Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Background w/ Others Weekday PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0		5.0	5.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	14.5	14.5		10.5	10.5		10.5	21.5		9.0	21.5	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	40.0		12.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	50.0%		15.0%	48.8%	
Maximum Green (s)	22.5	22.5		22.5	22.5		7.5	33.5		8.0	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.5		3.5	4.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.0		0.5	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5			5.5		5.5	6.5		4.0	6.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		12.5			10.8		27.3	25.1		31.9	29.5	
Actuated g/C Ratio		0.25			0.21		0.54	0.50		0.63	0.59	
v/c Ratio		0.43			0.39		0.06	0.48		0.26	0.47	
Control Delay		23.4			12.1		6.0	14.1		6.4	11.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		23.4			12.1		6.0	14.1		6.4	11.3	
LOS		C			B		A	B		A	B	
Approach Delay		23.4			12.1			13.9			10.7	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)		33			15		3	104		13	73	
Queue Length 95th (ft)		101			69		12	198		41	223	
Internal Link Dist (ft)		3793			3897			4780			370	
Turn Bay Length (ft)							100			220		
Base Capacity (vph)		692			880		507	2429		560	2340	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.21			0.19		0.05	0.35		0.24	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 50.3			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Merrow Road & Goose Lane/Rhodes Road

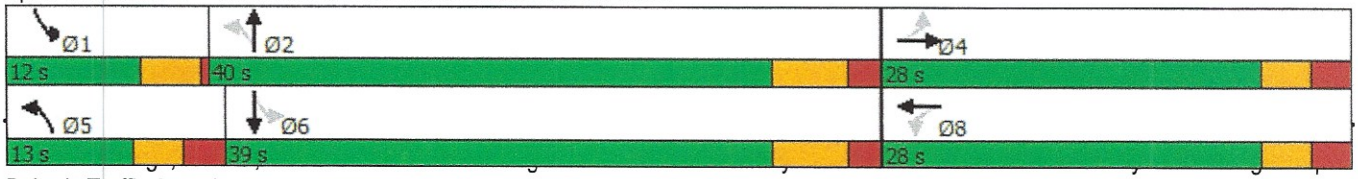


Exhibit 30
Traffic Operations Analysis Worksheets
Background 2026 (No-Build) with Others Saturday Midday Peak

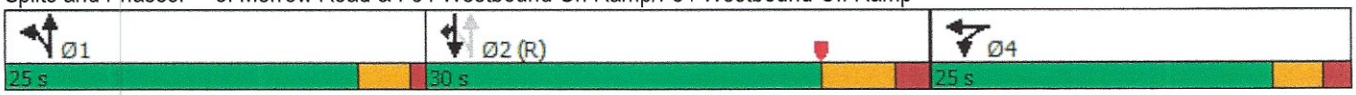
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	82	1	93	586	413	0	0	385	202
Future Volume (vph)	0	0	0	82	1	93	586	413	0	0	385	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		90
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.929							0.850
Flt Protected					0.977		0.950					
Satd. Flow (prot)	0	0	0	0	1691	0	1770	1863	0	0	1863	1583
Flt Permitted					0.977		0.399					
Satd. Flow (perm)	0	0	0	0	1691	0	743	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					68							154
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		3817			4042			1010			2234	
Travel Time (s)		74.4			78.7			17.2			38.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	89	1	101	637	449	0	0	418	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	191	0	637	449	0	0	418	220
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	1
Detector Template				Left	Thru		Left	Thru			Thru	Right
Leading Detector (ft)				20	100		20	100			100	20
Trailing Detector (ft)				0	0		0	0			0	0
Detector 1 Position(ft)				0	0		0	0			0	0
Detector 1 Size(ft)				20	6		20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				custom	NA		custom	NA			NA	custom
Protected Phases				4	4		1	1			2	2
Permitted Phases				4	4		1 2	1 2			2	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	4		1	1			2	2
Switch Phase												
Minimum Initial (s)				5.0	5.0		4.0	4.0			15.0	15.0
Minimum Split (s)				9.8	9.8		8.0	8.0			21.6	21.6
Total Split (s)				25.0	25.0		25.0	25.0			30.0	30.0
Total Split (%)				31.3%	31.3%		31.3%	31.3%			37.5%	37.5%
Maximum Green (s)				20.2	20.2		21.0	21.0			23.4	23.4
Yellow Time (s)				3.0	3.0		3.0	3.0			4.5	4.5
All-Red Time (s)				1.8	1.8		1.0	1.0			2.1	2.1
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)					4.8		4.0	4.0			6.6	6.6
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				None	None		None	None			C-Min	C-Min
Act Effct Green (s)					10.5		56.7	60.7			33.1	33.1
Actuated g/C Ratio					0.13		0.71	0.76			0.41	0.41
v/c Ratio					0.68		0.80	0.32			0.54	0.30
Control Delay					32.9		20.6	7.9			22.2	7.3
Queue Delay					0.0		0.0	0.0			0.0	0.0
Total Delay					32.9		20.6	7.9			22.2	7.3
LOS					C		C	A			C	A
Approach Delay					32.9			15.4			17.1	
Approach LOS					C			B			B	
Queue Length 50th (ft)					59		245	141			153	20
Queue Length 95th (ft)					116		#444	258			273	71
Internal Link Dist (ft)		3737			3962			930			2154	
Turn Bay Length (ft)												90
Base Capacity (vph)					477		796	1413			771	745
Starvation Cap Reductn					0		0	0			0	0
Spillback Cap Reductn					0		0	0			0	0
Storage Cap Reductn					0		0	0			0	0
Reduced v/c Ratio					0.40		0.80	0.32			0.54	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 17.7		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Merrow Road & I-84 Westbound On Ramp/I-84 Westbound Off Ramp



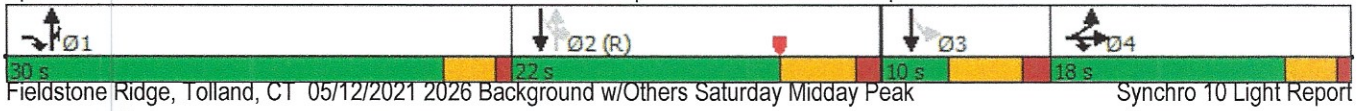
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	1	717	0	0	0	0	833	113	52	414	0
Future Volume (vph)	170	1	717	0	0	0	0	833	113	52	414	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		200	110		0
Storage Lanes	0		2	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.953								0.950		
Satd. Flow (prot)	0	1775	2787	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted		0.953								0.315		
Satd. Flow (perm)	0	1775	2787	0	0	0	0	3539	1583	587	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			312						123			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		3795			4001			600			1010	
Travel Time (s)		73.9			77.9			13.6			23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1	779	0	0	0	0	905	123	57	450	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	186	779	0	0	0	0	905	123	57	450	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	custom	NA	custom					NA	custom	Perm	NA	
Protected Phases	4	4	1 4					1	1		2 3	
Permitted Phases	4	4	1 4					1 2	1 2	2 3	2 3	

Lanes, Volumes, Timings
7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	1 4					1	1	2 3	2 3	
Switch Phase												
Minimum Initial (s)	9.0	9.0						5.0	5.0			
Minimum Split (s)	13.0	13.0						9.0	9.0			
Total Split (s)	18.0	18.0						30.0	30.0			
Total Split (%)	22.5%	22.5%						37.5%	37.5%			
Maximum Green (s)	14.0	14.0						26.0	26.0			
Yellow Time (s)	3.0	3.0						3.0	3.0			
All-Red Time (s)	1.0	1.0						1.0	1.0			
Lost Time Adjust (s)		0.0						0.0	0.0			
Total Lost Time (s)		4.0						4.0	4.0			
Lead/Lag	Lag	Lag						Lead	Lead			
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	2.0	2.0						2.0	2.0			
Recall Mode	None	None						None	None			
Act Effct Green (s)		13.0	39.8					49.0	49.0	30.2	30.2	
Actuated g/C Ratio		0.16	0.50					0.61	0.61	0.38	0.38	
v/c Ratio		0.65	0.50					0.42	0.12	0.26	0.34	
Control Delay		42.4	8.2					10.1	2.3	23.4	22.3	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		42.4	8.2					10.1	2.3	23.4	22.3	
LOS		D	A					B	A	C	C	
Approach Delay		14.8						9.1			22.4	
Approach LOS		B						A			C	
Queue Length 50th (ft)		87	66					160	4	28	114	
Queue Length 95th (ft)		152	110					85	m11	m52	154	
Internal Link Dist (ft)		3715			3921			520			930	
Turn Bay Length (ft)									200	110		
Base Capacity (vph)		310	1622					2169	1018	221	1336	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.60	0.48					0.42	0.12	0.26	0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 14.0		Intersection LOS: B	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp

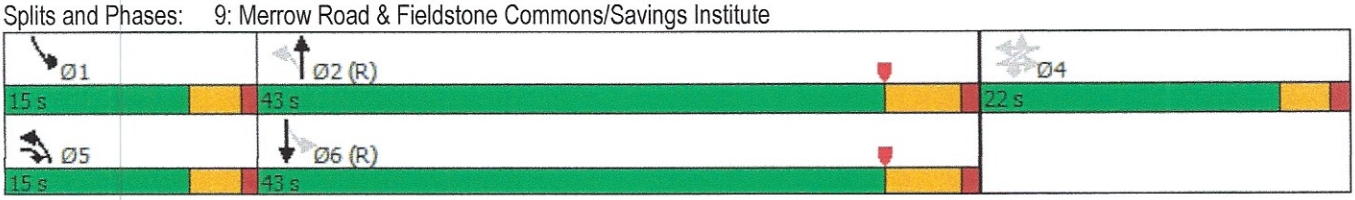


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	13	139	15	4	33	122	699	15	18	832	273
Future Volume (vph)	221	13	139	15	4	33	122	699	15	18	832	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.913			0.997			0.963	
Flt Protected		0.955			0.986		0.950			0.950		
Satd. Flow (prot)	0	1779	1583	0	1677	0	1770	3529	0	1770	3408	0
Flt Permitted		0.767			0.885		0.142			0.358		
Satd. Flow (perm)	0	1429	1583	0	1505	0	265	3529	0	667	3408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		36			3			75	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	240	14	151	16	4	36	133	760	16	20	904	297
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	254	151	0	56	0	133	776	0	20	1201	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	22.0	22.0	15.0	22.0	22.0		15.0	43.0		15.0	43.0	
Total Split (%)	27.5%	27.5%	18.8%	27.5%	27.5%		18.8%	53.8%		18.8%	53.8%	
Maximum Green (s)	17.7	17.7	11.0	17.7	17.7		11.0	37.3		11.0	37.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		16.5	27.5		16.5		54.7	49.8		49.6	42.8	
Actuated g/C Ratio		0.21	0.34		0.21		0.68	0.62		0.62	0.54	
v/c Ratio		0.86	0.25		0.17		0.43	0.35		0.04	0.65	
Control Delay		58.9	9.7		14.2		9.0	8.8		5.6	17.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		58.9	9.7		14.2		9.0	8.8		5.6	17.5	
LOS		E	A		B		A	A		A	B	
Approach Delay		40.5			14.3			8.8			17.3	
Approach LOS		D			B			A			B	
Queue Length 50th (ft)		121	22		8		20	78		3	194	
Queue Length 95th (ft)		#242	59		37		37	152		m11	347	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		316	679		361		389	2199		608	1859	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.80	0.22		0.16		0.34	0.35		0.03	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 69.7%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1	1	1	1	2	1	825	1	1	979	12
Future Vol, veh/h	11	1	1	1	1	2	1	825	1	1	979	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	1	1	1	2	1	897	1	1	1064	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1524	1973	539	1435	1979	449	1077	0	0	898	0	0
Stage 1	1073	1073	-	900	900	-	-	-	-	-	-	-
Stage 2	451	900	-	535	1079	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	81	62	487	94	61	557	643	-	-	752	-	-
Stage 1	235	295	-	300	355	-	-	-	-	-	-	-
Stage 2	557	355	-	497	293	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	79	62	487	92	61	557	643	-	-	752	-	-
Mov Cap-2 Maneuver	79	62	-	92	61	-	-	-	-	-	-	-
Stage 1	235	294	-	299	354	-	-	-	-	-	-	-
Stage 2	552	354	-	493	292	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	54.7	22.5	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	643	-	-	79	487	92	557	752	-	-
HCM Lane V/C Ratio	0.002	-	-	0.151	0.002	0.012	0.004	0.001	-	-
HCM Control Delay (s)	10.6	-	-	58.5	12.4	44.6	11.5	9.8	0	-
HCM Lane LOS	B	-	-	F	B	E	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0	0	0	0	-	-

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Background w/Others Saturday Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	14	16	6	3	90	17	625	1	114	758	108
Future Volume (vph)	106	14	16	6	3	90	17	625	1	114	758	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	220		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.984			0.877						0.981	
Flt Protected		0.962			0.997		0.950			0.950		
Satd. Flow (prot)	0	1763	0	0	1629	0	1770	3539	0	1770	3472	0
Flt Permitted		0.804			0.974		0.291			0.345		
Satd. Flow (perm)	0	1474	0	0	1591	0	542	3539	0	643	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			98						23	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		3873			3977			4860			450	
Travel Time (s)		88.0			90.4			82.8			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	15	17	7	3	98	18	679	1	124	824	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	0	0	108	0	18	680	0	124	941	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		custom	NA		custom	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4	4		8	8		2 5	2		1 6	6	

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Background w/Others Saturday Midday Peak

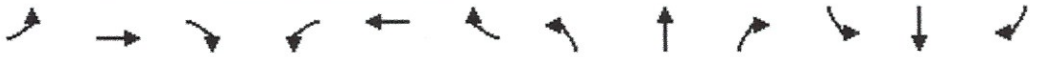
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0		5.0	5.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	14.5	14.5		10.5	10.5		10.5	21.5		9.0	21.5	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	40.0		12.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	50.0%		15.0%	48.8%	
Maximum Green (s)	22.5	22.5		22.5	22.5		7.5	33.5		8.0	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.5		3.5	4.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.0		0.5	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5			5.5		5.5	6.5		4.0	6.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		11.3			10.0		26.6	23.6		31.8	30.0	
Actuated g/C Ratio		0.23			0.20		0.54	0.48		0.65	0.61	
v/c Ratio		0.43			0.27		0.04	0.40		0.22	0.44	
Control Delay		22.7			8.0		5.8	13.4		5.8	9.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		22.7			8.0		5.8	13.4		5.8	9.4	
LOS		C			A		A	B		A	A	
Approach Delay		22.7			8.0			13.2			9.0	
Approach LOS		C			A			B			A	
Queue Length 50th (ft)		33			2		2	77		12	70	
Queue Length 95th (ft)		102			39		10	152		38	216	
Internal Link Dist (ft)		3793			3897			4780			370	
Turn Bay Length (ft)							100			220		
Base Capacity (vph)		722			825		512	2540		610	2445	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.20			0.13		0.04	0.27		0.20	0.38	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 49.2			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 57.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: Merrow Road & Goose Lane/Rhodes Road

Exhibit 31
Traffic Operations Analysis Worksheets
Combined 2026 (Build) Weekday AM Peak

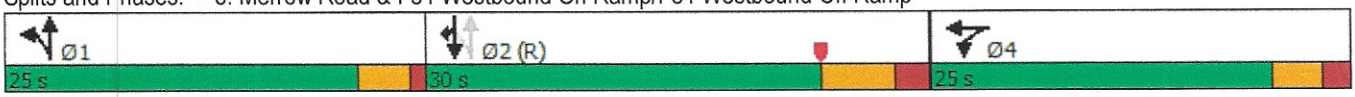
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	51	2	121	656	341	0	0	369	328
Future Volume (vph)	0	0	0	51	2	121	656	341	0	0	369	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		90
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.906							0.850
Flt Protected					0.986		0.950					
Satd. Flow (prot)	0	0	0	0	1664	0	1770	1863	0	0	1863	1583
Flt Permitted					0.986		0.434					
Satd. Flow (perm)	0	0	0	0	1664	0	808	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					132							260
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		3817			4042			1010			2234	
Travel Time (s)		74.4			78.7			17.2			38.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	55	2	132	713	371	0	0	401	357
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	189	0	713	371	0	0	401	357
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	1
Detector Template				Left	Thru		Left	Thru			Thru	Right
Leading Detector (ft)				20	100		20	100			100	20
Trailing Detector (ft)				0	0		0	0			0	0
Detector 1 Position(ft)				0	0		0	0			0	0
Detector 1 Size(ft)				20	6		20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				custom	NA		custom	NA			NA	custom
Protected Phases				4	4		1	1			2	2
Permitted Phases				4	4		1 2	1 2			2	2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	4		1	1			2	2
Switch Phase												
Minimum Initial (s)				5.0	5.0		4.0	4.0			15.0	15.0
Minimum Split (s)				9.8	9.8		8.0	8.0			21.6	21.6
Total Split (s)				25.0	25.0		25.0	25.0			30.0	30.0
Total Split (%)				31.3%	31.3%		31.3%	31.3%			37.5%	37.5%
Maximum Green (s)				20.2	20.2		21.0	21.0			23.4	23.4
Yellow Time (s)				3.0	3.0		3.0	3.0			4.5	4.5
All-Red Time (s)				1.8	1.8		1.0	1.0			2.1	2.1
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)					4.8		4.0	4.0			6.6	6.6
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				None	None		None	None			C-Min	C-Min
Act Effct Green (s)					8.2		59.0	63.0			35.4	35.4
Actuated g/C Ratio					0.10		0.74	0.79			0.44	0.44
v/c Ratio					0.66		0.84	0.25			0.49	0.42
Control Delay					23.0		22.1	5.5			19.3	6.6
Queue Delay					0.0		0.0	0.0			0.0	0.0
Total Delay					23.0		22.1	5.5			19.3	6.6
LOS					C		C	A			B	A
Approach Delay					23.0			16.4			13.3	
Approach LOS					C			B			B	
Queue Length 50th (ft)					27		277	41			134	27
Queue Length 95th (ft)					84		#503	217			244	96
Internal Link Dist (ft)		3737			3962			930			2154	
Turn Bay Length (ft)												90
Base Capacity (vph)					518		848	1467			825	846
Starvation Cap Reductn					0		0	0			0	0
Spillback Cap Reductn					0		0	0			0	0
Storage Cap Reductn					0		0	0			0	0
Reduced v/c Ratio					0.36		0.84	0.25			0.49	0.42

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 15.9		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Merrow Road & I-84 Westbound On Ramp/I-84 Westbound Off Ramp

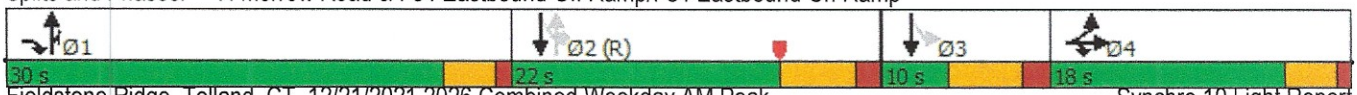


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1	587	0	0	0	0	885	29	33	387	0
Future Volume (vph)	110	1	587	0	0	0	0	885	29	33	387	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		200	110		0
Storage Lanes	0		2	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.953								0.950		
Satd. Flow (prot)	0	1775	2787	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted		0.953								0.298		
Satd. Flow (perm)	0	1775	2787	0	0	0	0	3539	1583	555	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			352						97			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		3795			4001			600			1010	
Travel Time (s)		73.9			77.9			13.6			23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	1	638	0	0	0	0	962	32	36	421	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	638	0	0	0	0	962	32	36	421	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	custom	NA	custom					NA	custom	Perm	NA	
Protected Phases	4	4	1 4					1	1		2 3	
Permitted Phases	4	4	1 4					1 2	1 2	2 3	2 3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	1 4					1	1	2 3	2 3	
Switch Phase												
Minimum Initial (s)	9.0	9.0						5.0	5.0			
Minimum Split (s)	13.0	13.0						9.0	9.0			
Total Split (s)	18.0	18.0						30.0	30.0			
Total Split (%)	22.5%	22.5%						37.5%	37.5%			
Maximum Green (s)	14.0	14.0						26.0	26.0			
Yellow Time (s)	3.0	3.0						3.0	3.0			
All-Red Time (s)	1.0	1.0						1.0	1.0			
Lost Time Adjust (s)		0.0						0.0	0.0			
Total Lost Time (s)		4.0						4.0	4.0			
Lead/Lag	Lag	Lag						Lead	Lead			
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	2.0	2.0						2.0	2.0			
Recall Mode	None	None						None	None			
Act Effct Green (s)		11.3	36.9					50.7	50.7	33.1	33.1	
Actuated g/C Ratio		0.14	0.46					0.63	0.63	0.41	0.41	
v/c Ratio		0.48	0.43					0.43	0.03	0.16	0.29	
Control Delay		37.9	6.2					9.9	0.6	23.8	23.9	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		37.9	6.2					9.9	0.6	23.8	23.9	
LOS		D	A					A	A	C	C	
Approach Delay		11.2						9.6			23.9	
Approach LOS		B						A			C	
Queue Length 50th (ft)		57	44					162	1	18	115	
Queue Length 95th (ft)		104	67					50	m0	m39	156	
Internal Link Dist (ft)		3715			3921			520			930	
Turn Bay Length (ft)									200	110		
Base Capacity (vph)		310	1581					2232	1034	229	1462	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.39	0.40					0.43	0.03	0.16	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp



Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	1	44	1	0	11	66	762	4	11	834	128
Future Volume (vph)	134	1	44	1	0	11	66	762	4	11	834	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.875			0.999			0.980	
Flt Protected		0.953			0.996		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1623	0	1770	3536	0	1770	3468	0
Flt Permitted		0.719			0.982		0.212			0.339		
Satd. Flow (perm)	0	1339	1583	0	1601	0	395	3536	0	631	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			48		91			1			28	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	1	48	1	0	12	72	828	4	12	907	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	48	0	13	0	72	832	0	12	1046	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

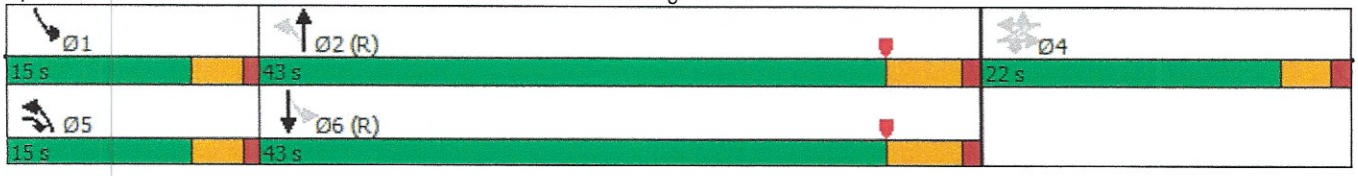
Fieldstone Ridge, Tolland, CT
2026 Combined Weekday AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	22.0	22.0	15.0	22.0	22.0		15.0	43.0		15.0	43.0	
Total Split (%)	27.5%	27.5%	18.8%	27.5%	27.5%		18.8%	53.8%		18.8%	53.8%	
Maximum Green (s)	17.7	17.7	11.0	17.7	17.7		11.0	37.3		11.0	37.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		12.8	22.7		12.8		58.4	55.4		55.1	49.4	
Actuated g/C Ratio		0.16	0.28		0.16		0.73	0.69		0.69	0.62	
v/c Ratio		0.69	0.10		0.04		0.19	0.34		0.02	0.49	
Control Delay		47.4	6.2		0.2		4.9	6.5		4.3	12.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		47.4	6.2		0.2		4.9	6.5		4.3	12.9	
LOS		D	A		A		A	A		A	B	
Approach Delay		37.3			0.3			6.4			12.8	
Approach LOS		D			A			A			B	
Queue Length 50th (ft)		70	0		0		8	67		1	185	
Queue Length 95th (ft)		122	21		0		23	164		m8	298	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		296	586		425		479	2447		621	2151	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.50	0.08		0.03		0.15	0.34		0.02	0.49	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 12.2 Intersection LOS: B
Intersection Capacity Utilization 57.1% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	3	1	1	11	2	644	1	11	732	18
Future Vol, veh/h	4	1	3	1	1	11	2	644	1	11	732	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1	3	1	1	12	2	700	1	12	796	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1185	1535	408	1128	1545	351	816	0	0	701	0	0
Stage 1	830	830	-	705	705	-	-	-	-	-	-	-
Stage 2	355	705	-	423	840	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	144	115	593	159	114	645	807	-	-	892	-	-
Stage 1	331	383	-	393	437	-	-	-	-	-	-	-
Stage 2	635	437	-	579	379	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	112	593	154	111	645	807	-	-	892	-	-
Mov Cap-2 Maneuver	137	112	-	154	111	-	-	-	-	-	-	-
Stage 1	330	373	-	392	436	-	-	-	-	-	-	-
Stage 2	620	436	-	560	370	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.1	12.2	0	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	807	-	-	137	593	154	645	892	-	-
HCM Lane V/C Ratio	0.003	-	-	0.032	0.005	0.007	0.019	0.013	-	-
HCM Control Delay (s)	9.5	-	-	32.1	11.1	28.5	10.7	9.1	0.1	-
HCM Lane LOS	A	-	-	D	B	D	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	21	9	4	12	147	16	576	6	142	665	28
Future Volume (vph)	84	21	9	4	12	147	16	576	6	142	665	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	220		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.989			0.878			0.998			0.994	
Flt Protected		0.965			0.999		0.950			0.950		
Satd. Flow (prot)	0	1778	0	0	1634	0	1770	3532	0	1770	3518	0
Flt Permitted		0.708			0.989		0.366			0.368		
Satd. Flow (perm)	0	1304	0	0	1617	0	682	3532	0	685	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			160			2			6	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		3873			3977			4860			450	
Travel Time (s)		88.0			90.4			82.8			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	23	10	4	13	160	17	626	7	154	723	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	124	0	0	177	0	17	633	0	154	753	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		custom	NA		custom	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4	4		8	8		2 5	2		1 6	6	

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Combined Weekday AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0		5.0	5.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	14.5	14.5		10.5	10.5		10.5	21.5		9.0	21.5	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	40.0		12.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	50.0%		15.0%	48.8%	
Maximum Green (s)	22.5	22.5		22.5	22.5		7.5	33.5		8.0	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.5		3.5	4.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.0		0.5	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5			5.5		5.5	6.5		4.0	6.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		11.5			9.9		23.5	21.3		28.8	27.5	
Actuated g/C Ratio		0.25			0.22		0.52	0.47		0.63	0.60	
v/c Ratio		0.37			0.37		0.03	0.38		0.26	0.36	
Control Delay		21.2			7.3		5.8	13.6		6.0	8.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		21.2			7.3		5.8	13.6		6.0	8.9	
LOS		C			A		A	B		A	A	
Approach Delay		21.2			7.3			13.4			8.4	
Approach LOS		C			A			B			A	
Queue Length 50th (ft)		29			4		2	71		15	52	
Queue Length 95th (ft)		81			47		9	137		44	162	
Internal Link Dist (ft)		3793			3897			4780			370	
Turn Bay Length (ft)							100			220		
Base Capacity (vph)		724			967		578	2584		646	2519	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.17			0.18		0.03	0.24		0.24	0.30	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 45.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: Merrow Road & Goose Lane/Rhodes Road

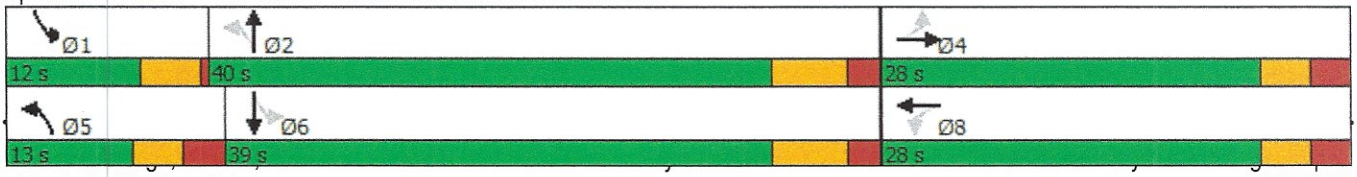
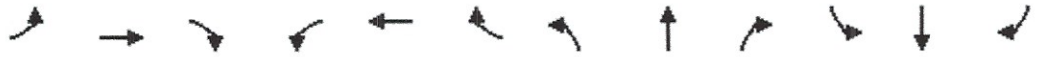


Exhibit 32
Traffic Operations Analysis Worksheets
Combined 2026 (Build) Weekday PM Peak

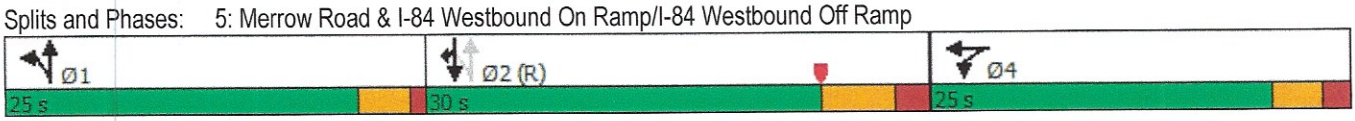
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	81	1	83	668	539	0	0	383	194
Future Volume (vph)	0	0	0	81	1	83	668	539	0	0	383	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		90
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.932							0.850
Flt Protected					0.976		0.950					
Satd. Flow (prot)	0	0	0	0	1694	0	1770	1863	0	0	1863	1583
Flt Permitted					0.976		0.404					
Satd. Flow (perm)	0	0	0	0	1694	0	753	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					61							148
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		3817			4042			1010			2234	
Travel Time (s)		74.4			78.7			17.2			38.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	88	1	90	726	586	0	0	416	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	179	0	726	586	0	0	416	211
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	1
Detector Template				Left	Thru		Left	Thru			Thru	Right
Leading Detector (ft)				20	100		20	100			100	20
Trailing Detector (ft)				0	0		0	0			0	0
Detector 1 Position(ft)				0	0		0	0			0	0
Detector 1 Size(ft)				20	6		20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				custom	NA		custom	NA			NA	custom
Protected Phases				4	4		1	1			2	2
Permitted Phases				4	4		1 2	1 2			2	2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	4		1	1			2	2
Switch Phase												
Minimum Initial (s)				5.0	5.0		4.0	4.0			15.0	15.0
Minimum Split (s)				9.8	9.8		8.0	8.0			21.6	21.6
Total Split (s)				25.0	25.0		25.0	25.0			30.0	30.0
Total Split (%)				31.3%	31.3%		31.3%	31.3%			37.5%	37.5%
Maximum Green (s)				20.2	20.2		21.0	21.0			23.4	23.4
Yellow Time (s)				3.0	3.0		3.0	3.0			4.5	4.5
All-Red Time (s)				1.8	1.8		1.0	1.0			2.1	2.1
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)					4.8		4.0	4.0			6.6	6.6
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				None	None		None	None			C-Min	C-Min
Act Effct Green (s)					10.2		57.0	61.0			33.4	33.4
Actuated g/C Ratio					0.13		0.71	0.76			0.42	0.42
v/c Ratio					0.66		0.90	0.41			0.54	0.28
Control Delay					33.0		28.7	8.9			21.8	7.2
Queue Delay					0.0		0.0	0.0			0.0	0.0
Total Delay					33.0		28.7	8.9			21.8	7.2
LOS					C		C	A			C	A
Approach Delay					33.0			19.8			16.9	
Approach LOS					C			B			B	
Queue Length 50th (ft)					56		312	223			151	19
Queue Length 95th (ft)					111		#432	342			267	68
Internal Link Dist (ft)		3737			3962			930			2154	
Turn Bay Length (ft)												90
Base Capacity (vph)					473		803	1419			776	746
Starvation Cap Reductn					0		0	0			0	0
Spillback Cap Reductn					0		0	0			0	0
Storage Cap Reductn					0		0	0			0	0
Reduced v/c Ratio					0.38		0.90	0.41			0.54	0.28

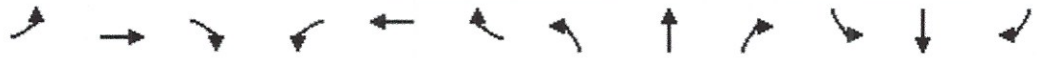
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 79.6%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Merrow Road & I-84 Westbound On Ramp/I-84 Westbound Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	1	734	0	0	0	0	995	90	47	417	0
Future Volume (vph)	212	1	734	0	0	0	0	995	90	47	417	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		200	110		0
Storage Lanes	0		2	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.953								0.950		
Satd. Flow (prot)	0	1775	2787	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted		0.953								0.264		
Satd. Flow (perm)	0	1775	2787	0	0	0	0	3539	1583	492	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			308						98			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		3795			4001			600			1010	
Travel Time (s)		73.9			77.9			13.6			23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	230	1	798	0	0	0	0	1082	98	51	453	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	231	798	0	0	0	0	1082	98	51	453	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	custom	NA	custom					NA	custom	Perm	NA	
Protected Phases	4	4	1 4					1	1		2 3	
Permitted Phases	4	4	1 4					1 2	1 2	2 3	2 3	

Lanes, Volumes, Timings
Fieldstone Ridge, Tolland, CT
7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp 2026 Combined Weekday PM Peak

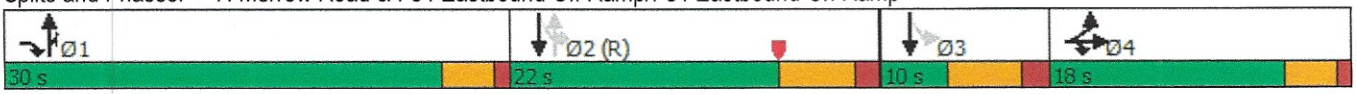


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	1 4					1	1	2 3	2 3	
Switch Phase												
Minimum Initial (s)	9.0	9.0						5.0	5.0			
Minimum Split (s)	13.0	13.0						9.0	9.0			
Total Split (s)	18.0	18.0						30.0	30.0			
Total Split (%)	22.5%	22.5%						37.5%	37.5%			
Maximum Green (s)	14.0	14.0						26.0	26.0			
Yellow Time (s)	3.0	3.0						3.0	3.0			
All-Red Time (s)	1.0	1.0						1.0	1.0			
Lost Time Adjust (s)		0.0						0.0	0.0			
Total Lost Time (s)		4.0						4.0	4.0			
Lead/Lag	Lag	Lag						Lead	Lead			
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	2.0	2.0						2.0	2.0			
Recall Mode	None	None						None	None			
Act Effct Green (s)		13.3	41.9					48.7	48.7	28.1	28.1	
Actuated g/C Ratio		0.17	0.52					0.61	0.61	0.35	0.35	
v/c Ratio		0.78	0.50					0.50	0.10	0.30	0.36	
Control Delay		51.6	7.9					12.3	2.7	26.1	24.2	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		51.6	7.9					12.3	2.7	26.1	24.2	
LOS		D	A					B	A	C	C	
Approach Delay		17.7						11.5			24.4	
Approach LOS		B						B			C	
Queue Length 50th (ft)		111	71					215	5	24	115	
Queue Length 95th (ft)		#215	116					m95	m8	m47	154	
Internal Link Dist (ft)		3715			3921			520			930	
Turn Bay Length (ft)									200	110		
Base Capacity (vph)		310	1646					2152	1001	172	1243	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.75	0.48					0.50	0.10	0.30	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 79.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp



Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	1	195	2	1	2	157	798	2	4	832	307
Future Volume (vph)	290	1	195	2	1	2	157	798	2	4	832	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.946						0.960	
Flt Protected		0.953			0.980		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1727	0	1770	3539	0	1770	3398	0
Flt Permitted		0.724			0.904		0.122			0.326		
Satd. Flow (perm)	0	1349	1583	0	1593	0	227	3539	0	607	3398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		2						89	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1	212	2	1	2	171	867	2	4	904	334
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	212	0	5	0	171	869	0	4	1238	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

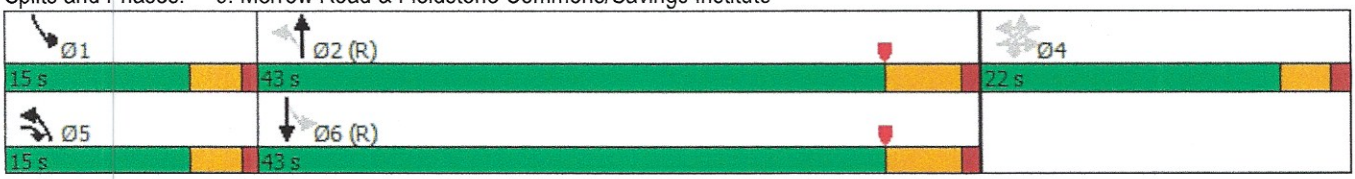
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	22.0	22.0	15.0	22.0	22.0		15.0	43.0		15.0	43.0	
Total Split (%)	27.5%	27.5%	18.8%	27.5%	27.5%		18.8%	53.8%		18.8%	53.8%	
Maximum Green (s)	17.7	17.7	11.0	17.7	17.7		11.0	37.3		11.0	37.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		17.7	29.6		17.7		54.0	50.5		47.4	40.7	
Actuated g/C Ratio		0.22	0.37		0.22		0.68	0.63		0.59	0.51	
v/c Ratio		1.06	0.33		0.01		0.57	0.39		0.01	0.70	
Control Delay		102.4	11.9		21.0		14.4	8.3		6.0	19.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		102.4	11.9		21.0		14.4	8.3		6.0	19.3	
LOS		F	B		C		B	A		A	B	
Approach Delay		66.1			21.0			9.3			19.3	
Approach LOS		E			C			A			B	
Queue Length 50th (ft)		~176	44		1		26	91		1	214	
Queue Length 95th (ft)		#329	87		10		67	173		m2	367	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		298	701		354		365	2233		561	1772	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		1.06	0.30		0.01		0.47	0.39		0.01	0.70	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 24.4 Intersection LOS: C
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	1	6	1	1	1	5	943	1	1	994	32
Future Vol, veh/h	12	1	6	1	1	1	5	943	1	1	994	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	1	7	1	1	1	5	1025	1	1	1080	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1623	2136	558	1579	2153	513	1115	0	0	1026	0	0
Stage 1	1100	1100	-	1036	1036	-	-	-	-	-	-	-
Stage 2	523	1036	-	543	1117	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	68	49	473	74	47	506	622	-	-	673	-	-
Stage 1	226	286	-	248	307	-	-	-	-	-	-	-
Stage 2	505	307	-	492	281	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	66	48	473	71	46	506	622	-	-	673	-	-
Mov Cap-2 Maneuver	66	48	-	71	46	-	-	-	-	-	-	-
Stage 1	224	285	-	246	305	-	-	-	-	-	-	-
Stage 2	498	305	-	481	280	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.6	34.3	0.1	0
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	622	-	-	66	473	71	506	673	-	-
HCM Lane V/C Ratio	0.009	-	-	0.198	0.014	0.015	0.002	0.002	-	-
HCM Control Delay (s)	10.8	-	-	72.5	12.7	56.5	12.1	10.4	0	-
HCM Lane LOS	B	-	-	F	B	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0	0	0	0	-	-

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	21	24	22	34	99	22	775	6	121	763	116
Future Volume (vph)	88	21	24	22	34	99	22	775	6	121	763	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	220		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.976			0.914			0.999			0.980	
Flt Protected		0.968			0.993		0.950			0.950		
Satd. Flow (prot)	0	1760	0	0	1691	0	1770	3536	0	1770	3468	0
Flt Permitted		0.729			0.939		0.266			0.274		
Satd. Flow (perm)	0	1325	0	0	1599	0	495	3536	0	510	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			108			1			25	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		3873			3977			4860			450	
Travel Time (s)		88.0			90.4			82.8			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	23	26	24	37	108	24	842	7	132	829	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	169	0	24	849	0	132	955	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		custom	NA		custom	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4	4		8	8		2 5	2		1 6	6	

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Combined Weekday PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0		5.0	5.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	14.5	14.5		10.5	10.5		10.5	21.5		9.0	21.5	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	40.0		12.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	50.0%		15.0%	48.8%	
Maximum Green (s)	22.5	22.5		22.5	22.5		7.5	33.5		8.0	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.5		3.5	4.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.0		0.5	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5			5.5		5.5	6.5		4.0	6.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		12.5			10.8		27.4	25.2		31.9	29.5	
Actuated g/C Ratio		0.25			0.21		0.54	0.50		0.63	0.59	
v/c Ratio		0.43			0.39		0.06	0.48		0.27	0.47	
Control Delay		23.5			12.1		6.0	14.1		6.4	11.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		23.5			12.1		6.0	14.1		6.4	11.3	
LOS		C			B		A	B		A	B	
Approach Delay		23.5			12.1			13.9			10.7	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)		34			15		3	105		13	74	
Queue Length 95th (ft)		102			69		12	201		41	225	
Internal Link Dist (ft)		3793			3897			4780			370	
Turn Bay Length (ft)							100			220		
Base Capacity (vph)		692			879		505	2427		556	2338	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.21			0.19		0.05	0.35		0.24	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 50.3			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 64.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 15: Merrow Road & Goose Lane/Rhodes Road

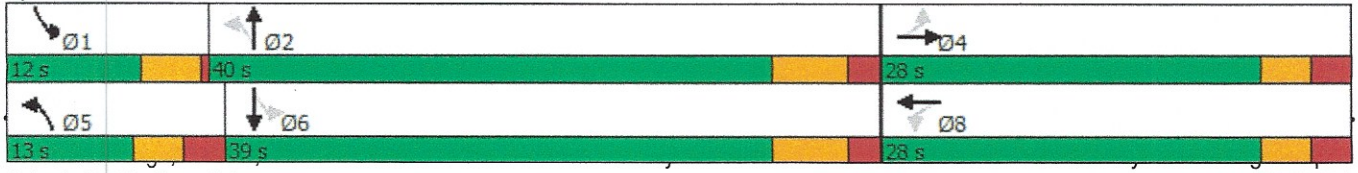


Exhibit 33
Traffic Operations Analysis Worksheets
Combined 2026 (Build) Saturday Midday Peak

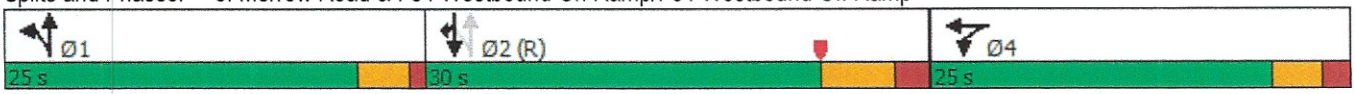
Lanes, Volumes, Timings
Fieldstone Ridge, Tolland, CT
5: Merrow Road & I-84 Westbound On Ramp/I-84 Westbound Off Ramp 2026 Combined Saturday Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	86	1	93	645	426	0	0	398	202
Future Volume (vph)	0	0	0	86	1	93	645	426	0	0	398	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		90
Storage Lanes	0		0	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.930							0.850
Flt Protected					0.977		0.950					
Satd. Flow (prot)	0	0	0	0	1693	0	1770	1863	0	0	1863	1583
Flt Permitted					0.977		0.381					
Satd. Flow (perm)	0	0	0	0	1693	0	710	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					65							149
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		3817			4042			1010			2234	
Travel Time (s)		74.4			78.7			17.2			38.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	93	1	101	701	463	0	0	433	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	195	0	701	463	0	0	433	220
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	1
Detector Template				Left	Thru		Left	Thru			Thru	Right
Leading Detector (ft)				20	100		20	100			100	20
Trailing Detector (ft)				0	0		0	0			0	0
Detector 1 Position(ft)				0	0		0	0			0	0
Detector 1 Size(ft)				20	6		20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				custom	NA		custom	NA			NA	custom
Protected Phases				4	4		1	1			2	2
Permitted Phases				4	4		1 2	1 2			2	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	4		1	1			2	2
Switch Phase												
Minimum Initial (s)				5.0	5.0		4.0	4.0			15.0	15.0
Minimum Split (s)				9.8	9.8		8.0	8.0			21.6	21.6
Total Split (s)				25.0	25.0		25.0	25.0			30.0	30.0
Total Split (%)				31.3%	31.3%		31.3%	31.3%			37.5%	37.5%
Maximum Green (s)				20.2	20.2		21.0	21.0			23.4	23.4
Yellow Time (s)				3.0	3.0		3.0	3.0			4.5	4.5
All-Red Time (s)				1.8	1.8		1.0	1.0			2.1	2.1
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)					4.8		4.0	4.0			6.6	6.6
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode				None	None		None	None			C-Min	C-Min
Act Effct Green (s)					10.8		56.4	60.4			32.8	32.8
Actuated g/C Ratio					0.14		0.70	0.76			0.41	0.41
v/c Ratio					0.69		0.90	0.33			0.57	0.30
Control Delay					33.7		29.5	8.0			23.0	7.8
Queue Delay					0.0		0.0	0.0			0.0	0.0
Total Delay					33.7		29.5	8.0			23.0	7.8
LOS					C		C	A			C	A
Approach Delay					33.7			21.0			17.9	
Approach LOS					C			C			B	
Queue Length 50th (ft)					62		294	161			161	21
Queue Length 95th (ft)					119		#430	274			287	75
Internal Link Dist (ft)		3737			3962			930			2154	
Turn Bay Length (ft)												90
Base Capacity (vph)					476		779	1407			764	736
Starvation Cap Reductn					0		0	0			0	0
Spillback Cap Reductn					0		0	0			0	0
Storage Cap Reductn					0		0	0			0	0
Reduced v/c Ratio					0.41		0.90	0.33			0.57	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 42 (53%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Merrow Road & I-84 Westbound On Ramp/I-84 Westbound Off Ramp



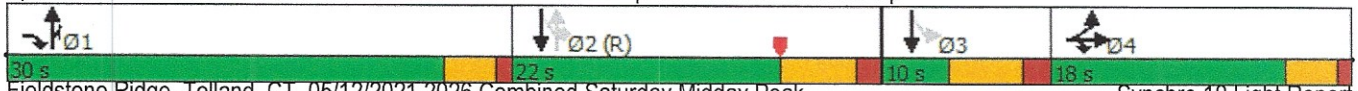
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	1	766	0	0	0	0	905	117	52	431	0
Future Volume (vph)	170	1	766	0	0	0	0	905	117	52	431	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		200	110		0
Storage Lanes	0		2	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.953								0.950		
Satd. Flow (prot)	0	1775	2787	0	0	0	0	3539	1583	1770	3539	0
Flt Permitted		0.953								0.291		
Satd. Flow (perm)	0	1775	2787	0	0	0	0	3539	1583	542	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			290						127			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		3795			4001			600			1010	
Travel Time (s)		73.9			77.9			13.6			23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1	833	0	0	0	0	984	127	57	468	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	186	833	0	0	0	0	984	127	57	468	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	custom	NA	custom					NA	custom	Perm	NA	
Protected Phases	4	4	1 4					1	1		2 3	
Permitted Phases	4	4	1 4					1 2	1 2	2 3	2 3	

Lanes, Volumes, Timings
Fieldstone Ridge, Tolland, CT
7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp
2026 Combined Saturday Midday Peak

