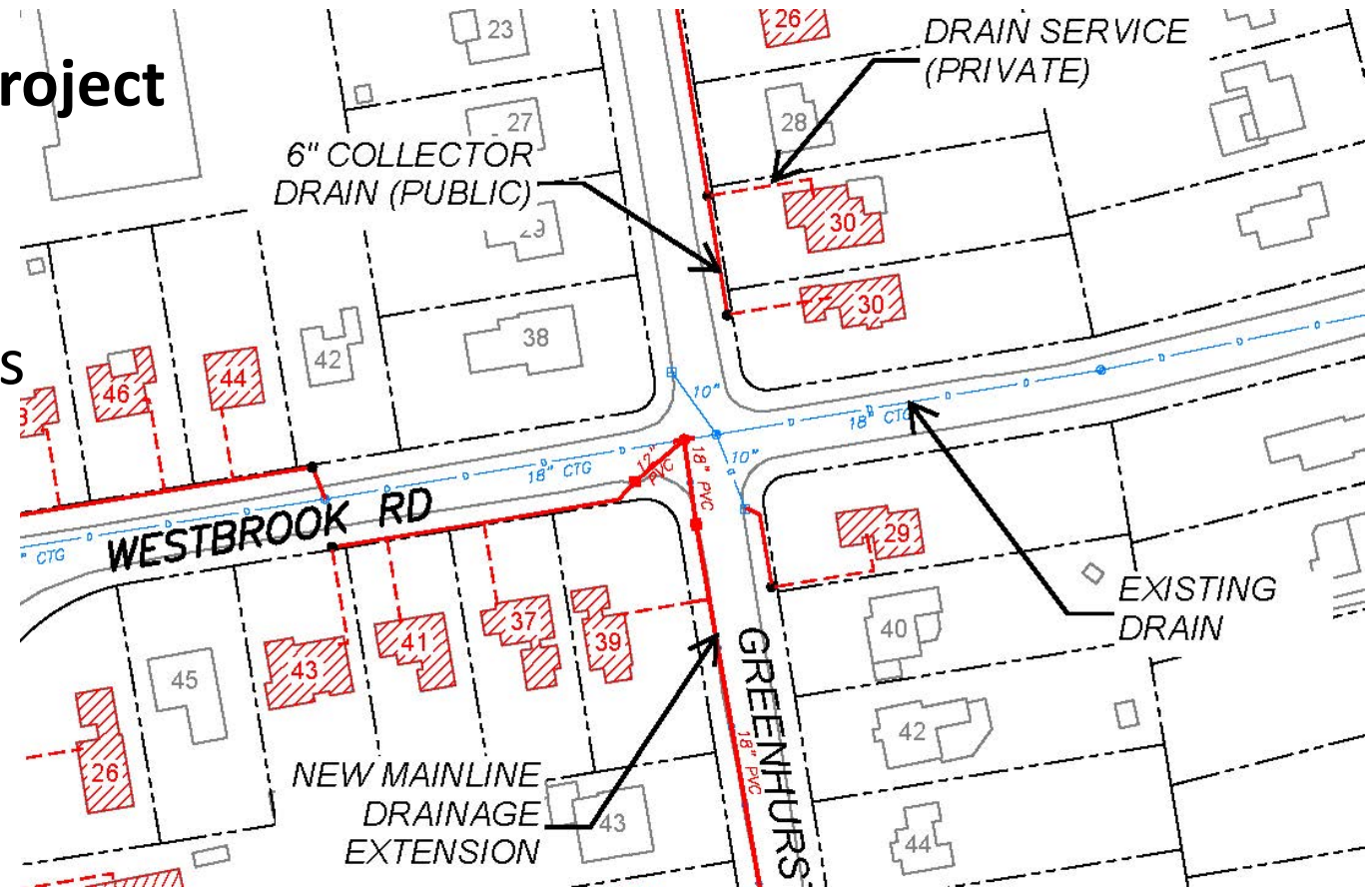
Greenhurst Road Project

Existing Drains

Drainage Extensions

Collector Drains

Drain Services

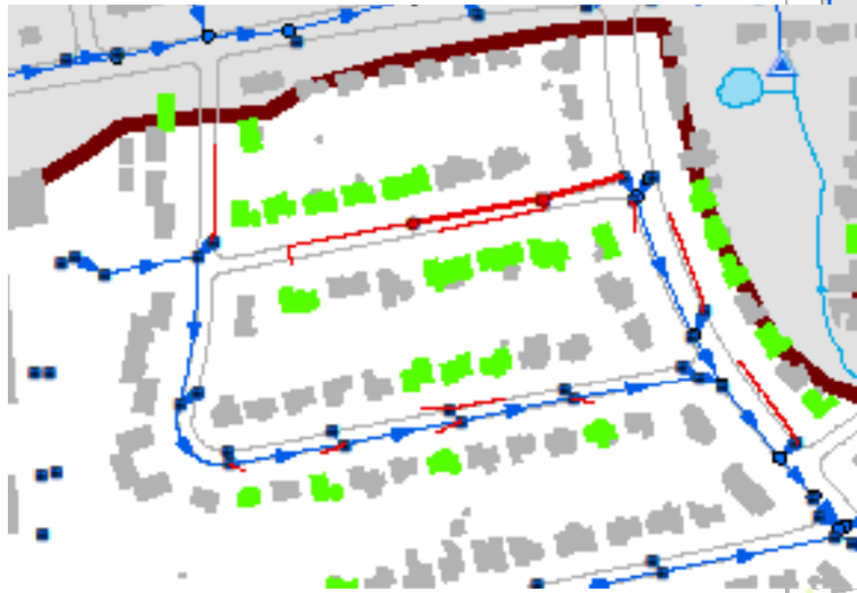




Recommendations

Recommendations

- Drainage system improvements
- Collector drains



Drainage System Prioritization

Tier 1 – High Priority

- Areas with documented flooding and modeled flooding during the design storm and historical events

Tier 2 – Moderate Priority

- Modeled flooding during 10 year design storm and historical events

Tier 3 – Low Priority

- Modeled flooding only during the 10 year design storm event

Drainage Systems with Modeled Flooding

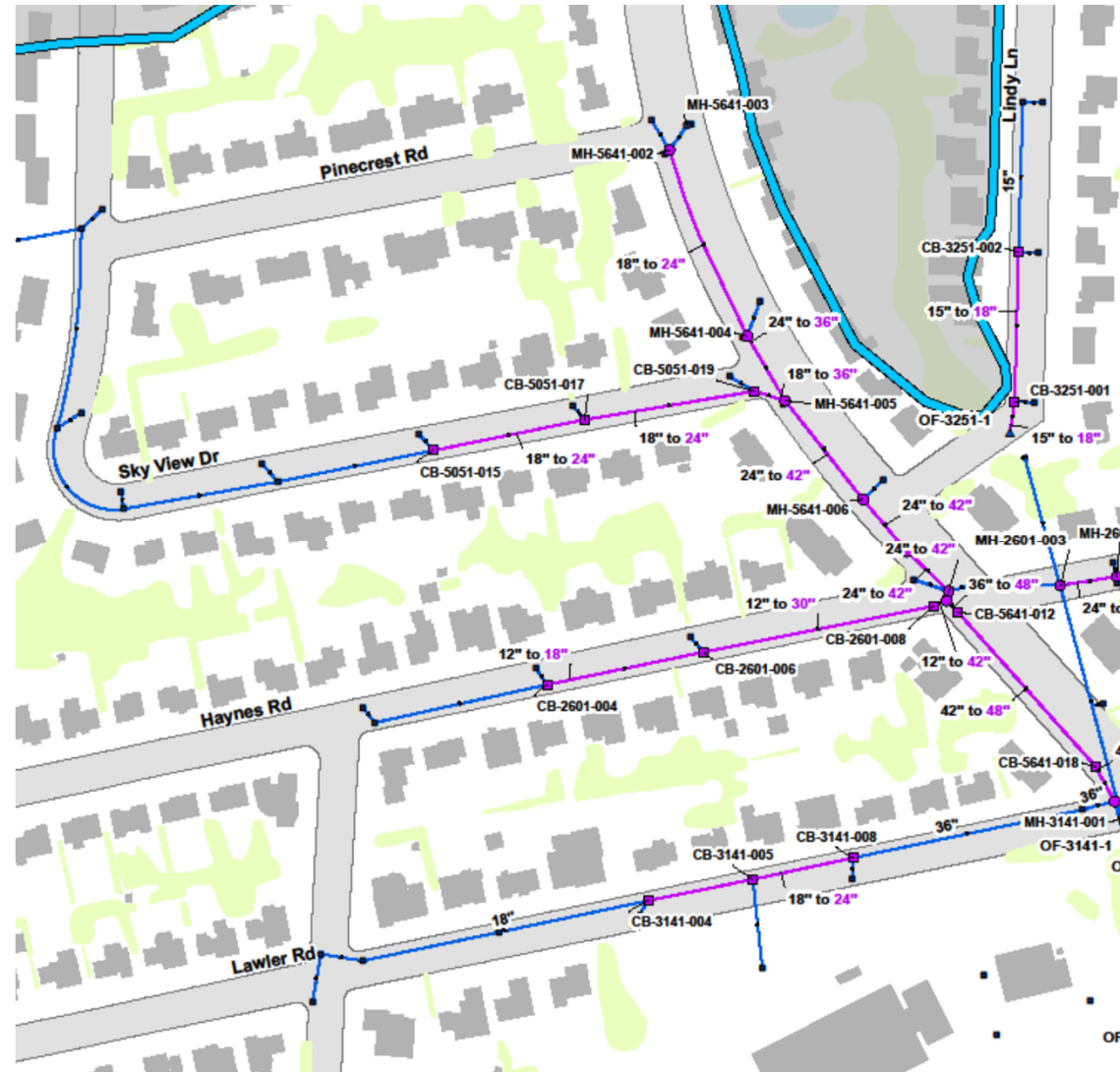
Area	Outfall	Location	10-yr Design Storm	Tropical Storm Lee	2018 Storms	August 2019 Storm
4	OF-3836-4	North Main Street (North)	✓	✓	✓	✓
4	OF-3836-5	North Main Street (South)				
4	OF-3232-1	Linbrook Road (West)	✓			
4	OF-3836-3	Arundel Avenue	✓	✓	✓	✓
5	OF-3141-3 OF-3141-4	St. Joseph's Tributary	✓	✓	✓	✓
6	OF-3251-1	Lindy Lane	✓			
6	MH-2601-003	Haynes Road (East)	✓			✓
6	OF-3141-1	Lawler Road (West)	✓	✓	✓	✓
6	MH-3141-001	Lawler Road (East)				
6	OF-5641-4	Trout Brook Drive at UConn (North)				
6	OF-5641-9	Trout Brook Drive at UConn (Middle)				
6	OF-5641-10	Trout Brook Drive at UConn (South)				
6	OF-0181-6	Asylum Avenue and Lincoln Avenue	✓	✓	✓	✓
6	OF-0181-7	Asylum Avenue at Trout Brook Drive				
6	OF-5641-17 OF-5641-19	Craigmoor Road	✓			