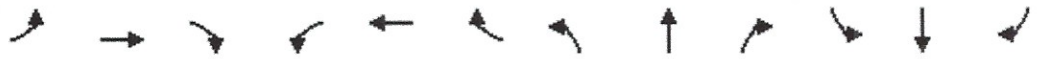
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	1 4					1	1	2 3	2 3	
Switch Phase												
Minimum Initial (s)	9.0	9.0						5.0	5.0			
Minimum Split (s)	13.0	13.0						9.0	9.0			
Total Split (s)	18.0	18.0						30.0	30.0			
Total Split (%)	22.5%	22.5%						37.5%	37.5%			
Maximum Green (s)	14.0	14.0						26.0	26.0			
Yellow Time (s)	3.0	3.0						3.0	3.0			
All-Red Time (s)	1.0	1.0						1.0	1.0			
Lost Time Adjust (s)		0.0						0.0	0.0			
Total Lost Time (s)		4.0						4.0	4.0			
Lead/Lag	Lag	Lag						Lead	Lead			
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	2.0	2.0						2.0	2.0			
Recall Mode	None	None						None	None			
Act Effct Green (s)		13.6	41.3					48.4	48.4	28.7	28.7	
Actuated g/C Ratio		0.17	0.52					0.60	0.60	0.36	0.36	
v/c Ratio		0.62	0.53					0.46	0.13	0.29	0.37	
Control Delay		40.5	8.8					11.7	2.9	24.2	22.8	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		40.5	8.8					11.7	2.9	24.2	22.8	
LOS		D	A					B	A	C	C	
Approach Delay		14.6						10.7			22.9	
Approach LOS		B						B			C	
Queue Length 50th (ft)		87	82					191	4	27	118	
Queue Length 95th (ft)		152	130					m103	m14	m50	158	
Internal Link Dist (ft)		3715			3921			520			930	
Turn Bay Length (ft)									200	110		
Base Capacity (vph)		310	1613					2126	1001	194	1267	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.60	0.52					0.46	0.13	0.29	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 7: Merrow Road & I-84 Eastbound Off Ramp/I-84 Eastbound On Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	13	147	15	4	33	130	699	15	18	832	349
Future Volume (vph)	297	13	147	15	4	33	130	699	15	18	832	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.913			0.997			0.956	
Flt Protected		0.954			0.986		0.950			0.950		
Satd. Flow (prot)	0	1777	1583	0	1677	0	1770	3529	0	1770	3383	0
Flt Permitted		0.759			0.735		0.113			0.358		
Satd. Flow (perm)	0	1414	1583	0	1250	0	210	3529	0	667	3383	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			83		36			3			108	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	14	160	16	4	36	141	760	16	20	904	379
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	160	0	56	0	141	776	0	20	1283	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	22.0	22.0	15.0	22.0	22.0		15.0	43.0		15.0	43.0	
Total Split (%)	27.5%	27.5%	18.8%	27.5%	27.5%		18.8%	53.8%		18.8%	53.8%	
Maximum Green (s)	17.7	17.7	11.0	17.7	17.7		11.0	37.3		11.0	37.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		17.7	29.0		17.7		53.7	48.6		48.0	41.3	
Actuated g/C Ratio		0.22	0.36		0.22		0.67	0.61		0.60	0.52	
v/c Ratio		1.08	0.26		0.18		0.51	0.36		0.04	0.71	
Control Delay		107.0	9.8		14.7		12.6	9.1		5.8	18.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		107.0	9.8		14.7		12.6	9.1		5.8	18.9	
LOS		F	A		B		B	A		A	B	
Approach Delay		75.7			14.7			9.7			18.7	
Approach LOS		E			B			A			B	
Queue Length 50th (ft)		~191	26		8		21	78		4	222	
Queue Length 95th (ft)		#348	62		38		52	152		m10	375	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		312	701		304		356	2147		595	1797	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		1.08	0.23		0.18		0.40	0.36		0.03	0.71	

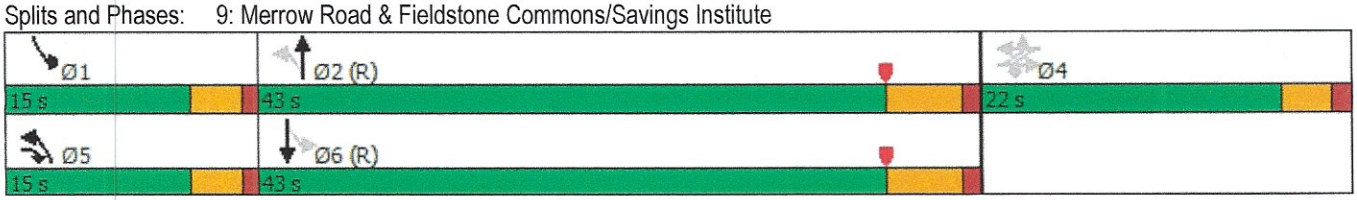
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 25.8		Intersection LOS: C	
Intersection Capacity Utilization 76.8%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1	1	1	1	2	1	833	1	1	987	12
Future Vol, veh/h	11	1	1	1	1	2	1	833	1	1	987	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	0	-	0	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1	1	1	1	2	1	905	1	1	1073	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1537	1990	543	1447	1996	453	1086	0	0	906	0	0
Stage 1	1082	1082	-	908	908	-	-	-	-	-	-	-
Stage 2	455	908	-	539	1088	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	79	60	484	92	60	554	638	-	-	747	-	-
Stage 1	232	292	-	296	352	-	-	-	-	-	-	-
Stage 2	554	352	-	494	290	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	77	60	484	90	60	554	638	-	-	747	-	-
Mov Cap-2 Maneuver	77	60	-	90	60	-	-	-	-	-	-	-
Stage 1	232	291	-	295	351	-	-	-	-	-	-	-
Stage 2	549	351	-	490	289	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	56.2	22.8	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	638	-	-	77	484	90	554	747	-	-
HCM Lane V/C Ratio	0.002	-	-	0.155	0.002	0.012	0.004	0.001	-	-
HCM Control Delay (s)	10.7	-	-	60.2	12.5	45.5	11.5	9.8	0	-
HCM Lane LOS	B	-	-	F	B	E	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0	0	0	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	14	16	6	3	90	17	633	1	114	766	108
Future Volume (vph)	106	14	16	6	3	90	17	633	1	114	766	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	220		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.984			0.877						0.982	
Flt Protected		0.962			0.997		0.950			0.950		
Satd. Flow (prot)	0	1763	0	0	1629	0	1770	3539	0	1770	3476	0
Flt Permitted		0.803			0.974		0.286			0.341		
Satd. Flow (perm)	0	1472	0	0	1591	0	533	3539	0	635	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			98						23	
Link Speed (mph)		30			30			40			30	
Link Distance (ft)		3873			3977			4860			450	
Travel Time (s)		88.0			90.4			82.8			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	15	17	7	3	98	18	688	1	124	833	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	0	0	108	0	18	689	0	124	950	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		custom	NA		custom	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4	4		8	8		2 5	2		1 6	6	

Lanes, Volumes, Timings
15: Merrow Road & Goose Lane/Rhodes Road

Fieldstone Ridge, Tolland, CT
2026 Combined Saturday Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0		5.0	5.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	14.5	14.5		10.5	10.5		10.5	21.5		9.0	21.5	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	40.0		12.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	50.0%		15.0%	48.8%	
Maximum Green (s)	22.5	22.5		22.5	22.5		7.5	33.5		8.0	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.5		3.5	4.5	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.5	2.0		0.5	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5			5.5		5.5	6.5		4.0	6.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		11.3			10.1		26.8	23.8		31.9	30.1	
Actuated g/C Ratio		0.23			0.20		0.54	0.48		0.65	0.61	
v/c Ratio		0.43			0.27		0.04	0.40		0.22	0.45	
Control Delay		22.8			8.0		5.8	13.5		5.9	9.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		22.8			8.0		5.8	13.5		5.9	9.4	
LOS		C			A		A	B		A	A	
Approach Delay		22.8			8.0			13.3			9.0	
Approach LOS		C			A			B			A	
Queue Length 50th (ft)		33			2		2	79		12	71	
Queue Length 95th (ft)		102			39		10	154		38	219	
Internal Link Dist (ft)		3793			3897			4780			370	
Turn Bay Length (ft)							100			220		
Base Capacity (vph)		719			823		508	2535		606	2443	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.20			0.13		0.04	0.27		0.20	0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 49.4			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 57.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: Merrow Road & Goose Lane/Rhodes Road

Exhibit 34
Traffic Operations Analysis Worksheets
IMPROVED Combined 2026 (Build) Peak Hours
Merrow Road at Fieldstone Commons/Savings Institute

Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

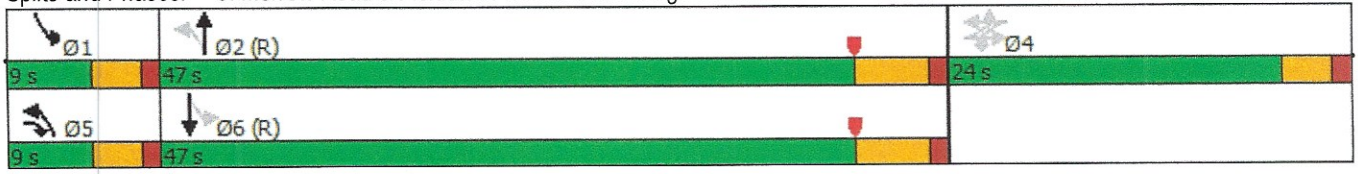
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	1	44	1	0	11	66	762	4	11	834	128
Future Volume (vph)	134	1	44	1	0	11	66	762	4	11	834	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.875			0.999			0.980	
Flt Protected		0.953			0.996		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1623	0	1770	3536	0	1770	3468	0
Flt Permitted		0.719			0.982		0.216			0.336		
Satd. Flow (perm)	0	1339	1583	0	1601	0	402	3536	0	626	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			48		91			1			31	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	1	48	1	0	12	72	828	4	12	907	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	48	0	13	0	72	832	0	12	1046	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	24.0	24.0	9.0	24.0	24.0		9.0	47.0		9.0	47.0	
Total Split (%)	30.0%	30.0%	11.3%	30.0%	30.0%		11.3%	58.8%		11.3%	58.8%	
Maximum Green (s)	19.7	19.7	5.0	19.7	19.7		5.0	41.3		5.0	41.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		13.1	22.4		13.1		57.8	55.1		55.4	49.7	
Actuated g/C Ratio		0.16	0.28		0.16		0.72	0.69		0.69	0.62	
v/c Ratio		0.67	0.10		0.04		0.19	0.34		0.02	0.48	
Control Delay		45.8	6.4		0.2		5.2	6.8		3.8	11.2	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		45.8	6.4		0.2		5.2	6.8		3.8	11.2	
LOS		D	A		A		A	A		A	B	
Approach Delay		36.1			0.3			6.6			11.1	
Approach LOS		D			A			A			B	
Queue Length 50th (ft)		70	0		0		8	67		1	188	
Queue Length 95th (ft)		119	21		0		24	171		m6	243	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		329	477		462		375	2436		505	2167	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.45	0.10		0.03		0.19	0.34		0.02	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 57.1%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	1	195	2	1	2	157	798	2	4	832	307
Future Volume (vph)	290	1	195	2	1	2	157	798	2	4	832	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.946						0.960	
Flt Protected		0.953			0.980		0.950			0.950		
Satd. Flow (prot)	0	1775	1583	0	1727	0	1770	3539	0	1770	3398	0
Flt Permitted		0.724			0.916		0.105			0.317		
Satd. Flow (perm)	0	1349	1583	0	1614	0	196	3539	0	590	3398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		2						83	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1	212	2	1	2	171	867	2	4	904	334
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	212	0	5	0	171	869	0	4	1238	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	29.0	29.0	11.0	29.0	29.0		11.0	42.0		9.0	40.0	
Total Split (%)	36.3%	36.3%	13.8%	36.3%	36.3%		13.8%	52.5%		11.3%	50.0%	
Maximum Green (s)	24.7	24.7	7.0	24.7	24.7		7.0	36.3		5.0	34.3	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		21.6	32.6		21.6		49.7	46.6		44.4	37.7	
Actuated g/C Ratio		0.27	0.41		0.27		0.62	0.58		0.56	0.47	
v/c Ratio		0.87	0.31		0.01		0.68	0.42		0.01	0.75	
Control Delay		51.9	11.3		16.6		25.6	11.3		9.8	24.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		51.9	11.3		16.6		25.6	11.3		9.8	24.3	
LOS		D	B		B		C	B		A	C	
Approach Delay		35.6			16.6			13.6			24.3	
Approach LOS		D			B			B			C	
Queue Length 50th (ft)		145	44		1		34	116		1	298	
Queue Length 95th (ft)		#267	87		9		#118	212		m2	381	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		416	689		499		259	2061		401	1644	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.76	0.31		0.01		0.66	0.42		0.01	0.75	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 22.5 Intersection LOS: C
Intersection Capacity Utilization 76.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute

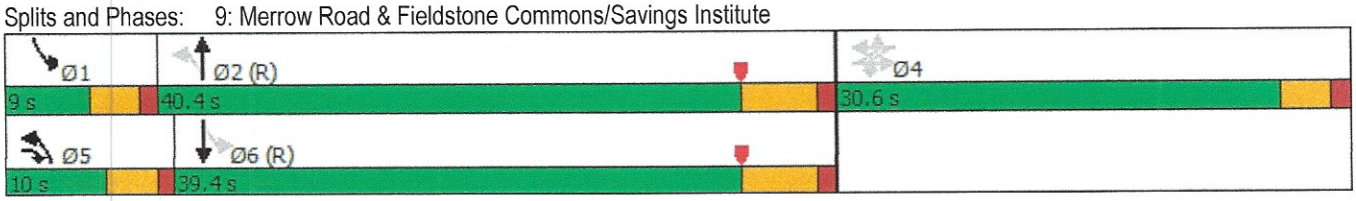
Lanes, Volumes, Timings
9: Merrow Road & Fieldstone Commons/Savings Institute

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	13	147	15	4	33	130	699	15	18	832	349
Future Volume (vph)	297	13	147	15	4	33	130	699	15	18	832	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		0	170		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.913			0.997			0.956	
Flt Protected		0.954			0.986		0.950			0.950		
Satd. Flow (prot)	0	1777	1583	0	1677	0	1770	3529	0	1770	3383	0
Flt Permitted		0.694			0.883		0.099			0.337		
Satd. Flow (perm)	0	1293	1583	0	1502	0	184	3529	0	628	3383	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62		36			3			100	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		3784			3904			990			600	
Travel Time (s)		103.2			106.5			16.9			10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	14	160	16	4	36	141	760	16	20	904	379
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	160	0	56	0	141	776	0	20	1283	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	custom	NA		custom	NA		custom	NA	
Protected Phases			5				5	2		1	6	
Permitted Phases	4	4	4 5	4	4		2 5	2		1 6	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	5	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	5.0	6.0	6.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	10.3	10.3	9.0	10.3	10.3		9.0	20.7		9.0	20.7	
Total Split (s)	30.6	30.6	10.0	30.6	30.6		10.0	40.4		9.0	39.4	
Total Split (%)	38.3%	38.3%	12.5%	38.3%	38.3%		12.5%	50.5%		11.3%	49.3%	
Maximum Green (s)	26.3	26.3	6.0	26.3	26.3		6.0	34.7		5.0	33.7	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.5		3.0	4.5	
All-Red Time (s)	1.3	1.3	1.0	1.3	1.3		1.0	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.3	4.0		4.3		4.0	5.7		4.0	5.7	
Lead/Lag			Lead				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		23.5	33.6		23.5		47.0	42.9		43.4	36.7	
Actuated g/C Ratio		0.29	0.42		0.29		0.59	0.54		0.54	0.46	
v/c Ratio		0.89	0.23		0.12		0.63	0.41		0.05	0.80	
Control Delay		53.0	9.1		10.3		25.3	13.3		10.4	26.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		53.0	9.1		10.3		25.3	13.3		10.4	26.3	
LOS		D	A		B		C	B		B	C	
Approach Delay		38.9			10.3			15.2			26.1	
Approach LOS		D			B			B			C	
Queue Length 50th (ft)		152	28		7		30	107		5	314	
Queue Length 95th (ft)		#289	62		31		#99	192		m11	#417	
Internal Link Dist (ft)		3704			3824			910			520	
Turn Bay Length (ft)							400			170		
Base Capacity (vph)		425	704		517		227	1894		411	1605	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.79	0.23		0.11		0.62	0.41		0.05	0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 66 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 24.5		Intersection LOS: C	
Intersection Capacity Utilization 76.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 9: Merrow Road & Fieldstone Commons/Savings Institute



Fieldstone Ridge
10 Fieldstone Commons
Tolland, Connecticut

STORMWATER MANAGEMENT REPORT

February 4, 2022
Revised March 23, 2022

PREPARED FOR: Fieldstone Ridge, LLC
1031 Hartford Turnpike
Vernon, Connecticut

PREPARED BY: Gardner & Peterson Associates, LLC
178 Hartford Turnpike
Tolland, Connecticut

TABLE OF CONTENTS

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Fieldstone Ridge

Summary:

This application proposes to construct twenty-one new multi-family buildings, a clubhouse building and a maintenance building on a 51-acre parcel located to the south of Fieldstone Commons road in Tolland. Access to the proposed development will be through the frontage on the west side of Fieldstone Commons with an emergency access through an existing easement through the shopping plaza located at 33 Fieldstone Commons. The new buildings will be serviced by public sanitary sewer and water services.

Existing Conditions:

Currently this parcel is wooded and is adjacent to a wetland system to the east, and a wetland system to the west and south adjacent to the Tolland Marsh and the Skungamaug River. The parcel abuts an existing shopping plaza to the north containing a grocery store and numerous retail uses. Currently, two drainage systems discharge onto this property. The first discharge is from the southerly 600-feet of Fieldstone Commons. This water is conveyed through a 15" RCP to a sediment chamber and then discharges to a stone level spreader, all of which is located within an easement in favor of the Town of Tolland. The second discharges water from the roof of the 75,000 square foot grocery store building located at 33 Fieldstone Commons. Water from this system is conveyed through an 18" RCP where it discharges to a large level spreader. The portion of this system that is located on this property falls within an easement in favor of the owner of 33 Fieldstone Commons.

This site is located at the top of a small sub-watershed that discharges water to the developed commercial property to the north, but mostly, to the surrounding wetland systems to the east, west and south. The entire site is located outside the 500-year flood zone as indicated on the available FEMA mapping, and is not located within the Shenipsit Lake Watershed or level A or level B aquifer areas as depicted on the Town of Tolland mapping system. The NRCS Web Soil Survey indicates that most of this site consists of Canton and Charlton, and Agawam fine sandy loams (Hydrologic Soil Group 'B') with smaller areas of Manchester and Gloucester gravelly sandy loams (Hydrologic Soil Group 'A') and Ninigret fine sandy loam (Hydrologic Soil Group 'C'). In the spring of 2021, eighteen test pits were evaluated on site to determine the depth to seasonal high groundwater, ledge and restrictive soil layers. Furthermore, samples were taken to determine the permeability rate of the sub soil in areas earmarked for stormwater infiltration. The test pits data is located on pages 8 & 9 of this report and confirms the existence of the Canton and Charlton, Agawam, Manchester, and Gloucester soils.

Stormwater Management:

The proposed stormwater management system has been designed based on the recommendations found within the "*Connecticut Department of Transportation Drainage Manual, 2000*", the "*2004 Connecticut Stormwater Quality Manual*" the "*Town of Tolland Low Impact Development and Stormwater Management Design Manual, Revised July 1, 2011*" and the *"2002 Connecticut Guidelines for Soil Erosion and Sediment Control"*. The goals of the stormwater management systems are to control stormwater peak rates of runoff, provide stormwater quality treatment where needed, and maintain pre-development hydrology.

The stormwater management system has been designed to mimic the pre-development conditions in regard to peak stormwater runoff and groundwater recharge. The system includes two stormwater basins, one located to the northwest of the site and the other to the southeast, and numerous stormwater infiltration chambers. The location of the infiltration chambers were selected to maintain pre-development annual groundwater volumes and the pre-development wetland habitats throughout the entire site. The chambers were designed to retain the 100-year frequency storm to the chambers and infiltrate the Groundwater Recharge Volume (GRv), Hydrologic Soil Group Approach, as described in the "*2004 Connecticut Stormwater Quality Manual*". This will ensure that water table levels, stream baseflow and wetland moisture levels will be maintained post-development. The GRv analyses indicate that with the use of the designed stormwater infiltration this project will maintain the pre-development GRv once constructed.

The northerly stormwater basin is located within an area of sandy soil with a deep seasonal groundwater table. This basin has been designed as a stormwater infiltration basin where the bottom of the basin provides a 3-foot vertical separation from the seasonal high groundwater. The basin has been designed such that the Water Quality Volume (WQv), as described in the "*2004 Connecticut Stormwater Quality Manual*", and all storms up to and including the 10-year storm will be retained within the basin and infiltrated in the underlying sandy soil. Flow from larger storms will exit the basin through one of two spillways. One-half of the field measured permeability rate of the underlying sandy soil was utilized as an exfiltration rate in the design of the basin. This basin collects runoff from the northerly portion of this site as well as the southerly most 600-feet of Fieldstone Commons. The site design includes re-routing the drainage system from Fieldstone Commons to discharge into this basin. The two culverts entering this basin, one from the Fieldstone Commons system and the other from the on-site system, will discharge into the basin in separate rip rap forebays. Each forebay was designed to contain at a minimum 10% of the WQv calculated for each culvert. The basin has been divided in two interconnected cells, one for the Fieldstone Commons runoff and the second for the site runoff. A new easement is proposed in favor of the Town of Tolland that will encompass the new drainage system from Fieldstone Commons to and including this basin. The Town of Tolland will have rights via this easement to maintain the Fieldstone Commons drainage system located on this property and the southerly potion of this basin as needed.

The drainage system commencing at the grocery store building on 33 Fieldstone Drive will also be relocated as part of this site construction. This system will discharge immediately south of the northerly stormwater basin with a designed outlet to prevent scour and erosion.

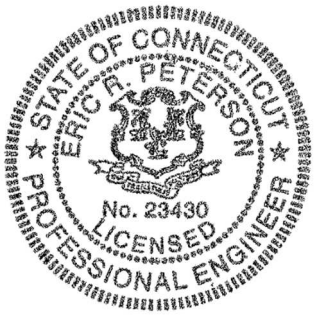
The southerly stormwater basin is also located in an area consisting of sandy soils with a relatively high field measured permeability rate. This basin was designed as a Wet Extended Detention Pond including wetland plantings for enhanced pollutant uptake and stormwater treatment. To provide enhanced stormwater treatment, the basin was design to retain the entire WQv below the lowest outlet. Furthermore, the forebay was designed like the northerly basin, to contain at a minimum 10% of the WQv. The outlet to this basin will consist of an outlet structure with various orifices to meter the peak flow and will discharge to a rip rap apron designed in accordance with the "*Connecticut Department of Transportation Drainage Manual, 2000*".

The design of the stormwater management system will result in a peak discharge off-site that will not exceed the pre-development conditions. Furthermore, the runoff to the North was also analyzed which resulted in a reduction of runoff to the drainage system at 33 Fieldstone Commons. Below is a tabulation of these findings:

Hydrograph \ Storm Frequency	2-Yr	10-Yr	100-Yr
#6: Total Proposed to South (cfs)	4.80	26.35	102.59
#7: Existing to South (cfs)	5.11	32.94	103.61
#8 Proposed to North (cfs)	5.01	7.08	9.89
#9 Existing to North (cfs)	5.89	8.39	11.83

Lastly, a Pollutant Renovation Analysis was conducted to determine the efficiency of the stormwater treatment systems designed for this project as described in section 4.5 of the "*Town of Tolland Low Impact Development and Stormwater Management Design Manual, Revised July 1, 2011*". The Town's manual provides a pollutant concentration for various land uses for Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Zinc (Zn), Total Petroleum Hydrocarbons (TPH), and Dissolved Inorganic Nitrogen (DIN) and the pollutant removal efficiencies for various stormwater systems. Pollutant removal efficiencies for certain devices were derived from other sources where not provided in the Town LID manual. The results of the pollutant renovation analysis indicate that the stormwater management system designed for this project meets the required minimum pollutant removal rates indicated in Table 4.4.a of the Town LID manual. The pollutant removal rates for the project are tabulated below:

Pollutant Type	TSS	TN	TP	Zn	TPH	DIN
Project Pollutant Removal Rate	94%	53%	62%	86%	87%	47%
Minimum Pollutant Removal Rate Required	90%	40%	60%	75%	80%	40%



Eric R. Peterson, P.E. 23430

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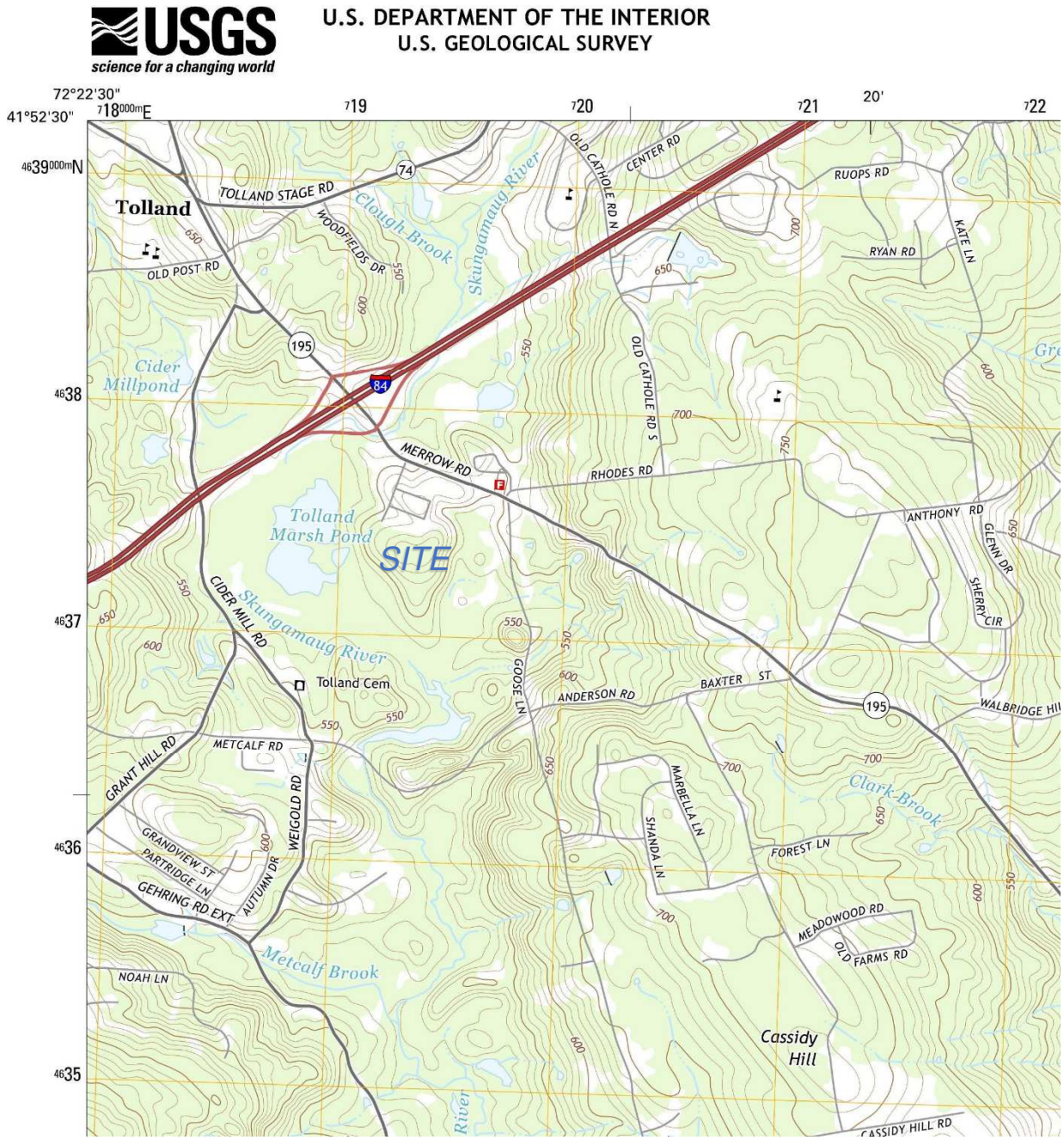
Job:	*9607 – Fieldstone Ridge*		
Sheet No:	*5*	*of*	*108*
Calculated By:	*ERP*	*Date*	*02/04/2022*
Checked By:		*Rev*	*03/23/2022*

USGS MAP: **Scale: 1:24,000**



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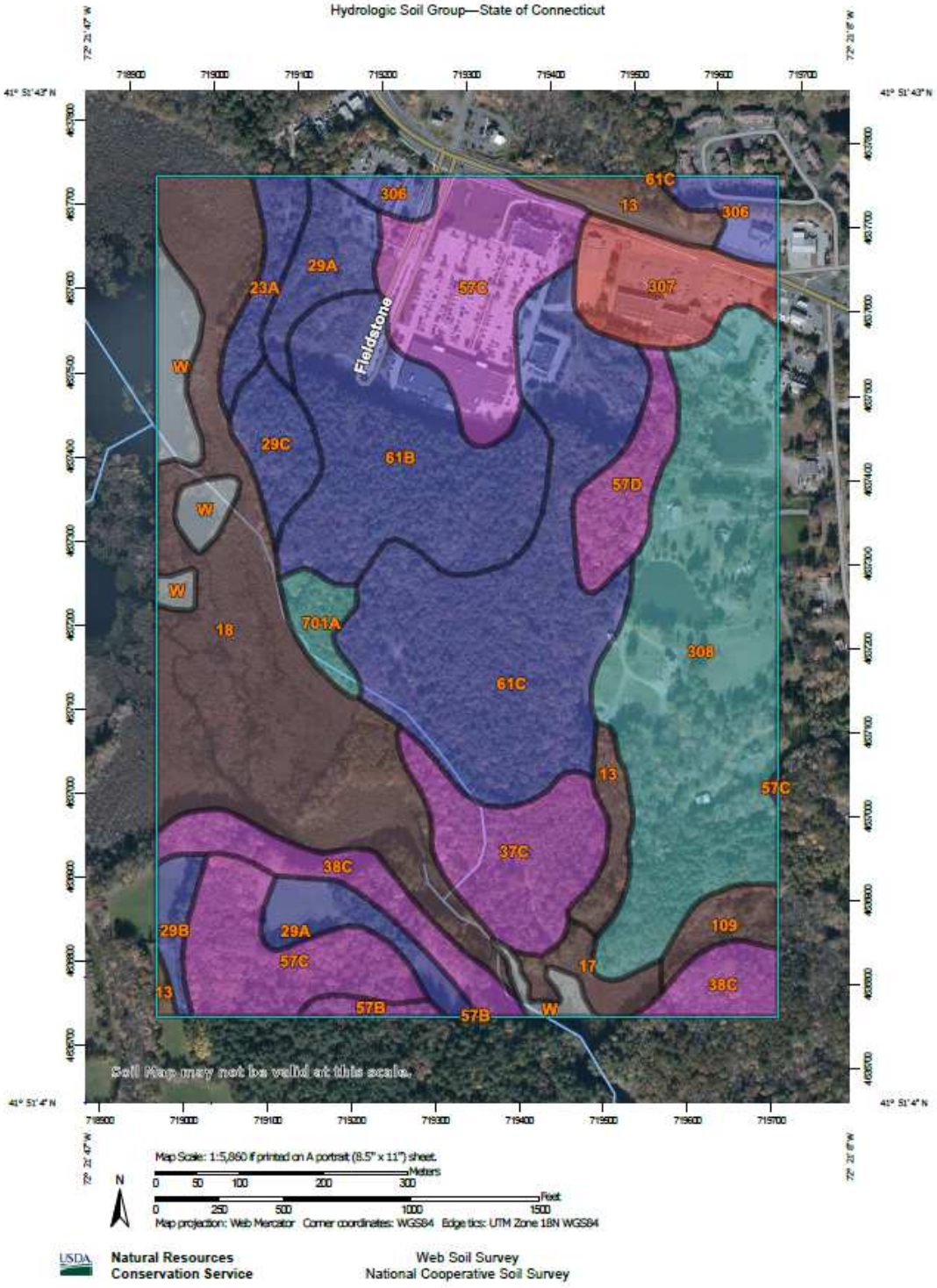
Calculated By:	*ERP*	*Date*	*02/04/2022*
Checked By:		*Rev*	*03/23/2022*

Hydrologic Soil Group Map:



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Sheet No:	*7*	*of*	*107*
Calculated By:	*ERP*	*Date*	*02/04/2022*
Checked By:		*Rev*	*03/23/2022*

Hydrologic Soil Group Legend:

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	2.2	1.7%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	1.5	1.2%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	25.4	19.8%
23A	Sudbury sandy loam, 0 to 5 percent slopes	B	2.4	1.9%
29A	Agawam fine sandy loam, 0 to 3 percent slopes	B	6.2	4.8%
29C	Agawam fine sandy loam, 8 to 15 percent slopes	B	3.3	2.5%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	A	8.3	6.5%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	6.2	4.9%
57B	Gloucester gravelly sandy loam, 3 to 8 percent slopes	A	3.9	3.0%
57C	Gloucester gravelly sandy loam, 8 to 15 percent slopes	A	9.4	7.3%
57D	Gloucester gravelly sandy loam, 15 to 25 percent slopes	A	4.2	3.3%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	B	17.3	13.5%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	25.2	19.6%
307	Urban land	D	0.4	0.3%
308	Udorthents, smoothed	C	7.5	5.8%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	2.0	1.5%
W	Water		3.0	2.3%
Totals for Area of Interest			**128.3**	**100.0%**

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Job:	*9607 – Fieldstone Ridge*		
Sheet No:	*8*	*of*	*108*
Calculated By:	*ERP*	*Date*	*02/04/2022*
Checked By:		*Rev*	*03/23/2022*

TEST PIT DATA:
OBSERVED BY E. PETERSON, P.E.
3/25/2021 & 3/26/2021

TEST PIT# 1
0-3" TOPSOIL
3-36" FINE SANDY LOAM
36-72" LIGHT BROWN FINE / MEDIUM SAND
NO MOTTLING NO GROUNDWATER
ROOTS TO 36" LEDGE AT 72"
PERM #12 AT 41" K=81 FT/DAY

TEST PIT# 2
0-4" TOPSOIL
4-15" YELLOW BROWN FINE SANDY LOAM
15-57" MEDIUM SAND WITH COBBLES, FIRM
57-99" MEDIUM SAND
ROOTS TO 57" MOTTLING AT 57"
SEEPAGE AT 78"
PERM #2 AT 36" K=100 FT/DAY

TEST PIT# 3
0-4" TOPSOIL
4-32" YELLOW BROWN FINE SANDY LOAM
32-120" GRAY FIRM SANDY TILL
RESTRICTIVE AT 32" ROOTS TO 24"
PERM #3 AT 24" K=5 FT/DAY

TEST PIT# 4
0-4" TOPSOIL
4-24" YELLOW BROWN FINE SANDY LOAM
24-96" GRAY SANDY TILL, FIRM
RESTRICTIVE AT 24" ROOTS TO 24"
PERM #70 AT 20" K=2.0 FT/DAY

TEST PIT# 5
0-6" TOPSOIL
6-36" FINE SANDY LOAM
36-90" GRAY SANDY TILL, FIRM
ROOTS TO 30" MOTTLING AT 36"
SEEPAGE AT 48"

TEST PIT# 6
0-4" TOPSOIL
4-42" VERY FINE SANDY LOAM
42-108" GRAY SANDY TILL, FIRM
ROOTS TO 42" NO SEEPAGE
PERM #12 AT 30" K=2.7 FT/DAY

TEST PIT# 7
0-4" TOPSOIL
4-31" VERY FINE SANDY LOAM YELLOW BROWN
31-108" GRAY SANDY TILL, FIRM
(SAME AT TP #6)
ROOTS TO 31" NO SEEPAGE

TEST PIT# 8
0-2" TOPSOIL
2-21" RED BROWN FINE SANDY LOAM WITH STONES
21-31" YELLOW BROWN SAND, FIRM
31-102" GRAY COMPACT TILL
ROOTS TO 21" MOTTLING AT 31"
SEEPAGE AT 72"
PERM #7 AT 18" K=12 FT/DAY

TEST PIT# 9
0-2" TOPSOIL
2-30" YELLOW BROWN FINE SANDY LOAM
30-42" MEDIUM SAND
42-66" COMPACT GRAVEL
66-108" GRAY TILL
RESTRICTIVE AT 42" ROOTS TO 30"

TEST PIT# 10
0-3" TOPSOIL
3-19" FINE SANDY LOAM
19-28" LIGHT BROWN LOAMY SAND
28-40" GRAY FINE SAND LOOSE
40-108" GRAY FINE SAND SOMEWHAT FIRM, STRATIFIED
EXPECTED GROUNDWATER AT 40"
PERM #2 AT 32" K=52 FT/DAY

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Checked By:		*Rev*	*03/23/2022*

TEST PIT DATA (continued)

TEST PIT# 11
0-4" TOPSOIL
4-27" FINE SANDY LOAM
27-36" LIGHT BROWN LOAMY SAND
36-111" GRAY SANDY TILL, FIRM
ROOTS TO 36"
PERM #70 AT 33" K=50 FT/DAY

TEST PIT# 12
0-4" TOPSOIL
4-28" FINE SANDY LOAM
28-36" LIGHT BROWN LOAMY SAND WITH COBBLES
36-126" GRAY SANDY TILL, FIRM
ROOTS TO 36"
PERM #7 AT 32" K=50 FT/DAY

TEST PIT# 13
0-4" TOPSOIL
4-38" FINE SANDY LOAM
38-78" LIGHT BROWN LOAMY SAND
78-144" GRAY SANDY TILL, FIRM
ROOTS TO 78"
PERM #1 AT 60" K=31 FT/DAY

TEST PIT# 14
0-3" TOPSOIL
3-27" FINE SANDY LOAM
27-100" GRAY SANDY TILL, FIRM
RESTRICTIVE AT 27" ROOTS TO 27"

TEST PIT# 15
0-4" TOPSOIL
4-18" FINE SANDY LOAM
18-116" GRAY SANDY TILL
RESTRICTIVE AT 36"
ROOTS TO 18"
PERM #3 AT 15" K=5.4 FT/DAY

TEST PIT# 16
0-4" TOPSOIL
4-18" FINE SANDY LOAM
18-156" GRAY SANDY TILL, FIRM
RESTRICTIVE AT 18" ROOTS TO 18"

TEST PIT# 17
0-6" TOPSOIL
6-36" FINE SANDY LOAM
36-168" GRAY SANDY TILL, FIRM
ROOTS TO 36" MOTTLING AT 36"

TEST PIT# 18
0-6" TOPSOIL
6-25" FINE SANDY LOAM
25-150" GRAY SANDY TILL, FIRM
ROOTS TO 25"

TEST PIT# 20
0-5" TOPSOIL
5-31" VERY FINE SANDY LOAM
31-84" GRAY SANDY TILL, FIRM
ROOTS TO 31" NO SEEPAGE

TEST PIT #21
0-5" TOPSOIL
5-42" LT. BROWN LOAMY SAND
42-100" GRAY FINE SAND W/ GRAVEL LENSES
MOTTLING AT 77" SEEPAGE AT 96"

TEST PIT #22
0-5" TOPSOIL
5-28" LT. BROWN LOAMY SAND
28-96" GRAY FINE SAND, LOOSE
MOTTLING AT 72" SEEPAGE AT 84"

TEST PIT #23
0-5" TOPSOIL
5-22" LT. BROWN LOAMY SAND
22-72" GRAY FINE SAND LOOSE
MOTTLING AT 40" SEEPAGE AT 60"

TEST PIT #24:
0-5" TOPSOIL
5-28" LT. BROWN FINE SANDY LOAM
28-72" GRAY SAND TILL, FIRM
MOTTLING @ 28" NO SEEPAGE/LEDGE

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 13

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	46.0		54.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	5.00		3.20		0.00		
Travel Time (min)	**=**	**5.26**	**+**	**0.61**	**+**	**0.00**	**=**	**5.86**
Shallow Concentrated Flow								
Flow length (ft)	=	221.00		0.00		0.00		
Watercourse slope (%)	=	3.20		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	3.64		0.00		0.00		
Travel Time (min)	**=**	**1.01**	**+**	**0.00**	**+**	**0.00**	**=**	**1.01**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 6.88 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 14

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	1.50		0.00		0.00		
Travel Time (min)	**=**	**15.84**	**+**	**0.00**	**+**	**0.00**	**=**	**15.84**
Shallow Concentrated Flow								
Flow length (ft)	=	59.00		134.00		0.00		
Watercourse slope (%)	=	8.00		2.00		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	4.56		2.28		0.00		
Travel Time (min)	**=**	**0.22**	**+**	**0.98**	**+**	**0.00**	**=**	**1.19**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 17.03 min

TR55 Tc Worksheet

CB 15

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	60.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	1.00		0.00		0.00		
Travel Time (min)	**=**	**12.38**	**+**	**0.00**	**+**	**0.00**	**=**	**12.38**
Shallow Concentrated Flow								
Flow length (ft)	=	332.00		0.00		0.00		
Watercourse slope (%)	=	1.10		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.13		0.00		0.00		
Travel Time (min)	**=**	**2.60**	**+**	**0.00**	**+**	**0.00**	**=**	**2.60**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 14.97 min

TR55 Tc Worksheet

CB 21

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	56.0		44.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	4.60		6.70		0.00		
Travel Time (min)	**=**	**6.36**	**+**	**0.38**	**+**	**0.00**	**=**	**6.75**
Shallow Concentrated Flow								
Flow length (ft)	=	133.00		0.00		0.00		
Watercourse slope (%)	=	6.70		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	5.26		0.00		0.00		
Travel Time (min)	**=**	**0.42**	**+**	**0.00**	**+**	**0.00**	**=**	**0.42**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.17 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 22

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.240		0.011		
Flow length (ft)	=	16.0		52.0		32.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		3.27		
Land slope (%)	=	1.00		33.00		6.30		
Travel Time (min)	**=**	**4.30**	**+**	**2.73**	**+**	**0.30**	**=**	**7.33**
Shallow Concentrated Flow								
Flow length (ft)	=	116.00		0.00		0.00		
Watercourse slope (%)	=	6.30		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	5.10		0.00		0.00		
Travel Time (min)	**=**	**0.38**	**+**	**0.00**	**+**	**0.00**	**=**	**0.38**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.71 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 24

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	3.50		0.00		0.00		
Travel Time (min)	**=**	**11.29**	**+**	**0.00**	**+**	**0.00**	**=**	**11.29**
Shallow Concentrated Flow								
Flow length (ft)	=	100.00		0.00		0.00		
Watercourse slope (%)	=	4.50		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	4.31		0.00		0.00		
Travel Time (min)	**=**	**0.39**	**+**	**0.00**	**+**	**0.00**	**=**	**0.39**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 11.67 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 26

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	74.0		26.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	9.00		1.50		0.00		
Travel Time (min)	**=**	**6.08**	**+**	**0.46**	**+**	**0.00**	**=**	**6.54**
Shallow Concentrated Flow								
Flow length (ft)	=	4.00		0.00		0.00		
Watercourse slope (%)	=	1.50		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.49		0.00		0.00		
Travel Time (min)	**=**	**0.03**	**+**	**0.00**	**+**	**0.00**	**=**	**0.03**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 6.56 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 33

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	10.00		0.00		0.00		
Travel Time (min)	**=**	**7.42**	**+**	**0.00**	**+**	**0.00**	**=**	**7.42**
Shallow Concentrated Flow								
Flow length (ft)	=	42.00		0.00		0.00		
Watercourse slope (%)	=	16.00		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.45		0.00		0.00		
Travel Time (min)	**=**	**0.11**	**+**	**0.00**	**+**	**0.00**	**=**	**0.11**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.52 min

TR55 Tc Worksheet

CB 34

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	11.00		0.00		0.00		
Travel Time (min)	**=**	**7.14**	**+**	**0.00**	**+**	**0.00**	**=**	**7.14**
Shallow Concentrated Flow								
Flow length (ft)	=	10.00		0.00		0.00		
Watercourse slope (%)	=	11.00		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	5.35		0.00		0.00		
Travel Time (min)	**=**	**0.03**	**+**	**0.00**	**+**	**0.00**	**=**	**0.03**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.17 min

TR55 Tc Worksheet

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CB 35

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	53.0		30.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	2.00		1.50		0.00		
Travel Time (min)	**=**	**8.49**	**+**	**0.51**	**+**	**0.00**	**=**	**9.01**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 9.01 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 36

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	70.0		30.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	1.50		1.50		0.00		
Travel Time (min)	**=**	**11.91**	**+**	**0.51**	**+**	**0.00**	**=**	**12.42**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 12.42 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 40

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	4.00		0.00		0.00		
Travel Time (min)	**=**	**10.70**	**+**	**0.00**	**+**	**0.00**	**=**	**10.70**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 10.70 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 41

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	37.0		52.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	4.00		1.50		0.00		
Travel Time (min)	**=**	**4.83**	**+**	**0.80**	**+**	**0.00**	**=**	**5.63**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 5.63 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 42

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	47.0		52.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	3.20		1.50		0.00		
Travel Time (min)	**=**	**6.39**	**+**	**0.80**	**+**	**0.00**	**=**	**7.19**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.19 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 43

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	65.0		45.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	3.00		1.00		0.00		
Travel Time (min)	**=**	**8.50**	**+**	**0.83**	**+**	**0.00**	**=**	**9.34**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 9.34 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 48

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	52.0		48.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	4.40		2.40		0.00		
Travel Time (min)	**=**	**6.10**	**+**	**0.62**	**+**	**0.00**	**=**	**6.72**
Shallow Concentrated Flow								
Flow length (ft)	=	100.00		0.00		0.00		
Watercourse slope (%)	=	2.40		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	3.15		0.00		0.00		
Travel Time (min)	**=**	**0.53**	**+**	**0.00**	**+**	**0.00**	**=**	**0.53**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.25 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 49

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**14.12**	**+**	**0.00**	**+**	**0.00**	**=**	**14.12**
Shallow Concentrated Flow								
Flow length (ft)	=	200.00		0.00		0.00		
Watercourse slope (%)	=	2.80		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.70		0.00		0.00		
Travel Time (min)	**=**	**1.23**	**+**	**0.00**	**+**	**0.00**	**=**	**1.23**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 15.35 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 50

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	32.0		68.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	2.50		1.10		0.00		
Travel Time (min)	**=**	**5.19**	**+**	**1.12**	**+**	**0.00**	**=**	**6.31**
Shallow Concentrated Flow								
Flow length (ft)	=	129.00		0.00		0.00		
Watercourse slope (%)	=	1.10		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.13		0.00		0.00		
Travel Time (min)	**=**	**1.01**	**+**	**0.00**	**+**	**0.00**	**=**	**1.01**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.32 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 51

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	95.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	1.80		0.00		0.00		
Travel Time (min)	**=**	**14.13**	**+**	**0.00**	**+**	**0.00**	**=**	**14.13**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 14.13 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 52

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	6.00		0.00		0.00		
Travel Time (min)	**=**	**9.10**	**+**	**0.00**	**+**	**0.00**	**=**	**9.10**
Shallow Concentrated Flow								
Flow length (ft)	=	282.00		0.00		0.00		
Watercourse slope (%)	=	1.80		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.73		0.00		0.00		
Travel Time (min)	**=**	**1.72**	**+**	**0.00**	**+**	**0.00**	**=**	**1.72**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 10.82 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 55

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	31.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	1.00		0.00		0.00		
Travel Time (min)	**=**	**7.30**	**+**	**0.00**	**+**	**0.00**	**=**	**7.30**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.30 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 61

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	65.0		35.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	5.60		1.70		0.00		
Travel Time (min)	**=**	**6.63**	**+**	**0.55**	**+**	**0.00**	**=**	**7.18**
Shallow Concentrated Flow								
Flow length (ft)	=	149.00		0.00		0.00		
Watercourse slope (%)	=	1.70		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.65		0.00		0.00		
Travel Time (min)	**=**	**0.94**	**+**	**0.00**	**+**	**0.00**	**=**	**0.94**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 8.11 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 62

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	45.0		55.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	5.00		1.70		0.00		
Travel Time (min)	**=**	**5.17**	**+**	**0.79**	**+**	**0.00**	**=**	**5.96**
Shallow Concentrated Flow								
Flow length (ft)	=	43.00		0.00		0.00		
Watercourse slope (%)	=	1.70		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.65		0.00		0.00		
Travel Time (min)	**=**	**0.27**	**+**	**0.00**	**+**	**0.00**	**=**	**0.27**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 6.23 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 65

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	62.0		38.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	10.00		1.50		0.00		
Travel Time (min)	**=**	**5.06**	**+**	**0.62**	**+**	**0.00**	**=**	**5.68**
Shallow Concentrated Flow								
Flow length (ft)	=	16.00		0.00		0.00		
Watercourse slope (%)	=	1.50		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.49		0.00		0.00		
Travel Time (min)	**=**	**0.11**	**+**	**0.00**	**+**	**0.00**	**=**	**0.11**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 5.79 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 71

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.240		0.011		
Flow length (ft)	=	65.0		35.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	7.40		33.00		0.00		
Travel Time (min)	**=**	**5.93**	**+**	**1.99**	**+**	**0.00**	**=**	**7.91**
Shallow Concentrated Flow								
Flow length (ft)	=	10.00		0.00		0.00		
Watercourse slope (%)	=	33.00		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	9.27		0.00		0.00		
Travel Time (min)	**=**	**0.02**	**+**	**0.00**	**+**	**0.00**	**=**	**0.02**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 7.93 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 72

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	82.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	9.00		0.00		0.00		
Travel Time (min)	**=**	**6.60**	**+**	**0.00**	**+**	**0.00**	**=**	**6.60**
Shallow Concentrated Flow								
Flow length (ft)	=	291.00		0.00		0.00		
Watercourse slope (%)	=	2.20		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	3.02		0.00		0.00		
Travel Time (min)	**=**	**1.61**	**+**	**0.00**	**+**	**0.00**	**=**	**1.61**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 8.21 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 81

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	76.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	12.00		0.00		0.00		
Travel Time (min)	**=**	**5.54**	**+**	**0.00**	**+**	**0.00**	**=**	**5.54**
Shallow Concentrated Flow								
Flow length (ft)	=	0.00		0.00		0.00		
Watercourse slope (%)	=	0.00		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	0.00		0.00		0.00		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 5.54 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

FieldstoneCommons

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	48.0		52.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		3.27		0.00		
Land slope (%)	=	3.50		2.10		0.00		
Travel Time (min)	**=**	**6.27**	**+**	**0.70**	**+**	**0.00**	**=**	**6.97**
Shallow Concentrated Flow								
Flow length (ft)	=	112.00		0.00		0.00		
Watercourse slope (%)	=	2.20		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	3.02		0.00		0.00		
Travel Time (min)	**=**	**0.62**	**+**	**0.00**	**+**	**0.00**	**=**	**0.62**
Channel Flow								
X sectional flow area (sqft)	=	1.23		1.23		0.00		
Wetted perimeter (ft)	=	3.93		3.93		0.00		
Channel slope (%)	=	0.30		0.50		0.00		
Manning's n-value	=	0.013		0.013		0.015		
Velocity (ft/s)	=	2.88		3.72		0.00		
Flow length (ft)	=	229.0		331.0		0.0		
Travel Time (min)	**=**	**1.33**	**+**	**1.48**	**+**	**0.00**	**=**	**2.81**

Total Travel Time, Tc ..... 10.40 min

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

CB 91

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	4.50		0.00		0.00		
Travel Time (min)	**=**	**10.21**	**+**	**0.00**	**+**	**0.00**	**=**	**10.21**
Shallow Concentrated Flow								
Flow length (ft)	=	130.00		0.00		0.00		
Watercourse slope (%)	=	2.30		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	2.45		0.00		0.00		
Travel Time (min)	**=**	**0.89**	**+**	**0.00**	**+**	**0.00**	**=**	**0.89**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 11.09 min

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *39* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

GUTTER FLOW ANALYSIS

AI Entering Catch Basin	0.28	0.26	0.41	0.06	0.24	0.27	0.25	0.13	0.06	0.18	0.13	0.13	0.44	0.32	0.23	0.17	0.16	0.14	0.15	0.11	0.12	
AI Bypassing Inlet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Q Bypassing Inlet (cfs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Width of Flow (ft)	7	6.5	6	3.5	6	6.5	6.2	5.0	3.5	5.5	5	3.8	7	5.9	6	5.2	5.2	5.0	3.5	3	3.5	
Depth of Flow at Gutter (ft)	0.2	0.2	0.19	0.1	0.19	0.2	0.2	0.16	0.11	0.18	0.16	0.12	0.2	0.19	0.19	0.17	0.17	0.16	0.11	0.1	0.11	
Cross Slope fo Shoulder (%)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Grade of Gutter (%)	1	1	3	2	1	1	1	1	2	1	1	4	1	1	1	1	1	1	8	8	6	
Q To Inlet (cfs)	1.7	1.6	2.5	0.4	1.4	1.6	1.5	0.8	0.4	1.1	0.8	0.7	1.7	1.3	1.4	1.0	1.0	0.8	0.9	0.6	0.6	
10yr Rainfall Intensity (in/hr)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	3.8	4.0	6.0	6.0	6.0	6.0	6.0	5.5	5.3	
Total AI	0.28	0.26	0.41	0.06	0.24	0.27	0.25	0.13	0.06	0.18	0.13	0.13	0.44	0.32	0.23	0.17	0.16	0.14	0.15	0.11	0.12	
Sum AI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AI	0.28	0.26	0.41	0.06	0.24	0.27	0.25	0.13	0.06	0.18	0.13	0.13	0.44	0.32	0.23	0.17	0.16	0.14	0.15	0.11	0.12	
Runoff Coeficient	0.90	0.90	0.59	0.63	0.53	0.88	0.90	0.77	0.90	0.63	0.77	0.65	0.47	0.68	0.90	0.87	0.84	0.90	0.56	0.75	0.53	
Area (Acres)	0.31	0.29	0.69	0.1	0.45	0.31	0.28	0.17	0.07	0.29	0.17	0.2	0.94	0.47	0.25	0.19	0.19	0.15	0.26	0.15	0.22	
Time To Inlet (Min)	5	5	5	5	5	5	5	5	5	5	5	7	17	15	5	5	5	5	5	7	8	
Inlet Number	CB 1	CB 2	CB 3	CB 4	CB 5	CB 6	CB 7	CB 8	CB 9	CB 11	CB 12	CB 13	CB 14	CB 15	CB 16	CB 17	CB 18	CB 19	CB 20	CB 21	CB 22	

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *40* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

GUTTER FLOW ANALYSIS

AI Entering Catch Basin	0.05	0.16	0.19	0.16	0.11	0.04	0.18	0.08	0.24	0.2	0.23	0.16	0.26	0.19			0.05	0.28	0.3	0.05	0.19	0.1
AI Bypassing Inlet	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0
Q Bypassing Inlet (cfs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0
Width of Flow (ft)	2.4	3.7	5.5	5.1	4	2.5	5	3.5	6	5.7	2.6	2.4	5.9	5.1			2.2	6.5	7	3.5	2.5	2.1
Depth of Flow at Gutter (ft)	0.07	0.12	0.17	0.16	0.13	0.08	0.16	0.11	0.19	0.18	0.28	0.25	0.19	0.16			0.12	0.2	0.2	0.11	0.25	0.23
Cross Slope fo Shoulder (%	3	3	3	3	3	3	3	3	3	3	10	10	3	3			5	3	3	3	10	10
Grade of Gutter (%)	8	5	1	1	3	3	2	1	1	1	1	1	1	1			1	1	1	1	1	1
Q To Inlet (cfs)	0.3	0.7	1.1	0.9	0.7	0.2	1.1	0.5	1.4	1.2	1.2	0.9	1.3	0.9			0.2	1.6	1.7	0.3	1.1	0.6
10yr Rainfall Intensity (in/hr)	6.0	4.5	6.0	5.5	6.0	6.0	6.0	6.0	6.0	6.0	5.3	5.5	5.1	4.5			4.7	5.8	5.5	5.1	6.0	6.0
Total AI	0.05	0.16	0.19	0.16	0.11	0.04	0.18	0.08	0.24	0.20	0.23	0.16	0.26	0.19			0.05	0.28	0.30	0.05	0.19	0.10
Sum AI	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0
AI	0.05	0.16	0.19	0.16	0.11	0.04	0.18	0.08	0.24	0.2	0.23	0.16	0.26	0.19			0.05	0.28	0.3	0.05	0.19	0.1
Runoff Coeficient	0.90	0.52	0.62	0.73	0.86	0.63	0.58	0.79	0.84	0.90	0.46	0.52	0.75	0.75			0.38	0.66	0.77	0.53	0.70	0.68
Area (Acres)	0.05	0.3	0.31	0.22	0.13	0.06	0.31	0.1	0.29	0.22	0.51	0.3	0.34	0.25			0.12	0.43	0.39	0.09	0.27	0.15
Time To Inlet (Min)	5	12	5	7	5	5	5	5	5	5	8	7	9	12			11	6	7	9	5	5
Inlet Number	CB 23	CB 24	CB 25	CB 26	CB 27	CB 28	CB 29	CB 30	CB 31	CB 32	CB 33	CB 34	CB 35	CB 36			CB 40	CB 41	CB 42	CB 43	CB 44	CB 45

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *41* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

GUTTER FLOW ANALYSIS

AI Entering Catch Basin	0.27	0.26	0.16	0.30	0.23	0.13	0.29	0.28	0.29	0.03	0.26	0.25	0.10	0.31	0.27	0.25	0.11	0.24	0.21	0.06	0.21	
AI Bypassing Inlet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	
Q Bypassing Inlet (cfs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	
Width of Flow (ft)	6.5	6.5	4.5	5.7	5.9	4.5	3.0	7.0	7.0	2.7	6.5	6.2	4.0	7.0	6.5	5.9	3.6	6.0	5.9	3.5	5.2	
Depth of Flow at Gutter (ft)	0.20	0.20	0.13	0.18	0.19	0.13	0.27	0.20	0.20	0.08	0.20	0.20	0.12	0.20	0.20	0.19	0.11	0.19	0.19	0.11	0.16	
Cross Slope fo Shoulder (%	3	3	3	3	3	3	9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Grade of Gutter (%)	1	1	2	1	1	1	1	1	1	2	1	1	2	1	1	3	3	1	1	2	2	
Q To Inlet (cfs)	1.6	1.6	0.9	1.2	1.3	0.6	1.4	1.7	1.7	0.2	1.6	1.5	0.6	1.9	1.6	1.3	0.6	1.4	1.3	0.4	1.3	
10yr Rainfall Intensity (in/hr)	6.0	6.0	5.5	4.0	5.5	4.2	4.7	6.0	6.0	5.5	6.0	6.0	6.0	6.0	6.0	5.3	5.8	6.0	6.0	6.0	5.8	
Total AI	0.27	0.26	0.16	0.30	0.23	0.13	0.29	0.28	0.29	0.03	0.26	0.25	0.10	0.31	0.27	0.25	0.11	0.24	0.21	0.06	0.23	
Sum AI	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
AI	0.27	0.26	0.16	0.30	0.23	0.13	0.29	0.28	0.29	0.03	0.26	0.25	0.10	0.31	0.27	0.25	0.11	0.24	0.21	0.06	0.23	
Runoff Coeficient	0.88	0.90	0.59	0.55	0.69	0.61	0.44	0.77	0.74	0.53	0.90	0.90	0.70	0.79	0.82	0.59	0.58	0.72	0.79	0.72	0.62	
Area (Acres)	0.31	0.29	0.27	0.54	0.34	0.21	0.67	0.37	0.39	0.06	0.29	0.28	0.14	0.39	0.33	0.43	0.19	0.33	0.26	0.09	0.37	
Time To Inlet (Min)	5	5	7	15	7	14	11	5	5	7	5	5	5	5	5	8	6	5	5	5	6	
Inlet Number	CB 46	CB 47	CB 48	CB 49	CB 50	CB 51	CB 52	CB 53	CB 54	CB 55	CB 56	CB 57	CB 58	CB 59	CB 60	CB 61	CB 62	CB 63	CB 64	CB 65	CB 66	

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *42* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

GUTTER FLOW ANALYSIS

AI Entering Catch Basin	0.05	0.1	0.23	0.2	0.11	0.33	0.13	0.29	0.01	0.03	0.08	0.31	0.06	0.03	0.09	0.07			0.74		1.56	0.26
AI Bypassing Inlet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0		0	0
Q Bypassing Inlet (cfs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0		0	0
Width of Flow (ft)	3	4.5	6	5.7	1.4	6	4.5	7	2	2.5	3.7	5.5	1.2	1.2	2.7	3.5						5
Depth of Flow at Gutter (ft)	0.09	0.13	0.19	0.18	0.15	0.18	0.14	0.2	0.06	0.07	0.11	0.18	0.12	0.12	0.08	0.1						0.16
Cross Slope fo Shoulder (%	3	3	3	3	10	3	3	3	3	3	3	3	10	10	3	3						3
Grade of Gutter (%)	2	1	1	1	10	2	2	1	2	2	2	4	10	2	10	2						2
Q To Inlet (cfs)	0.3	0.6	1.4	1.2	0.6	1.8	0.8	1.7	0.1	0.2	0.5	1.9	0.4	0.2	0.5	0.4			3.6		9.4	1.2
10yr Rainfall Intensity (in/hr)	6.0	6.0	6.0	6.0	5.3	5.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.8	6.0			4.8		6.0	4.7
Total AI	0.05	0.1	0.23	0.2	0.11	0.33	0.13	0.29	0.01	0.03	0.08	0.31	0.06	0.03	0.09	0.07			0.74		1.56	0.26
Sum AI	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0			0		0	0
AI	0.05	0.1	0.23	0.2	0.11	0.31	0.13	0.29	0.01	0.03	0.08	0.31	0.06	0.03	0.09	0.07			0.74		1.56	0.26
Runoff Coeficient	0.90	0.70	0.75	0.81	0.42	0.54	0.83	0.81	0.90	0.90	0.75	0.85	0.66	0.53	0.63	0.65			0.68		0.90	0.37
Area (Acres)	0.06	0.14	0.30	0.25	0.25	0.58	0.16	0.36	0.01	0.03	0.11	0.36	0.09	0.06	0.14	0.11		FIELDSTONE COMMONS	1.09		1.73	0.70
Time To Inlet (Min)	5	5	5	5	8	8	5	5	5	5	5	5	5	5	6	5			10		5	11
Inlet Number	CB 67	CB 68	CB 69	CB 70	CB 71	CB 72	CB 73	CB 74	CB 75	CB 76	CB 77	CB 78	CB 79	CB 80	CB 81	CB 82			STMH		BIG Y	91

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *43* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

STORM SEWER DESIGN

N'	0.013	0.013	0.013	0.013	0.012	0.012	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	
Headwater (ft)	0.7	1.0	0.9	1.4	1.5	1.5	0.7	1.0	0.5	0.2	1.2	1.4	1.6	1.7	0.7	1.5	0.6	0.9	1.0	1.2	2.2	2.2				
Full Capacity (cfs)	4.7	4.8	4.9	7.9	11.4	21.2	4.7	10.1	4.9	10.4	6.5	5.4	6.6	6.4	9.4	33.2	4.7	4.7	4.7	20.4	11.2	31.2				
Average Velocity (fps)	3.8	3.9	4	4.5	6.5	12	3.8	8.2	4	8.5	5.3	4.4	5.4	5.2	7.7	18.8	3.8	3.8	3.8	16.6	6.4	17.6				
Slope (%)	0.53	0.55	0.58	0.56	1.00	3.45	0.53	2.41	0.57	2.60	1.02	0.70	1.03	0.97	2.12	9.95	0.52	0.52	0.52	9.95	1.14	8.76				
Length of Pipe (ft)	95	91	86	107	10	62	95	139	70	42	98	95	58	62	24	124	95	115	95	124	22	113				
Pipe Size (in)	15	15	15	18	18	18	15	15	15	15	15	15	15	15	15	18	15	15	15	15	18	18				
Q In System (cfs)	1.7	3.2	2.5	6.1	7.3	7.3	1.6	3.1	0.8	0.4	4.3	5.2	5.9	6.3	1.7	7.3	1.4	2.4	3.4	4.1	10.5	10.9				
10yr Rainfall Intensity (in	6	6	6	6	5.8	5.8	6	6	6	6	6	5.8	5.8	5.5	3.8	3.8	6	6	6	5.8	3.8	3.8				
Sum AI In System	0.28	0.54	0.41	1.01	1.25	1.25	0.27	0.52	0.13	0.06	0.71	0.89	1.02	1.15	0.44	1.91	0.23	0.4	0.56	0.7	2.76	2.87				
AI Entering Catch Basin	0.28	0.26	0.41	0.06	0.24	0	0.27	0.25	0.13	0.06	0	0.18	0.13	0.13	0.44	0.32	0.23	0.17	0.16	0.14	0.15	0.11				
Accumulated Time (min)	5	5	5	5	6	6	5	5	5	5	5	6	6	7	17	17	5	5	5	6	17	17				
Time In Pipe (sec)	25	23	22	24	2	5	25	17	18	5	18	22	11	12	3	7	25	30	25	7	3	6				
Time To Inlet (Min)	5	5	5	5	5	0	5	5	5	5	0	5	5	7	17	15	5	5	5	5	5	7				
Line Segment	1-2	2-4	3-4	4-5	5-5A	5A-CHAMBERS	6-7	7-10	8-10	9-10	10-11	11-12	12-13	13-15	14-15	15-20	16-17	17-18	18-19	19-20	20-21	21-23				

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *44* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

STORM SEWER DESIGN

N'	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013			0.013	0.013	0.013	0.013	0.013
Headwater (ft)	0.4	2.2	2.2	0.6	0.7	0.9	2.8	0.6	2.0	2.1	2.2	0.6	0.8	1.0	2.6	2.6			0.3	0.7	1.0	1.0	0.6
Full Capacity (cfs)	7.6	28.8	25	4.7	4.8	5.3	16.4	4.8	17	16.4	16.5	4.7	4.8	4.7	19.8	26.7			4.6	4.7	4.6	11.6	4.8
Average Velocity (fps)	6.2	16.3	14.1	3.8	3.9	4.4	9.3	3.9	5.4	5.2	5.3	3.8	3.9	3.8	6.3	8.5			3.7	3.8	3.7	9.5	3.9
Slope (%)	1.36	7.47	5.63	0.53	0.54	0.68	2.41	0.56	0.56	0.52	0.53	0.52	0.56	0.52	0.76	1.39			0.50	0.52	0.50	3.23	0.56
Length of Pipe (ft)	22	187	96	95	46	22	66	106	106	95	151	95	125	95	66	130			89	95	90	138	107
Pipe Size (in)	15	18	18	15	15	15	18	15	24	24	24	15	15	15	24	24			15	15	15	15	15
Q In System (cfs)	0.6	11.6	12.2	1.1	1.9	2.5	14.1	1.1	15.1	15.5	16.3	1.2	2.1	3.3	19.4	19.4			0.2	1.6	3.0	3.1	1.1
10yr Rainfall Intensity (in	5.3	3.8	3.8	6	5.5	5.5	3.8	6	3.8	3.7	3.7	5.3	5.3	5.1	3.7	3.7			4.7	4.7	4.7	4.5	6
Sum AI In System	0.12	3.04	3.2	0.19	0.35	0.46	3.70	0.18	3.96	4.20	4.40	0.23	0.39	0.65	5.24	5.24			0.05	0.33	0.63	0.68	0.19
AI Entering Catch Basin	0.12	0.05	0.16	0.19	0.16	0.11	0.04	0.18	0.08	0.24	0.2	0.23	0.16	0.26	0.19	0			0.05	0.28	0.3	0.05	0.19
Accumulated Time (min)	8	17	17	5	7	7	17	5	17	18	18	8	8	9	18	18			11	11	11	12	5
Time In Pipe (sec)	4	11	7	25	12	5	7	27	20	18	28	25	32	25	10	15			24	25	24	15	27
Time To Inlet (Min)	8	5	12	5	7	5	5	5	5	5	5	8	7	9	12	0			11	6	7	9	5
Line Segment	22-23	23-24	24-28	25-26	26-27	27-28	28-30	29-30	30-31	31-32	32-36	33-34	34-35	35-36	36-37	37-END			40-41	41-42	42-43	43-45	44-45

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *45* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

STORM SEWER DESIGN

N'	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	
Headwater (ft)	1.3	0.7	1.0	1.9	0.6	0.6	2.0	0.6	0.9	1.2	1.9	0.7	1.0	2.2	0.7	1.0	0.6	2.4	0.6	0.9	2.7	0.6				
Full Capacity (cfs)	6.4	4.7	4.7	7.7	8.3	7.8	18.5	4.6	4.8	4.9	17	4.8	4.8	17.1	4.8	7	6.6	35.5	4.7	5.9	28.1	8.4				
Average Velocity (fps)	5.3	3.8	3.8	6.3	6.8	6.3	10.5	3.8	3.9	4	5.4	3.9	3.9	5.5	3.9	5.7	5.4	11.3	3.8	4.8	8.9	6.8				
Slope (%)	0.99	0.52	0.53	1.41	1.64	1.44	3.09	0.51	0.54	0.57	0.56	0.55	0.56	0.57	0.55	1.18	1.04	2.45	0.52	0.84	1.53	1.67				
Length of Pipe (ft)	91	95	85	78	24	21	129	97	92	70	142	91	90	141	91	93	19	112	95	106	134	18				
Pipe Size (in)	15	15	15	15	15	15	18	15	15	15	24	15	15	24	15	15	15	24	15	15	24	15				
Q In System (cfs)	4.4	1.6	3.2	7.5	1.2	1.3	9.3	1.4	2.7	4.0	12.8	1.6	3.1	15.3	1.9	3.5	1.3	18.6	1.4	2.7	20.6	1.2				
10yr Rainfall Intensity (in	4.5	6	6	4.5	4	5.5	4	4.7	4.7	4.7	4	6	6	4	6	6	5.3	3.9	6	6	3.9	5.8				
Sum AI In System	0.97	0.27	0.53	1.66	0.30	0.23	2.32	0.29	0.57	0.86	3.21	0.26	0.51	3.82	0.31	0.58	0.25	4.76	0.24	0.45	5.27	0.21				
AI Entering Catch Basin	0.1	0.27	0.26	0.16	0.30	0.23	0.13	0.29	0.28	0.29	0.03	0.26	0.25	0.1	0.31	0.27	0.25	0.11	0.24	0.21	0.06	0.21				
Accumulated Time (min)	12	5	5	12	15	7	15	11	11	11	15	5	5	15	5	5	8	16	5	5	16	6				
Time In Pipe (sec)	17	25	22	12	4	3	12	26	24	18	26	23	23	26	23	16	4	10	25	22	15	3				
Time To Inlet (Min)	5	5	5	7	15	7	14	11	5	5	7	5	5	5	5	5	8	6	5	5	5	6				
Line Segment	45-48	46-47	47-48	48-51	49-51	50-51	51-55	52-53	53-54	54-55	55-58	56-57	57-58	58-62	59-60	60-62	61-62	62-65	63-64	64-65	65-67	66-67				

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JOB *9607 - Fieldstone Ridge*
SHEET NO. *46* OF *108*
CALCULATED BY *ERP* DATE *2/4/2022*
CHECKED BY REV. *3/23/2022*

STORM SEWER DESIGN

Line Segment	N'	Headwater (ft)	Full Capacity (cfs)	Average Velocity (fps)	Slope (%)	Length of Pipe (ft)	Pipe Size (in)	Q In System (cfs)	10yr Rainfall Intensity (in	Sum AI In System	AI Entering Catch Basin	Accumulated Time (min)	Time In Pipe (sec)	Time To Inlet (Min)
67-69	0.013	2.8	47.6	15.1	4.40	59	24	21.6	3.9	5.53	0.05	16	4	5
68-69	0.013	0.4	9.7	7.9	2.24	94	15	0.6	6	0.10	0.10	5	12	5
69-70	0.013	3.0	24.3	7.7	1.15	95	24	22.9	3.9	5.86	0.23	16	12	5
70-71	0.013	3.0	71.5	22.8	9.94	112	24	23.6	3.9	6.06	0.2	16	5	5
71-84	0.013	3.0	71	22.6	9.79	99	24	24.1	3.9	6.17	0.11	16	4	8
72-73	0.013	0.7	5.8	4.7	0.79	19	15	1.8	5.3	0.33	0.33	8	4	8
73-74	0.013	0.9	7.5	6.1	1.34	149	15	2.4	5.3	0.46	0.13	8	24	5
74-83	0.013	1.2	19.9	16.2	9.45	32	15	4.0	5.3	0.75	0.29	8	2	5
75-76	0.013	0.2	5.8	4.8	0.81	24	15	0.1	6	0.01	0.01	5	5	5
76-77	0.013	0.3	7.9	6.4	1.49	81	15	0.2	6	0.04	0.03	5	13	5
77-78	0.013	0.5	11.1	9.1	2.95	156	15	0.7	6	0.12	0.08	5	17	5
78-80	0.013	0.9	9.3	7.6	2.05	29	15	2.6	6	0.43	0.31	5	4	5
79-80	0.013	0.3	4.7	3.8	0.53	57	15	0.4	6	0.06	0.06	5	15	5
80-82	0.013	1.0	4.6	3.8	0.51	136	15	3.1	6	0.52	0.03	5	36	5
81-82	0.013	0.4	7.7	6.2	1.40	71	15	0.5	5.8	0.09	0.09	6	11	6
82-83	0.013	1.2	13	10.6	4.00	115	15	3.9	5.8	0.68	0.07	6	11	5
83-84	0.013	2.2	19.5	15.9	9.03	74	15	7.6	5.3	1.43	0	8	5	0
84-END	0.013	2.7	85.8	17.5	4.35	58	30	29.6	3.9	7.60	0	16	3	0
STMH-90	0.013	1.0	9.3	7.6	2.05	300	15	3.6	4.8	0.74	0.74	10	39	10
90-END	0.013	1.0	18.9	15.4	8.50	106	15	3.6	4.8	0.74	0	10	7	0
BIGY-91	0.013	2.1	29.2	16.5	7.70	66	18	9.4	6	1.56	1.56	5	4	5
91-92	0.013	1.9	16.4	9.3	2.43	300	18	8.6	4.7	1.82	0.26	11	32	11
92-END	0.013	1.9	16.6	9.4	2.47	81	18	8.6	4.7	1.82	0	11	9	0

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WATER QUALITY VOLUME (WQV) TO STORMWATER BASINS:

SOUTHERLY BASIN:

WQV = 1" x R x A / 12 — A = 8.79 acres I = 48%
R = 0.05 + (0.009 x 48) = 0.48

WQV = 1" x 0.48 x 8.79 / 12 = 0.3516 acre-ft or 15,316 cu.ft.

Volume Provided Below Outlet: 23,605 cu.ft. (see pond report)

SIZE FOREBAY:

Forebay to be sized to contain 10% to WQV = 10% x 15,316 = 1,532 cu. ft.

Volume Provided:

Depth = 2 ft
Bottom Area = 470 sq. ft.
Top Area = 1,200 sq. ft.

Average End Area Method: Vol = 2 x (470+1200) / 2 = 1,670 cu. ft.

NORTHERLY BASIN

Northerly Inlet:	A = 12.70 acres	I = 53%	R = 0.53
Southerly Inlet:	A = 2.15 acres	I = 51%	R = 0.51
Total:	A = 14.85 aces	I = 53%	R = 0.53

WQV = 1" x 0.53 x 14.85 / 12 = 0.656 acre-ft or 28,590 cu.ft.

Volume Provided Below Outlet: 29,607 cu.ft. (see pond report)

SIZE FOREBAY:

Northerly Inlet: WQV = 1" x 0.53 x 12.70 / 12 = 0.561 acre-ft or 24,434 cu.ft.

10% WQV = 2,443 cu.ft. (required)

Volume Provided:

Depth = 2.25 ft
Bottom Area = 670 sq. ft.
Top Area = 1,617 sq. ft.

Average End Area Method: Vol = 2.25 x (670+1617) / 2 = 2,573 cu. ft.

Southerly Inlet: WQV = 1" x 0.51 x 2.15 / 12 = 0.091 acre-ft or 3,980 cu.ft.

10% WQV = 398 cu.ft. (required)

Volume Provided:

Depth = 2.25 ft
Bottom Area = 64 sq. ft.
Top Area = 452 sq. ft.

Average End Area Method: Vol = 2.25 x (64+452) / 2 = 580 cu. ft.

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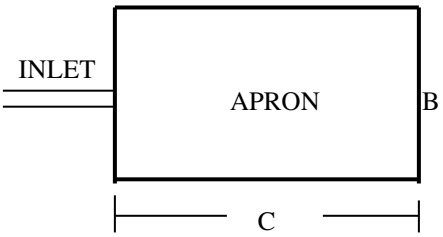
APRON REQUIREMENTS FOR OUTLET PROTECTION:

- 18" RCP (Big Y Drainage):
  Q = 8.6 cfs
  Critical Depth Dc=1.4 ft (Concrete Pipe Design Manual – Figure 28)
  Approximate Tailwater (TW)
  TW ≈ (Dc + dia)/2 = (1.4+1.5)/2 = 1.5 ft

  Size Preformed Scour Hole per D.O.T. Design Manual – Section 11.13.6
  Use Type 1 Scour Hole Depression = ½ pipe rise
  Length – $C = 3S_P + 6F$
  Width – $B = 2S_P + 6F$
  Depression – $F = 0.5\ R_P$

  $F = 0.5 \times 18"/12 = 0.75$ ft
  $C = 3 \times 18"/12 + 6 \times 0.75 = 9$ ft
  $B = 2 \times 18"/12 + 6 \times 0.75 = 8$ ft



  Median Stone Diameter:
  $d_{50} = (0.0125\ R_P^2 / TW) \times (Q / R_P^{2.5})^{1.33}$
  $d_{50} = (0.0125 \times 1.5^2 / 1.5) \times (8.6 / 1.5^{2.5})^{1.33}$
  $d_{50} = 0.09$ ft
  For $d_{50} < 0.42$ ft → Use <u>Modified</u> Riprap

- 18" RCP (From Southerly Stormwater Basin)
  Q = 8.8 cfs (Out of basin)
  Critical Depth Dc=1.5 ft (Concrete Pipe Design Manual – Figure 28)
  Approximate Tailwater (TW)
  TW ≈ (Dc + dia)/2 = (1.5+1.5)/2 = 1.5 ft

  Size Rip Rap Apron per D.O.T. Design Manual – Table 11-12.1
  For Q = 9 cfs → L = 14 feet

  Figure 11-13:
  $W_1 = 3Sp$ $W_1 = 3 \times 18"/12 = 5$ ft
  $W_2 = 3Sp+0.7La$ $W_2 = 3 \times 18"/12 + 0.7 \times 14 = 15$ ft

  Median Stone Diameter:
  $d_{50} = (0.0125\ R_P^2 / TW) \times (Q / R_P^{2.5})^{1.33}$
  $d_{50} = (0.0125 \times 1.5^2 / 1.5) \times (8.6 / 1.5^{2.5})^{1.33}$
  $d_{50} = 0.09$ ft
  For $d_{50} < 0.42$ ft → Use <u>Modified</u> Riprap

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WATER QUALITY FLOW (WQF):

Specify Hydrodynamic Separator for WQF per "Connecticut Stormwater Quality Manual – Appendix B"

HS 5A:

$$WQV = \frac{1" \times R \times A}{12}$$

A = 1.84 acres = 0.003 mi^2
I = 60%
R = 0.05 + (0.009 x 60) = 0.59

$$WQV = \frac{1" \times 0.59 \times 1.84}{12} = 0.0905 \text{ acre-ft or } 3{,}941 \text{ cu.ft.}$$

$CN = 1000 / (10 + 5P + 10Q - 10(Q^2 + 1.25 \times QP)^{½}$ P = design precipitation = 1" for water quality storm
CN = 95 Q = runoff depth = (WQV x 12) / A
Q = (0.0905 x 12) / 1.84 = 0.59 in

T_C = 6 min (from Storm Sewer Design) = 0.10 hr

I_a = 0.105 (Table 4-1) $I_a/P = 0.105/1 = 0.105$ q_u = 650 cfs/mi^2/in

$WQF = q_u \times A \times Q = 650 \times 0.003 \times 0.59$
WQF = 1.15 cfs = Min. Flow Treated

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TEMPORARY SEDIMENT TRAP (TST) #1: (per 2002 Connecticut Guidelines for Soil Erosion and Sediment Control)

Drainage Area = 3.5 Ac.

Initial Storage I_S = 134 cy/ac x 3.5 Ac. x 27cf/cy = 12,663 cu.ft.

Required Wet Storage Volume (V_W) = ½ x 12,663 = 6,332 cu.ft.

Volume Below Crest (elev 570.0) = 6,391 cu.ft. > 6,332 cu.ft. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	568.00	2,650	0.000	0.000
0.20	568.20	2,755	541	541
0.40	568.40	2,862	562	1,102
0.60	568.60	2,970	583	1,685
0.80	568.80	3,079	605	2,290
1.00	569.00	3,190	627	2,917
1.20	569.20	3,302	649	3,566
1.40	569.40	3,415	672	4,238
1.60	569.60	3,529	694	4,933
1.80	569.80	3,645	717	5,650
2.00	570.00	3,762	741	6,391

Required Dry Storage (V_D) = ½ x 12,663 = 6,332 cu.ft.

Volume Above Crest (elev 570.0) = 13,184 - 6,391 = 6,793 cu.ft. > 6,332 cu.ft. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	568.00	2,650	0.000	0.000
0.36	568.36	2,841	988	988
0.72	568.72	3,036	1,058	2,046
1.08	569.08	3,235	1,129	3,174
1.44	569.44	3,438	1,201	4,375
1.80	569.80	3,645	1,275	5,650
2.16	570.16	3,856	1,350	7,000
2.52	570.52	4,072	1,427	8,427
2.88	570.88	4,292	1,505	9,933
3.24	571.24	4,516	1,585	11,518
3.60	571.60	4,744	1,667	13,184

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TEMPORARY SEDIMENT TRAP (TST) #2: (per 2002 Connecticut Guidelines for Soil Erosion and Sediment Control)

Drainage Area = 4.9 Ac.

Initial Storage I_S = 134 cy/ac x 5.0 Ac. x 27cf/cy = 17,728 cu.ft.

Required Wet Storage Volume (V_W) = ½ x 17,728 = 8,864 cu.ft.

Volume Below Crest (elev 580.0) = 8,935 cu.ft. > 8,864 cu.ft. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	577.80	3,424	0.000	0.000
0.22	578.02	3,547	767	767
0.44	578.24	3,672	794	1,561
0.66	578.46	3,798	822	2,382
0.88	578.68	3,926	850	3,232
1.10	578.90	4,055	878	4,110
1.32	579.12	4,186	906	5,016
1.54	579.34	4,318	935	5,952
1.76	579.56	4,452	965	6,916
1.98	579.78	4,588	994	7,911
2.20	580.00	4,725	1,024	8,935

Required Dry Storage (V_D) = ½ x 17,728 = 8,864 cu.ft.

Volume Above Crest (elev 580.0) = 17,898 - 8,935 = 8,963 cu.ft. > 8,864 cu.ft.. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	577.80	3,424	0.000	0.000
0.39	578.19	3,643	1,378	1,378
0.78	578.58	3,867	1,464	2,842
1.17	578.97	4,096	1,553	4,395
1.56	579.36	4,330	1,643	6,038
1.95	579.75	4,569	1,735	7,773
2.34	580.14	4,813	1,829	9,603
2.73	580.53	5,061	1,925	11,528
3.12	580.92	5,314	2,023	13,551
3.51	581.31	5,573	2,123	15,674
3.90	581.70	5,836	2,224	17,898

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TEMPORARY SEDIMENT TRAP (TST) #3: (per 2002 Connecticut Guidelines for Soil Erosion and Sediment Control)

Drainage Area = 5.0 Ac.
Initial Storage I_S = 134 cy/ac x 5.0 Ac. x 27cf/cy = 18,090 cu.ft.
Required Wet Storage Volume (V_W) = ½ x 18,090 = 9,045 cu.ft.
Volume Below Crest (elev 533.75) = 9,090 cu.ft. > 9,045 cu.ft. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	531.50	3,392	0.000	0.000
0.23	531.73	3,517	777	777
0.45	531.95	3,644	806	1,583
0.68	532.18	3,772	834	2,417
0.90	532.40	3,902	863	3,280
1.13	532.63	4,033	893	4,173
1.35	532.85	4,166	922	5,095
1.58	533.08	4,301	953	6,048
1.80	533.30	4,437	983	7,031
2.03	533.53	4,575	1,014	8,045
2.25	533.75	4,715	1,045	9,090

Required Dry Storage (V_D) = ½ x 18,090 = 9,045 cu.ft.
Volume Above Crest (elev 533.75) = 18,325 - 9,090 = 9,235 cu.ft. > 9,045 cu.ft. √

Stage	Elevation	Contour Area	Incremental Storage	Total Storage
(ft)	(ft)	(sqft)	(cuft)	(cuft)
0.00	531.50	3,392	0.000	0.000
0.40	531.90	3,615	1,401	1,401
0.80	532.30	3,844	1,492	2,893
1.20	532.70	4,077	1,584	4,477
1.60	533.10	4,316	1,679	6,156
2.00	533.50	4,560	1,775	7,931
2.40	533.90	4,809	1,874	9,804
2.80	534.30	5,063	1,974	11,779
3.20	534.70	5,322	2,077	13,855
3.60	535.10	5,587	2,182	16,037
4.00	535.50	5,856	2,288	18,325

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DETERMINE THE GROUNDWATER RECHARGE VOLUME (GRV):
(*2004 Connecticut Stormwater Quality Manual*)

$$GRV = \frac{(D)(A)(I)}{12}$$

D_A = 0.40" (Hydrologic Soil Group A)
D_B = 0.25" (Hydrologic Soil Group B)
D_C = 0.10" (Hydrologic Soil Group C)
D_D = 0.00" (Hydrologic Soil Group D)
A = Site Area (Acres)
I = Post-Development Site Imperviousness

For Entire Site:
A = 48.01 Acres (Exclusive of Wetlands and 'D' Soils)
Soil Group A: A = 6.87 Acres I = 16%
Soil Group B: A = 39.49 Acres I = 33%
Soil Group C: A = 1.65 Acres I = 0%

$$GRV = \frac{[(0.4)(6.87)(0.16) + (0.25)(39.49)(0.33) + (0.10)(1.65)(0.00)]}{12} = 0.3081 \text{ ac.ft or } 13{,}421 \text{ cu.ft.}$$

Volume Provided:

Northerly Stormwater Basin	160,654 cu.ft.
Buildings 2, 12, 13, 14 & 15	2,904 cu.ft
Buildings 11, 16 & 17	3,771 cu.ft.
Building 18	631 cu.ft.
Buildings 19, 20 & ¾ of 21	1,789 cu.ft.
Total:	169,749 cu.ft. > 13,421 cu.ft. √

For specific sub-watersheds, a modified Groundwater Recharge Volume (GRV) calculation was utilized to determine the GRV to specific areas. The original equation assumes the existing and proposed watershed areas are equal, therefore the modified approach allows for changes in watershed area and impervious coverage to determine an appropriate volume of water to be captured and infiltrated. The purpose of this criterion is not only to maintain pre-development annual groundwater volumes, but also maintain the pre-development wetland habitats.

$$GRV_{EX} = \frac{(D)(A_{EX})(1-I_{EX})}{12} \quad GRV_{PR} = \frac{(D)(A_{PR})(1-I_{PR})}{12} \quad GRV = GRV_{EX} - GRV_{PR}$$

B-Series Wetland:
Entire watershed on site consists of soils within Hydrologic Soil Group 'B': D_B = 0.25"

Existing Conditions:
A = 7.18 Acres A_I = 0.0 Acres I = 0%

$$GRV_{EX} = \frac{(0.25)(7.18)(1-0.0)}{12} = 0.1496 \text{ ac.ft.}$$

Proposed Conditions:
A = 5.12 Acres A_I = 1.12 Acres I = 22%

$$GRV_{PR} = \frac{(0.25)(5.12)(1-0.22)}{12} = 0.0832 \text{ ac.ft.}$$

Required GRV = 0.1496 – 0.0832 = 0.0664 ac.ft = 2,892 cu.ft.

Volume Provided:
Volume Infiltrated from Buildings 2, 12, 13, 14 & 15 → 2,904 cu.ft. > 2,892 cu.ft √

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DETERMINE THE GROUNDWATER RECHARGE VOLUME (GRV): (continued)

A-Series Wetland along Easterly Property Boundary:

Hydrologic Soil Group 'A': $D_A = 0.40$"
Hydrologic Soil Group 'B': $D_B = 0.25$"

Existing Conditions:

$A_A = 1.84$ Acres $A_I = 0.0$ Acres I = 0%
$A_B = 5.44$ Acres $A_I = 0.0$ Acres I = 0%

$$GRV_{EX} = \frac{(0.40)(1.84)(1\text{-}0.0) + (0.25)(5.44)(1\text{-}0.0)}{12} = 0.175 \text{ ac.ft.}$$

Proposed Conditions:

$A_A = 1.69$ Acres $A_I = 0.13$ Acres I = 8%
$A_B = 4.40$ Acres $A_I = 1.55$ Acres I = 35%

$$GRV_{PR} = \frac{(0.40)(1.69)(1\text{-}0.08) + (0.25)(4.40)(1\text{-}0.35)}{12} = 0.111 \text{ ac.ft.}$$

Required GRV = 0.175 – 0.111 = 0.064 ac.ft = 2,788 cu.ft.

Volume Provided:

Volume Infiltrated from Buildings 11, 16 & 17 → 3,771 cu.ft. > 2,788 cu.ft. √

A-Series Wetland Southerly Property Boundary:

Hydrologic Soil Group 'A': $D_A = 0.40$"
Hydrologic Soil Group 'B': $D_B = 0.25$"

Existing Conditions:

$A_A = 1.55$ Acres $A_I = 0.0$ Acres I = 0%
$A_B = 1.61$ Acres $A_I = 0.0$ Acres I = 0%

$$GRV_{EX} = \frac{(0.40)(1.55)(1\text{-}0.0) + (0.25)(1.61)(1\text{-}0.0)}{12} = 0.0852 \text{ ac.ft.}$$

Proposed Conditions:

$A_A = 1.29$ Acres $A_I = 0.30$ Acres I = 23%
$A_B = 0.54$ Acres $A_I = 0.32$ Acres I = 59%

$$GRV_{PR} = \frac{(0.40)(1.29)(1\text{-}0.23) + (0.25)(0.54)(1\text{-}0.59)}{12} = 0.0377 \text{ ac.ft.}$$

Required GRV = 0.0852 – 0.0377 = 0.0475 ac.ft = 2,069 cu.ft.

Volume Provided:

Volume Infiltrated from Building 18, ½ 19 & ½ 20 → 1,284 cu.ft.
Volume Infiltrated from Buildings ½ 19, ½ 20 & ¾ of 21 → 1,157 cu.ft.
Total: 2,441 cu.ft. > 2,069 cu.ft.√

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JOB	9607 - Fieldstone Ridge		
SHEET NO.	53	OF	108
CALCULATED BY	ERP	DATE	2/4/2022
CHECKED BY		REV	3/23/2022

Pollutant Renovation Analysis

Pollutant Concentration per Land Use Type

	Pollutant Concentration (mg/l)					
Land Use Type	TSS	TP	TN	Zn	TPH	DIN
Medium Density Residential (2-8 units/ac)	60	0.30	2.1	0.176	1.25	0.344
Commercial	58	0.25	2.6	0.156	3.0	0.324
Transportation (Roads Only)	99	0.25	2.3	0.156	3.0	0.375
Mixed Forest	90	0.10	1.5	0.0	0.0	0.215
Wetlands	0	0.38	1.5	0.0	0.0	0.100
Brush	90	0.38	1.5	0.0	0.0	0.215

Pollutant Load (L): Simple Method

$L = 0.226(P)(Pj)(Rv)(C)(A)$ where

P = Rainfall depth (inch) → Use 1 inch
Pj = 0.9
Rv = 0.05 + 0.009(I)
I = Impervious coverage (%)
C = Flow weighted mean concentration of pollutant (mg/l)
A = Area of Site (acres)

Proposed Conditions

To HS 5A and Infiltration Chambers

Land Use Type:	Area (Ac.)	C_{TSS} (mg/L)	C_{TP} (mg/L)	C_{TN} (mg/L)	C_{ZN} (mg/L)	C_{TPH} (mg/L)	C_{DIN} (mg/L)
Medium Density Residential	1.84	60	0.30	2.1	0.176	1.25	0.344
Weighted C	--	60	0.30	2.1	0.176	1.25	0.344
Total Area (Ac.)	1.84						
Impervious Area	1.10	→ I =	60%	→ Rv = 0.59			

	TSS	TP	TN	Zn	TPH	DIN
Pollutant Load L (lbs) =	13.2	0.066	0.464	0.039	0.276	0.0760

To Infiltration Chambers: Bulidings 2, 12, 13, 14, 15, 18, 19, 20, 21

Land Use Type:	Area (Ac.)	C_{TSS} (mg/L)	C_{TP} (mg/L)	C_{TN} (mg/L)	C_{ZN} (mg/L)	C_{TPH} (mg/L)	C_{DIN} (mg/L)
Medium Density Residential	2.53	60	0.30	2.1	0.176	1.25	0.344
Weighted C	--	60	0.30	2.1	0.176	1.25	0.344
Total Area (Ac.)	2.53						
Impervious Area	2.53	→ I =	100%	→ Rv = 0.95			

	TSS	TP	TN	Zn	TPH	DIN
Pollutant Load L (lbs) =	29.3	0.147	1.027	0.086	0.611	0.1682

continued on next page

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JOB	9607 - Fieldstone Ridge		
SHEET NO.	54	OF	108
CALCULATED BY	ERP	DATE	2/4/2022
CHECKED BY		REV	3/23/2022

To Southerly Stormwater Basin

Land Use Type:	Area (Ac.)	C_{TSS} (mg/L)	C_{TP} (mg/L)	C_{TN} (mg/L)	C_{ZN} (mg/L)	C_{TPH} (mg/L)	C_{DIN} (mg/L)
Medium Density Residential	7.40	60	0.30	2.1	0.176	1.25	0.344
Mixed Forrest	0.89	99	0.25	2.3	0.156	3.0	0.375
Wetlands (Stormwater Basin)	0.47	0	0.38	1.5	0	0	0.100
Weighted C	--	60.7	0.299	2.088	0.1645	1.360	0.3341
Total Area (Ac.)	8.76						
Impervious Area	4.21	→ I =	48%	→ Rv =	0.48		

	TSS	TP	TN	Zn	TPH	DIN
Pollutant Load L (lbs) =	51.9	0.256	1.786	0.141	1.163	0.2857

To Northerly Stormwater Basin

Land Use Type:	Area (Ac.)	C_{TSS} (mg/L)	C_{TP} (mg/L)	C_{TN} (mg/L)	C_{ZN} (mg/L)	C_{TPH} (mg/L)	C_{DIN} (mg/L)
Medium Density Residential	13.29	60	0.30	2.1	0.176	1.25	0.344
Mixed Forrest	0.02	90	0.10	1.5	0	0	0.215
Transportation	1.09	99	0.25	2.3	0.156	3	0.375
Wetlands (Stormwater Basin)	0.45	0	0.38	1.5	0	0	0.100
Weighted C	--	61	0.30	2.10	0.170	1.340	0.34
Total Area (Ac.)	14.85						
Impervious Area	7.82	→ I =	53%	→ Rv =	0.53		

	TSS	TP	TN	Zn	TPH	DIN
Pollutant Load L (lbs) =	97.7	0.480	3.362	0.272	2.145	0.544

Below Treatment Systems

Land Use Type:	Area (Ac.)	C_{TSS} (mg/L)	C_{TP} (mg/L)	C_{TN} (mg/L)	C_{ZN} (mg/L)	C_{TPH} (mg/L)	C_{DIN} (mg/L)
Medium Density Residential	1.72	60	0.30	2.1	0.176	1.25	1.25
Commercial	4.27	58	0.25	2.6	0.156	3.000	0.324
Mixed Forrest	15.1	90	0.10	1.5	0	0	0.215
Wetland	0.33	0	0.38	1.5	0	0	0.100
Brush	2.74	90	0.38	1.5	0	0	0.215
Weighted C	--	71	0.13	1.28	0.010	0.090	0.25
Total Area (Ac.)	24.16						
Impervious Area	2.26	→ I =	9%	→ Rv =	0.13		

	TSS	TP	TN	Zn	TPH	DIN
Pollutant Load L (lbs) =	45.4	0.083	0.818	0.006	0.057	0.1600

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Pollutant Removal:

	Polluntant Removal Effencies (percent)					
Type of System	TSS	TN	TP	Zn	TPH	DIN
Wet Extended Detention Pond	80	35	55	69	0	36
Infiltration Trench/Chambers	80	55	60	99	99	50
Infiltration Basin	90	60	65	88	90	50
Catch Basins with Hood*	73	0	0	0	62	0
Hydrodynamic Separator**	92	22	20	37	81	10

* Pollutant Removal Efficiency from “Dissecting Proprietary Stormwater Treatment BMPs to Develop Practical Solutions – Unbiased Research and Case Studies.” By Amtrak Environment & Sustainability Group, Amec Foster Wheeler Environment & Infrastructure, Inc., and University of New Hampshire Stormwater Center

** Pollutant Removal Efficiencies taken from the following publications:

TSS/TPH: Field Evaluation of a Stormceptor® Model STC 1200 Westwood, Massachusetts Prepared by: Stormceptor Group of Companies June, 2004

ZN/DIN: Storm Water Low-Impact Development, Conventional Structural, and Manufactured Treatment Strategies for Parking Lot Runoff Performance Evaluations Under Varied Mass Loading Conditions" R. M. Roseen, T. P. Ballestero, and J. J. Houle, UNH Stormwater Center, and P. Avelleneda, R. Wildey, and J. Briggs, Water Resources, Department of Civil Engineering, University of New Hampshire.