Phase 1 - Prioritization Recommendations

Area	Outfall	Location	Alternative			Tier
			1	2	3	
4	OF-3836-4	North Main Street (North)	√			2
4	OF-3232-1	Linbrook Road (West)	√			3
4	OF-3836-3	Arundel Avenue			√	1
5	OF-3141-3 and OF-3141-4	St. Joseph's Tributary	√			1
6	OF-3251-1	Lindy Lane	√			3
6	MH-2601-003	Haynes Road (East)	√			2
6	OF-3141-1	Lawler Road (West)	√			1
6	OF-0181-6	Asylum Avenue and Lincoln Avenue	√			2
6	OF-5641-17 and OF-5641-19	Craigmoor Road	√			3

Tier 1 – Lawler Road

Proposed Pipe (in)	Pipe Length (lf)
18	200
24	1,000
30	300
36	200
42	400
48	400
Total	2,500



Tier 1 – St Joseph's Tributary

Proposed Pipe Size (in)	Pipe Length (lf)
18	1,200
24	2,100
30	1,800
36	300
42	400
48	800
54	3,300
Total	9,900



Tier 1 – Arundel Avenue

Proposed Pipe Size (in)	Pipe Length (lf)
15	500
18	600
24	1,400
30	800
36	2,900
42	300
48	700
54	1,600
60	1,200
Total	10,000





Costs

Phase 1 - Conceptual Design & Construction Costs

Area	Outfall	Location	Recommendations	Tier
1	5641-022	FEAT Trunk Line	\$25,700,000	1A, 1C, 2
2	5641-007	Fern Street East	\$4,200,000	1C
2	5641-001	Milton Street	\$7,800,000	2
2	5641-12	Ballard Drive	\$300,000	3
3	3681-001	Montclair Drive	\$300,000	1B
3	0731-001	Linbrook Road	\$1,100,000	1B
3	3261-001	Linnard Road	\$2,300,000	2
3	2547-001	Clifford Cross Country	\$600,000	2
3	1981-009	Fern Street West	\$800,000	2
3	1091-001	Clifford Drive	\$300,000	3
3	3321-002	Loomis North	\$271,000	3
3	3321-003	Loomis Central	\$60,000	3
3	3321-001	Loomis South	\$277,000	3
		TOTAL COST	\$44,008,000	



Phase 1 - Conceptual Design & Construction Costs

Outfall	Location	Private I/I Removal Buildings	Collector Drain (Lf)	Drain Extensions (Lf)	Drain Structure (Each)	Total Costs ¹
5641-022	FEAT - Trunk line	292	15,281	3,303	21	\$5,392,000
5641-007	Fern Street East	87	5,615	1,789	12	\$2,346,000
5641-001	Milton Street	129	7,872	1,614	15	\$2,758,000
5641-12	Cross Country System Area 2	35	2,106	641	3	\$853,000
3681-001	Montclair Drive	9	350	0	0	\$77,000
0731-001	Linbrook Road	8	645	0	0	\$141,000
3261-001	Linnard Road	45	2,489	1,700	8	\$1,586,000
2547-001	Clifford Drive Cross Country	4	256	0	0	\$56,000
1981-009	Fern Street West	26	1,440	332	2	\$521,000
1091-001	Clifford Drive	4	256	0	0	\$56,000
3321-002	Loomis North	0	0	0	0	\$0
3321-003	Loomis Central	0	0	0	0	\$0
3321-001	Loomis South	0	0	0	0	\$0
Totals		639	36,309	9,379	61	\$13,786,000



Phase 2 - Conceptual Design & Construction Costs

Area	Outfall	Location	Alternative 1	Alternative 2	Alternative 3	Tier
4	OF-3836-4	North Main Street (North)	\$4,300,000			2
4	OF-3232-1	Linbrook Road (West)	\$170,000			3
4	OF-3836-3	Arundel Avenue	\$40,400,000	\$28,200,000	\$33,200,000	1
5	OF-3141-3 OF-3141-4	St. Joseph's Tributary	\$27,200,000	\$32,400,000		1
6	OF-3251-1	Lindy Lane	\$300,000			3
6	MH-2601-003	Haynes Road (East)	\$2,100,000			2
6	OF-3141-1	Lawler Road (West)	\$5,800,000			1
6	OF-0181-6	Asylum Avenue and Lincoln Avenue	\$4,600,000			2
6	OF-5641-17 OF-5641-19	Craigmoor Road	\$1,000,000			3



Phase 2 - Conceptual Design & Construction Costs

Area	Location	Private I/I Removal Buildings	Collector Drain (Lf)	Drain Extensions (Lf)	Drain Structure (Each)	Total Costs ¹
4	North Main Street (North)	62	3,815	1,500	8	\$1,757,800
4	Linbrook Road (West)	3	215	0	0	\$46,800
4	Arundel Avenue	260	15,780	5,230	21	\$6,617,800
5	St. Joseph's Tributary	164	9,865	1,360	8	\$2,992,500
6	Lindy Lane	2	90	0	0	\$19,600
6	Haynes Road (East)	39	1,770	1,310	5	\$1,181,100
6	Lawler Road (West)	39	2,540	780	3	\$1,026,600
6	Asylum Ave and Lincoln Ave	24	1,380	260	1	\$458,200
6	Craigmoor Road	16	920	1600	5	\$1,164,400
Totals		609	36,375	12,040	51	\$15,264,800