TP: Virginia Stormwater BMP Clearinghouse (https://swbmp.vwrrc.vt.edu/bmps/hydrodynamic-devices/)

TN: Hydro International (https://hydro-int.com/en/news/florida-dep-accepts-downstream-defender-water-quality)

	TSS	TN	TP	Zn	TPH	DIN
Load to HS 5A and Infiltration Chambers	13.2	0.066	0.464	0.039	0.276	0.0760
Load Removed by Catch Basin	9.6	0.000	0.000	0.000	0.171	0.0000
Load Remaining in Runoff (Load-Removed)	3.6	0.066	0.464	0.039	0.105	0.0760
Load Removed by HDS	3.3	0.015	0.093	0.014	0.085	0.0076
Load Remaining in Runoff (Load-Removed)	0.3	0.051	0.371	0.025	0.020	0.0684
Load Removed by Infiltration Chambers	0.2	0.028	0.223	0.024	0.020	0.0342
Total Load Removed	13.1	0.043	0.316	0.039	0.276	0.0418

Load from Buildings 2, 12-15, 18- 21	29.3	0.147	1.027	0.086	0.611	0.1682
Load Removed by Infiltration Chambers	23.4	0.081	0.616	0.085	0.605	0.0841

Load to Southerly Stormwater Basin	51.9	0.256	1.786	0.141	1.163	0.2857
Load Removed by Catch Basin	37.9	0.000	0.000	0.000	0.721	0.0000
Load Remaining in Runoff (Load-Removed)	14.0	0.256	1.786	0.141	0.442	0.2860
Load Removed by Wet Extended Det.	11.2	0.090	0.982	0.097	0.000	0.1030
Total Load Removed	49.1	0.090	0.982	0.097	0.721	0.1030

Load to Northerly Stormwater Basin	97.7	0.480	3.362	0.272	2.145	0.5440
Load Removed by Catch Basin	71.3	0.000	0.000	0.000	1.330	0.0000
Load Remaining in Runoff (Load-Removed)	26.4	0.480	3.362	0.272	0.815	0.5440
Load Removed by Infiltration Basin	23.7	0.288	2.185	0.239	0.734	0.2720
Total Load Removed	95.1	0.288	2.185	0.239	2.063	0.2720

Total Load Removed from All Treatment	180.7	0.501	4.099	0.461	3.665	0.5009
Total Pre-Treatment Load	192.1	0.949	6.639	0.538	4.195	1.0739
Removal Efficiency	94%	53%	62%	86%	87%	47%
Minimum Removal Efficiency Required	90%	40%	60%	75%	80%	40%

Worksheet 2: Runoff Curve Number and Runoff

Project *9607: Fieldstone Ridge* By *ERP* Date *3/23/2022*
Location *Fieldstone Commons, Tolland* Checked Date

Choose one: Present Developed

Existing Conditions to Marsh

1. Runoff Curve Number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconected / connected impervious area ratio)	CN[1] Table 2-2	CN[1] Fig. 2-3	CN[1] Fig. 2-4	Area (acres)	Product of CN x Area
	Impervious	*98*			*2.91*	*285.18*
Group A	*Woods*	*30*			*6.00*	*180*
Group B	*Woods*	*55*			*36.00*	*1980*
Group C	*Woods*	*70*			*1.74*	*121.8*
Group D	*Woods*	*77*			*0.42*	*32.34*
Group A	*Grassland*	*39*			*0.35*	*13.65*
Group B	*Grassland*	*61*			*2.33*	*142.13*
				Totals =	*49.75*	*2755.1*

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{2755.1}{49.75} = 55$$

2. Runoff

Frequency	Storm #1	Storm #2	Storm #3
Rainfall, P (24-hour)			
Runoff, Q (use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4)			

Worksheet 2: Runoff Curve Number and Runoff

Project *9607: Fieldstone Ridge* By *ERP* Date *3/23/2022*
Location *Fieldstone Commons, Tolland* Checked Date

Choose one: Present [Developed]

Area Bypassing Drainage Systems

1. Runoff Curve Number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconected / connected impervious area ratio)	CN[1] Table 2-2	CN[1] Fig. 2-3	CN[1] Fig. 2-4	Area (acres)	Product of CN x Area
	Impervious	*98*			*2.26*	*221.48*
Group A	*Woods*	*30*			*2.35*	*70.5*
Group B	*Woods*	*55*			*10.59*	*582.45*
Group C	*Woods*	*70*			*1.73*	*121.1*
Group D	*Woods*	*77*			*0.43*	*33.11*
Group A	*Grassland*	*39*			*1.18*	*46.02*
Group B	*Grassland*	*61*			*2.88*	*175.68*
Group A	*Brush - Brush-Weed Mixture*	*30*			*0.12*	*3.6*
Group B	*Brush - Brush-Weed Mixture*	*48*			*2.62*	*125.76*
				Totals =	*24.16*	*1379.7*

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1379.7}{24.16} = 57$$

2. Runoff

Frequency	Storm #1	Storm #2	Storm #3
Rainfall, P (24-hour)			
Runoff, Q (use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4)			

Worksheet 3: Time of Concentration (T_c) or Travel Time (T_t)

Project *Fieldstone Ridge* By *ERP* Date *3/23/2022*
Location *Fieldstone Commons, Tolland* Checked _____ Date _____

Choose one: Present | Developed
Choose one: T_c | T_t through subarea *To Northerly Stormwater Basin (sheet 1)*

NOTES: Space for as many as two segments per flow type can be used for each worksheet
Include a map, or description of flow segments

Sheet Flow (Applicable to T_c only)		Segment ID					
Surface description (table 3-1)			*Grass*				
Manning's roughness coeff., n (table 3-1)			*0.24*				
Flow length, L (total L ≤ 300 ft)		ft	*100*				
Two-yr 24-hr rainfall, P_2		in	*3.27*				
Land slope, s		%	*2.1*				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	min	*13.84*	+		=	*13.84*

Shallow concentrated flow		Segment ID					
Surface description (paved or unpaved)			*unpaved*				
Flow length, L		ft	*203*				
Watercourse slope, s		%	*2.6*				
Average velocity; V (figure 3-1)		ft/s	*2.6*				
$T_t = \frac{L}{3600\,V}$	Compute T_t	min	*1.30*	+		=	*1.30*

(See following sheet for Channel flow

Worksheet 3: Time of Concentration (T_c) or Travel Time (T_t)

Project *Fieldstone Ridge* By *ERP* Date *3/23/2022*

Location *Fieldstone Commons, Tolland* Checked _____ Date _____

Choose one: Present | Developed — *To Northerly Stormwater Basin*

Choose one: T_c | T_t through subarea *(sheet 2)*

Total Sheet Flow (from Previous Page) = *13.84*

Total Shallow Concentrated Flow (from Previous Page) = *1.30*

Channel flow

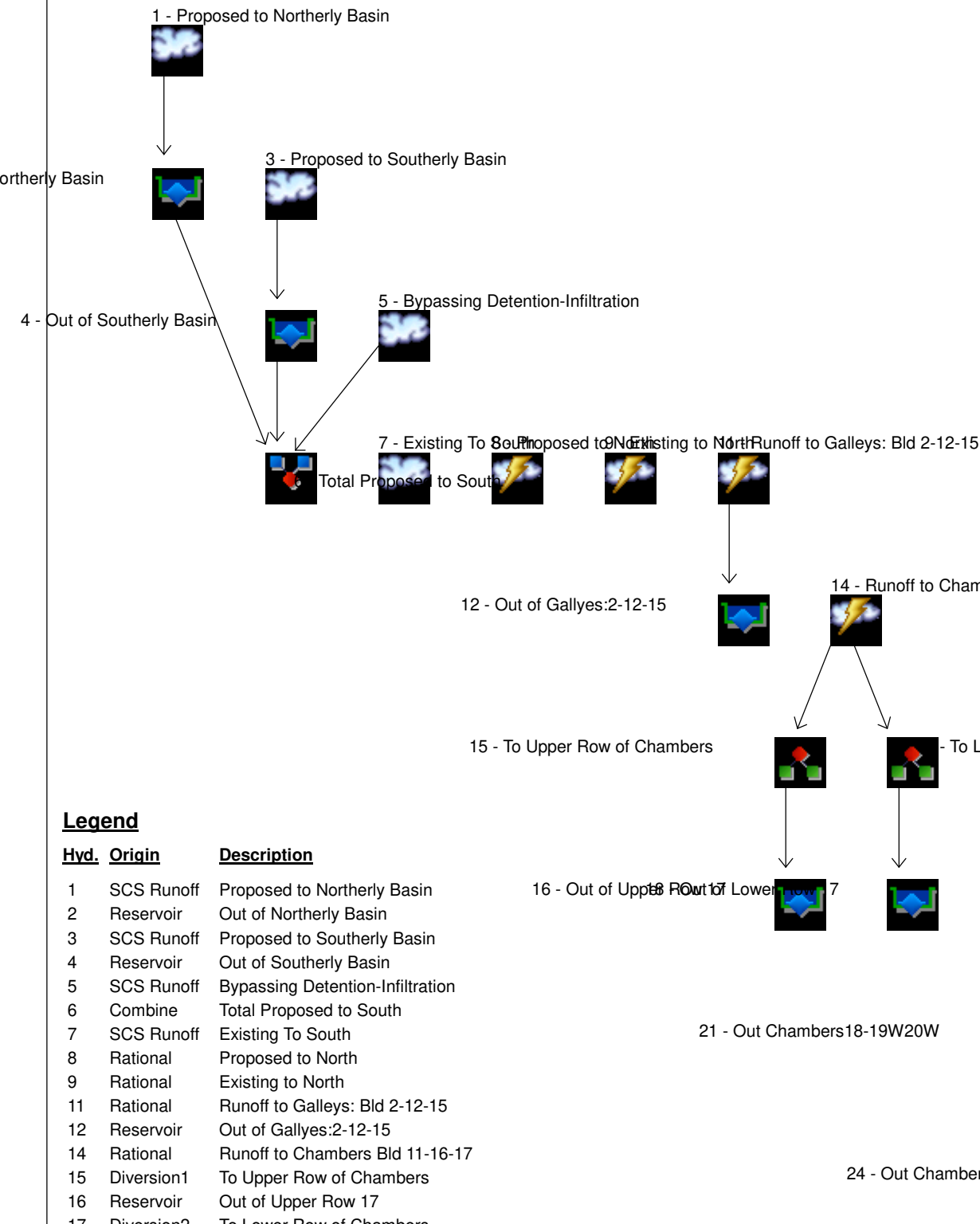
X-sectional area (ft^2)	1.227	1.767	3.142	3.142	*3.142*	*3.142*			
Wetted perimeter (ft)	3.926	4.712	6.283	6.283	*6.283*	*6.283*			
Hydraulic radius	0.31	0.38	0.5	0.5	*0.5*	*0.5*			
Watercourse slope (%)	1.64	3.09	0.56	0.57	*2.45*	*1.53*			
Manning's (n)	0.013	0.013	0.013	0.013	*0.013*	*0.013*			
V(fps) = $\frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	6.72	10.57	5.4	5.45	*11.30*	*8.93*			
Flow length (ft)	24	129	142	141	*112*	*134*			
$T_{t(min)} = \frac{L}{60\ V}$	0.06	0.20	0.44	0.43	*0.17*	+	*0.25*	=	*1.55*

X-sectional area (ft^2)		3.142	3.142	3.142	*3.142*	*4.909*			
Wetted perimeter (ft)		6.283	6.283	6.283	*6.283*	*7.854*			
Hydraulic radius		0.5	0.5	0.5	*0.5*	*0.63*			
Watercourse slope (%)		4.4	1.15	9.94	*9.82*	*3.28*			
Manning's (n)		0.013	0.013	0.013	*0.013*	*0.013*			
V(fps) = $\frac{1.49\ r^{2/3}\ s^{1/2}}{n}$		15.15	7.74	22.76	*22.63*	*15.25*			
Flow length (ft)		59	95	122	*88*	*102*			
$T_{t(min)} = \frac{L}{60\ V}$		0.06	0.2	0.09	*0.06*	+	*0.11*	=	*0.52*

Total Channel Flow = *2.07*

Watershed or subarea Tc or Tt = *17.21*

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Proposed to Northerly Basin
2	Reservoir	Out of Northerly Basin
3	SCS Runoff	Proposed to Southerly Basin
4	Reservoir	Out of Southerly Basin
5	SCS Runoff	Bypassing Detention-Infiltration
6	Combine	Total Proposed to South
7	SCS Runoff	Existing To South
8	Rational	Proposed to North
9	Rational	Existing to North
11	Rational	Runoff to Galleys: Bld 2-12-15
12	Reservoir	Out of Gallyes:2-12-15
14	Rational	Runoff to Chambers Bld 11-16-17
15	Diversion1	To Upper Row of Chambers
16	Reservoir	Out of Upper Row 17
17	Diversion2	To Lower Row of Chambers
18	Reservoir	Out of Lower Row 17
20	Rational	Bld 18-19W-20W
21	Reservoir	Out Chambers18-19W20W
23	Rational	Runoff to Chamber Bld 19E20E21
24	Reservoir	Out Chambers1920E21

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	-------	17.61	-------	-------	36.34	-------	-------	67.93	Proposed to Northerly Basin
2	Reservoir	1	-------	0.000	-------	-------	0.000	-------	-------	39.03	Out of Northerly Basin
3	SCS Runoff	------	-------	8.893	-------	-------	19.55	-------	-------	37.94	Proposed to Southerly Basin
4	Reservoir	3	-------	2.185	-------	-------	9.201	-------	-------	13.33	Out of Southerly Basin
5	SCS Runoff	------	-------	3.774	-------	-------	20.81	-------	-------	61.40	Bypassing Detention-Infiltration
6	Combine	2, 4, 5	-------	4.801	-------	-------	26.35	-------	-------	102.59	Total Proposed to South
7	SCS Runoff	------	-------	5.109	-------	-------	32.94	-------	-------	103.61	Existing To South
8	Rational	------	-------	5.012	-------	-------	7.081	-------	-------	9.894	Proposed to North
9	Rational	------	-------	5.887	-------	-------	8.392	-------	-------	11.83	Existing to North
11	Rational	------	-------	5.701	-------	-------	7.440	-------	-------	9.680	Runoff to Galleys: Bld 2-12-15
12	Reservoir	11	-------	0.000	-------	-------	0.000	-------	-------	0.000	Out of Gallyes:2-12-15
14	Rational	------	-------	7.403	-------	-------	9.661	-------	-------	12.57	Runoff to Chambers Bld 11-16-17
15	Diversion1	14	-------	3.701	-------	-------	4.830	-------	-------	6.285	To Upper Row of Chambers
16	Reservoir	15	-------	0.000	-------	-------	0.000	-------	-------	0.000	Out of Upper Row 17
17	Diversion2	14	-------	3.701	-------	-------	4.830	-------	-------	6.285	To Lower Row of Chambers
18	Reservoir	17	-------	0.000	-------	-------	0.000	-------	-------	0.000	Out of Lower Row 17
20	Rational	------	-------	2.520	-------	-------	3.289	-------	-------	4.279	Bld 18-19W-20W
21	Reservoir	20	-------	0.000	-------	-------	0.000	-------	-------	0.000	Out Chambers18-19W20W
23	Rational	------	-------	2.272	-------	-------	2.965	-------	-------	3.858	Runoff to Chamber Bld 19E20E21
24	Reservoir	23	-------	0.000	-------	-------	0.000	-------	-------	0.000	Out Chambers1920E21

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	17.61	2	734	78,484	------	------	------	Proposed to Northerly Basin
2	Reservoir	0.000	2	756	0	1	532.74	5,786	Out of Northerly Basin
3	SCS Runoff	8.893	2	734	40,269	------	------	------	Proposed to Southerly Basin
4	Reservoir	2.185	2	768	40,244	3	529.12	40,203	Out of Southerly Basin
5	SCS Runoff	3.774	2	742	28,504	------	------	------	Bypassing Detention-Infiltration
6	Combine	4.801	2	746	68,748	2, 4, 5	------	------	Total Proposed to South
7	SCS Runoff	5.109	2	752	49,979	------	------	------	Existing To South
8	Rational	5.012	1	14	4,210	------	------	------	Proposed to North
9	Rational	5.887	1	16	5,651	------	------	------	Existing to North
11	Rational	5.701	1	5	1,710	------	------	------	Runoff to Galleys: Bld 2-12-15
12	Reservoir	0.000	1	611	0	11	547.91	1,683	Out of Gallyes:2-12-15
14	Rational	7.403	1	5	2,221	------	------	------	Runoff to Chambers Bld 11-16-17
15	Diversion1	3.701	1	5	1,110	14	------	------	To Upper Row of Chambers
16	Reservoir	0.000	1	n/a	0	15	542.62	757	Out of Upper Row 17
17	Diversion2	3.701	1	5	1,110	14	------	------	To Lower Row of Chambers
18	Reservoir	0.000	1	n/a	0	17	541.22	757	Out of Lower Row 17
20	Rational	2.520	1	5	756	------	------	------	Bld 18-19W-20W
21	Reservoir	0.000	1	n/a	0	20	529.94	499	Out Chambers18-19W20W
23	Rational	2.272	1	5	682	------	------	------	Runoff to Chamber Bld 19E20E21
24	Reservoir	0.000	1	n/a	0	23	530.40	444	Out Chambers1920E21

Hydrograph Report

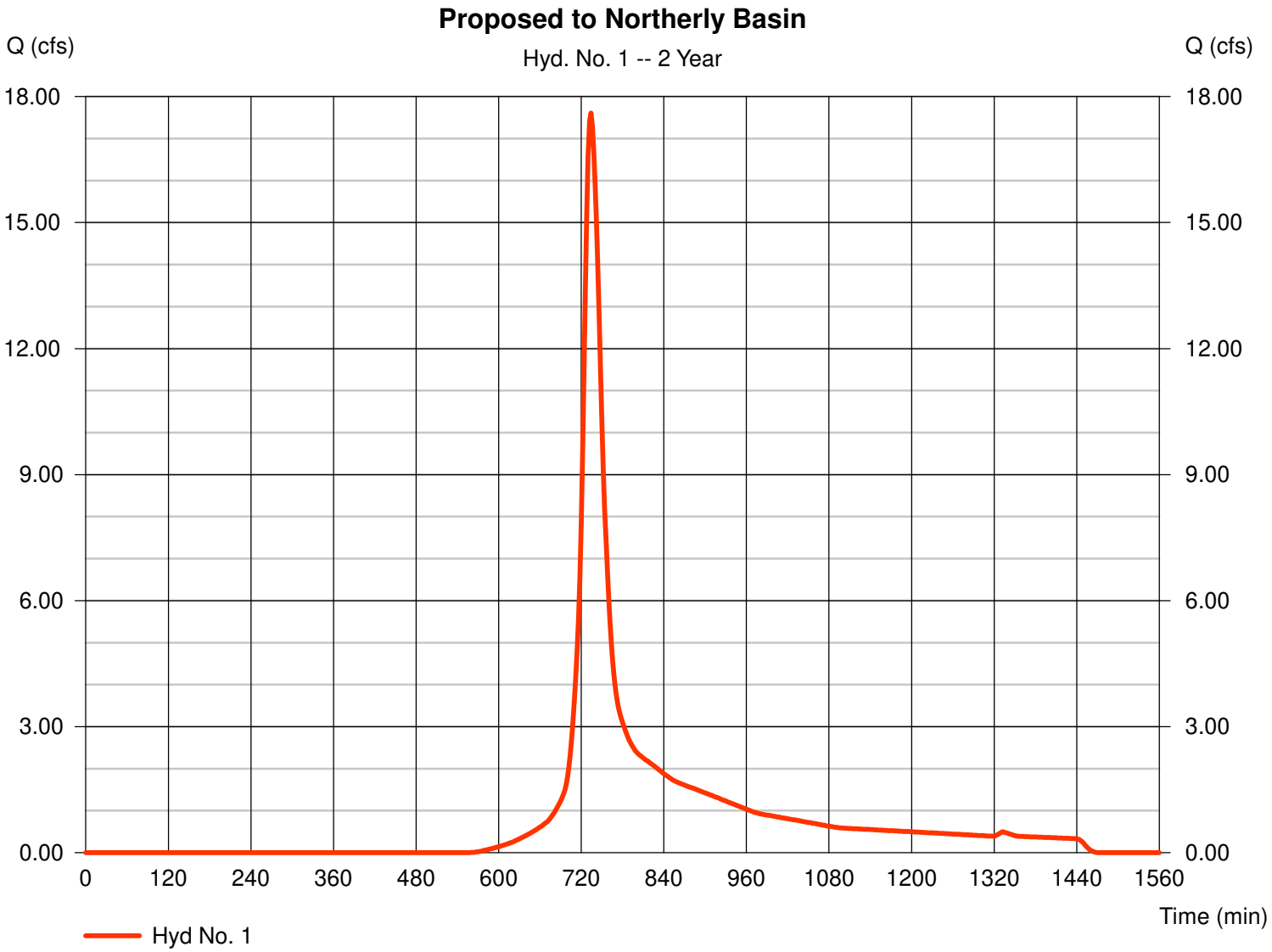
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 1

Proposed to Northerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.61 cfs
Storm frequency	=	2 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	78,484 cuft
Drainage area	=	14.850 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	17.20 min
Total precip.	=	3.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.820 x 98) + (6.660 x 61) + (0.020 x 55) + (0.350 x 39)] / 14.850



Hydrograph Report

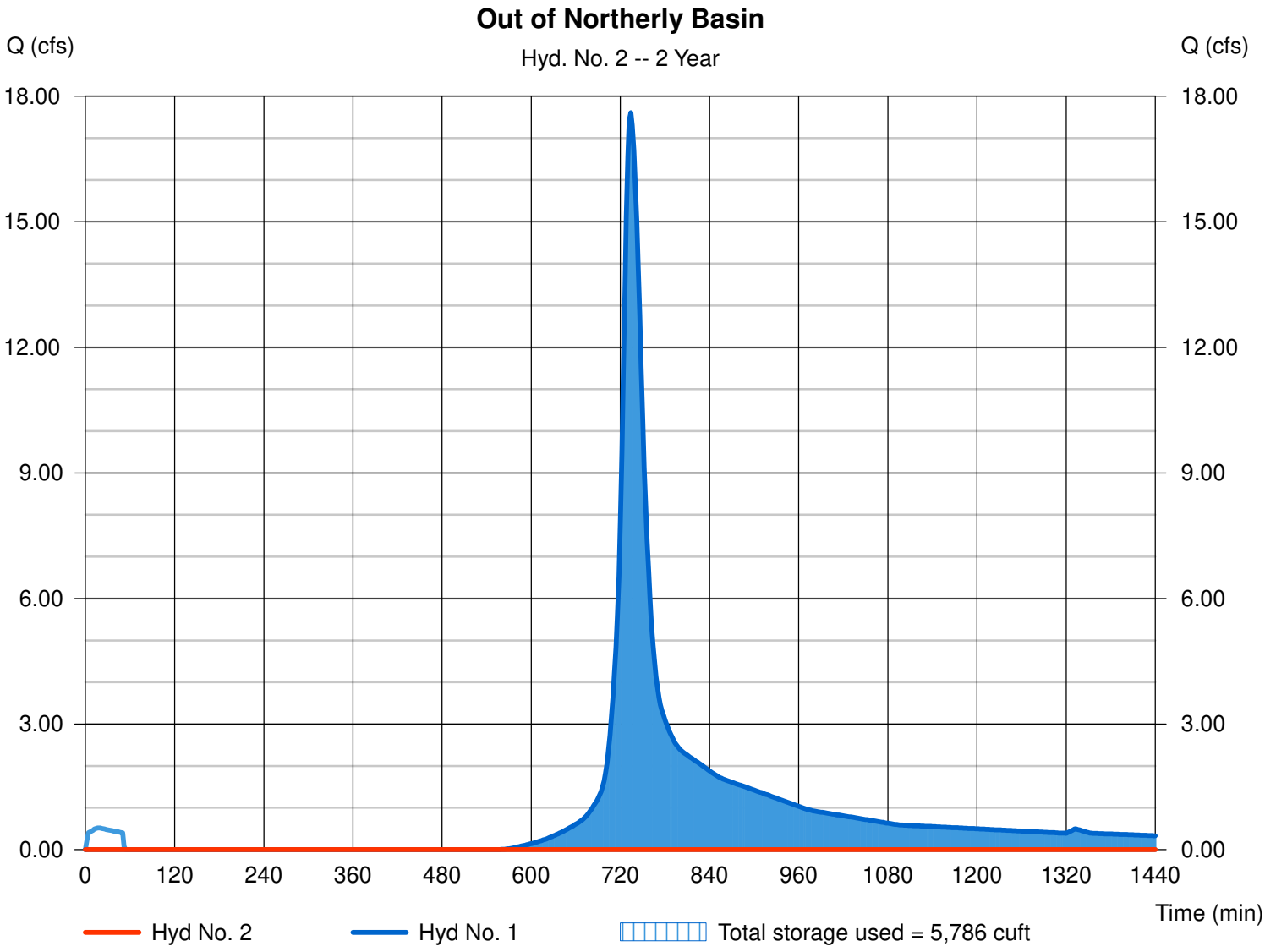
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 2

Out of Northerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	756 min
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	1 - Proposed to Northerly Basin	Max. Elevation	=	532.74 ft
Reservoir name	=	North Basin 1	Max. Storage	=	5,786 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 1 - North Basin 1

Pond Data

Trapezoid - Bottom L x W = 154.0 x 74.0 ft, Side slope = 3.00:1, Bottom elev. = 532.25 ft, Depth = 3.25 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	532.25	11,396	0	0
0.33	532.58	11,844	3,776	3,776
0.65	532.90	12,300	3,923	7,700
0.98	533.23	12,764	4,073	11,772
1.30	533.55	13,235	4,225	15,997
1.63	533.88	13,714	4,379	20,376
1.95	534.20	14,200	4,536	24,912
2.28	534.53	14,695	4,695	29,607
2.60	534.85	15,196	4,857	34,464
2.93	535.18	15,705	5,021	39,486
3.25	535.50	16,222	5,188	44,674

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 534.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Ciplti	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 50.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	532.25	---	---	---	---	0.00	---	---	---	0.000	---	0.000
0.33	3,776	532.58	---	---	---	---	0.00	---	---	---	13.709	---	13.71
0.65	7,700	532.90	---	---	---	---	0.00	---	---	---	14.237	---	14.24
0.98	11,772	533.23	---	---	---	---	0.00	---	---	---	14.773	---	14.77
1.30	15,997	533.55	---	---	---	---	0.00	---	---	---	15.318	---	15.32
1.63	20,376	533.88	---	---	---	---	0.00	---	---	---	15.873	---	15.87
1.95	24,912	534.20	---	---	---	---	0.00	---	---	---	16.436	---	16.44
2.28	29,607	534.53	---	---	---	---	0.16	---	---	---	17.007	---	17.17
2.60	34,464	534.85	---	---	---	---	8.27	---	---	---	17.588	---	25.86
2.93	39,486	535.18	---	---	---	---	22.16	---	---	---	18.177	---	40.34
3.25	44,674	535.50	---	---	---	---	39.96	---	---	---	18.776	---	58.74

Hydrograph Report

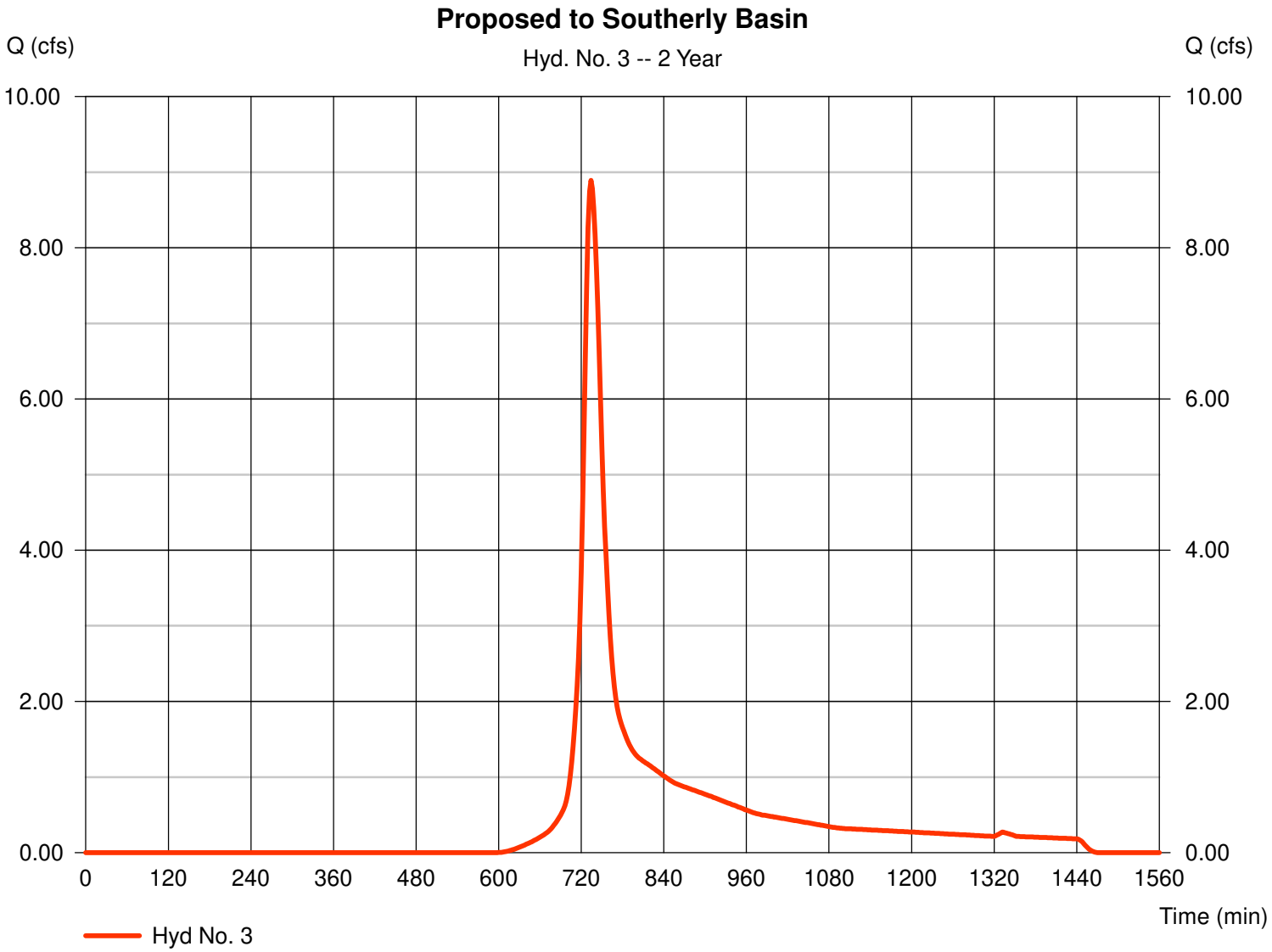
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 3

Proposed to Southerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.893 cfs
Storm frequency	=	2 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	40,269 cuft
Drainage area	=	8.790 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	3.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.240 x 98) + (0.890 x 39) + (3.660 x 61)] / 8.790



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 3

Proposed to Southerly Basin

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.27		0.00		0.00		
Land slope (%)	= 1.50		0.00		0.00		
Travel Time (min)	**= 15.84**	**+**	**0.00**	**+**	**0.00**	**=**	**15.84**
Shallow Concentrated Flow							
Flow length (ft)	= 59.00		134.00		0.00		
Watercourse slope (%)	= 8.00		2.00		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	= 4.56		2.28		0.00		
Travel Time (min)	**= 0.22**	**+**	**0.98**	**+**	**0.00**	**=**	**1.19**
Channel Flow							
X sectional flow area (sqft)	= 1.77		3.14		0.00		
Wetted perimeter (ft)	= 4.71		6.28		0.00		
Channel slope (%)	= 8.00		1.00		0.00		
Manning's n-value	= 0.013		0.013		0.015		
Velocity (ft/s)	= 16.80		7.20		0.00		
Flow length (ft)	= 590.0		685.0		0.0		
Travel Time (min)	**= 0.59**	**+**	**1.58**	**+**	**0.00**	**=**	**2.17**

Total Travel Time, Tc ..... 19.20 min

Hydrograph Report

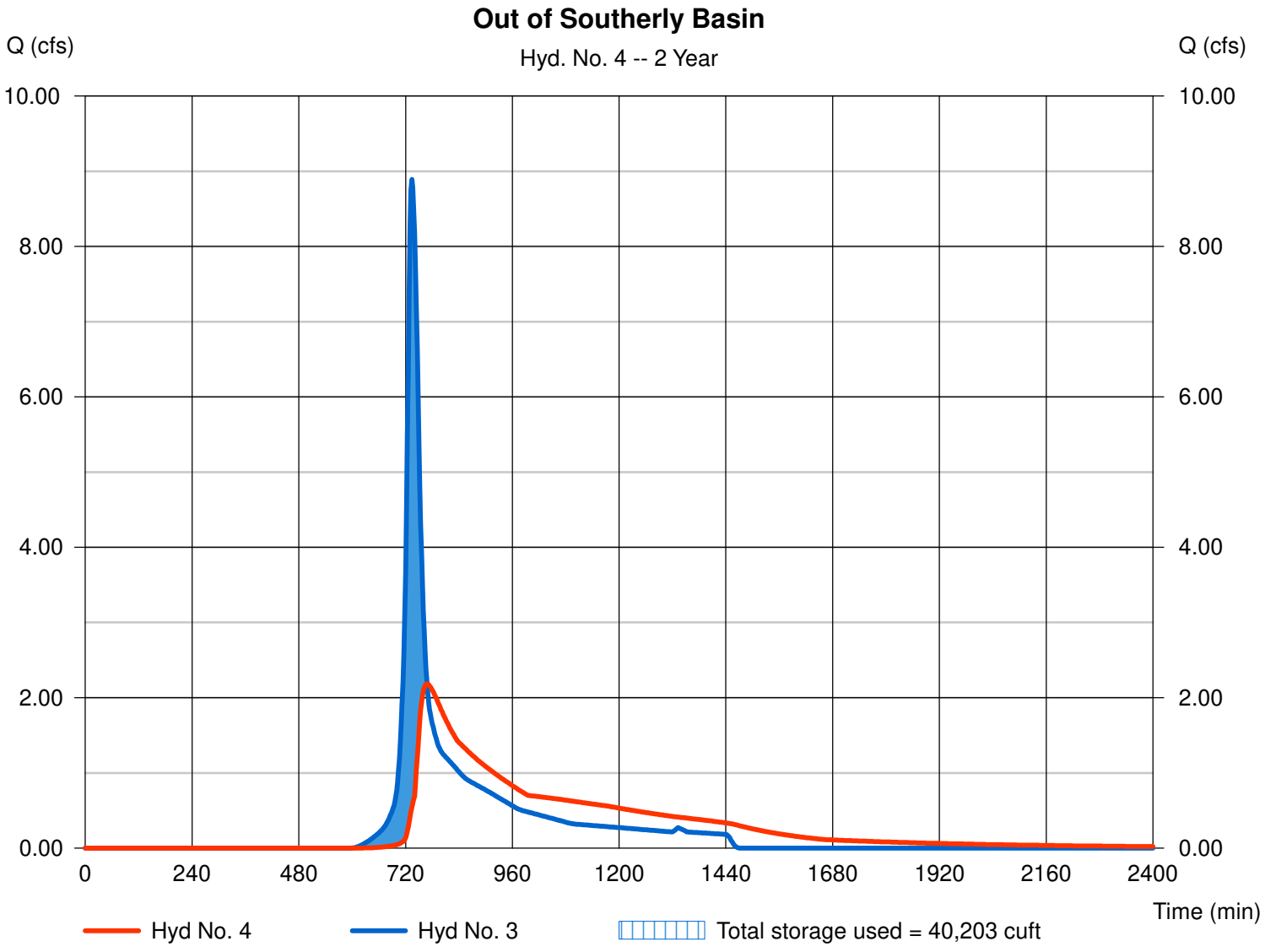
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 4

Out of Southerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	2.185 cfs
Storm frequency	=	2 yrs	Time to peak	=	768 min
Time interval	=	2 min	Hyd. volume	=	40,244 cuft
Inflow hyd. No.	=	3 - Proposed to Southerly Basin	Max. Elevation	=	529.12 ft
Reservoir name	=	South Basin 2	Max. Storage	=	40,203 cuft

Storage Indication method used. Wet pond routing start elevation = 528.00 ft.



Pond No. 19 - South Basin 2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 526.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	526.00	10,388	0	0
2.00	528.00	13,278	23,605	23,605
4.00	530.00	16,297	29,521	53,125
6.00	532.00	19,742	35,980	89,106

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	15.00	0.00
Span (in)	= 18.00	6.00	24.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 527.50	528.00	528.80	0.00
Length (ft)	= 43.00	0.00	0.00	0.00
Slope (%)	= 1.05	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	526.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
2.00	23,605	528.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
4.00	53,125	530.00	9.05 oc	0.68 ic	8.37 ic	---	---	---	---	---	---	---	9.050
6.00	89,106	532.00	13.78 ic	1.00 ic	12.78 ic	---	---	---	---	---	---	---	13.78

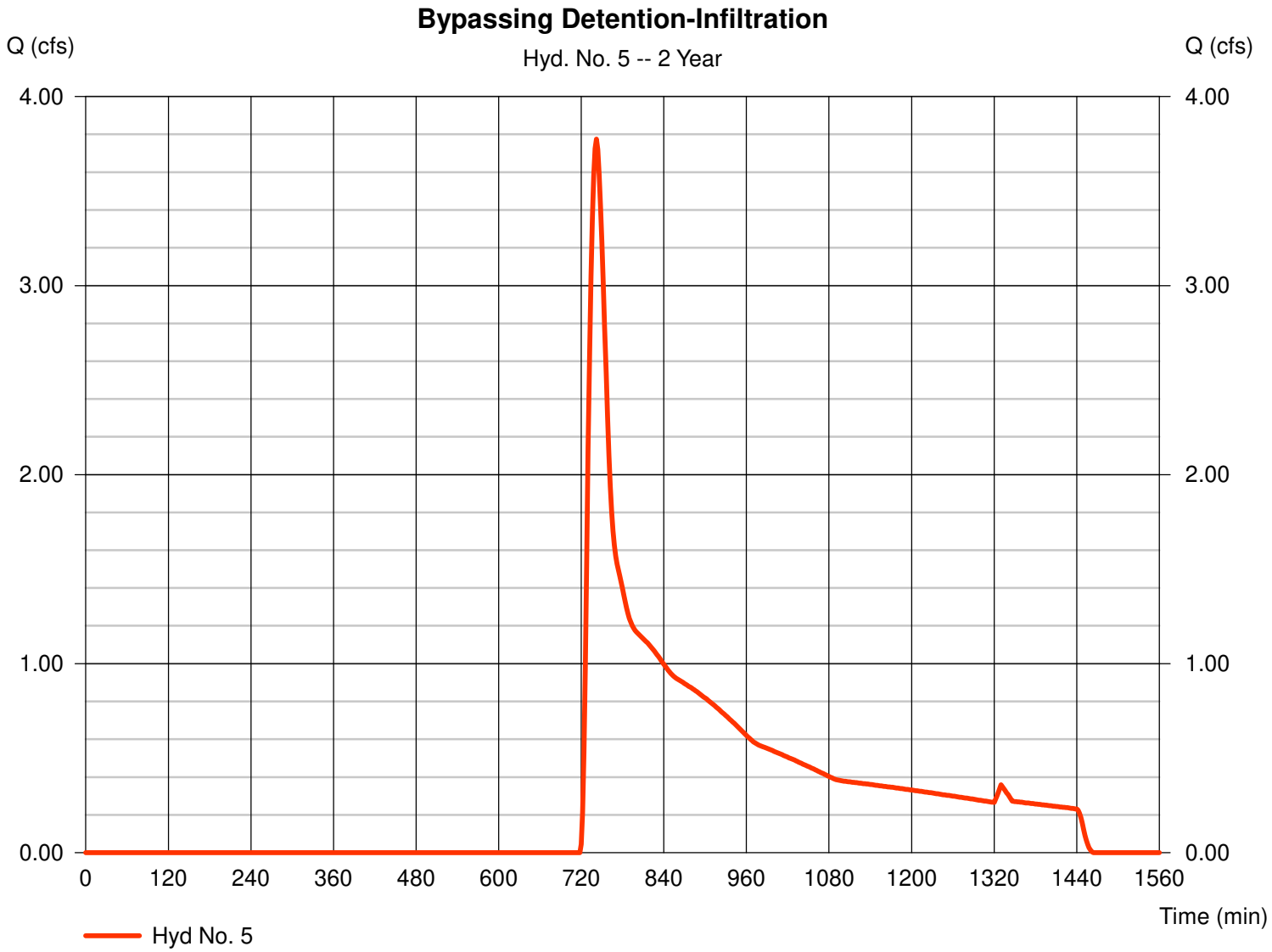
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 5

Bypassing Detention-Infiltration

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.774 cfs
Storm frequency	=	2 yrs	Time to peak	=	742 min
Time interval	=	2 min	Hyd. volume	=	28,504 cuft
Drainage area	=	24.160 ac	Curve number	=	57
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	15.50 min
Total precip.	=	3.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 5

Bypassing Detention-Infiltration

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.400		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.27		0.00		0.00		
Land slope (%)	= 8.00		0.00		0.00		
Travel Time (min)	**= 12.20**	**+**	**0.00**	**+**	**0.00**	**=**	**12.20**
Shallow Concentrated Flow							
Flow length (ft)	= 255.00		290.00		0.00		
Watercourse slope (%)	= 10.50		1.40		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	= 5.23		1.91		0.00		
Travel Time (min)	**= 0.81**	**+**	**2.53**	**+**	**0.00**	**=**	**3.34**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

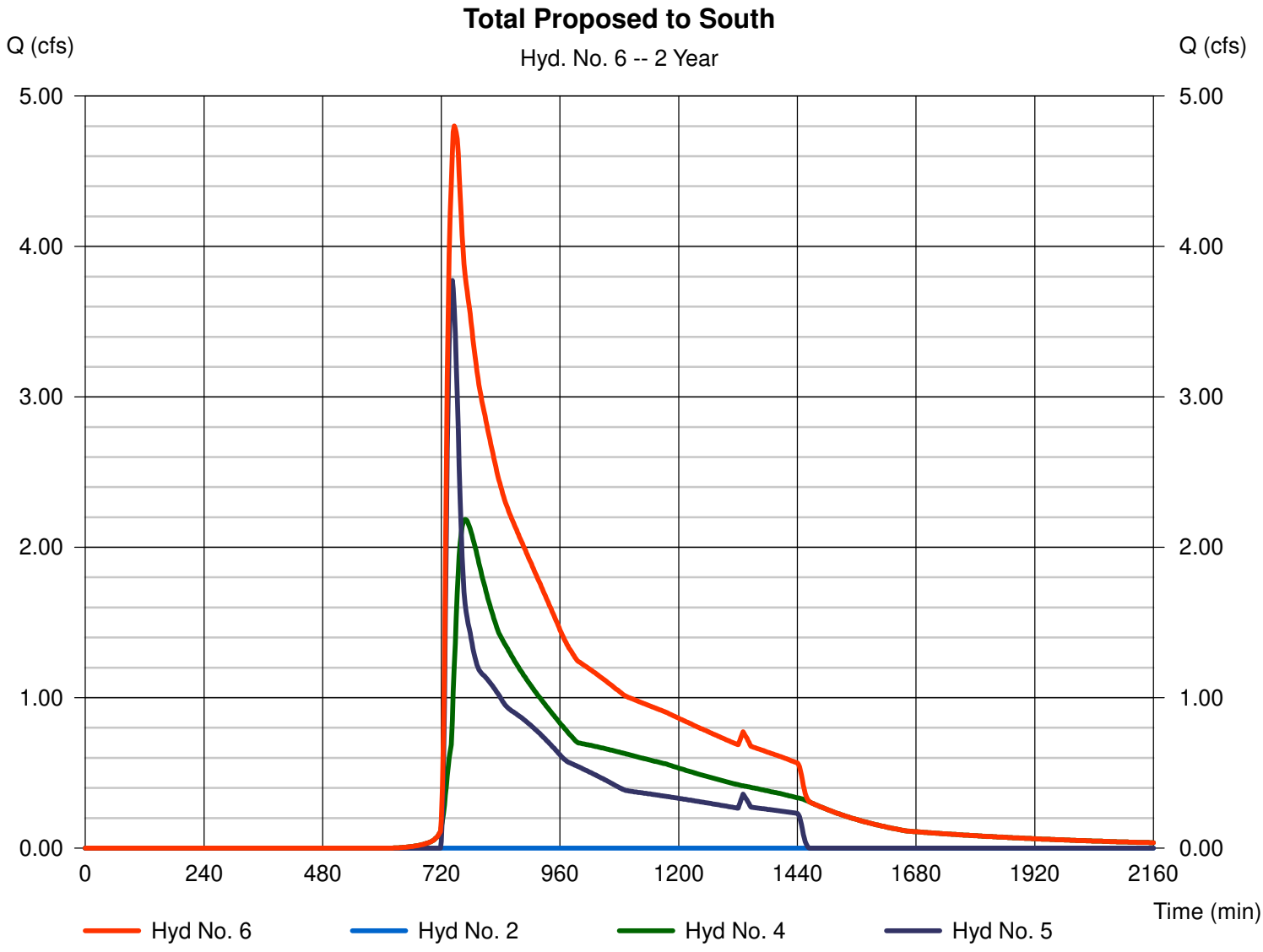
Total Travel Time, Tc ..... 15.50 min

Hydrograph Report

Hyd. No. 6

Total Proposed to South

Hydrograph type	= Combine	Peak discharge	= 4.801 cfs
Storm frequency	= 2 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 68,748 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 24.160 ac



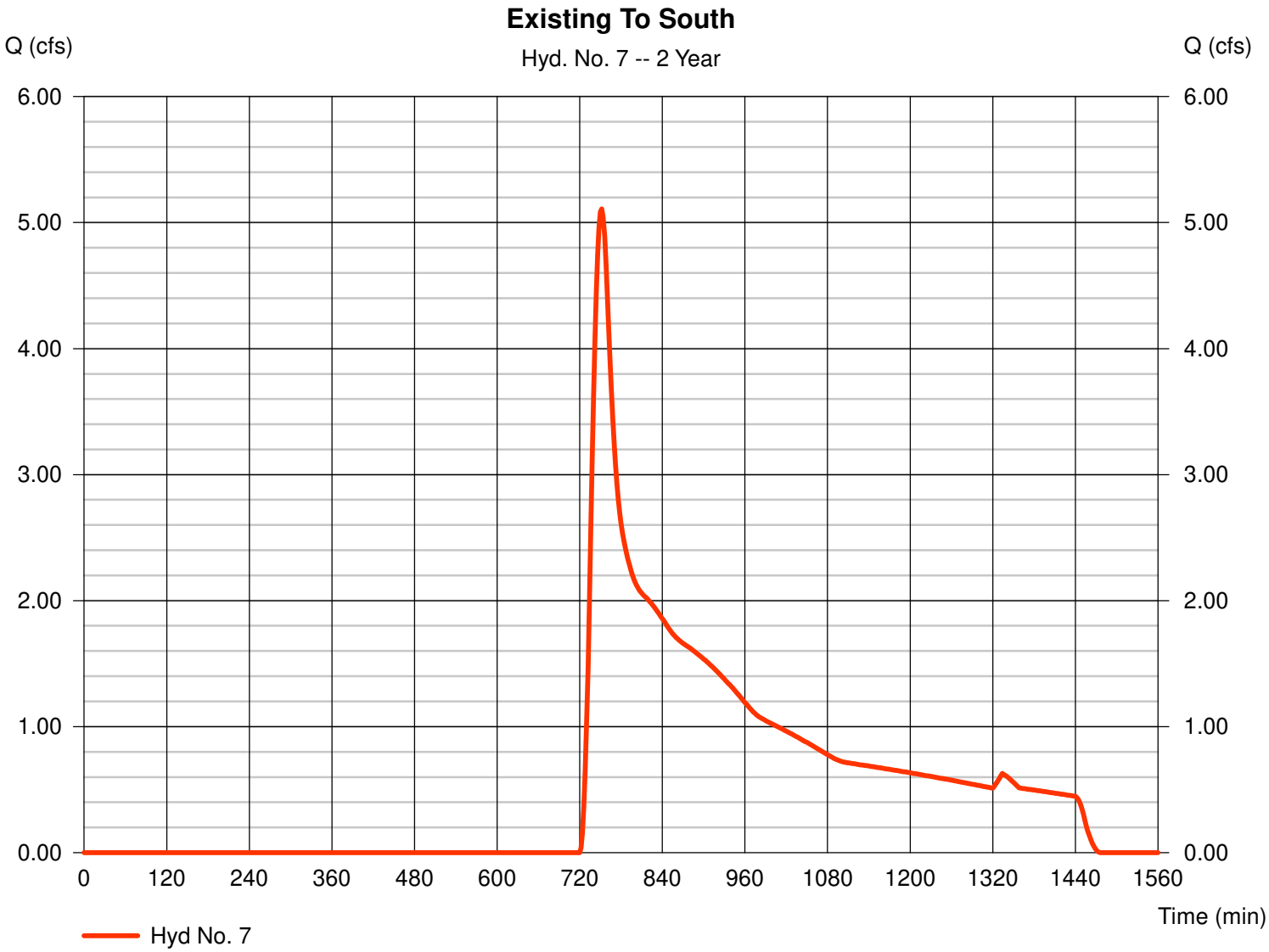
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 7

Existing To South

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.109 cfs
Storm frequency	=	2 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	49,979 cuft
Drainage area	=	49.750 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	3.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 7

Existing To South

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.27	0.00	0.00	
Land slope (%)	= 7.30	0.00	0.00	
Travel Time (min)	**= 12.66**	**+ 0.00**	**+ 0.00**	**= 12.66**
Shallow Concentrated Flow				
Flow length (ft)	= 294.00	493.00	537.00	
Watercourse slope (%)	= 3.40	11.00	1.50	
Surface description	= Unpaved	Unpaved	Unpaved	
Average velocity (ft/s)	= 2.98	5.35	1.98	
Travel Time (min)	**= 1.65**	**+ 1.54**	**+ 4.53**	**= 7.71**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 20.40 min

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	36.34	2	734	160,654	------	------	------	Proposed to Northerly Basin
2	Reservoir	0.000	2	684	0	1	534.49	29,000	Out of Northerly Basin
3	SCS Runoff	19.55	2	734	86,370	------	------	------	Proposed to Southerly Basin
4	Reservoir	9.201	2	752	86,344	3	530.04	53,870	Out of Southerly Basin
5	SCS Runoff	20.81	2	734	99,037	------	------	------	Bypassing Detention-Infiltration
6	Combine	26.35	2	738	185,381	2, 4, 5	------	------	Total Proposed to South
7	SCS Runoff	32.94	2	742	189,362	------	------	------	Existing To South
8	Rational	7.081	1	14	5,948	------	------	------	Proposed to North
9	Rational	8.392	1	16	8,057	------	------	------	Existing to North
11	Rational	7.440	1	5	2,232	------	------	------	Runoff to Galleys: Bld 2-12-15
12	Reservoir	0.000	1	751	0	11	548.50	2,202	Out of Gallyes:2-12-15
14	Rational	9.661	1	5	2,898	------	------	------	Runoff to Chambers Bld 11-16-17
15	Diversion1	4.830	1	5	1,449	14	------	------	To Upper Row of Chambers
16	Reservoir	0.000	1	n/a	0	15	543.08	1,062	Out of Upper Row 17
17	Diversion2	4.830	1	5	1,449	14	------	------	To Lower Row of Chambers
18	Reservoir	0.000	1	n/a	0	17	541.68	1,062	Out of Lower Row 17
20	Rational	3.289	1	5	987	------	------	------	Bld 18-19W-20W
21	Reservoir	0.000	1	n/a	0	20	530.36	706	Out Chambers18-19W20W
23	Rational	2.965	1	5	890	------	------	------	Runoff to Chamber Bld 19E20E21
24	Reservoir	0.000	1	n/a	0	23	530.79	631	Out Chambers1920E21

Hydrograph Report

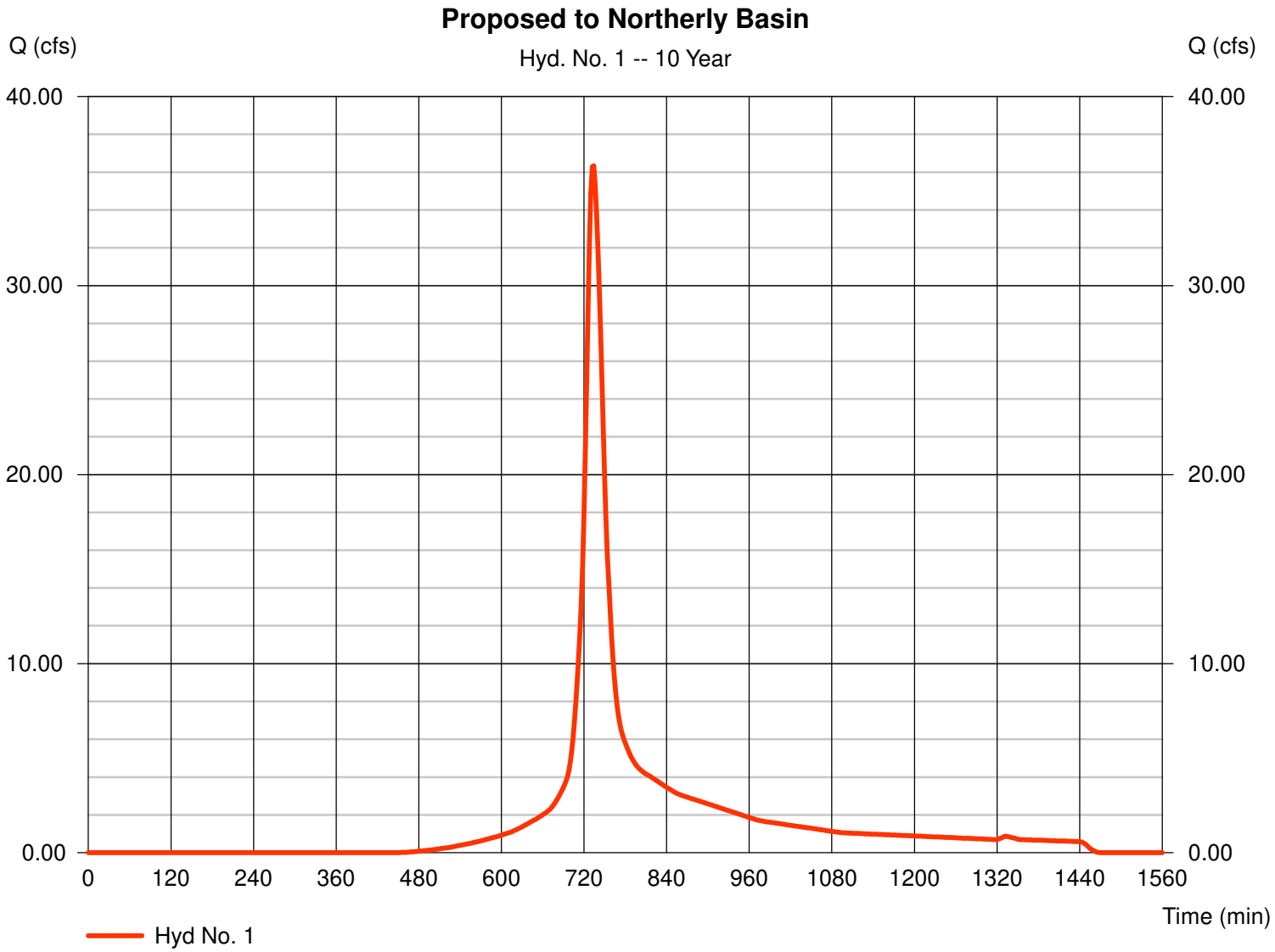
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 1

Proposed to Northerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	36.34 cfs
Storm frequency	=	10 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	160,654 cuft
Drainage area	=	14.850 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	17.20 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.820 x 98) + (6.660 x 61) + (0.020 x 55) + (0.350 x 39)] / 14.850



Hydrograph Report

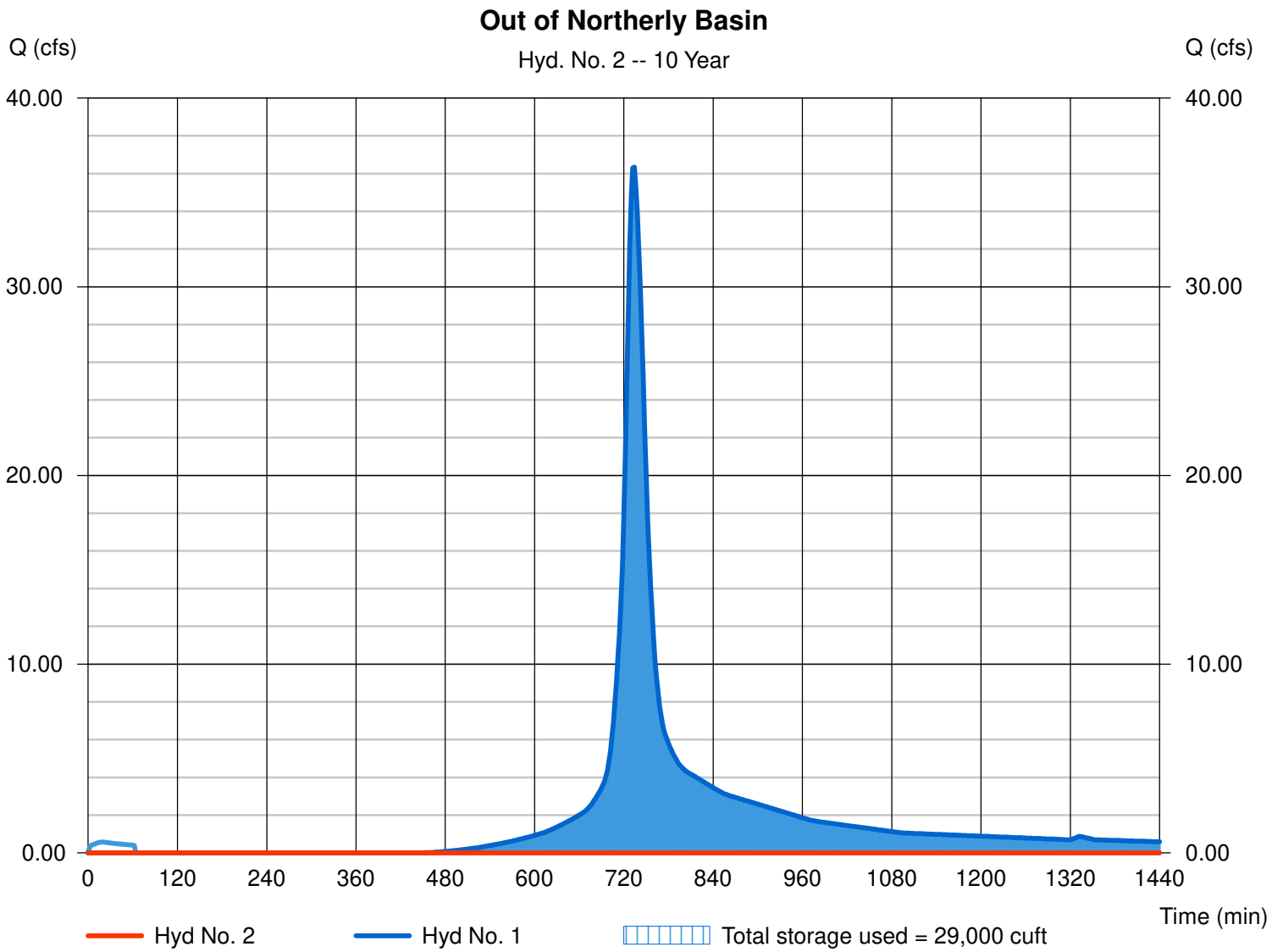
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 2

Out of Northerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	684 min
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	1 - Proposed to Northerly Basin	Max. Elevation	=	534.49 ft
Reservoir name	=	North Basin 1	Max. Storage	=	29,000 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



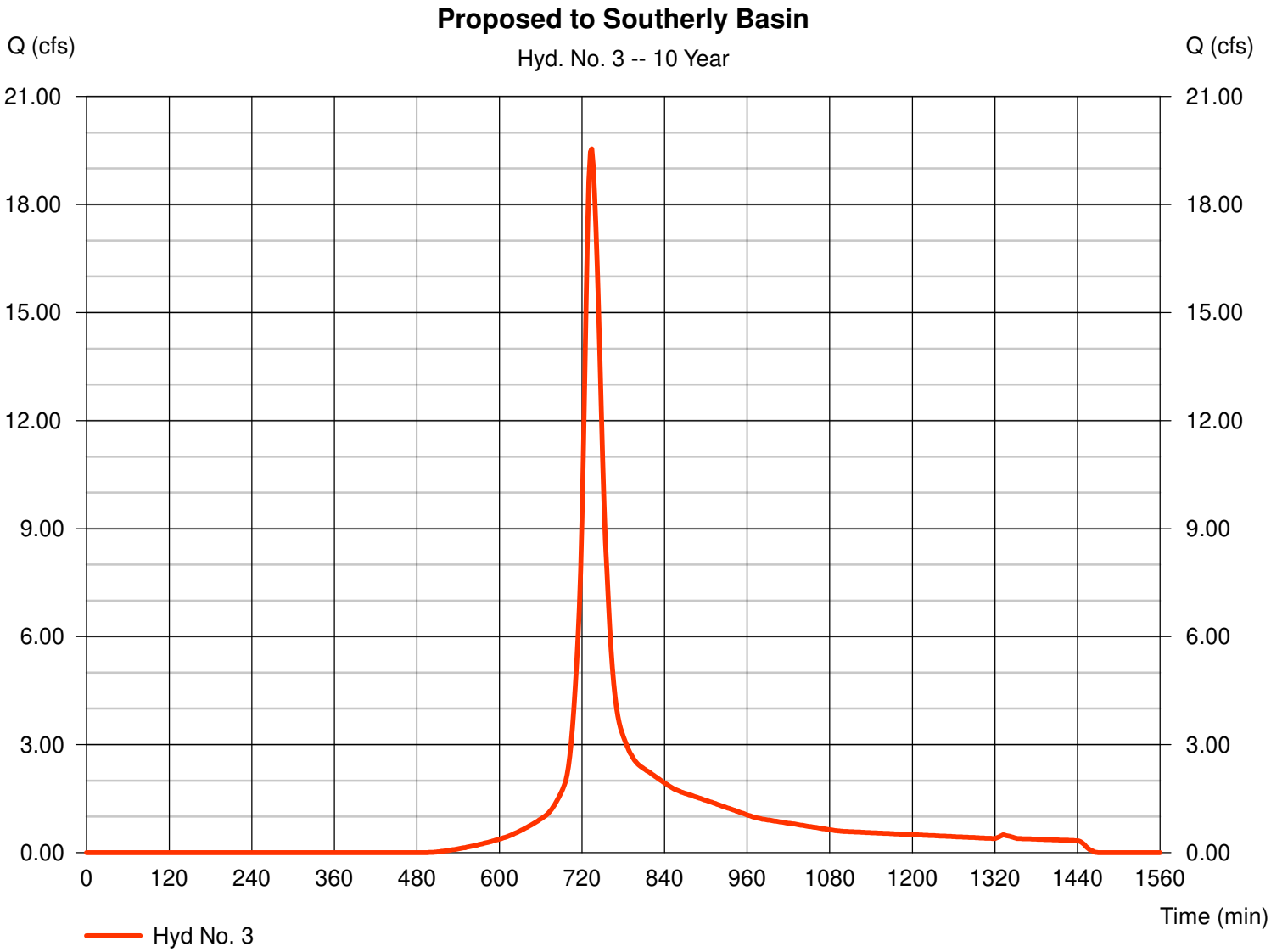
Hydrograph Report

Hyd. No. 3

Proposed to Southerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.55 cfs
Storm frequency	=	10 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	86,370 cuft
Drainage area	=	8.790 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.240 x 98) + (0.890 x 39) + (3.660 x 61)] / 8.790



Hydrograph Report

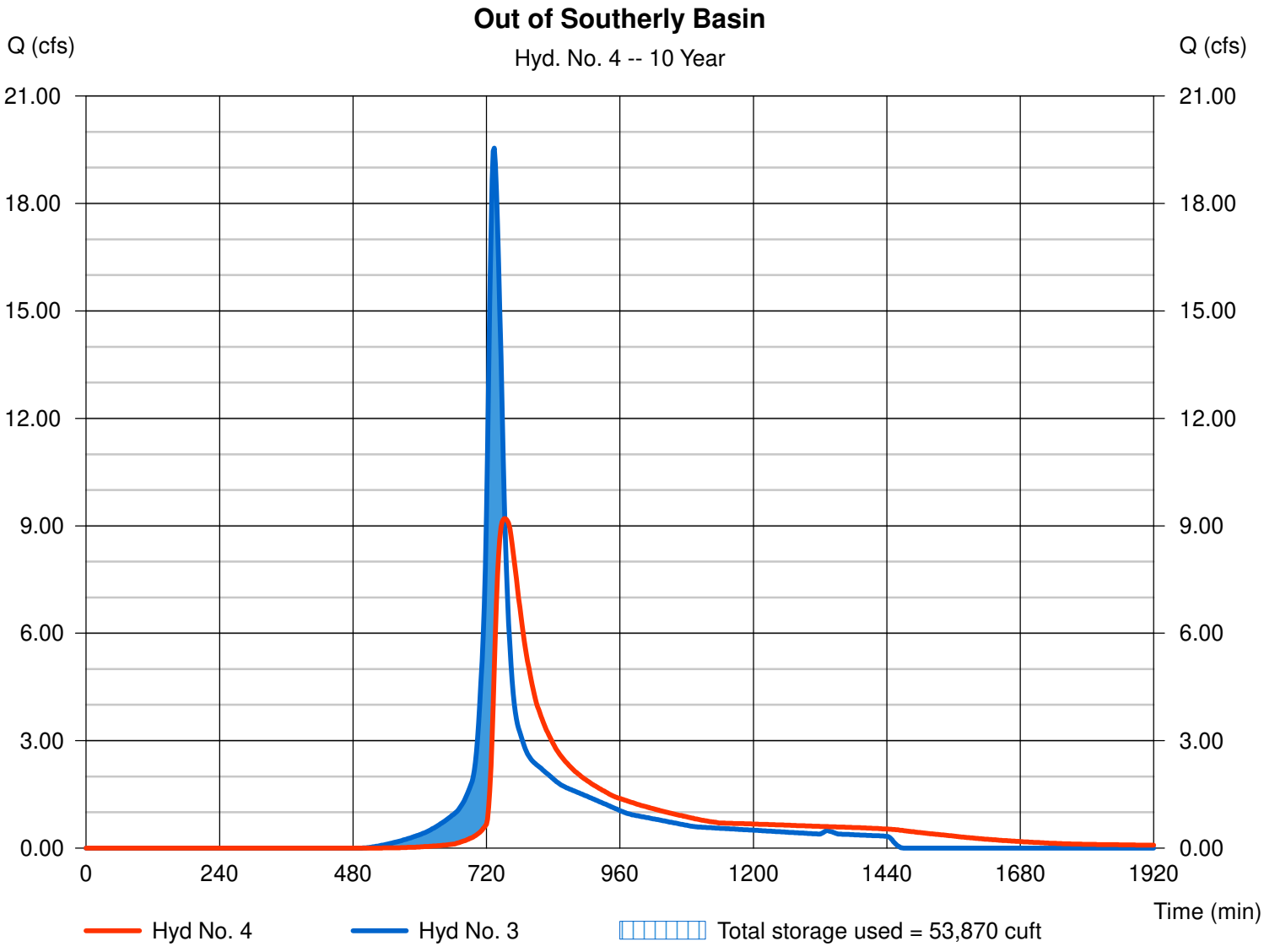
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 4

Out of Southerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	9.201 cfs
Storm frequency	=	10 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	86,344 cuft
Inflow hyd. No.	=	3 - Proposed to Southerly Basin	Max. Elevation	=	530.04 ft
Reservoir name	=	South Basin 2	Max. Storage	=	53,870 cuft

Storage Indication method used. Wet pond routing start elevation = 528.00 ft.



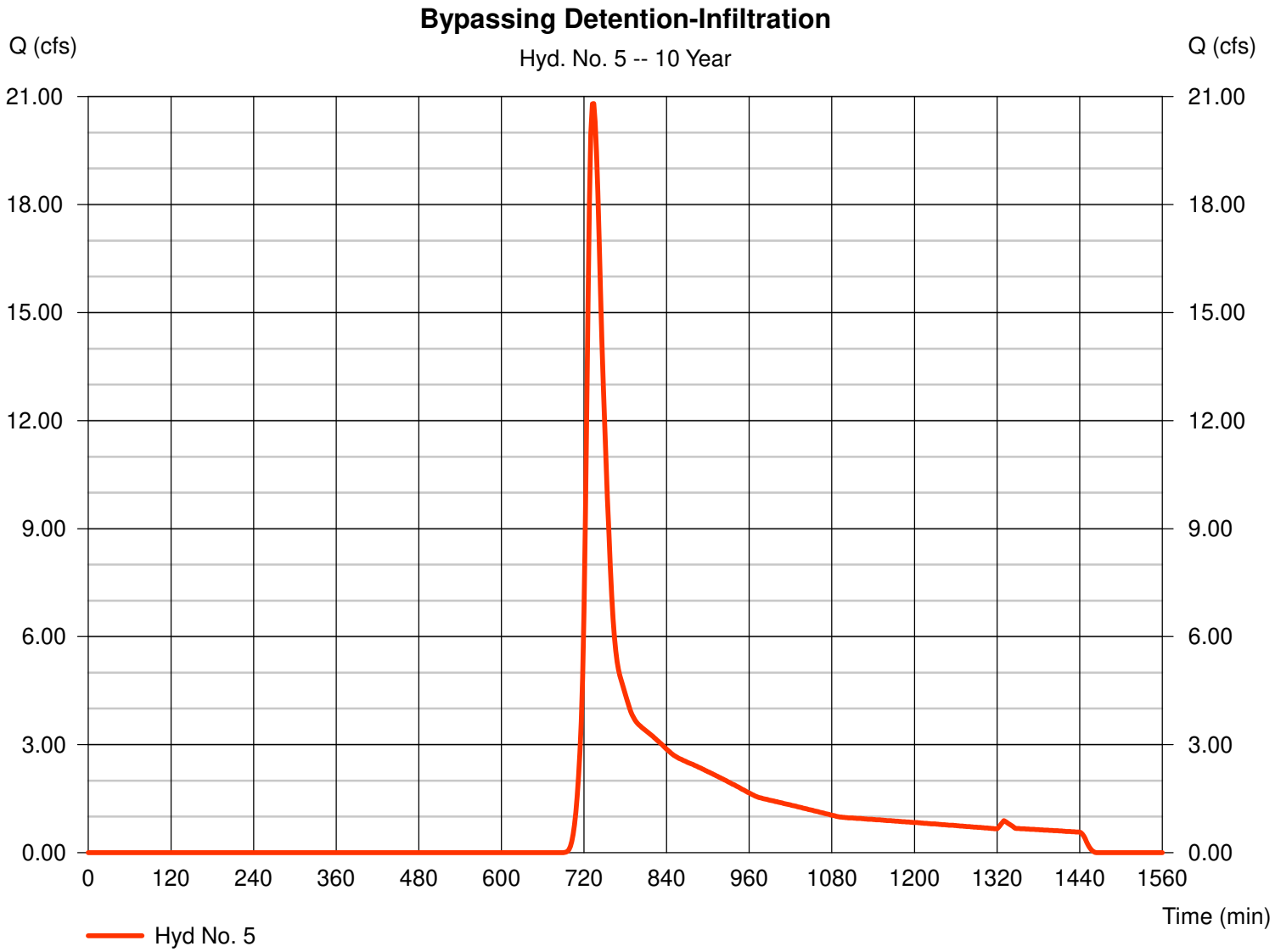
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 5

Bypassing Detention-Infiltration

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.81 cfs
Storm frequency	=	10 yrs	Time to peak	=	734 min
Time interval	=	2 min	Hyd. volume	=	99,037 cuft
Drainage area	=	24.160 ac	Curve number	=	57
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	15.50 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



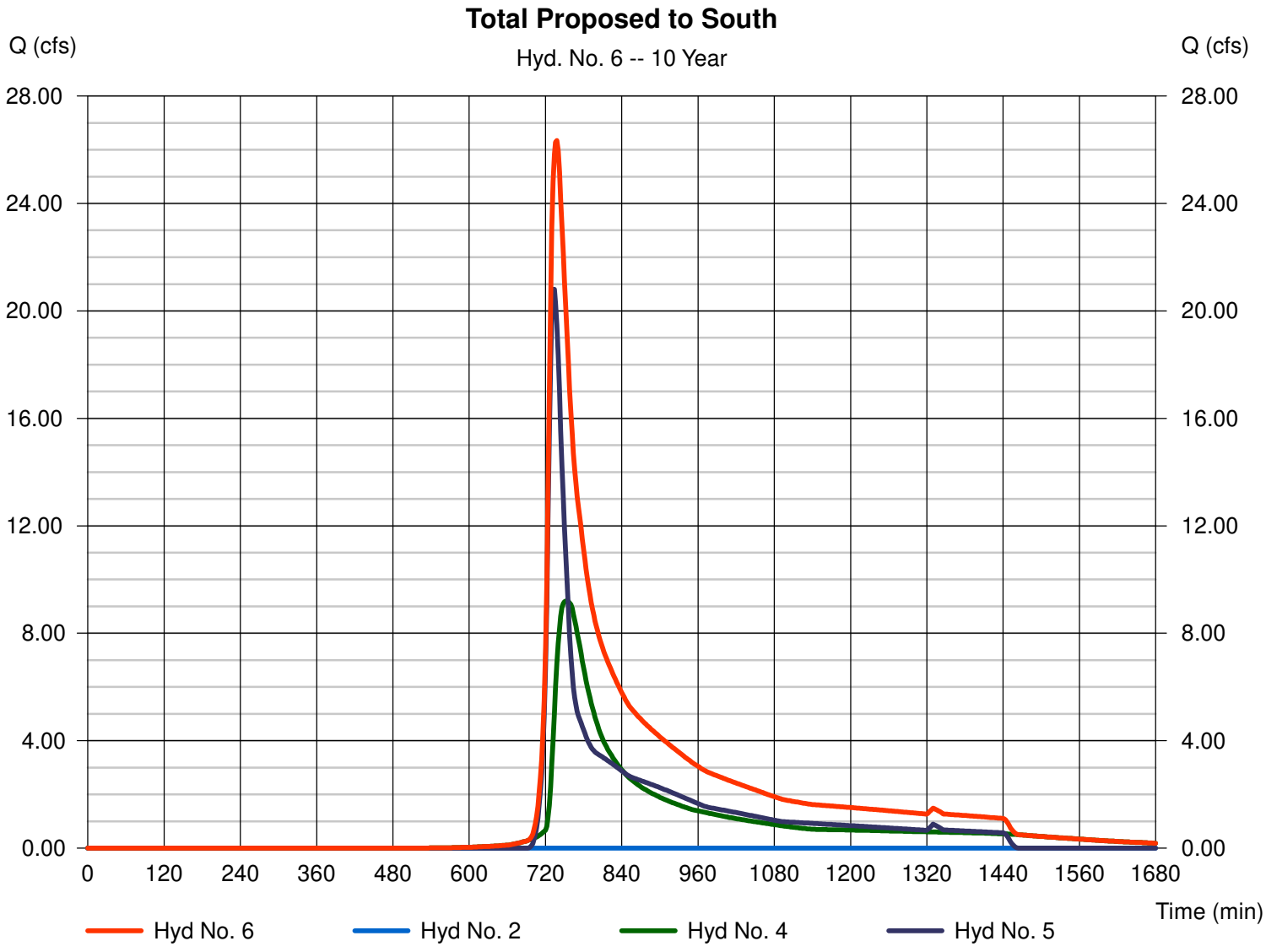
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 6

Total Proposed to South

Hydrograph type	= Combine	Peak discharge	= 26.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 185,381 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 24.160 ac



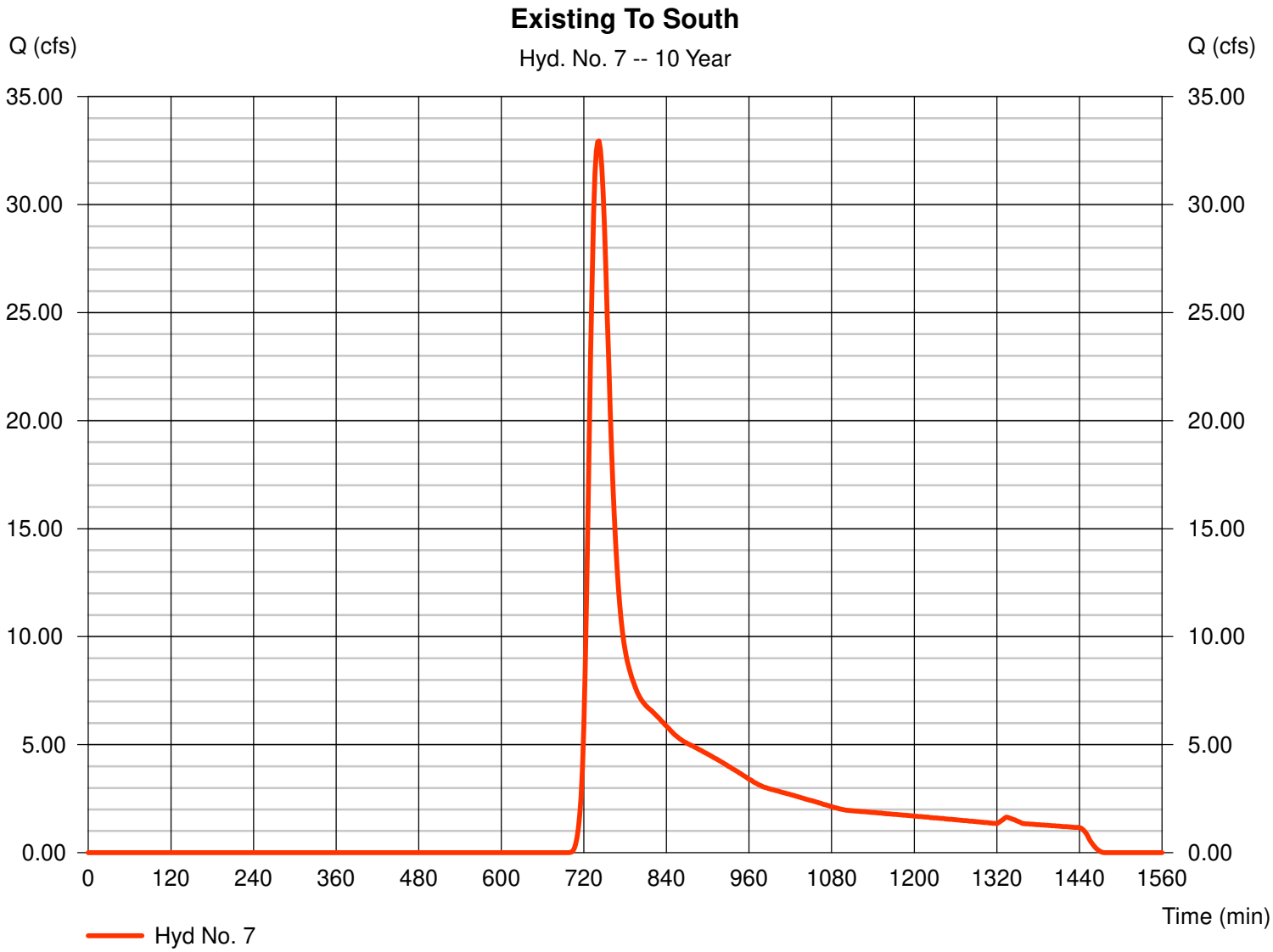
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 7

Existing To South

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.94 cfs
Storm frequency	=	10 yrs	Time to peak	=	742 min
Time interval	=	2 min	Hyd. volume	=	189,362 cuft
Drainage area	=	49.750 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	5.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	67.93	2	732	303,724	------	------	------	Proposed to Northerly Basin
2	Reservoir	39.03	2	740	51,207	1	535.49	44,426	Out of Northerly Basin
3	SCS Runoff	37.94	2	732	168,585	------	------	------	Proposed to Southerly Basin
4	Reservoir	13.33	2	758	168,559	3	531.76	84,796	Out of Southerly Basin
5	SCS Runoff	61.40	2	732	257,320	------	------	------	Bypassing Detention-Infiltration
6	Combine	102.59	2	738	477,087	2, 4, 5	------	------	Total Proposed to South
7	SCS Runoff	103.61	2	738	513,021	------	------	------	Existing To South
8	Rational	9.894	1	14	8,311	------	------	------	Proposed to North
9	Rational	11.83	1	16	11,361	------	------	------	Existing to North
11	Rational	9.680	1	5	2,904	------	------	------	Runoff to Galleys: Bld 2-12-15
12	Reservoir	0.000	1	932	0	11	549.25	2,872	Out of Gallyes:2-12-15
14	Rational	12.57	1	5	3,771	------	------	------	Runoff to Chambers Bld 11-16-17
15	Diversion1	6.285	1	5	1,886	14	------	------	To Upper Row of Chambers
16	Reservoir	0.000	1	n/a	0	15	543.80	1,454	Out of Upper Row 17
17	Diversion2	6.285	1	5	1,886	14	------	------	To Lower Row of Chambers
18	Reservoir	0.000	1	n/a	0	17	542.40	1,454	Out of Lower Row 17
20	Rational	4.279	1	5	1,284	------	------	------	Bld 18-19W-20W
21	Reservoir	0.000	1	n/a	0	20	530.99	971	Out Chambers18-19W20W
23	Rational	3.858	1	5	1,157	------	------	------	Runoff to Chamber Bld 19E20E21
24	Reservoir	0.000	1	n/a	0	23	531.39	870	Out Chambers1920E21

Hydrograph Report

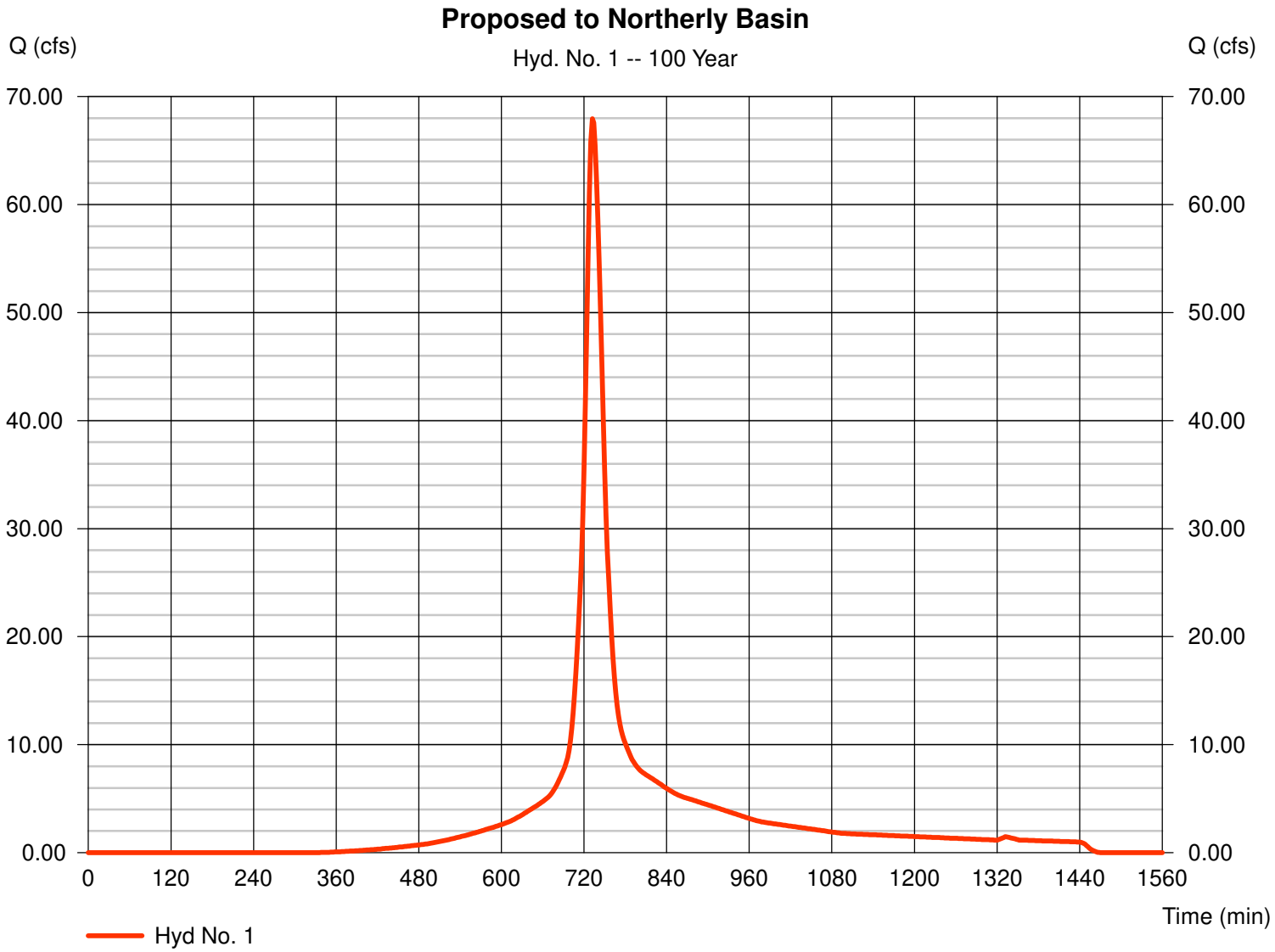
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 1

Proposed to Northerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	67.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	303,724 cuft
Drainage area	=	14.850 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	17.20 min
Total precip.	=	8.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.820 x 98) + (6.660 x 61) + (0.020 x 55) + (0.350 x 39)] / 14.850



Hydrograph Report

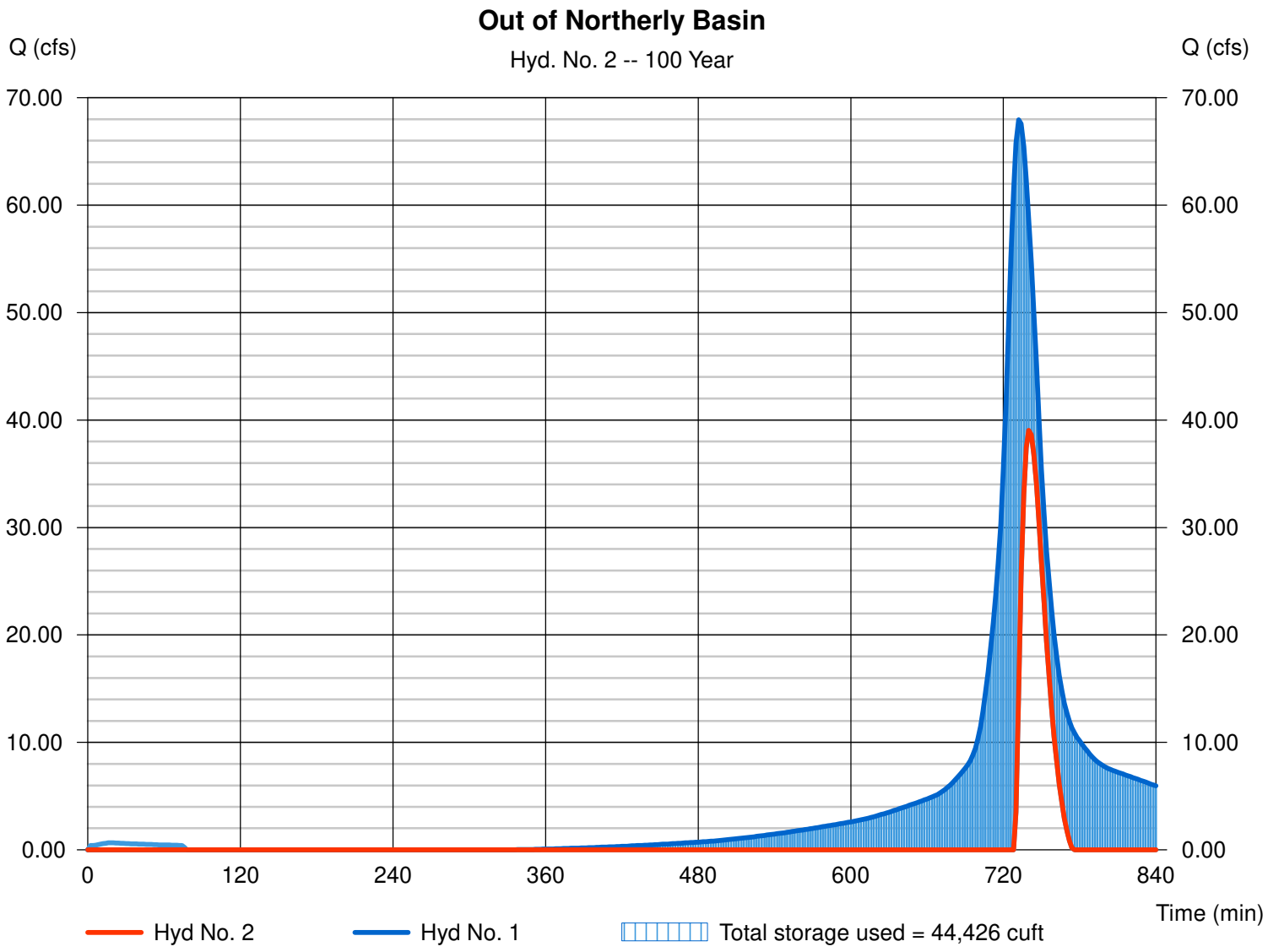
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 2

Out of Northerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	39.03 cfs
Storm frequency	=	100 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	51,207 cuft
Inflow hyd. No.	=	1 - Proposed to Northerly Basin	Max. Elevation	=	535.49 ft
Reservoir name	=	North Basin 1	Max. Storage	=	44,426 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

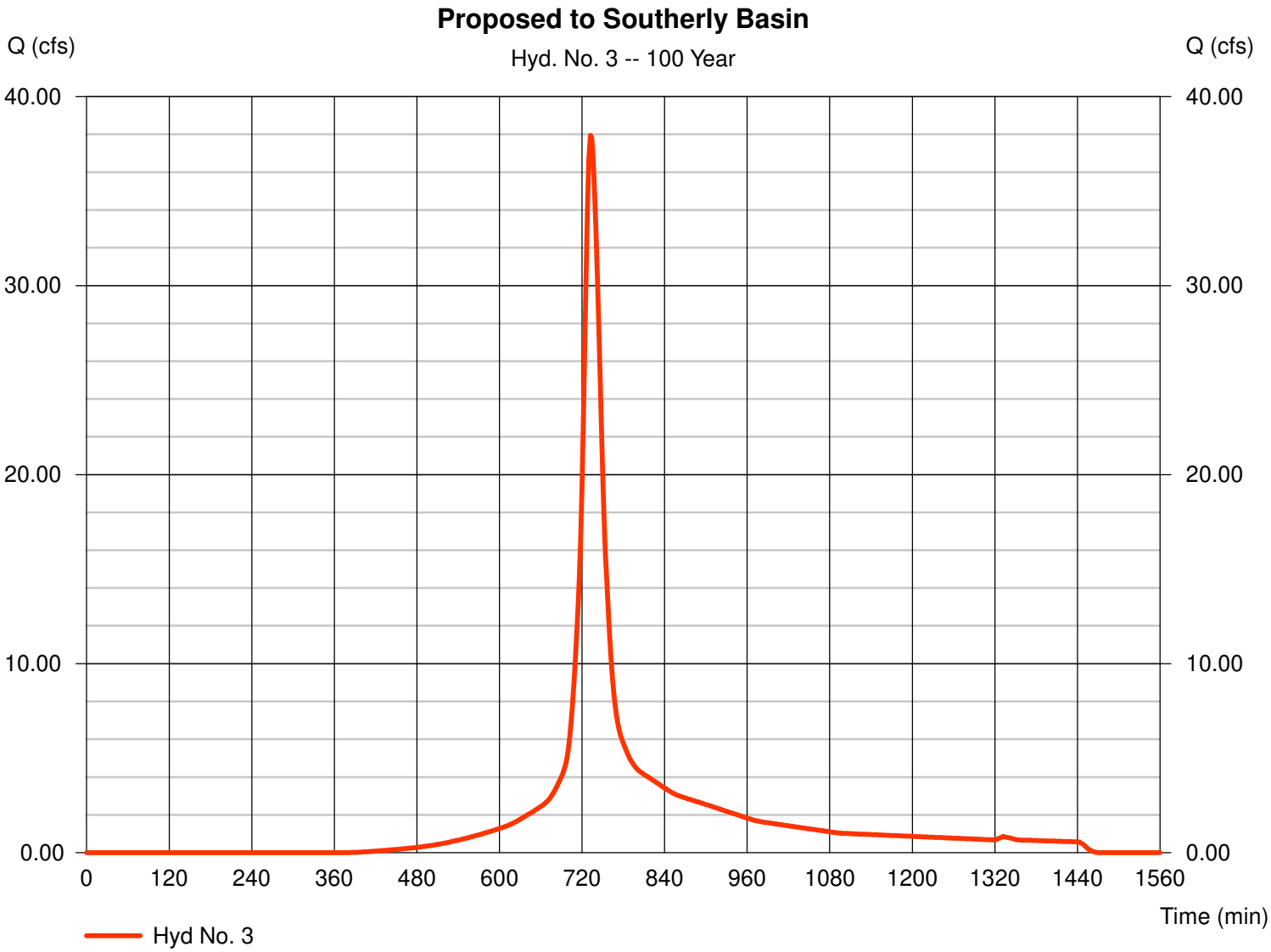
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 3

Proposed to Southerly Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	168,585 cuft
Drainage area	=	8.790 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	8.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.240 x 98) + (0.890 x 39) + (3.660 x 61)] / 8.790



Hydrograph Report

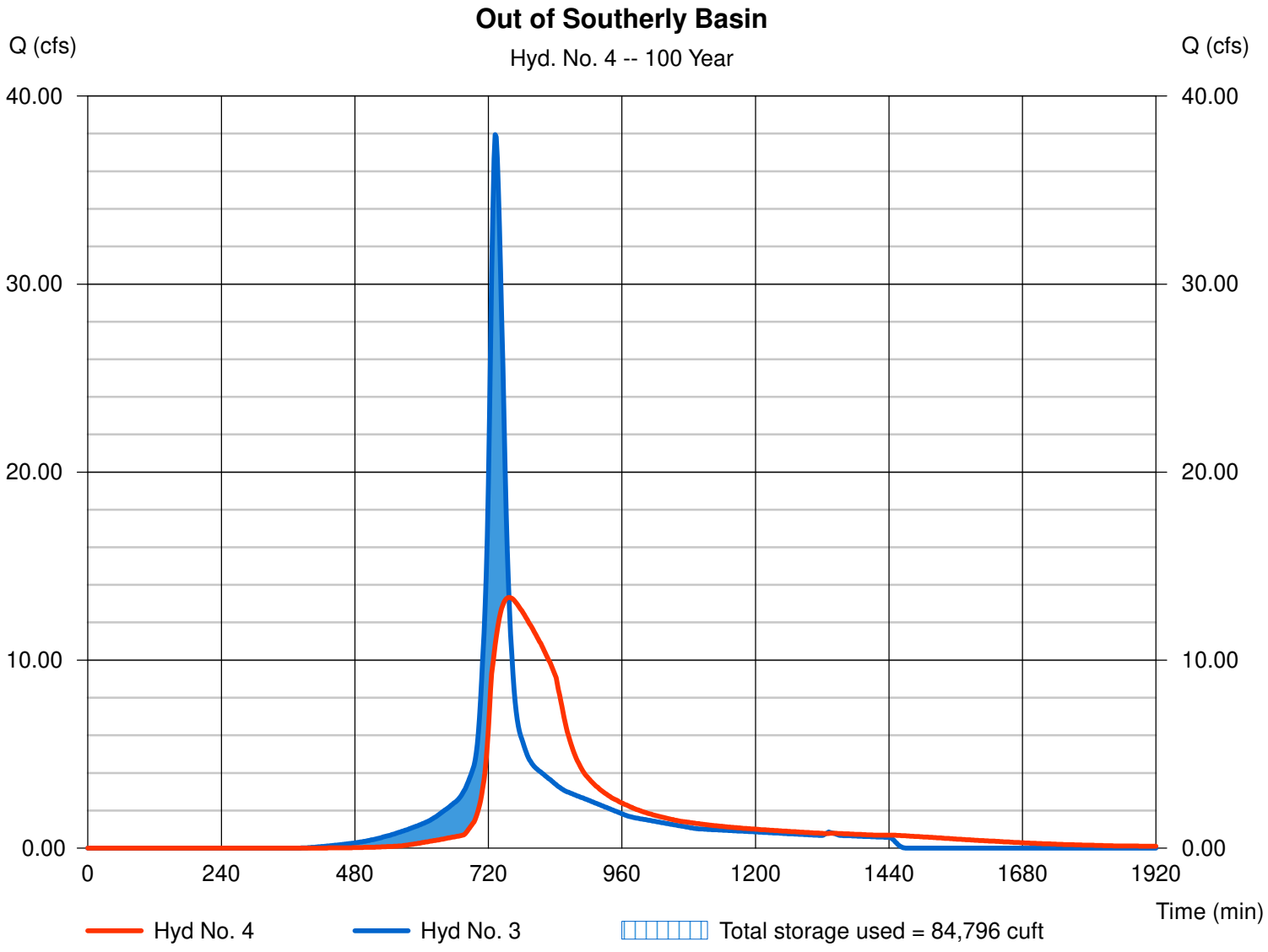
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 4

Out of Southerly Basin

Hydrograph type	=	Reservoir	Peak discharge	=	13.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	758 min
Time interval	=	2 min	Hyd. volume	=	168,559 cuft
Inflow hyd. No.	=	3 - Proposed to Southerly Basin	Max. Elevation	=	531.76 ft
Reservoir name	=	South Basin 2	Max. Storage	=	84,796 cuft

Storage Indication method used. Wet pond routing start elevation = 528.00 ft.