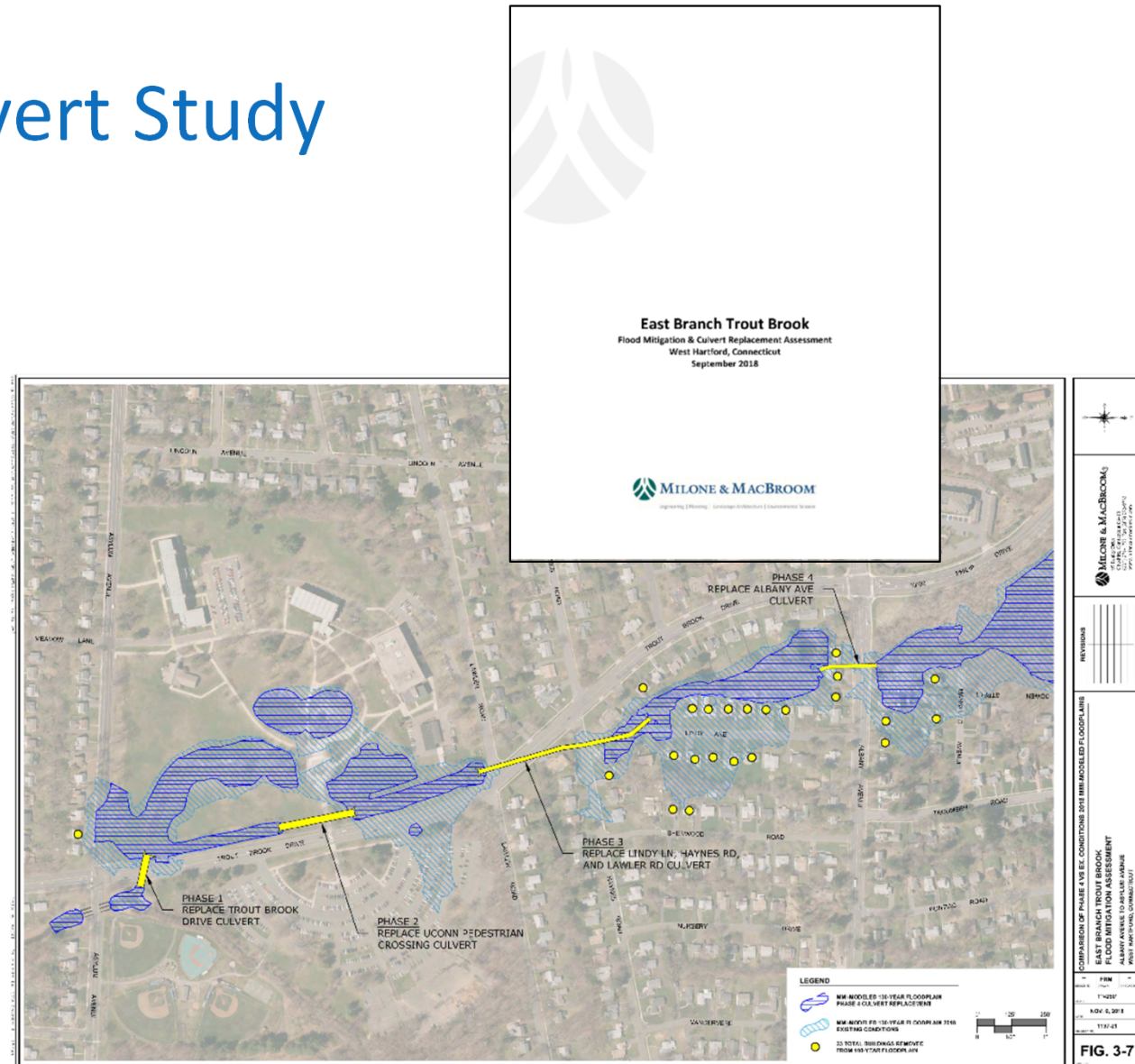




Prioritization: Phase 1 and 2

Trout Brook - Culvert Study

- September 2018 – Milone & McBroom (now SLR)
- Evaluated four culverts along Trout Brook
- Proposed culvert replacements:
Trout Brook Drive
UConn Pedestrian
Lawler/Haynes/Lindy
Albany Avenue



Tier 1 Project Area Summary

Outfall	Location	Project Area	Pipe Replacements	Collector Drains	Drain Extensions	Private Disconnects	Study
Tier 1A – Pipe Capacity Improvements							
OF-5641-022	FEAT (Alternative 2)	1	\$23,800,000	\$3,324,000	\$2,068,000	\$5,928,000	P1
OF-5641-007	Fern Street East	2	\$4,200,000	\$1,222,000	\$1,125,000	\$1,767,000	P1
OF-3681-001	Montclair Drive	3	\$300,000	\$77,000	-	\$183,000	P1
OF-0731-001	Linbrook Road	3	\$1,100,000	\$141,000	-	\$163,000	P1
OF-3836-003	Arundel Avenue (Alternative 3)	4	\$33,200,000	\$3,432,200	\$3,185,700	\$5,278,000	P2
OF-3141-003 OF-3141-004	St Joseph's Tributary (Alternative 1)	5	\$27,200,000	\$2,145,700	\$846,800	\$3,329,200	P2
OF-3141-001	Lawler Road (West)	6	\$5,800,000	\$552,500	\$474,200	\$791,700	P2
Culvert	Trout Brook Drive	6	\$1,008,000*	-	-	-	SLR
Culvert	UConn Pedestrian Crossing	6	\$1,476,000*	-	-	-	SLR
Culvert	Lawler Avenue, Trout Brook Drive, Haynes Road	6	\$2,852,000*	-	-	-	SLR
Culvert	Lindy Lane	6	\$555,000*	-	-	-	SLR
Culvert	Albany Avenue	6	\$1,656,000*	-	-	-	SLR
Tier 1 Projects Total			\$103,147,000	\$10,894,400	\$7,699,700	\$17,439,900	