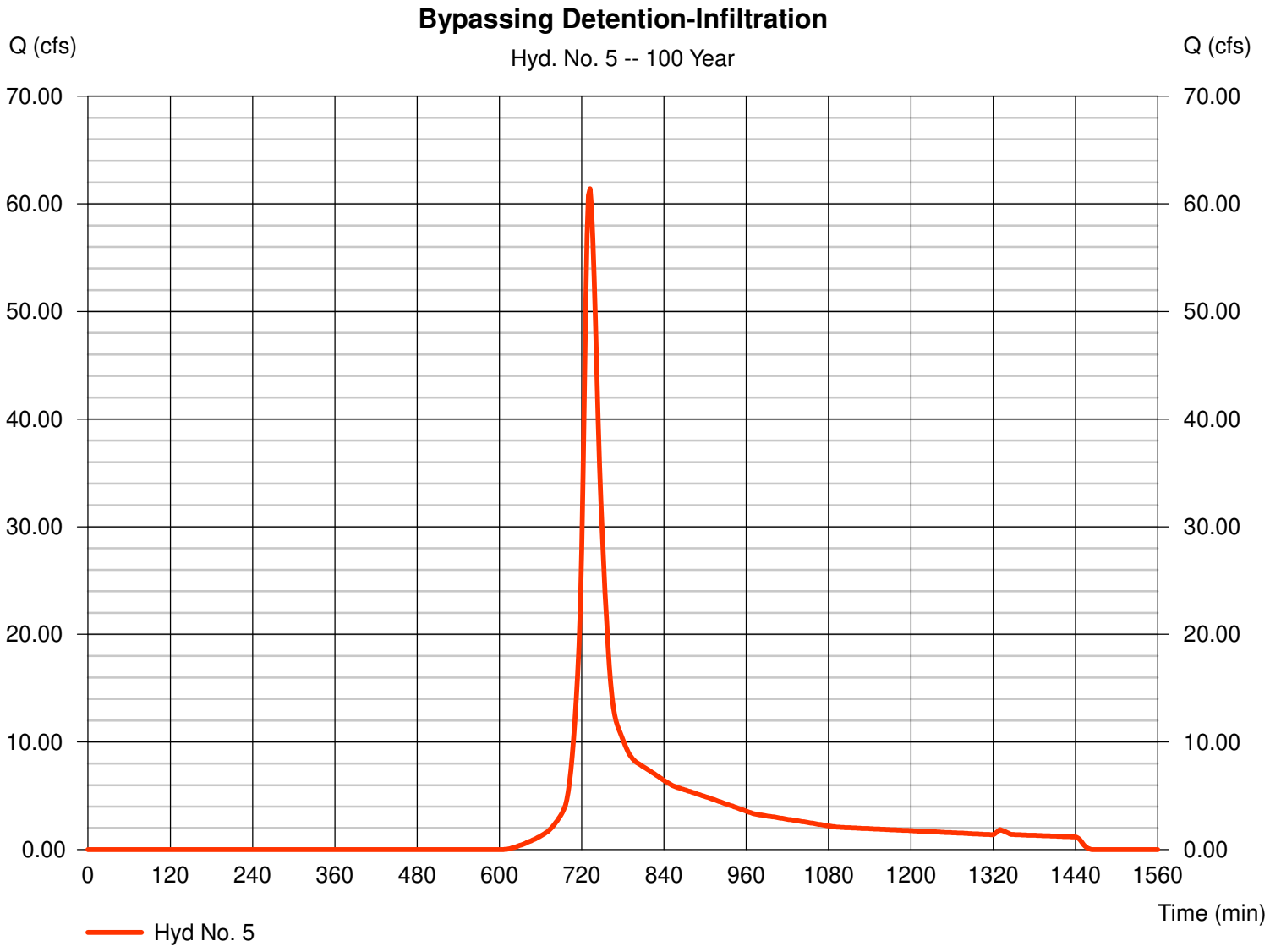


Hydrograph Report

Hyd. No. 5

Bypassing Detention-Infiltration

Hydrograph type	=	SCS Runoff	Peak discharge	=	61.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	257,320 cuft
Drainage area	=	24.160 ac	Curve number	=	57
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	15.50 min
Total precip.	=	8.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

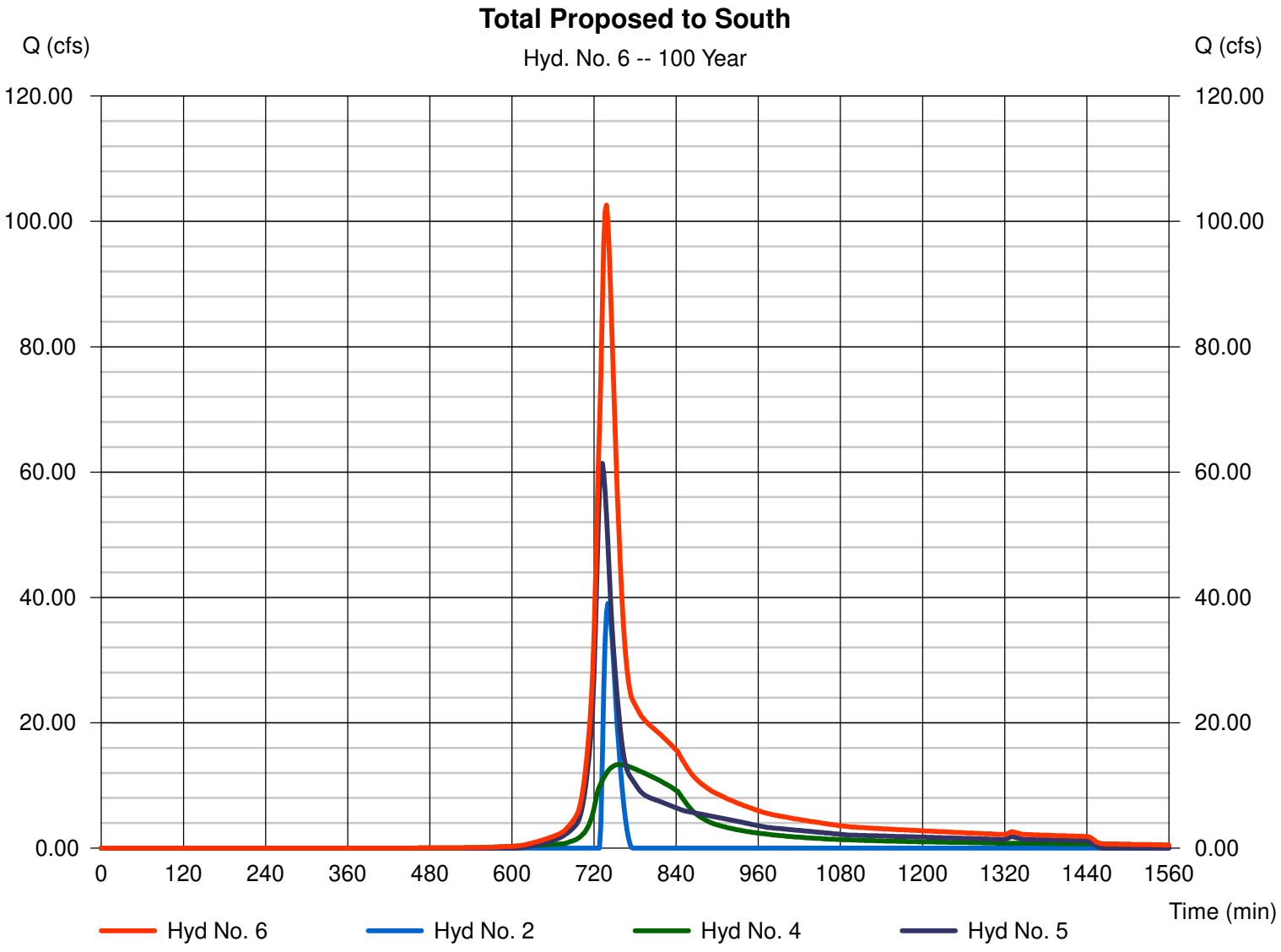


Hydrograph Report

Hyd. No. 6

Total Proposed to South

Hydrograph type	= Combine	Peak discharge	= 102.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 477,087 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 24.160 ac



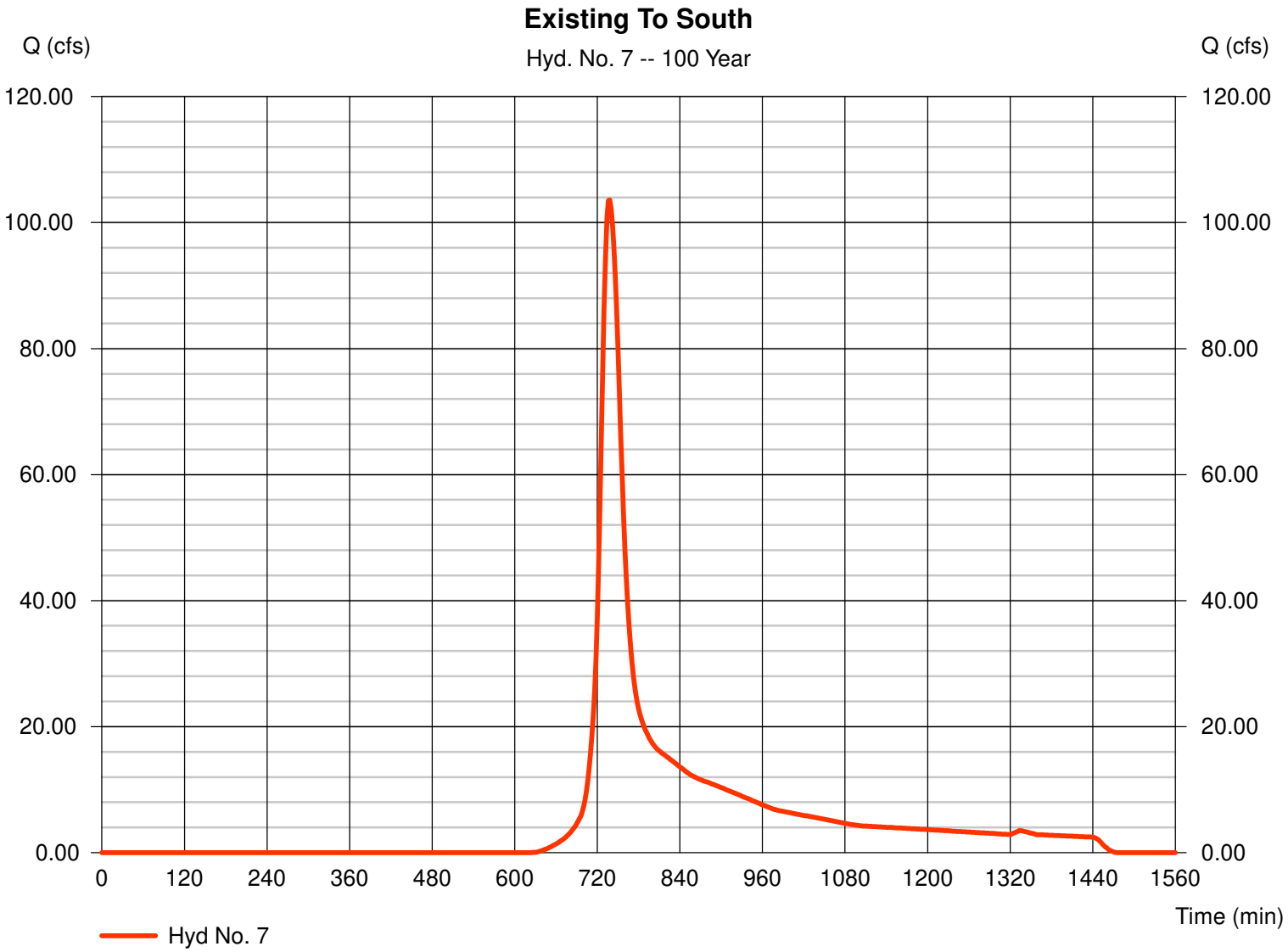
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 7

Existing To South

Hydrograph type	=	SCS Runoff	Peak discharge	=	103.61 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	513,021 cuft
Drainage area	=	49.750 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	8.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

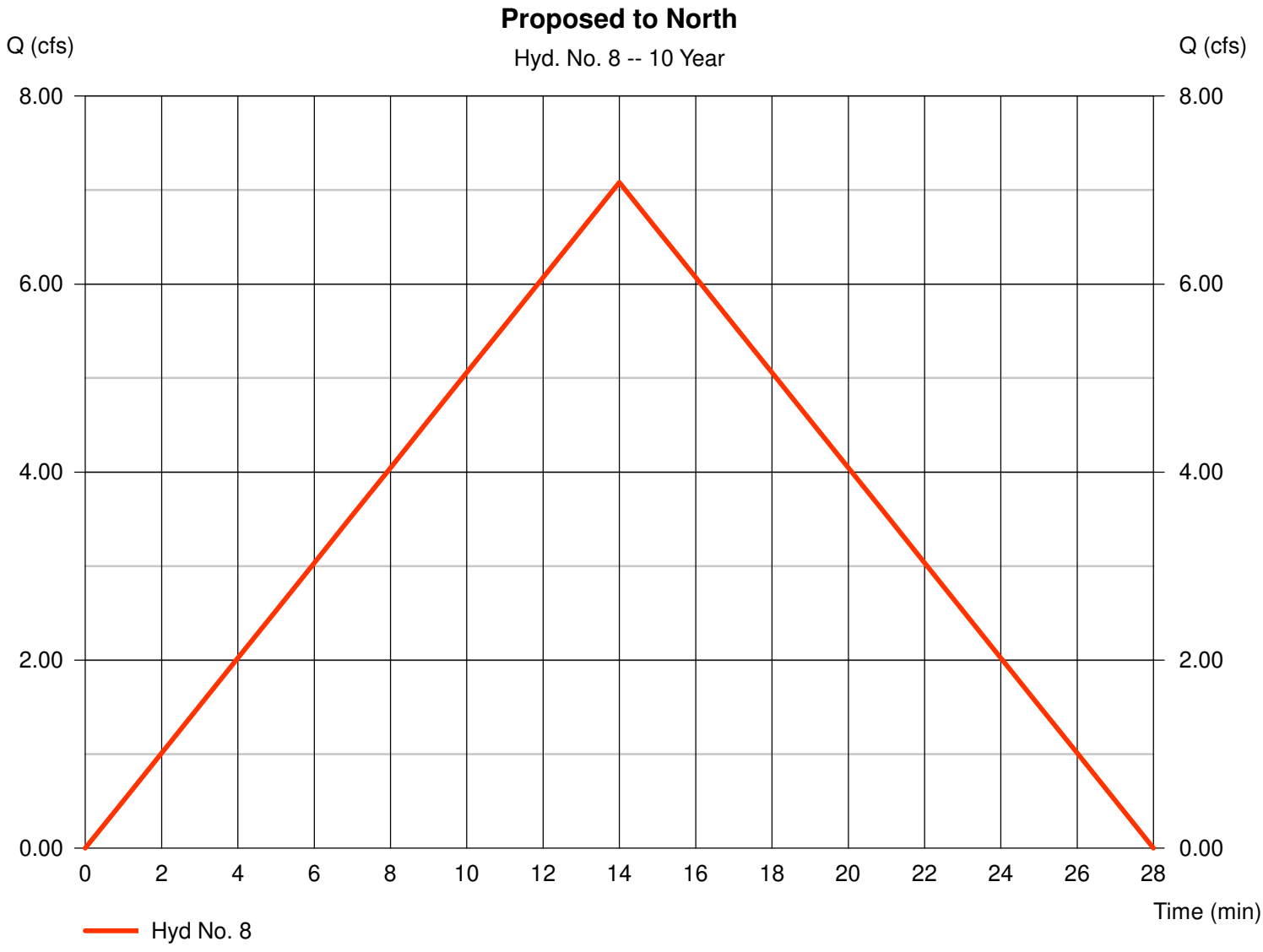
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 8

Proposed to North

Hydrograph type	=	Rational	Peak discharge	=	7.081 cfs
Storm frequency	=	10 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	5,948 cuft
Drainage area	=	3.030 ac	Runoff coeff.	=	0.56*
Intensity	=	4.173 in/hr	Tc by TR55	=	14.00 min
IDF Curve	=	CT-DOT.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.230 x 0.90) + (0.470 x 0.25) + (1.330 x 0.35)] / 3.030



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 8

Proposed to North

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.27		0.00		0.00		
Land slope (%)	= 6.70		0.00		0.00		
Travel Time (min)	**= 13.10**	**+**	**0.00**	**+**	**0.00**	**=**	**13.10**
Shallow Concentrated Flow							
Flow length (ft)	= 28.00		12.00		308.00		
Watercourse slope (%)	= 3.50		33.00		6.90		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	= 3.02		9.27		5.34		
Travel Time (min)	**= 0.15**	**+**	**0.02**	**+**	**0.96**	**=**	**1.14**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 14.00 min

Hydrograph Report

Hyd. No. 9

Existing to North

Hydrograph type	=	Rational	Peak discharge	=	8.392 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	8,057 cuft
Drainage area	=	5.350 ac	Runoff coeff.	=	0.4*
Intensity	=	3.922 in/hr	Tc by TR55	=	16.00 min
IDF Curve	=	CT-DOT.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.070 x 0.90) + (3.180 x 0.25) + (1.100 x 0.35)] / 5.350

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 9

Existing to North

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.400		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.27		0.00		0.00		
Land slope (%)	=	6.70		0.00		0.00		
Travel Time (min)	**=**	**13.10**	**+**	**0.00**	**+**	**0.00**	**=**	**13.10**
Shallow Concentrated Flow								
Flow length (ft)	=	185.00		70.00		164.00		
Watercourse slope (%)	=	4.00		33.00		1.50		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	3.23		9.27		2.49		
Travel Time (min)	**=**	**0.96**	**+**	**0.13**	**+**	**1.10**	**=**	**2.18**
Channel Flow								
X sectional flow area (sqft)	=	1.77		1.77		3.14		
Wetted perimeter (ft)	=	4.71		4.71		6.28		
Channel slope (%)	=	2.00		0.50		1.00		
Manning's n-value	=	0.013		0.013		0.013		
Velocity (ft/s)	=	8.40		4.20		7.20		
Flow length (ft)	=	189.0		127.0		88.0		
Travel Time (min)	**=**	**0.37**	**+**	**0.50**	**+**	**0.20**	**=**	**1.08**

Total Travel Time, Tc ..... 16.00 min

Hydrograph Report

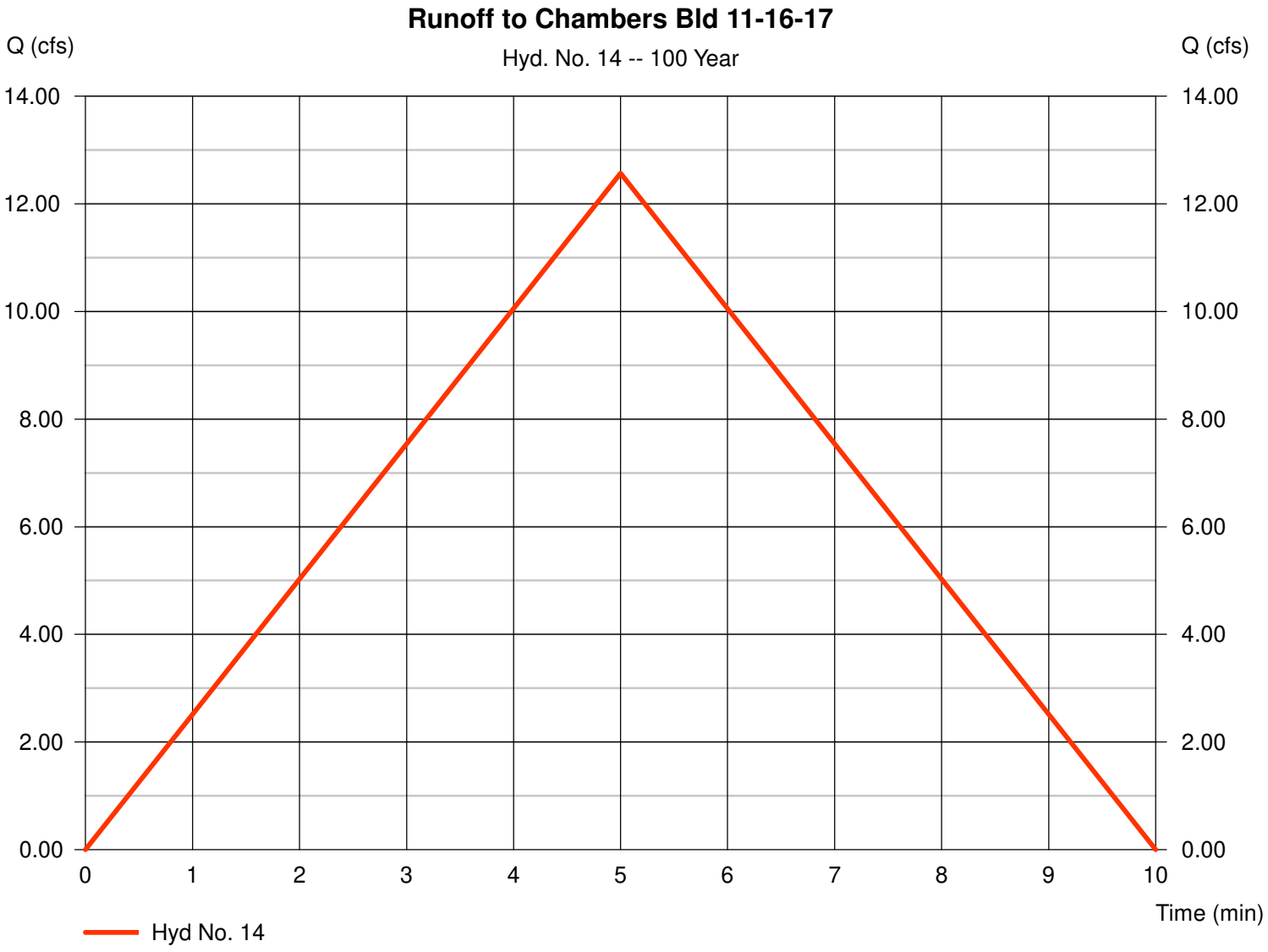
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 14

Runoff to Chambers Bld 11-16-17

Hydrograph type	=	Rational	Peak discharge	=	12.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,771 cuft
Drainage area	=	2.240 ac	Runoff coeff.	=	0.72*
Intensity	=	7.794 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CT-DOT.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(1.520 x 0.90) + (0.720 x 0.35)] / 2.240

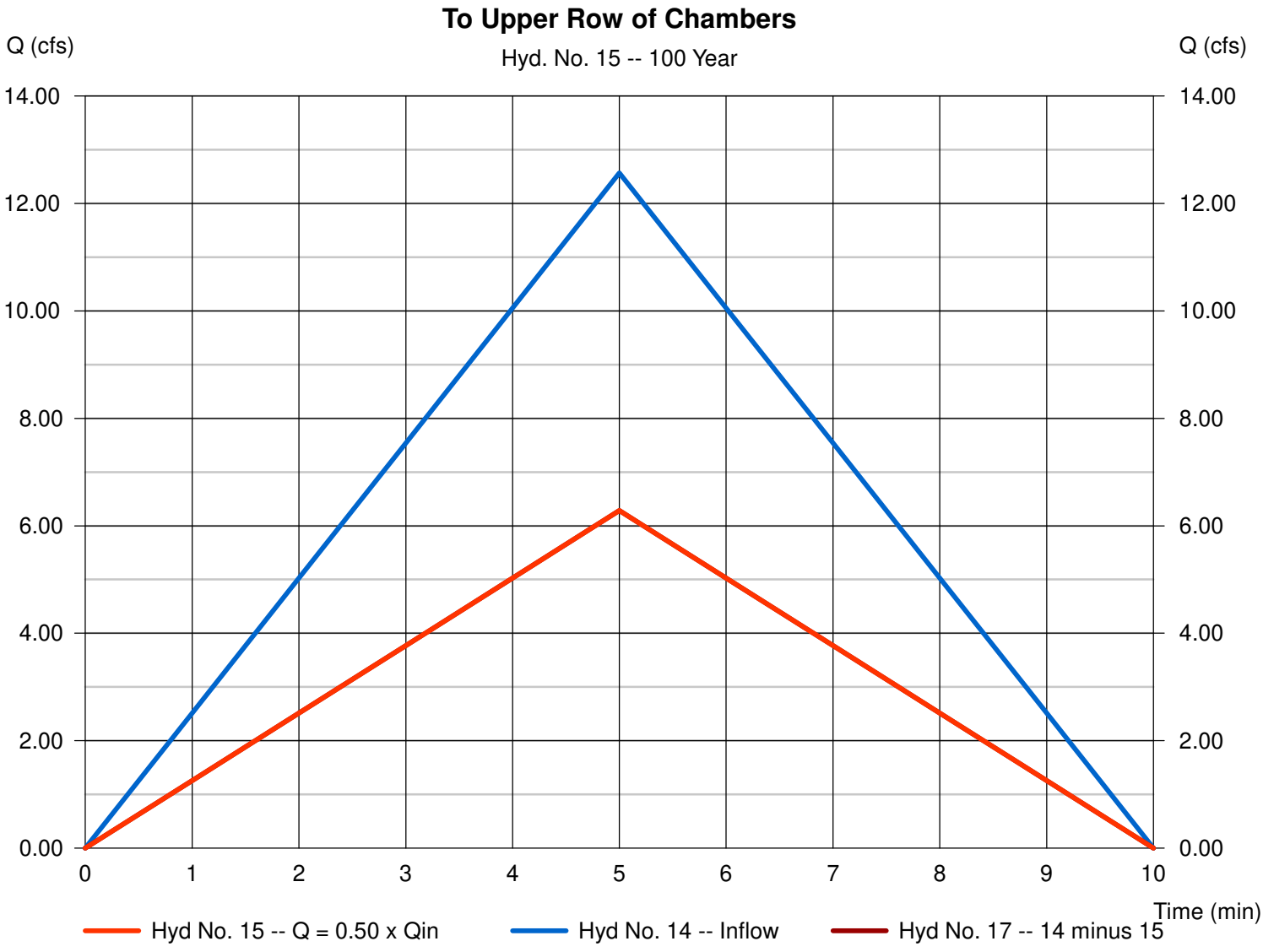


Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066
Wednesday, Mar 23, 2022

Hyd. No. 15

To Upper Row of Chambers

Hydrograph type	=	Diversion1	Peak discharge	=	6.285 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,886 cuft
Inflow hydrograph	=	14 - Runoff to Chambers Bld 11-16-17	2nd diverted hyd.	=	17
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

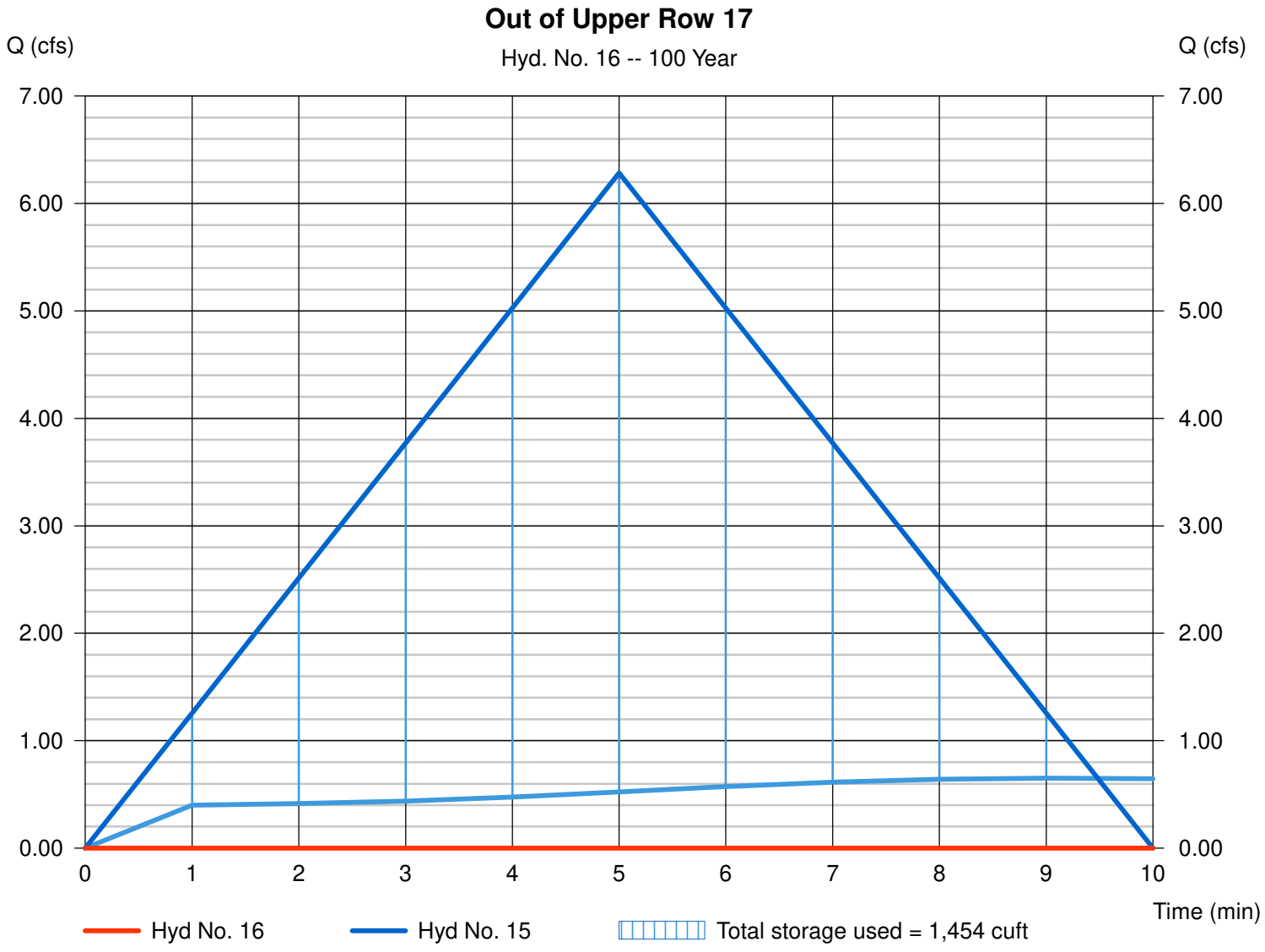
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 16

Out of Upper Row 17

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	15 - To Upper Row of Chambers	Max. Elevation	=	543.80 ft
Reservoir name	=	Cultech280-17-Row1	Max. Storage	=	1,454 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 17 - Cultech280-17-Row1

Pond Data

UG Chambers - Invert elev. = 541.60 ft, Rise x Span = 2.21 x 3.92 ft, Barrel Len = 168.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 541.60 ft, Width = 5.92 ft, Height = 2.21 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	541.60	n/a	0	0
0.22	541.82	n/a	168	168
0.44	542.04	n/a	167	334
0.66	542.26	n/a	165	499
0.88	542.48	n/a	161	660
1.11	542.71	n/a	157	817
1.33	542.93	n/a	151	968
1.55	543.15	n/a	143	1,111
1.77	543.37	n/a	133	1,245
1.99	543.59	n/a	119	1,364
2.21	543.81	n/a	96	1,460

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 25.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

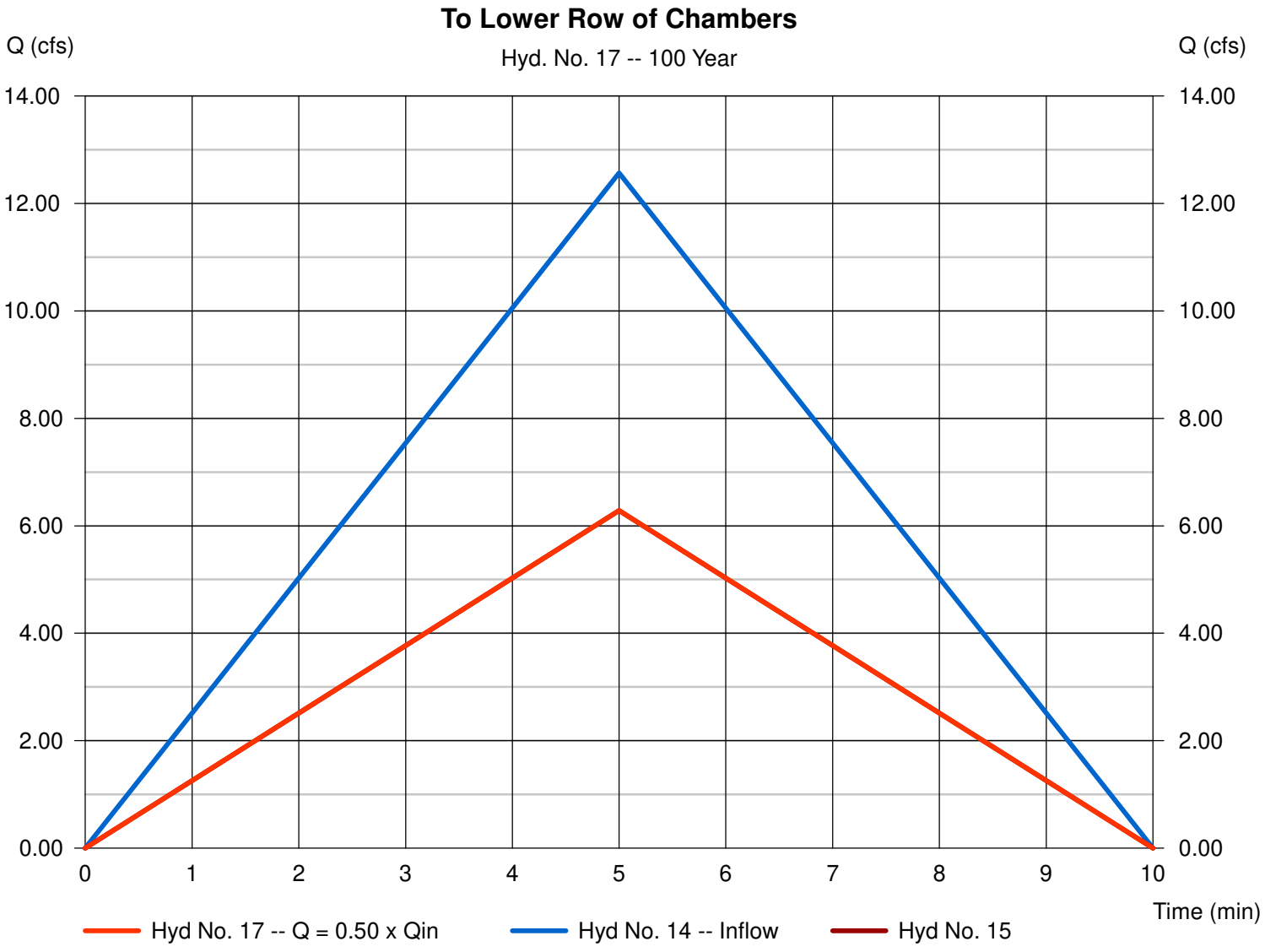
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	541.60	---	---	---	---	---	---	---	---	0.000	---	0.000
0.22	168	541.82	---	---	---	---	---	---	---	---	0.619	---	0.619
0.44	334	542.04	---	---	---	---	---	---	---	---	0.661	---	0.661
0.66	499	542.26	---	---	---	---	---	---	---	---	0.704	---	0.704
0.88	660	542.48	---	---	---	---	---	---	---	---	0.747	---	0.747
1.11	817	542.71	---	---	---	---	---	---	---	---	0.790	---	0.790
1.33	968	542.93	---	---	---	---	---	---	---	---	0.833	---	0.833
1.55	1,111	543.15	---	---	---	---	---	---	---	---	0.876	---	0.876
1.77	1,245	543.37	---	---	---	---	---	---	---	---	0.919	---	0.919
1.99	1,364	543.59	---	---	---	---	---	---	---	---	0.962	---	0.962
2.21	1,460	543.81	---	---	---	---	---	---	---	---	1.005	---	1.005

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066
Wednesday, Mar 23, 2022

Hyd. No. 17

To Lower Row of Chambers

Hydrograph type	=	Diversion2	Peak discharge	=	6.285 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,886 cuft
Inflow hydrograph	=	14 - Runoff to Chambers Bld 11-16-17	2nd diverted hyd.	=	15
Diversion method	=	Flow Ratio	Flow ratio	=	0.50



Hydrograph Report

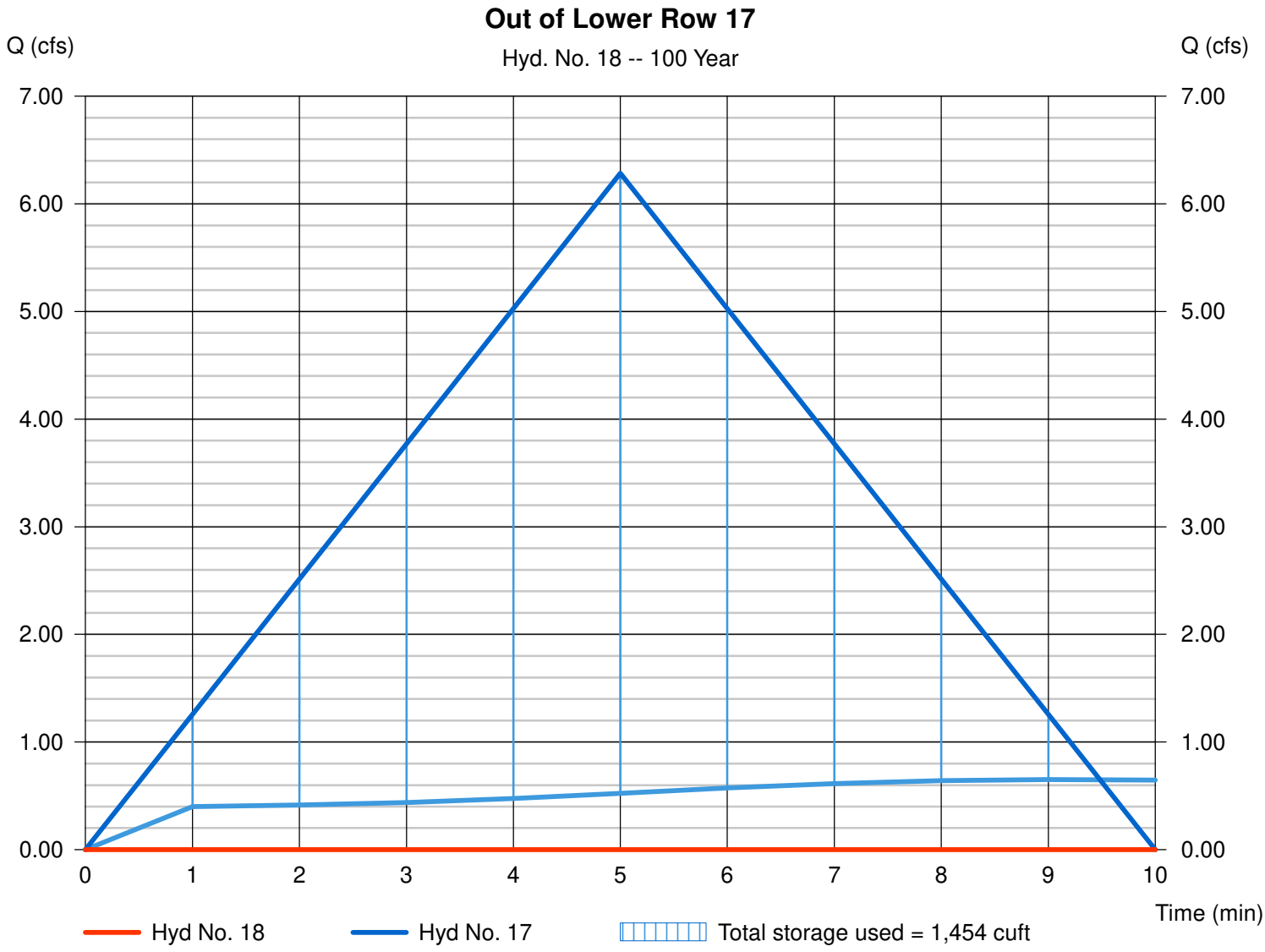
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 18

Out of Lower Row 17

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	17 - To Lower Row of Chambers	Max. Elevation	=	542.40 ft
Reservoir name	=	Cultech280-17-Row2	Max. Storage	=	1,454 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 18 - Cultech280-17-Row2

Pond Data

UG Chambers - Invert elev. = 540.20 ft, Rise x Span = 2.21 x 3.92 ft, Barrel Len = 168.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 540.20 ft, Width = 5.92 ft, Height = 2.21 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	540.20	n/a	0	0
0.22	540.42	n/a	168	168
0.44	540.64	n/a	167	334
0.66	540.86	n/a	165	499
0.88	541.08	n/a	161	660
1.11	541.31	n/a	157	817
1.33	541.53	n/a	151	968
1.55	541.75	n/a	143	1,111
1.77	541.97	n/a	133	1,245
1.99	542.19	n/a	119	1,364
2.21	542.41	n/a	96	1,460

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 25.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	540.20	---	---	---	---	---	---	---	---	0.000	---	0.000
0.22	168	540.42	---	---	---	---	---	---	---	---	0.619	---	0.619
0.44	334	540.64	---	---	---	---	---	---	---	---	0.661	---	0.661
0.66	499	540.86	---	---	---	---	---	---	---	---	0.704	---	0.704
0.88	660	541.08	---	---	---	---	---	---	---	---	0.747	---	0.747
1.11	817	541.31	---	---	---	---	---	---	---	---	0.790	---	0.790
1.33	968	541.53	---	---	---	---	---	---	---	---	0.833	---	0.833
1.55	1,111	541.75	---	---	---	---	---	---	---	---	0.876	---	0.876
1.77	1,245	541.97	---	---	---	---	---	---	---	---	0.919	---	0.919
1.99	1,364	542.19	---	---	---	---	---	---	---	---	0.962	---	0.962
2.21	1,460	542.41	---	---	---	---	---	---	---	---	1.005	---	1.005

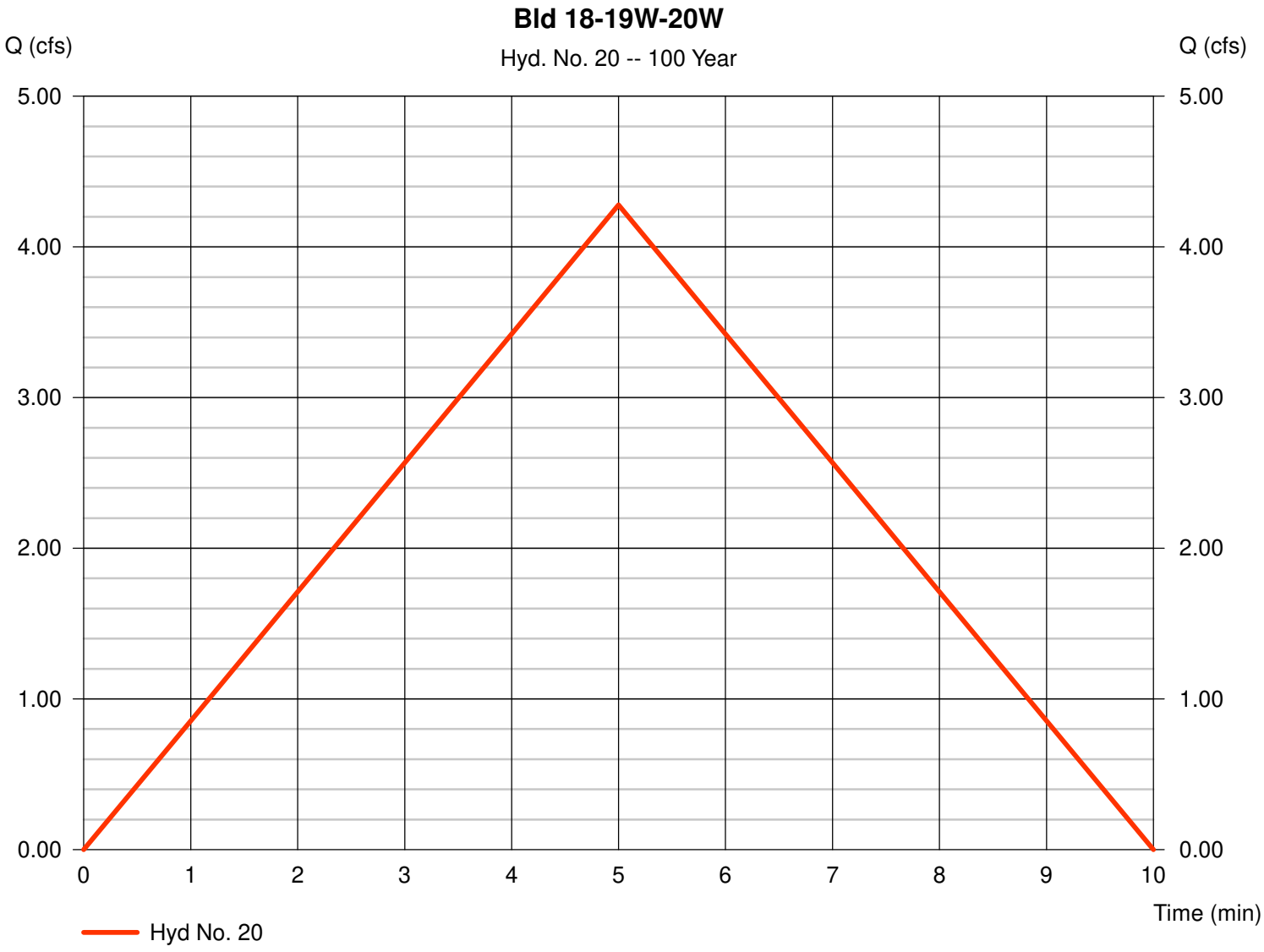
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 20

Bld 18-19W-20W

Hydrograph type	= Rational	Peak discharge	= 4.279 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,284 cuft
Drainage area	= 0.610 ac	Runoff coeff.	= 0.9
Intensity	= 7.794 in/hr	Tc by User	= 5.00 min
IDF Curve	= CT-DOT.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

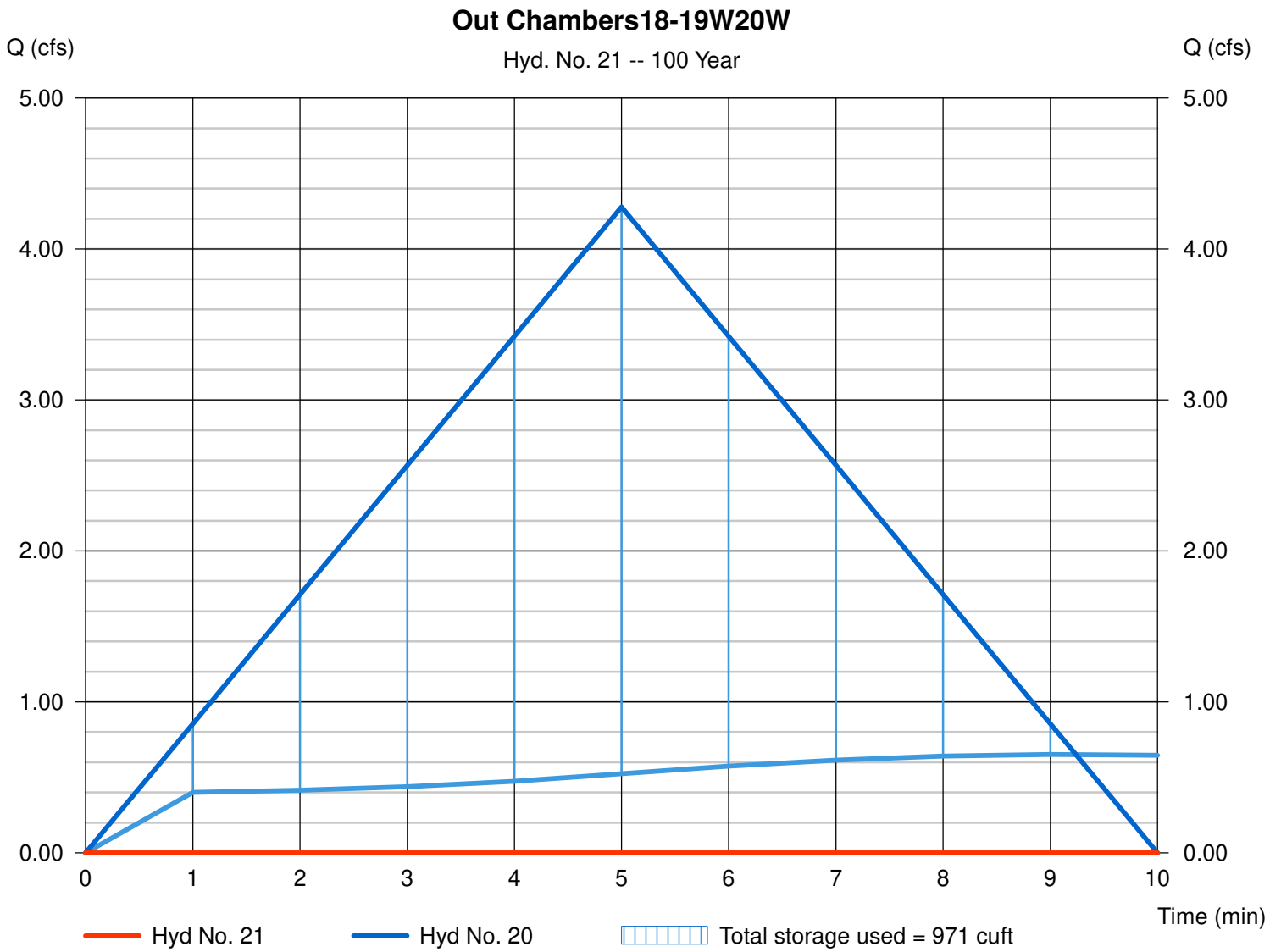
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 21

Out Chambers18-19W20W

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	20 - Bld 18-19W-20W	Max. Elevation	=	530.99 ft
Reservoir name	=	Cultech280-18-19W-20W	Max. Storage	=	971 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 21 - Cultech280-18-19W-20W

Pond Data

UG Chambers - Invert elev. = 529.00 ft, Rise x Span = 2.21 x 3.92 ft, Barrel Len = 120.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 529.00 ft, Width = 5.92 ft, Height = 2.21 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	529.00	n/a	0	0
0.22	529.22	n/a	120	120
0.44	529.44	n/a	119	239
0.66	529.66	n/a	118	356
0.88	529.88	n/a	115	472
1.11	530.11	n/a	112	584
1.33	530.33	n/a	108	692
1.55	530.55	n/a	102	794
1.77	530.77	n/a	95	889
1.99	530.99	n/a	85	974
2.21	531.21	n/a	68	1,043

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 26.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	529.00	---	---	---	---	---	---	---	---	0.000	---	0.000
0.22	120	529.22	---	---	---	---	---	---	---	---	0.459	---	0.459
0.44	239	529.44	---	---	---	---	---	---	---	---	0.491	---	0.491
0.66	356	529.66	---	---	---	---	---	---	---	---	0.523	---	0.523
0.88	472	529.88	---	---	---	---	---	---	---	---	0.555	---	0.555
1.11	584	530.11	---	---	---	---	---	---	---	---	0.587	---	0.587
1.33	692	530.33	---	---	---	---	---	---	---	---	0.619	---	0.619
1.55	794	530.55	---	---	---	---	---	---	---	---	0.651	---	0.651
1.77	889	530.77	---	---	---	---	---	---	---	---	0.683	---	0.683
1.99	974	530.99	---	---	---	---	---	---	---	---	0.715	---	0.715
2.21	1,043	531.21	---	---	---	---	---	---	---	---	0.747	---	0.747

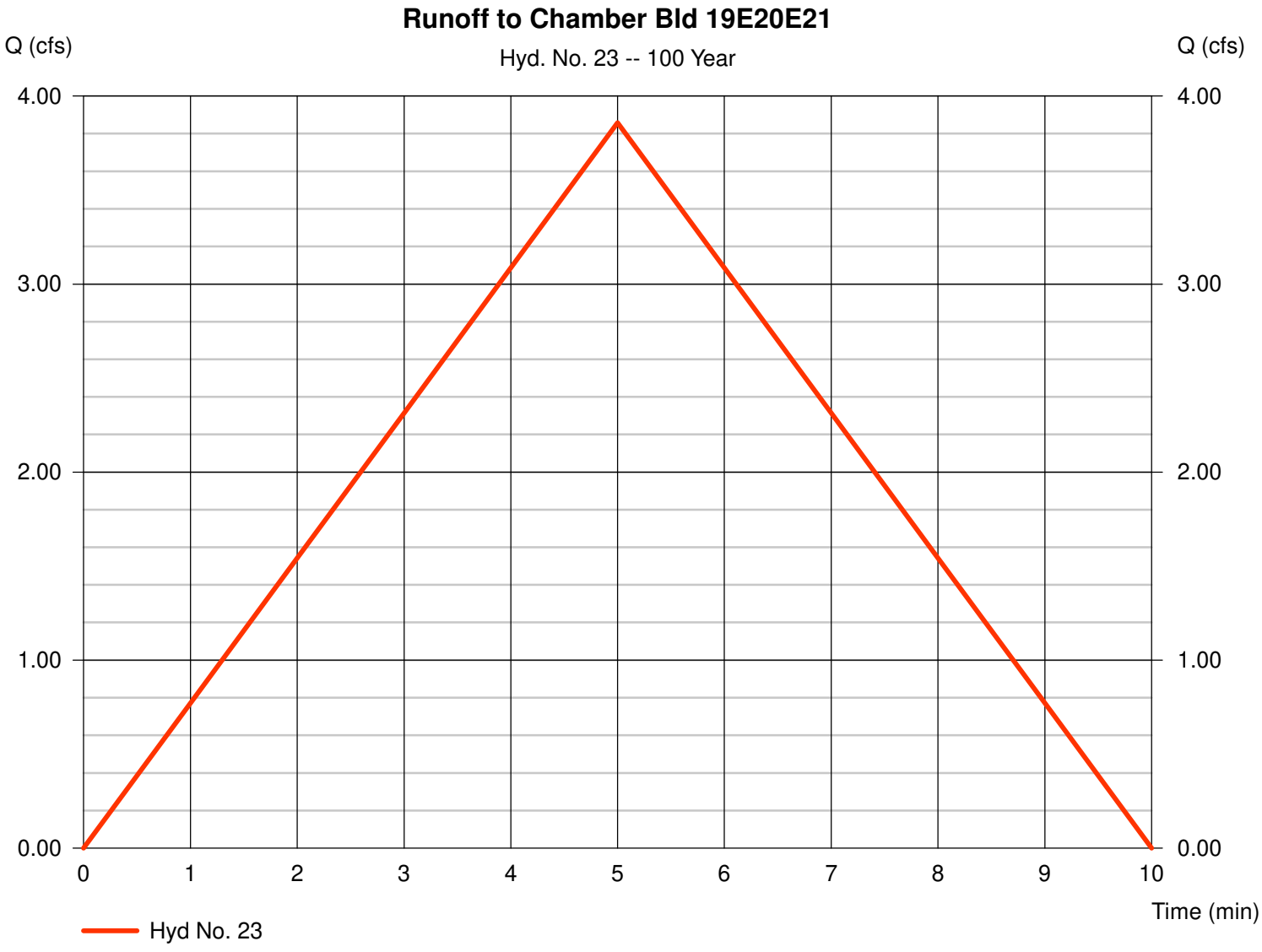
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 23

Runoff to Chamber Bld 19E20E21

Hydrograph type	=	Rational	Peak discharge	=	3.858 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,157 cuft
Drainage area	=	0.550 ac	Runoff coeff.	=	0.9
Intensity	=	7.794 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CT-DOT.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Report

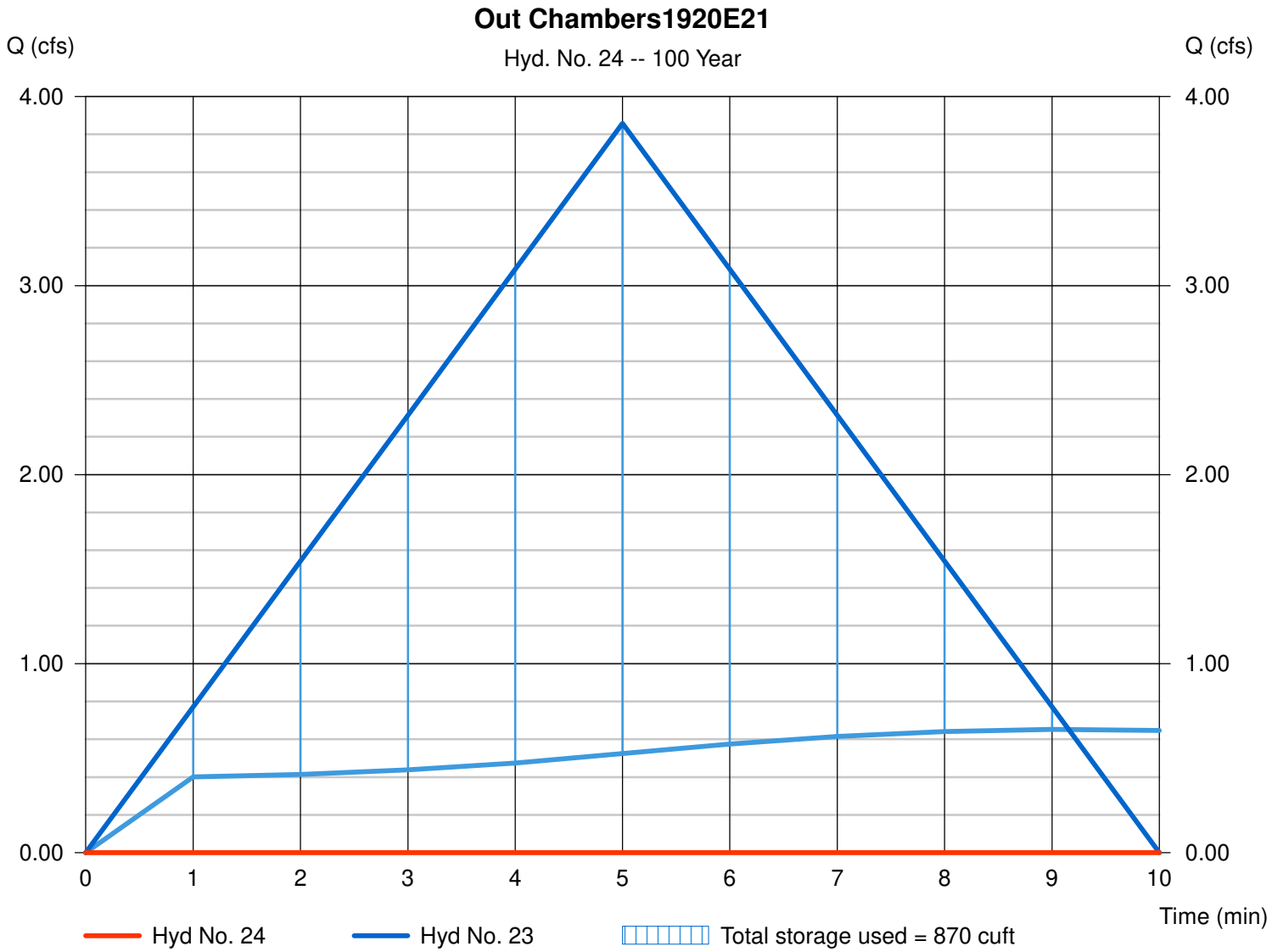
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Mar 23, 2022

Hyd. No. 24

Out Chambers1920E21

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	23 - Runoff to Chamber Bld 19E20E21	Max. Elevation	=	531.39 ft
Reservoir name	=	Cultech280-19E-20E-21	Max. Storage	=	870 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 22 - Cultech280-19E-20E-21

Pond Data

UG Chambers - Invert elev. = 529.50 ft, Rise x Span = 2.21 x 3.92 ft, Barrel Len = 56.00 ft, No. Barrels = 2, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 529.50 ft, Width = 5.92 ft, Height = 2.21 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	529.50	n/a	0	0
0.22	529.72	n/a	112	112
0.44	529.94	n/a	111	223
0.66	530.16	n/a	110	333
0.88	530.38	n/a	108	440
1.11	530.61	n/a	105	545
1.33	530.83	n/a	101	645
1.55	531.05	n/a	96	741
1.77	531.27	n/a	89	830
1.99	531.49	n/a	80	909
2.21	531.71	n/a	64	973

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 26.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	529.50	---	---	---	---	---	---	---	---	0.000	---	0.000
0.22	112	529.72	---	---	---	---	---	---	---	---	0.429	---	0.429
0.44	223	529.94	---	---	---	---	---	---	---	---	0.459	---	0.459
0.66	333	530.16	---	---	---	---	---	---	---	---	0.488	---	0.488
0.88	440	530.38	---	---	---	---	---	---	---	---	0.518	---	0.518
1.11	545	530.61	---	---	---	---	---	---	---	---	0.548	---	0.548
1.33	645	530.83	---	---	---	---	---	---	---	---	0.578	---	0.578
1.55	741	531.05	---	---	---	---	---	---	---	---	0.608	---	0.608
1.77	830	531.27	---	---	---	---	---	---	---	---	0.637	---	0.637
1.99	909	531.49	---	---	---	---	---	---	---	---	0.667	---	0.667
2.21	973	531.71	---	---	---	---	---	---	---	---	0.697	---	0.697

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	26.1693	6.2000	0.7786	--------
2	30.1225	6.6000	0.7676	--------
3	0.0000	0.0000	0.0000	--------
5	52.3308	9.8000	0.8367	--------
10	54.7383	10.8000	0.8016	--------
25	101.9813	15.8000	0.8971	--------
50	98.1551	15.7000	0.8577	--------
100	106.5909	17.0000	0.8462	--------

File name: CT-DOT.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.99	2.99	2.43	2.06	1.80	1.60	1.45	1.32	1.22	1.14	1.06	1.00
2	4.59	3.49	2.85	2.43	2.13	1.90	1.72	1.58	1.46	1.36	1.27	1.20
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.49	4.30	3.57	3.06	2.69	2.40	2.17	1.99	1.84	1.71	1.60	1.50
10	5.99	4.81	4.04	3.51	3.11	2.80	2.55	2.35	2.18	2.03	1.91	1.80
25	6.70	5.52	4.71	4.12	3.66	3.30	3.01	2.76	2.56	2.38	2.23	2.10
50	7.30	6.06	5.20	4.57	4.09	3.70	3.38	3.12	2.90	2.71	2.54	2.40
100	7.79	6.55	5.68	5.02	4.51	4.10	3.76	3.48	3.24	3.04	2.86	2.70

Tc = time in minutes. Values may exceed 60.

Precip. file name: Tolland-NOAA Atlas 14.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.65	3.27	0.00	4.27	5.10	6.24	7.09	8.01
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOIL TYPE LEGEND
(Per NRCS Web Soil Survey)

13	Walpole sandy loam, 0 to 3 percent slopes
18	Calden and Freetown soils, 0 to 2 percent slopes
23A	Sudbury sandy loam, 0 to 5 percent slopes
29A	Agawam fine sandy loam, 0 to 3 percent slopes
29C	Agawam fine sandy loam, 8 to 15 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
57C	Gloucester gravelly sandy loam, 8 to 15 percent slopes
57D	Gloucester gravelly sandy loam, 15 to 25 percent slopes
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony
701A	Ninigret fine sandy loam, 0 to 3 percent slopes

100 50 0 100 200 300
GRAPHIC SCALE 1"=100'

EXISTING DRAINAGE AREA MAP

FIELDSTONE RIDGE

10 FIELDSTONE COMMONS
TOLLAND, CONNECTICUT

REVISIONS
03/23/2022

GARDNER & PETERSON ASSOCIATES, LLC
178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT
PROFESSIONAL ENGINEERS LAND SURVEYORS

BY	SCALE	DATE	SHEET NO.	MAP NO.
E.R.P.	1"=100'	02-04-2022	A1	9607A

SOIL TYPE LEGEND
(Per NRCS Web Soil Survey)

13	Walpole sandy loam, 0 to 3 percent slopes
18	Catden and Freetown soils, 0 to 2 percent slopes
23A	Sudbury sandy loam, 0 to 5 percent slopes
29A	Agawam fine sandy loam, 0 to 3 percent slopes
29C	Agawam fine sandy loam, 8 to 15 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
57C	Gloucester gravelly sandy loam, 8 to 15 percent slopes
57D	Gloucester gravelly sandy loam, 15 to 25 percent slopes
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony
701A	Ninigret fine sandy loam, 0 to 3 percent slopes

100 50 0 100 200 300
GRAPHIC SCALE 1"=100'

PROPOSED DRAINAGE AREA MAP

FIELDSTONE RIDGE

10 FIELDSTONE COMMONS
TOLLAND, CONNECTICUT

REVISIONS
03/23/2022

GARDNER & PETERSON ASSOCIATES, LLC
178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT
PROFESSIONAL ENGINEERS LAND SURVEYORS

BY	SCALE	DATE	SHEET NO.	MAP NO.
E.R.P.	1"=100'	02-04-2022	A2	9607A

9607S \dwg \9607A.dwg

SOIL TYPE LEGEND
(Per NRCS Web Soil Survey)

13	Walpole sandy loam, 0 to 3 percent slopes
18	Calden and Freetown soils, 0 to 2 percent slopes
23A	Sudbury sandy loam, 0 to 5 percent slopes
29A	Agawam fine sandy loam, 0 to 3 percent slopes
29C	Agawam fine sandy loam, 8 to 15 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
57C	Gloucester gravelly sandy loam, 8 to 15 percent slopes
57D	Gloucester gravelly sandy loam, 15 to 25 percent slopes
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony
701A	Ninigret fine sandy loam, 0 to 3 percent slopes

EXISTING DRAINAGE AREA MAP

FIELDSTONE RIDGE

10 FIELDSTONE COMMONS
TOLLAND, CONNECTICUT

REVISIONS

GARDNER & PETERSON ASSOCIATES, LLC
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TOLLAND, CONNECTICUT
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E.R.P.	1"=100'	02-04-2022	A1	9607A

MERROW ROAD - RTE 195

FIELDSTONE COMMONS

PROPOSED TO NORTH
A=3.03 Acres
C=0.56
T=14 MIN

PROPOSED TO SOUTHERLY BASIN
A=8.76 Acres
CN=77
T=19 MIN

PROPOSED TO NORTHERLY BASIN
A=14.98 Acres
CN=80
T=17 MIN

PROPOSED BYPASSING DETENTION-INFILTRATION
A=24.16 Acres
CN=57
T=16 MIN

AREA TO INFILTRATION CHAMBERS
(11-16-17)
A=2.24 Acres
C=0.72
T=5 MIN

(5) ROOFS TO INFILTRATION CHAMBERS
(2-12-15)
A=1.38 Acres
C=0.9
T=5 MIN

ROOFS TO INFILTRATION CHAMBERS
(19-20-21)
A=0.85 Acres
C=0,9
T=5 MIN

ROOF TO INFILTRATION CHAMBERS
(18)
A=0.30 Acres
C=0.9
T=5 MIN

57D
57C 'A'
61B 'B'
61C 'B'
37C 'A'
13 'D'
18 'D'
29A 'B'
29C 'B'
701A 'C'

LEGEND

- PROPERTY LINE
- EDGE WATER
- EX. CURBING
- EX. DRAINAGE
- INLAND WETLAND BOUNDARY
- EX. CONTOUR
- PROPOSED CONTOUR
- PROPOSED CURB
- PROPOSED DRAINAGE
- TRAVEL TIME PATH
- WATERSHED BOUNDARY

SOIL TYPE LEGEND
(Per NRCS Web Soil Survey)

13	Walpole sandy loam, 0 to 3 percent slopes
18	Catden and Freetown soils, 0 to 2 percent slopes
23A	Sudbury sandy loam, 0 to 5 percent slopes
29A	Agawam fine sandy loam, 0 to 3 percent slopes
29C	Agawam fine sandy loam, 8 to 15 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
57C	Gloucester gravelly sandy loam, 8 to 15 percent slopes
57D	Gloucester gravelly sandy loam, 15 to 25 percent slopes
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony
701A	Ninigret fine sandy loam, 0 to 3 percent slopes

100 50 0 100 200 300
GRAPHIC SCALE 1"=100'

PROPOSED DRAINAGE AREA MAP

FIELDSTONE RIDGE

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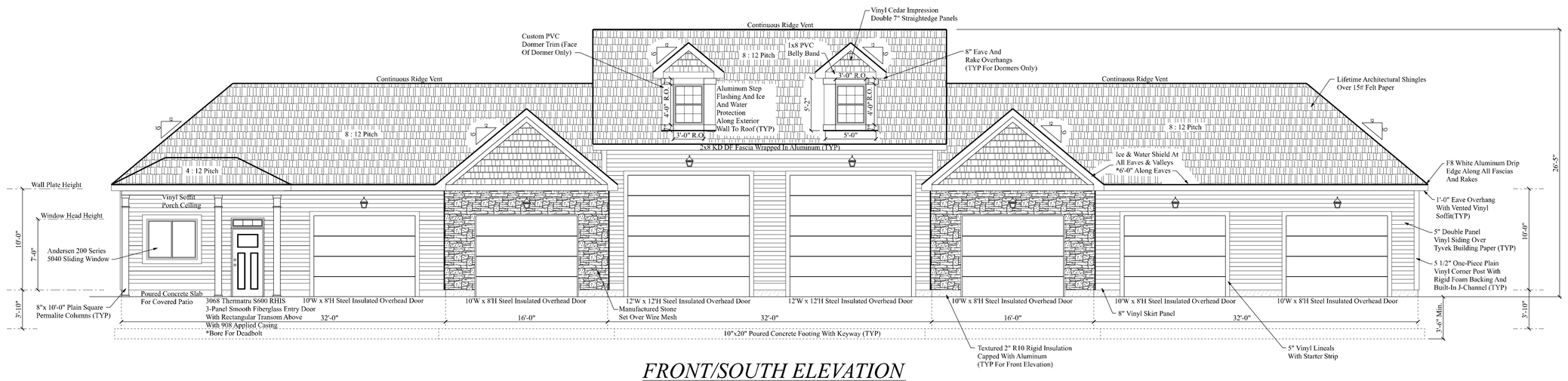
BY	SCALE	DATE	SHEET NO.	MAP NO.
E.R.P.	1"=100'	02-04-2022	A2	9607A

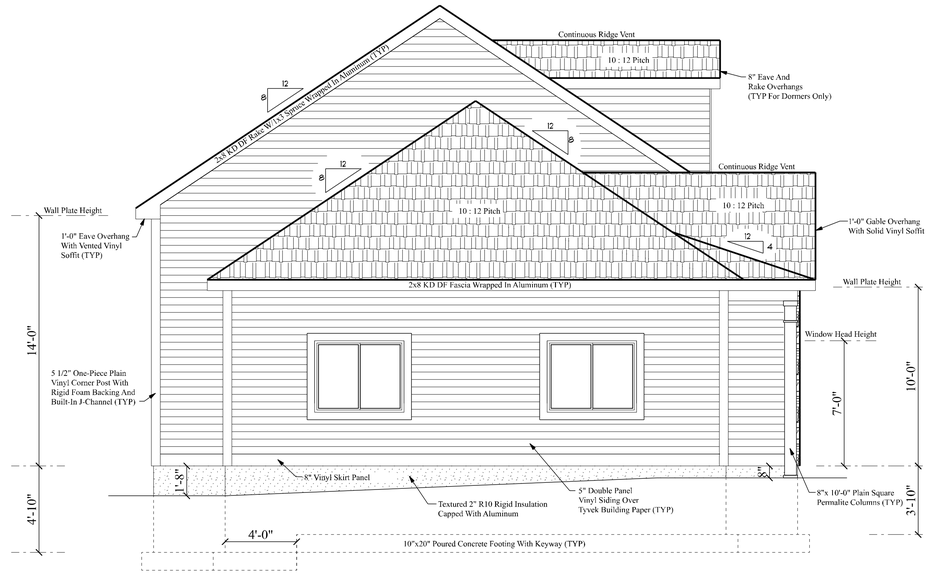
9607S \dwg \9607A.dwg

MAINTENANCE GARAGE



FRONT/SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



LEFT/WEST ELEVATION

SCALE: 1/4" = 1'-0"

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VERNON, CT 06066

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10 FIELDSTONE COMMONS
TOLLAND, CT 06084
A SANTINI COMMUNITY

SECTION NUMBER 1
PAGE NUMBER A-1

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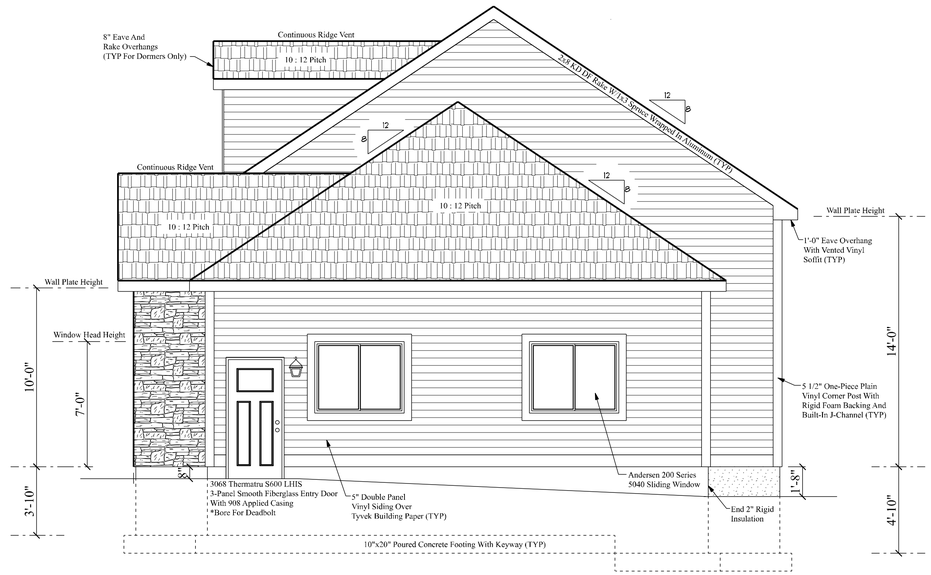
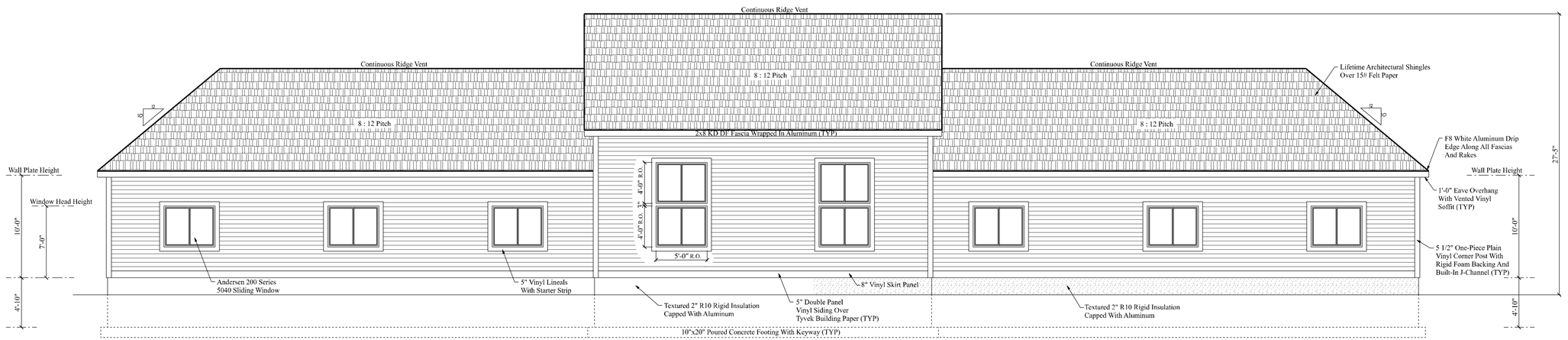
A-1

MAINTENANCE GARAGE



RIGHT/EAST ELEVATION

SCALE: 1/4" = 1'-0"



REAR/NORTH ELEVATION

SCALE: 3/16" = 1'-0"

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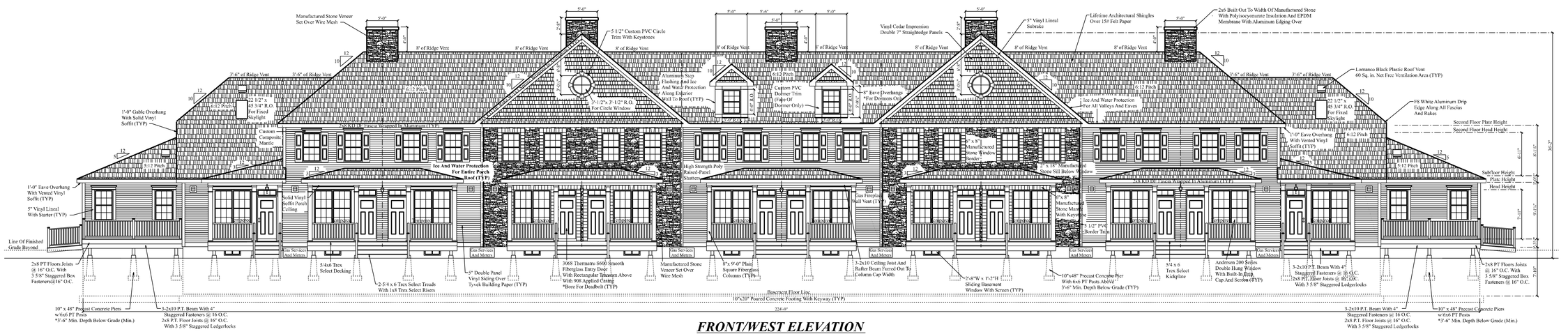
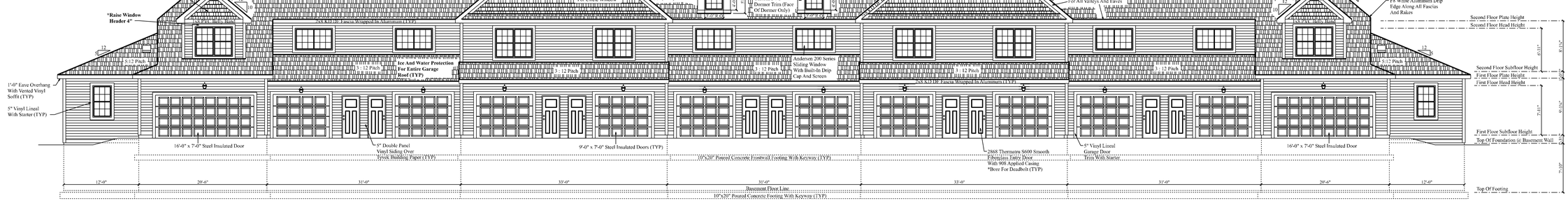
A-2

BUILDING #6
UNIT #s 601-612
12 UNIT ACCESS. BUILDING



FRONT/WEST ELEVATION
SCALE: 1/8" = 1'-0"



REAR/EAST ELEVATION
SCALE: 1/8" = 1'-0"

Page Summary

Unit Summary

Type of Unit	# of Units	Size of Units	# of Bedrooms	# of Bathrooms	# of Cars in Garage
Type 1	2	1721 S.F.	2	2.5	2
Type 2	4	1287 S.F.	1	1.5	1
Type 3	4	1432 S.F.	2	2.5	1
Type 5	2	1287 S.F.	2	1.5	1
Total # of Units - 12					

CODE INFORMATION
CODE BASIS: CONNECTICUT STATE BUILDING CODE, 2018
INTERNATIONAL RESIDENTIAL CODE, 2015
INTERNATIONAL ENERGY CONSERVATION CODE, 2015
NATIONAL ELECTRICAL CODE, 2017
CONNECTICUT STATE FIRE SAFETY CODE, 2015
SEC. 29-292-1e(b): THE PROVISIONS OF THIS CODE ONLY APPLY WITH RESPECT TO SMOKE ALARMS AND CARBON MONOXIDE DETECTORS.
USE GROUP: MULTIPLE SINGLE-FAMILY DWELLING (TOWNHOUSES)
TYPE OF CONSTRUCTION: 5B COMBUSTIBLE UNPROTECTED
NOT SPRINKLERED
HEIGHT & AREA: ALLOWED: 3 STORIES
ACTUAL: 2 STORIES, 36' +/-, 12,868 S.F. FIRST FLOOR ENCLOSED
1,224 S.F. COVERED PORCHES
FIRE SEPARATION BETWEEN UNITS: 2 HR. RATED, UL DESIGN U347 CONFIGURATION B

Area Summary

Total Garage SF-	3754 SF
Total Basement SF-	7984 SF
Total Deck/Porch SF-	1188 SF
Total First Floor Finished SF-	8748 SF
Total Second Floor Finished SF-	8160 SF
Total Finished SF-	16908 SF

Building Height Summary

Front Elevation-	36'-0"
Rear Elevation-	34'-4"
Right Elevation-	35'-2"
Left Elevation-	35'-2"
Total 140'-8"/4=	35'-2" Average Building Height

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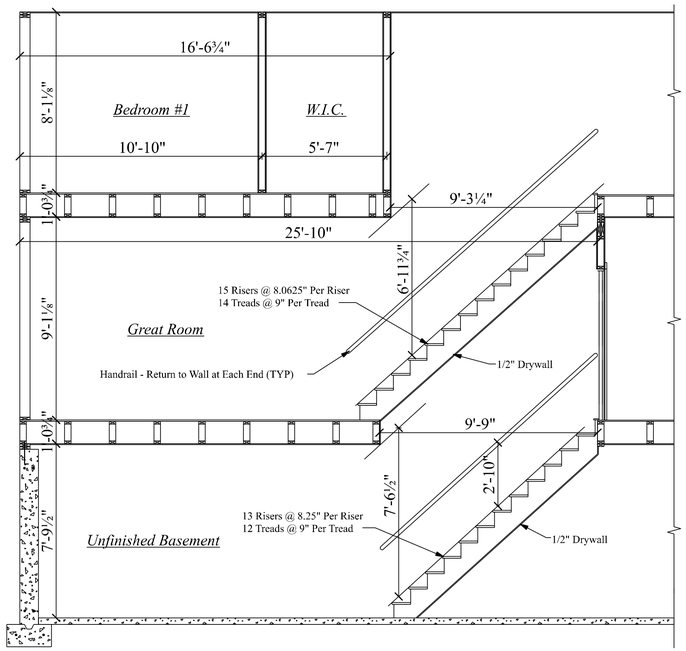
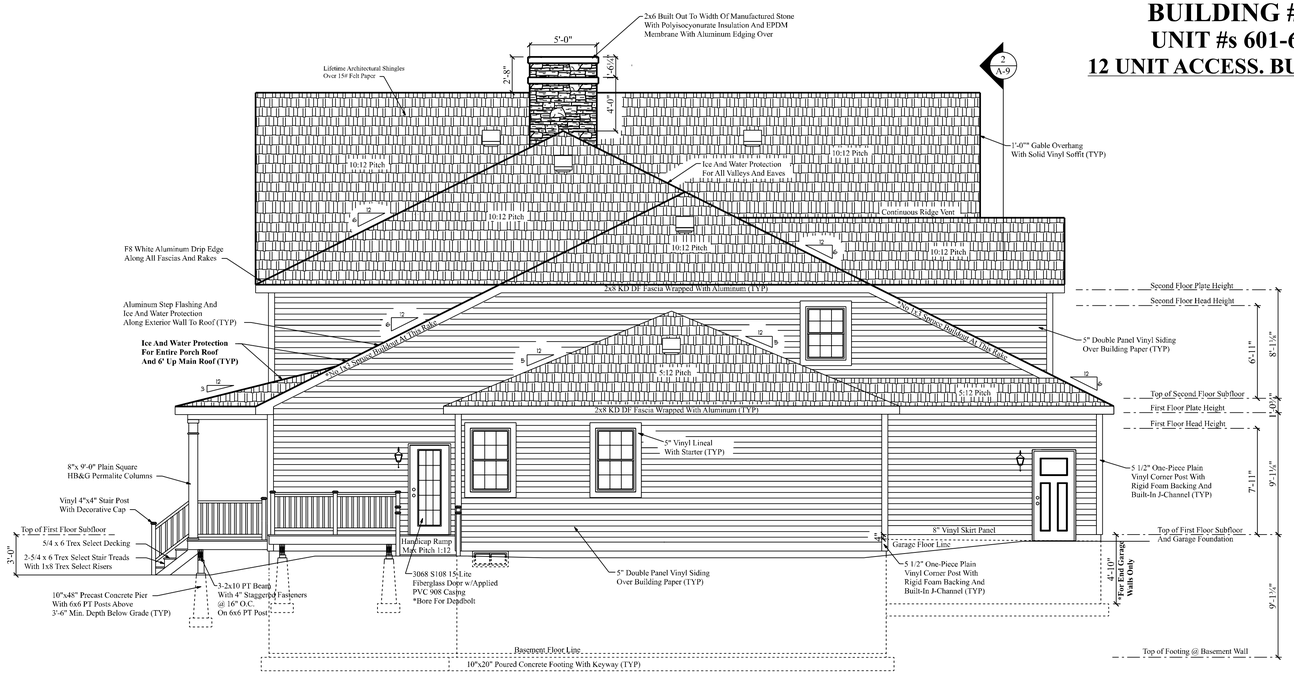


Stair Section @ Type-3 Units

SCALE: 5/16" = 1'-0"

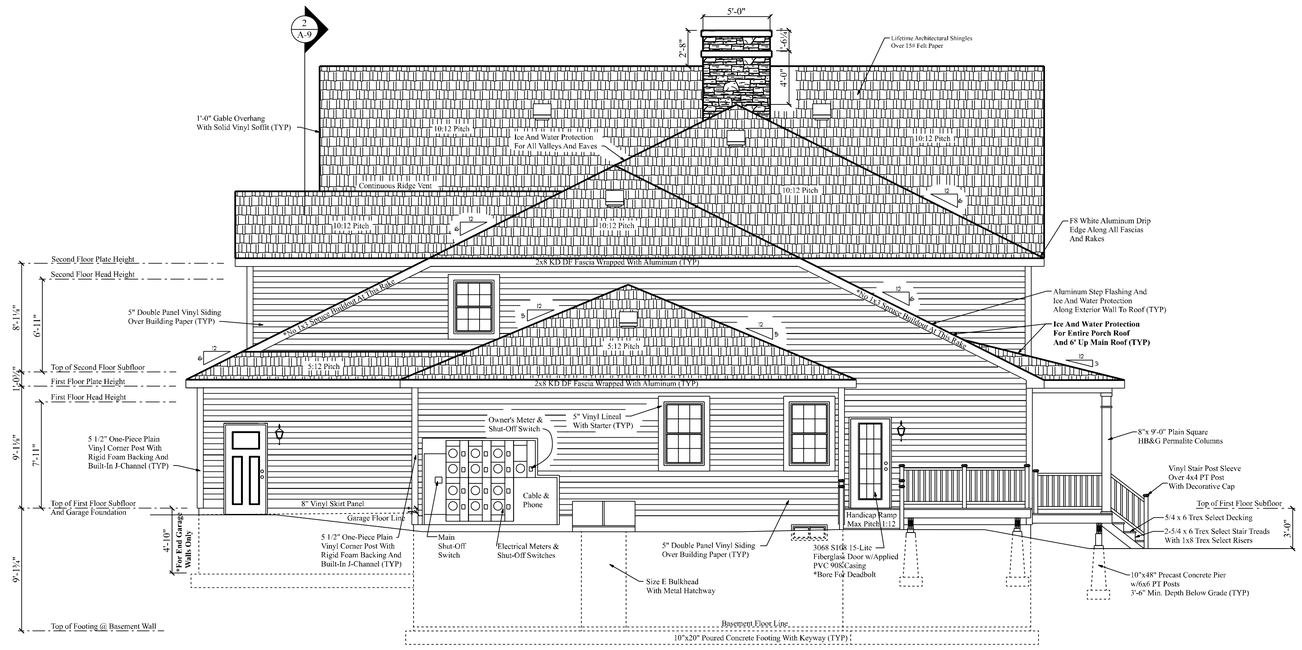
(These Units Have The Least Headroom Clearance)

BUILDING #6
UNIT #s 601-612
12 UNIT ACCESS. BUILDING



LEFT/NORTH ELEVATION

SCALE: 3/16" = 1'-0"



RIGHT/SOUTH ELEVATION

SCALE: 3/16" = 1'-0"

12-UNIT ACCESSIBLE DOOR SCHEDULE

SIZE	COUNT	GRILLE	JAMB SIZE	DESCRIPTION
3'-0" x 6'-8" LHIS	6	TRANSOM ONLY	6 9/16"	Thermatru S600 3-Panel LHIS Fiberglass with 1'-0"H, 3-Lite, Low-E Rectangular Transom Above, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
3'-0" x 6'-8" RHIS	6	TRANSOM ONLY	6 9/16"	Thermatru S600 3-Panel RHIS Fiberglass with 1'-0"H, 3-Lite, Low-E Rectangular Transom Above, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
2'-8" x 6'-8" LHIS	5	NA	6 9/16"	Thermatru S600 3-Panel LHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
2'-8" x 6'-8" RHIS	5	NA	6 9/16"	Thermatru S600 3-Panel RHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
3'-0" x 6'-8" LHIS	1	NA	6 9/16"	Thermatru S600 3-Panel LHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges, Public Access Sill
3'-0" x 6'-8" RHIS	1	NA	6 9/16"	Thermatru S600 3-Panel RHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges, Public Access Sill
3'-0" x 6'-8" LHIS	1	15-Lite	6 9/16"	Thermatru S108 15-Lite (Low-E) LHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges, Public Access Sill
3'-0" x 6'-8" RHIS	1	15-Lite	6 9/16"	Thermatru S108 15-Lite (Low-E) RHIS Fiberglass, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges, Public Access Sill

TOTAL # OF DOORS - 26

12-UNIT ACCESSIBLE WINDOW SCHEDULE

ANDERSEN 200 SERIES LOW-E TILT-WASH DOUBLE-HUNG WITH GBG, WHITE HARDWARE AND SCREEN, UNLESS NOTED OTHERWISE

TYPE & R.O.	SIZE	COUNT	GRILLE	JAMB SIZE
6'-0" x 6'-0" Double Hung	DH3060-2 *Meets Min. Egress Size Requirements Clear Opening = 7.45 S.F. Clear Width = 32.56" Clear Height = 32.95"	12 Total 6 Tempered	Yes	6 9/16"
6'-0" x 4'-9" Double Hung	DH3049-2 *Meets Min. Egress Size Requirements Clear Opening = 7.45 S.F. Clear Width = 32.56" Clear Height = 25.45"	6	Yes	6 9/16"
6'-0" x 3'-6" Slider	GW6036 *Meets Min. Egress Size Requirements Clear Opening = 8.73 S.F. Clear Width = 33" Clear Height = 38.125"	6	Yes	6 9/16"
3'-0" x 4'-9" Double Hung	DH3049 *Meets Min. Egress Size Requirements Clear Opening = 5.76 S.F. Clear Width = 32.56" Clear Height = 25.45"	30	Yes	6 9/16"
3'-0" x 4'-0" Double Hung	DH3040 Clear Opening = 4.74 S.F. Clear Width = 33" Clear Height = 20.95"	6 *4 Without Screens	Yes	2 With 6 9/16" 4 With None
3'-0" x 3'-0½" Fixed	CIR30	4	Yes	None