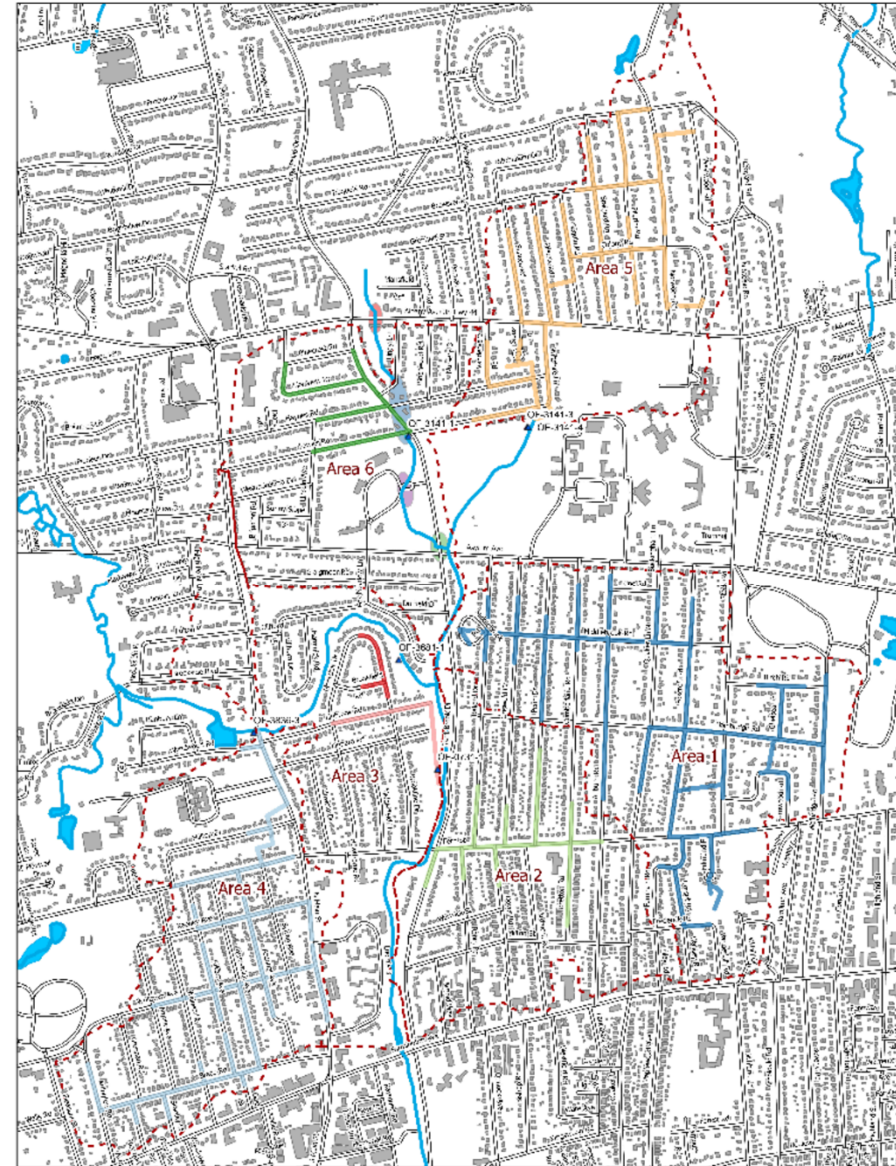
Tier 1 Projects

Seven Drainage system improvement projects:

- Area 1 – FEAT Area (blue)
- Area 2 – Fern Street East (light green)
- Area 3 – Montclair Drive (red)
- Area 3 – Linbrook Road (pink)
- Area 4 – Arundel Avenue (light blue)
- Area 5 – St Joseph's Tributary (yellow)
- Area 6 – Lawler Road West (green)

Five culvert replacement projects:

- Trout Brook Drive (green oval)
- UConn Pedestrian Culvert (purple oval)
- Lawler Road & Haynes Road (blue oval)
- Lindy Lane (blue oval)
- Albany Avenue (rose oval)

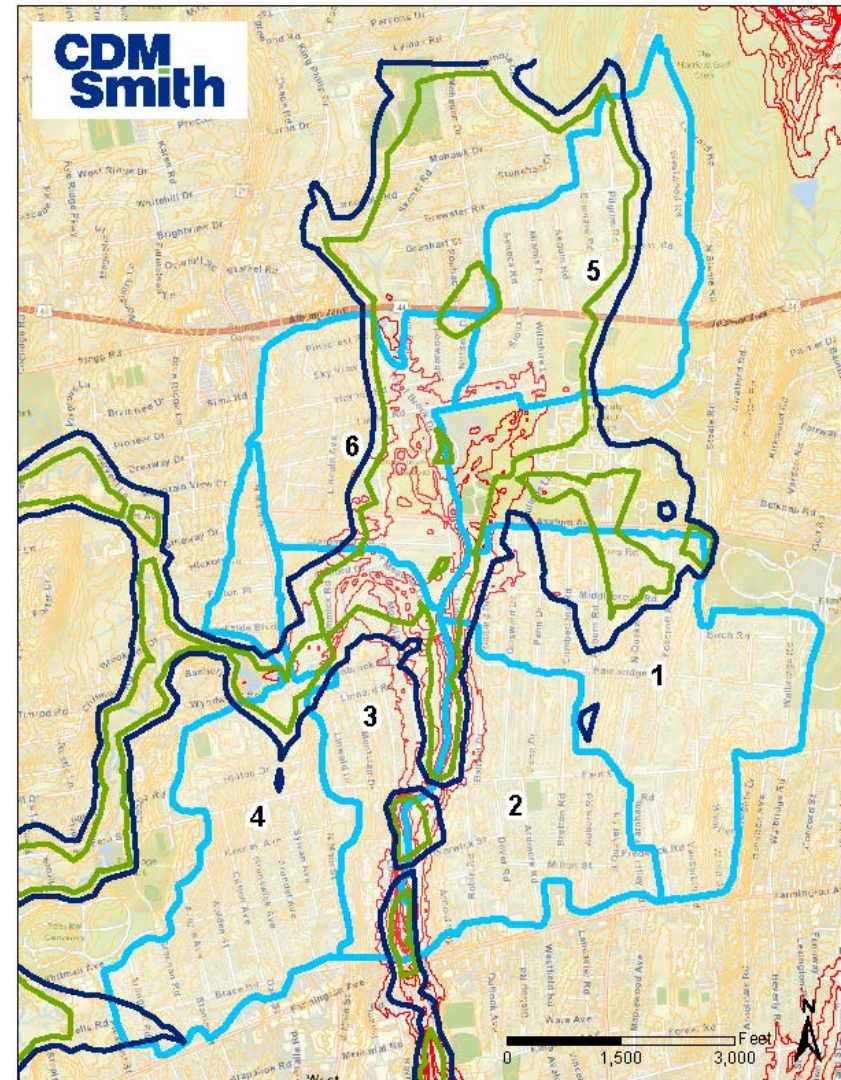




Groundwater Study

Groundwater Study

- Depth to groundwater is very shallow within 5 feet of ground surface
- Area 3:
 - Approximately 85 houses with 5 feet
 - Approximately 90 houses with 10 feet
- The project areas are located within a regional low elevation point
- Future groundwater study is recommended including monitoring wells – cost \$50,000





Next Steps

Next Steps

Phase 2 Public Meeting in October (Areas 4, 5, and 6)

Groundwater Study – Area 3

Drainage Systems Design – Areas 1, 2, 4, 5 and 6

- FEAT
- Fern Street East
- Arundel Avenue
- St Joseph's Tributary
- Lawler Road West

Culvert Replacement Design

- Trout Brook Drive Culvert
- UConn Pedestrian Culvert

Grant and Funding Opportunities

MDC Coordination for House Inspections and Collector Drains

Questions and Contacts

QUESTIONS??

Contacts:

West Hartford:

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Department of Community Development

Engineering Division

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Project webpage:

<https://www.westhartfordct.gov/town-departments/engineering/storm-water-management>