TOTAL # OF WINDOWS - 64

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SCALE
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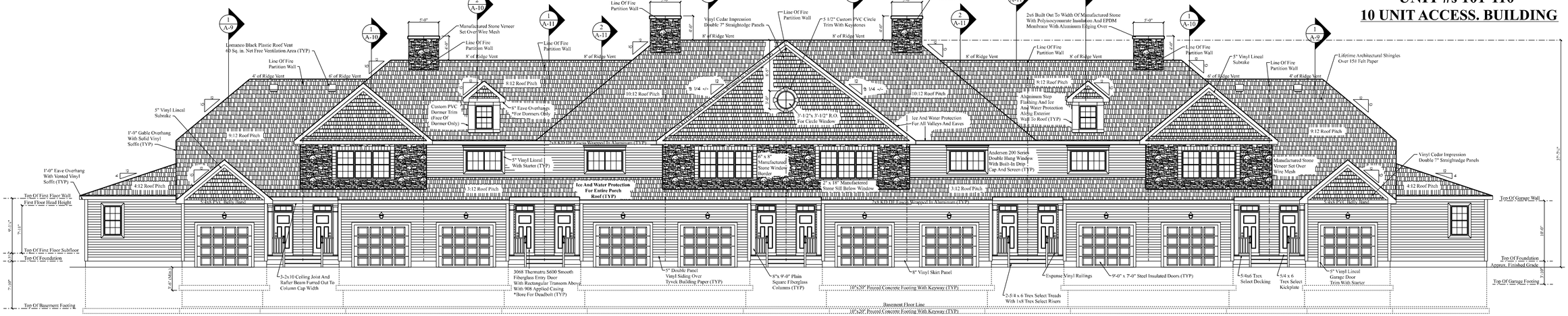
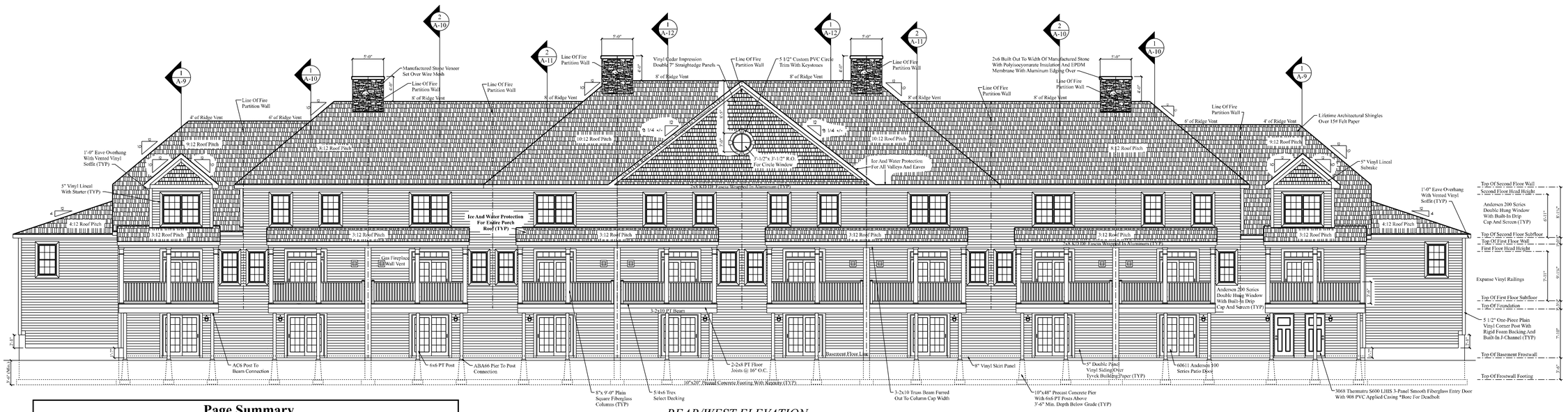
A-2

BUILDING #1
UNIT #s 101-110
10 UNIT ACCESS. BUILDING



FRONT/EAST ELEVATION

SCALE: 1/8" = 1'-0"



REAR/WEST ELEVATION

SCALE: 1/8" = 1'-0"

Page Summary

A-1 - Front/Rear Elevations (Scale: 1/8"= 1'-0") & Building Summaries
A-2 - Left/Right Elevations (Scale: 3/16"= 1'-0"), Window & Door Schedules
A-3 - Foundation Plan & Foundation Sections (Scale as Noted)
A-4 - First & Second Floor Plans (Scale: 1/8"= 1'-0")
A-5 - First Floor Plan~Units 106-110 (Scale: 1/4"= 1'-0")
A-6 - First Floor Plan~Units 101-105 (Scale: 1/4"= 1'-0")
A-7 - Second Floor Plan~Units 106-110 (Scale: 1/4"= 1'-0")
A-8 - Second Floor Plan~Units 101-105 (Scale: 1/4"= 1'-0")
A-9 - Building Section And Stair Section @ Type 11 Units (Scale: 1/4"= 1'-0"), Interior Door Opening Details, Fireplace Opening Details And Garage Door Opening Details (Scale: 1/4"=1'-0")
A-10 - Buiding Section @ Type 9 Units (Scale: 1/4"= 1'-0"), Upper Dormer Section (Scale: 1/4"= 1'-0"), Roof Plan (Not To Scale)
A-11 - Front Porch Section @ Type 10 Units, Building Section @ Type-10 Units, Gable Section @ Type 9 Units, Attic Window Fire Separation Detail, Chimney Box Section, Masonry Block Penetration @ Basement Detail (Scale: 1/4"= 1'-0")
A-12 - Building Section @ Type 9 Units (@ Center Of Building), Stair Section @ Type 9 & 10 Units, General Notes (Scale: 1/4"=1'-0")
A-13 - Fire Partition Wall Key Plan And Details (Not To Scale)
B-1 - First And Second Floor Braced Wall Plans (Not To Scale)
B-2 - Braced Wall Schedule And Details (Scale: 1/4"=1'-0")

Unit Summary

Type of Unit	# of Units	Size of Units	# of Bedrooms	# of Bathrooms	# of Cars in Garage
Type 9	4	1580 S.F.	2	2.5	1
Type 10	4	1423 S.F.	1	1.5	1
Type 11	2	1829 S.F.	2	2.5	1
Total # of Units - 10					

CODE INFORMATION
CODE BASIS: CONNECTICUT STATE BUILDING CODE, 2018
INTERNATIONAL RESIDENTIAL CODE, 2015
INTERNATIONAL ENERGY CONSERVATION CODE, 2009
NATIONAL ELECTRICAL CODE, 2015
CONNECTICUT STATE FIRE SAFETY CODE, 2015
SEC. 29-292-1e(b): THE PROVISIONS OF THIS CODE ONLY APPLY WITH RESPECT TO SMOKE ALARMS AND CARBON MONOXIDE DETECTORS.
USE GROUP: MULTIPLE SINGLE-FAMILY DWELLING (TOWNHOUSES)
TYPE OF CONSTRUCTION: 5B COMBUSTIBLE UNPROTECTED
NOT SPRINKLERED
HEIGHT & AREA: ALLOWED: 3 STORIES
ACTUAL: 2 STORIES, 36' +/-, 12,570 S.F. FIRST FLOOR ENCLOSED
1,650 S.F. COVERED PORCHES
FIRE SEPARATION BETWEEN UNITS: 2 HR. RATED, UL DESIGN U347 CONFIGURATION B

Area Summary

Total Garage SF-	2678 SF
Total Basement SF-	8138 SF
Total Deck/Porch SF-	1650 SF
Total First Floor Finished SF-	8114 SF
Total Second Floor Finished SF-	7548 SF
Total Finished SF-	15662 SF

Building Height Summary

Front Elevation-	34'-6"
Rear Elevation-	38'-0"
Right Elevation-	36'0"
Left Elevation-	36'-0"
Total 144'-6"/4=	36'-0" Average Building Height

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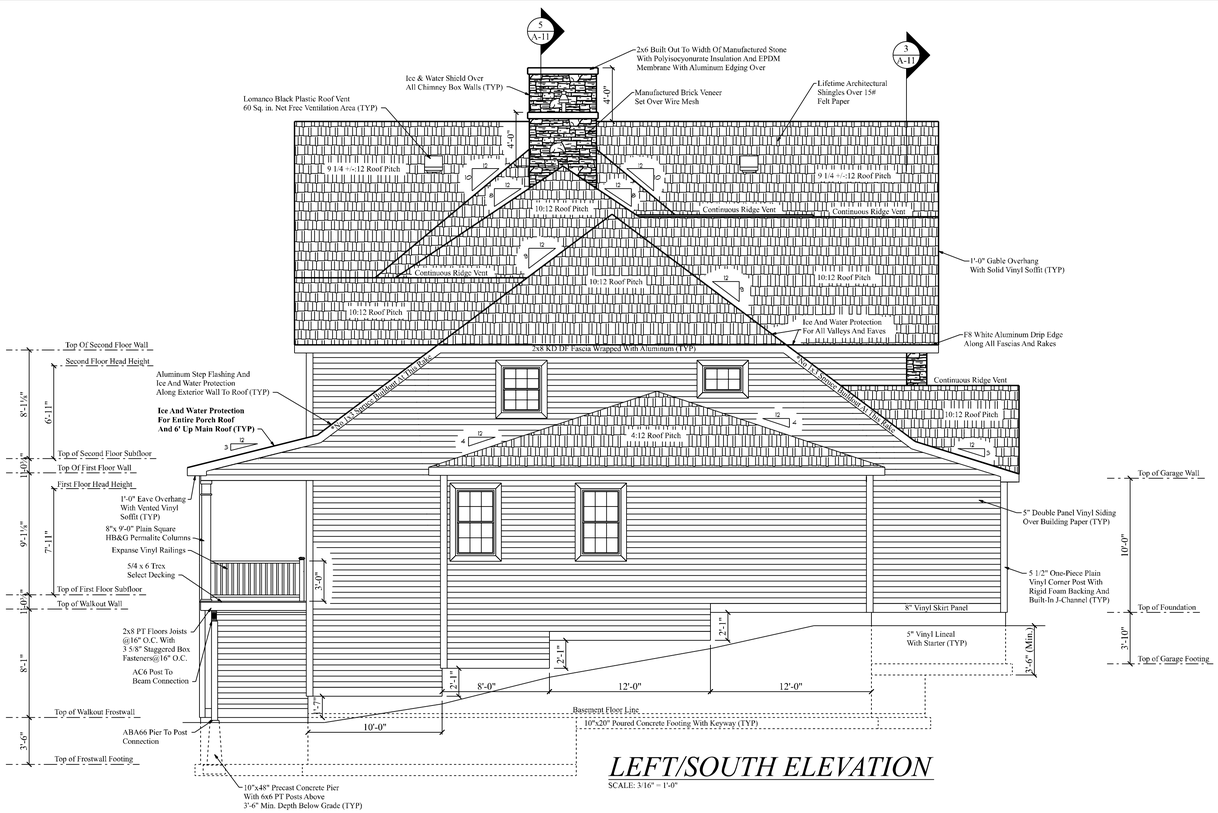
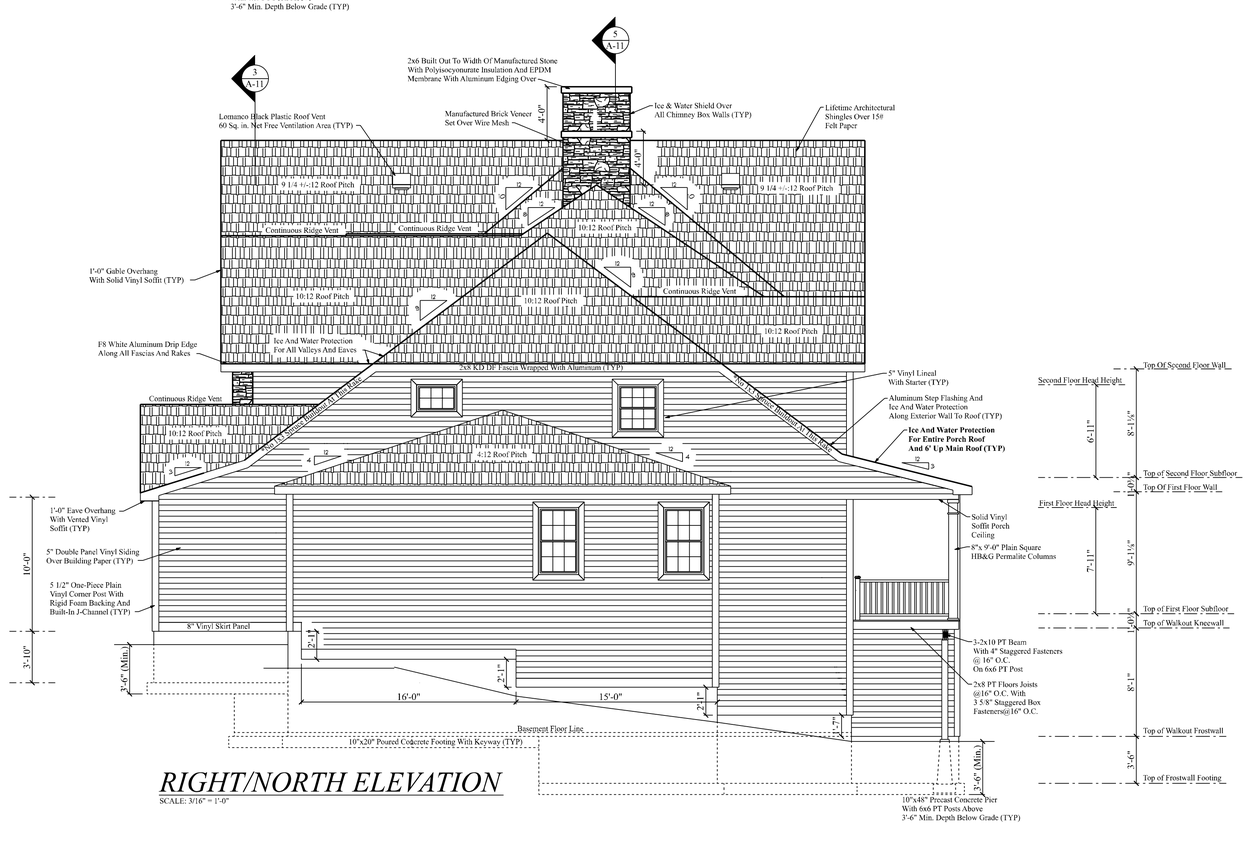
A-1

BUILDING #1
UNIT #s 101-110
10 UNIT ACCESS. BUILDING



LEFT/SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



RIGHT/NORTH ELEVATION

SCALE: 3/16" = 1'-0"

10-UNIT NON-ACCESSIBLE WINDOW SCHEDULE

ANDERSEN 200 SERIES LOW-E TILT-WASH DOUBLE-HUNG WITH GBG, WHITE HARDWARE AND SCREEN, UNLESS NOTED OTHERWISE

TYPE & R.O.	SIZE	COUNT	GRILLE	JAMB SIZE
2'-8" × 3'-6" Double Hung	DH2836 Clear Opening = 3.56 S.F. Clear Width = 28.56" Clear Height = 17.95"	2	Yes	6 9/16"
2'-8" × 5'-0" Double Hung	DH2850 *Meets Min. Egress Size Requirements Clear Opening = 5.35 S.F. Clear Width = 28.56" Clear Height = 26.95"	10 Tempered	Yes	6 9/16"
3'-0" × 3'-0" Double Hung	DH3030 Clear Opening = 3.38 S.F. Clear Width = 32.56" Clear Height = 14.95"	1	Yes	6 9/16"
6'-0" × 3'-0" Double Hung	DH3030-2 Clear Opening = 3.38 S.F. Clear Width = 32.56" Clear Height = 14.95"	1	Yes	6 9/16"
3'-0" × 3'-6" Double Hung	DH3036 Clear Opening = 4.06 S.F. Clear Width = 32.56" Clear Height = 17.95"	2	Yes	6 9/16"
3'-0" × 4'-0" Double Hung	DH3040 *Without Screens Clear Opening = 4.74 S.F. Clear Width = 32.56" Clear Height = 20.95"	2	Yes	NONE
3'-0" × 4'-9" Double Hung	DH3049 *Meets Min. Egress Size Requirements Clear Opening = 5.76 S.F. Clear Width = 32.56" Clear Height = 25.45"	12	Yes	6 9/16"
6'-0" × 4'-9" Double Hung	DH3049-2 *Meets Min. Egress Size Requirements Clear Opening = 5.76 S.F. Clear Width = 32.56" Clear Height = 25.45"	6	Yes	6 9/16"
9'-0" × 4'-9" Double Hung	DH3049-3 *Meets Min. Egress Size Requirements Clear Opening = 5.76 S.F. Clear Width = 32.56" Clear Height = 25.45"	4	Yes	6 9/16"
3'-0" × 5'-0" Double Hung	DH3050 *Meets Min. Egress Size Requirements Clear Opening = 6.09 S.F. Clear Width = 32.56" Clear Height = 26.95"	1	Yes	6 9/16"
3'-0" × 6'-0" Double Hung	DH3060 *Meets Min. Egress Size Requirements Clear Opening = 7.45 S.F. Clear Width = 32.56" Clear Height = 32.95"	4	Yes	6 9/16"
6'-0" × 3'-6" Slider	GW6036 *Meets Min. Egress Size Requirements Clear Opening = 8.73 S.F. Clear Width = 33" Clear Height = 38.125"	4	Yes	6 9/16"
6'-0" × 1'-0" Fixed Transom	ASW 6010	10	Yes	6 9/16"
3'-0" × 3'-0" Fixed	CIR30	2	Yes	NONE
6'-0½" × 6'-11"	6'-0" x 6'-11" Andersen 100 Series PS61611, Low-E, GBG,White Hardware And Screen, Inside Lock Only	11 Total 6 RH, 5 LH	Yes	6 9/16"

TOTAL # OF WINDOWS - 61
TOTAL # OF PATIO DOORS - 11

10-UNIT NON-ACCESSIBLE DOOR SCHEDULE

SIZE	COUNT	GRILLE	JAMB SIZE	DESCRIPTION
3'-0" x 6'-8" LHIS	5	TRANSOM ONLY	6 9/16"	Thermatru S600 3-Panel LHIS Fiberglass with 1'-0"H, 3-Lite, Low-E Rectangular Transom Above, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
3'-0" x 6'-8" RHIS	5	TRANSOM ONLY	6 9/16"	Thermatru S600 3-Panel RHIS Fiberglass with 1'-0"H, 3-Lite, Low-E Rectangular Transom Above, Bore for Deadbolt, Applied PVC 908 Casing, Satin Nickel Hinges
TOTAL # OF DOORS - 10				

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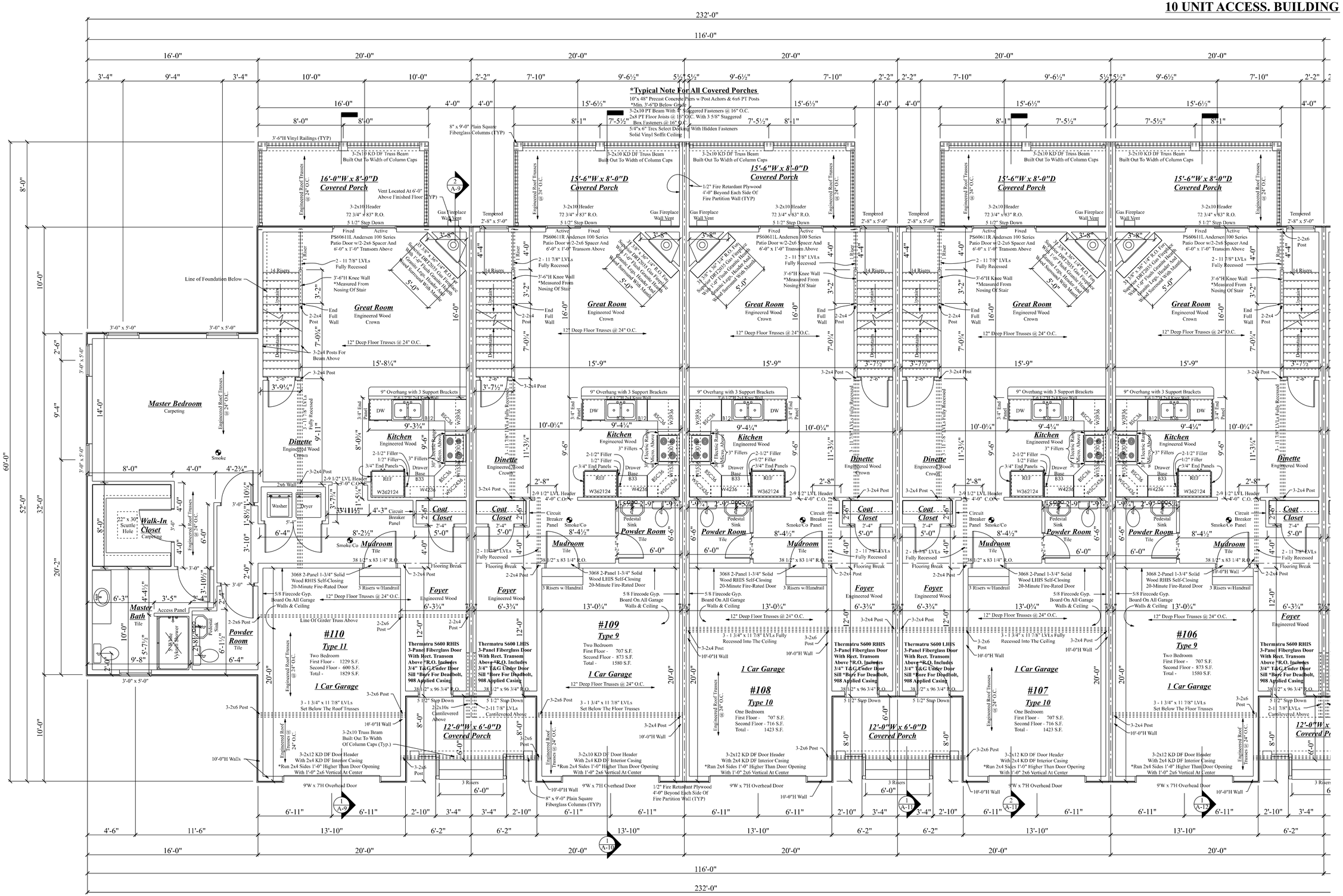
SCALE
AS NOTED

DRAWING #
A-2

BUILDING #1
UNIT #s 101-110
10 UNIT ACCESS. BUILDING



NOTE: THIS FLOOR PLAN SHOWS ONLY 5 OF THE 10 UNITS. THE REMAINING UNITS ARE A MIRROR IMAGE OF WHAT IS SHOWN, AND ALL NOTES, DETAILS AND SPECIFICATIONS ARE TYPICAL FOR EACH UNIT TYPE.

DETAILED FIRST FLOOR PLAN~ UNITS 106-110

SCALE: 1/4" = 1'-0"

***9' FIRST FLOOR WALL HEIGHT**

FIELDSTONE RIDGE, LLC.
10 FIELDSTONE RIDGE
TOLLAND, CT 06084
A SANTINI COMMUNITY

FIELDSTONE RIDGE
10 FIELDSTONE COMMONS
TOLLAND, CT 06084
A SANTINI COMMUNITY

1 A-1 SECTION NUMBER / PAGE NUMBER

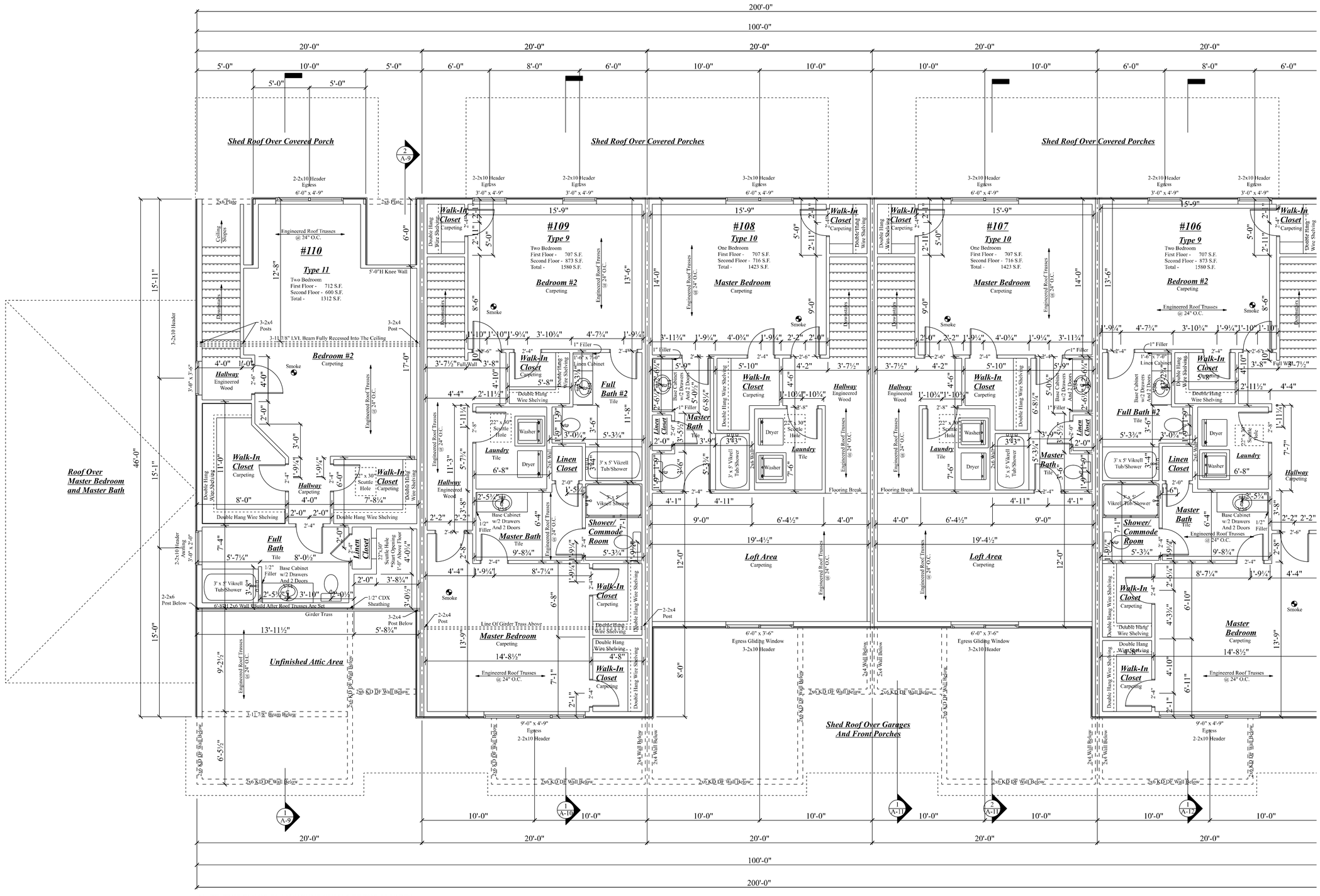
DRAWN BY
KRO

DATE
2/15/22

SCALE
AS NOTED

DRAWING #
A-5

BUILDING #1
UNIT #s 101-110
10 UNIT ACCESS. BUILDING



NOTE: THIS FLOOR PLAN SHOWS ONLY 5 OF THE 10 UNITS. THE REMAINING UNITS ARE A MIRROR IMAGE OF WHAT IS SHOWN, AND ALL NOTES, DETAILS AND SPECIFICATIONS ARE TYPICAL FOR EACH UNIT TYPE.

DETAILED SECOND FLOOR PLAN~ UNITS 106-110

SCALE: 1/4" = 1'-0"

***8' SECOND FLOOR WALL HEIGHT**

FIELDSTONE RIDGE, LLC.
1031 HARTFORD TURNPIKE
VERNON, CT 06066

FIELDSTONE RIDGE
10 FIELDSTONE COMMONS
TOLLAND, CT 06084
A SANTINI COMMUNITY

1 A-1 — SECTION NUMBER / PAGE NUMBER

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DATE
2/15/22

SCALE
AS NOTED

DRAWING #
A-7

Fieldstone Ridge

Presented by Eric and Kevin Santini

FIELDSTONE
RIDGE
A SANTINI COMMUNITY

Presentation to the Design Advisory Board on March 3, 2022

Agenda

Clubhouse Elevation

Apartment Building Elevations

Maintenance Garage

Mailbox Pavilion

Dumpster Enclosures

Signage




The Fieldstone Ridge Clubhouse

The Fieldstone Ridge Clubhouse will be located at the entrance of the community facing Fieldstone Commons. The Clubhouse will include a pool area at the walkout level in the rear of the building. The front elevation will feature a grand vaulted entrance with double doors, shed dormers and porch roofs with metal roof accents, architectural asphalt shingles, double hung windows, manufactured stone veneer, composite posts, gable roofs and double 5” woodgrain vinyl siding.

The Fieldstone Ridge Clubhouse (cont.)

The rear elevation of the clubhouse will walkout to the pool area. The elevation features a 2 ½ story brick veneered chimney with a fireplace facing the pool area. The rear elevation will also feature metal roof accents, vinyl siding and manufactured stone veneer. The rear elevation includes numerous double hung and fixed windows that allow for great views of our pool area and the Tolland Marsh.

The Fieldstone Ridge Clubhouse (cont.)

Our Grand Lofts Clubhouse located in Vernon shares similar features with our proposed Fieldstone Ridge Clubhouse.

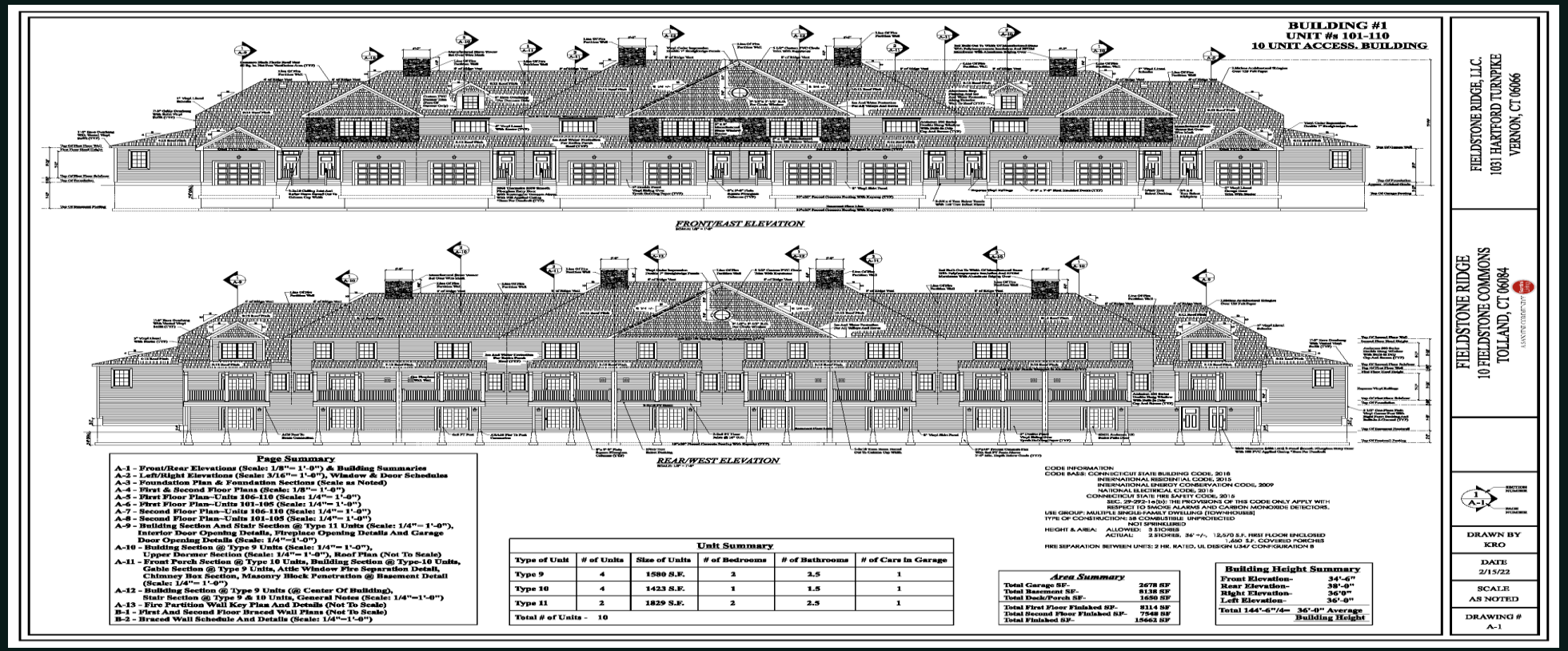
- Manufactured stone veneer
- 5” Vinyl siding
- Composite posts
- Double hung windows and transom windows
- Gable roofs
- Dormers

The Fieldstone Ridge Clubhouse (cont.)

Our Fieldstone Ridge pool area will be similar in scale to our Grand Lofts pool area complete with black aluminum fencing with evergreen hedge screening, ornamental plantings and a paver patio.

Fieldstone Ridge Apartment Buildings

Fieldstone Ridge will feature 10-unit rear walk out buildings and 12-unit buildings. An elevation of our 10-unit building is below. We will use the same windows, shingles, manufactured stone veneers and vinyl siding that we have specified for the Fieldstone Ridge Clubhouse. All units will have attached garages and full private unfinished basements.

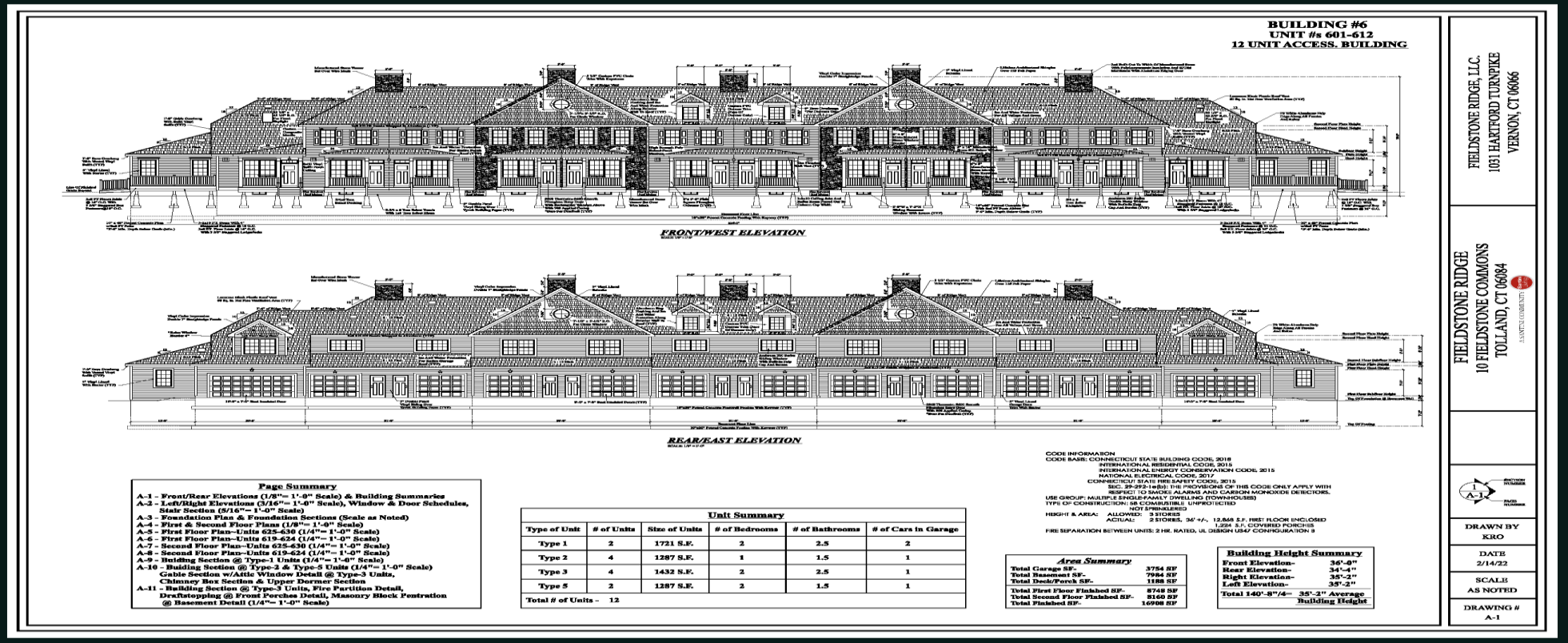


Fieldstone Ridge Apartment Buildings (cont.)

Below is an elevation of a 10-unit walkout building from our Grand Lofts III community in Vernon. This building elevation will closely resemble our Fieldstone Ridge 10-unit walkout building.

Fieldstone Ridge Apartment Buildings (cont.)

Below is an elevation of our 12-unit townhome building that will use the same exterior materials as our Fieldstone Ridge Clubhouse.



BUILDING #6
UNIT #s 601-612
12 UNIT ACCESS. BUILDING

FRONT/WEST ELEVATION

REAR/EAST ELEVATION

FIELDSTONE RIDGE, LLC.
1031 HARTFORD TURNPIKE
VERNON, CT 06066

FIELDSTONE RIDGE
10 FIELDSTONE COMMONS
TOLLAND, CT 06084

DRAWN BY
KRO

DATE
2/14/22

SCALE
AS NOTED

DRAWING #
A-1

Page Summary

A-1 - Front/Rear Elevations (1/8"= 1'-0" Scale) & Building Summaries
A-2 - Left/Right Elevations (3/16"= 1'-0" Scale), Window & Door Schedules, Stair Section (3/16"= 1'-0" Scale)
A-3 - Foundation Plan & Foundation Sections (Scale as Noted)
A-4 - First & Second Floor Plans (1/8"= 1'-0" Scale)
A-5 - First Floor Plan--Units 625-630 (1/4"= 1'-0" Scale)
A-6 - First Floor Plan--Units 619-624 (1/4"= 1'-0" Scale)
A-7 - Second Floor Plan--Units 625-630 (1/4"= 1'-0" Scale)
A-8 - Second Floor Plan--Units 619-624 (1/4"= 1'-0" Scale)
A-9 - Building Section @ Type-1 Units (1/4"= 1'-0" Scale)
A-10 - Building Section @ Type-2 & Type-5 Units (1/4"= 1'-0" Scale) Gable Section w/Attic Window Detail @ Type-3 Units, Chimney Box Section & Upper Dormer Section
A-11 - Building Section @ Type-3 Units, Fire Partition Detail, Draftstopping @ Front Porches Detail, Masonry Block Fentration @ Basement Detail (1/4"= 1'-0" Scale)

Unit Summary

Type of Unit	# of Units	Size of Units	# of Bedrooms	# of Bathrooms	# of Cars in Garage
Type 1	2	1721 S.F.	2	2.5	2
Type 2	4	1287 S.F.	1	1.5	1
Type 3	4	1432 S.F.	2	2.5	1
Type 5	2	1287 S.F.	2	1.5	1
Total # of Units -	12				

CODE INFORMATION
CODE BASIS: CONNECTICUT STATE BUILDING CODE, 2018
INTERNATIONAL RESIDENTIAL CODE, 2015
INTERNATIONAL ENERGY CONSERVATION CODE, 2015
NATIONAL ELECTRICAL CODE, 2017
CONNECTICUT STATE FIRE SAFETY CODE, 2015
SEC. 29-292-1e(b): THE PROVISIONS OF THIS CODE ONLY APPLY WITH RESPECT TO SMOKE ALARMS AND CARBON MONOXIDE DETECTORS.
USE GROUP: MULTIPLE SINGLE FAMILY DWELLING (TOWNHOUSES)
TYPE OF CONSTRUCTION: 5B COMBUSTIBLE, UNPROTECTED
NOT SPRINKLERED
HEIGHT & AREA: ALLOWED: 3 STORIES
ACTUAL: 2 STORES, 34' +/-, 12,868 S.F. FIRST FLOOR ENCLOSED
1,224 S.F. COVERED PORCHES
FIRE SEPARATION BETWEEN UNITS: 2 HR. RATED, UL DESIGN U347 CONFIGURATION 9

Area Summary

Total Garage SF-	3754 SF
Total Basement SF-	7984 SF
Total Deck/Porch SF-	1188 SF
Total First Floor Finished SF-	8748 SF
Total Second Floor Finished SF-	8160 SF
Total Finished SF-	16908 SF

Building Height Summary

Front Elevation-	36'-0"
Rear Elevation-	34'-4"
Right Elevation-	35'-2"
Left Elevation-	35'-2"
Total 140'-8"/4=	35'-2" Average Building Height

Fieldstone Ridge Apartment Buildings (cont.)

Below are pictures of our 12-unit building from our Grand Lofts III community in Vernon. This building elevation will closely resemble our Fieldstone Ridge 12-unitbuilding.

Fieldstone Ridge Apartment Buildings (cont.)

Below is are aerial photos of our Grand Lofts III community which shares very similar building elevations and topography with our proposed Fieldstone Ridge community.

Fieldstone Ridge Maintenance Garage

Our yet to be designed maintenance garage will blend in with the existing apartment buildings and clubhouse. The elevation will feature the same building materials that we use for the apartment buildings and clubhouse. Below is a picture of a maintenance garage that we built at Deer Valley North in Ellington CT. This maintenance garage will be very similar in appearance to the Fieldstone Ridge maintenance garage.

Fieldstone Ridge Mailbox Pavilion

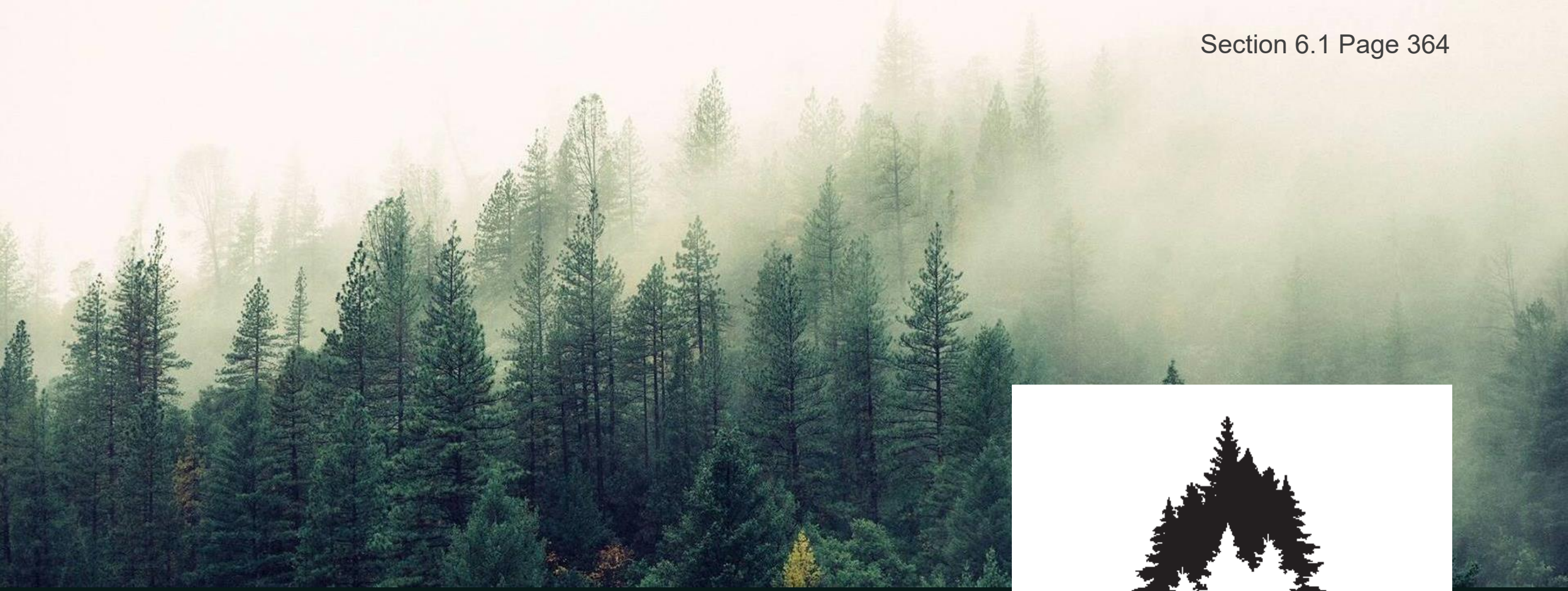
Our mailbox pavilion will be built with the same materials that we are specifying for the apartment buildings and clubhouse. Below is a picture of a mailbox pavilion that we built in Deer Valley North in Ellington that will be very similar to the Fieldstone Ridge mailbox pavilion. Our yet to be designed mailbox pavilion will also include an enclosed portion for parcel delivery. The rear and sides of the mailboxes will be screened with a mix of deciduous and evergreen trees and shrubs.

Dumpster Enclosures

Our Fieldstone Ridge dumpster areas will be screened with white vinyl fences and a combination of evergreen trees and shrubs. The dumpster enclosure below is from our Grand Lofts II community in Vernon and will be very similar to the Fieldstone Ridge dumpster areas.

Signage

The signage for Fieldstone Ridge will reflect the architecture of the community and the surrounding scenery. We will utilize masonry and up lighting for our monument signs at our entrance. Below are pictures of signs that we have at



Questions?

FIELDSTONE
RIDGE
A SANTINI COMMUNITY

Thank You!

TOWN OF TOLLAND, CONNECTICUT
WETLAND/WATERCOURSE PERMIT

Inland Wetlands Commission Application No: 22-1
Approved: April 7, 2022
Expiration: Pursuant to CGS§ 22a-42a this permit shall be valid until any approval granted by the Tolland Planning & Zoning Commission expires or, for ten years, whichever is earlier.

The Tolland Inland Wetlands Commission has approved this permit for the following activity with the conditions stated in this permit. The permittee is subject to the provisions stated in Section 11 of the Tolland Wetlands and Watercourses Regulations.

Location: 10 Fieldstone Commons

Permittee: Fieldstone Ridge, LLC

Regulated Activity: Construction of buildings, parking areas and storm water management facilities within the upland review area, associated with the construction of a 240 multifamily residential development.

Conditions:

1. The plans shall be revised to:
    a. Incorporate the requested revisions as outlined in a memo provided by consulting Town Engineer Chuck Eaton dated 04-06-22
    b. Include a vegetated buffer between the outfall of the southerly stormwater basin and the wetland line as presented during the public hearing.
    c. Modify the construction sequencing schedule to include the installation of activity limit staking where clearing, grading, construction, or any other site work is proposed within 25ft of a delineated wetland or watercourse.
    d. Include additional erosion controls, to the satisfaction of Town staff adjacent to the walking path in areas of steeper slopes.
    e. Incorporate a copy of this approval.
2. All work and all regulated activities conducted pursuant to this authorization shall be consistent with the terms and conditions of this permit. Any structures, excavation, fill, obstructions, encroachments or regulated activities not specifically identified and authorized herein shall constitute a violation of this permit and may result in its modification, suspension, or revocation. Upon initiation of the activities authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions of this permit.
3. This permit is not transferrable without the written consent of the Commission or its Agent.
4. In evaluation of this application, the Commission has relied on information provided by the applicant and, if such information subsequently proves to be false, deceptive, incomplete, and/or inaccurate, this permit may be modified, suspended, or revoked.
5. The permittee shall notify the Town's wetland agent immediately upon the commencement of site work.
6. An Erosion & Sedimentation control bond, subject to review by the Town Engineer shall be provided prior to the commencement of site work.
7. All "limits of disturbance" shall be field staked by the permittee and inspected by the Commission's agent before the commencement of site work. Any violation of the limitation that no work be performed, or equipment moved beyond the limit of disturbance shall immediately be reported by the permittee to the designated agent who is authorized to order immediate cessation of work to allow for evaluation of appropriate remedial actions including but not limited to revocation of the permit.
8. Adequate protection shall be provided within the upland review area for any existing/mature trees to ensure that root damage does not occur during site grading.
9. Straw bales used for erosion control shall be certified to be free of invasives.
10. Prior to the release of the Erosion & Sedimentation control bond, the applicant's engineer shall certify that the drainage structures within the upland review area have been installed in conformance with the approved plans.

11. The applicant's engineer shall provide certification that the temporary sedimentation basins to be utilized during construction have been installed in accordance with the approved plans and in accordance with the construction schedule.
12. The delineated wetland limits and upland review areas as shown on the approved plans shall be included on the final as-built plan.
13. Any modification or deviation from the approved plan shall require prior review by the Commission
14. The applicant's Professional Wetland Scientist shall provide quarterly project reports to the Town to certify compliance with the approved plans, to include erosion and sedimentation control measures, wetlands and the upland review areas.
15. Copies of any/all reporting required by CT DEEP shall be provided to the Commission's agent.
16. The Commission or its agents may make regular inspections, at reasonable hours, of all regulated activities for which permits have been issued under these regulations.

A public notice will be published in the local newspaper with a description of your proposed activity on April 13, 2022. Please note that by State of Connecticut statute, your permit may be appealed to the Inland Wetland and Watercourses Commission within 14 days of the notice's publication.

This permit may be revoked at a later date by the Inland Wetlands and Watercourses Commission or its agent if the stipulations mentioned above are not followed or if an inspection shows that the environmental impact is more severe than anticipated. The penalty clause, Section 22a-44 of the Connecticut General Statutes, provides for a fine of up to one thousand ($1000) dollars for each day that these requirements are violated.

The applicant shall have the permit readily available, and shall produce it for inspection by Commission's representative upon request.

Inland Wetland Agent: 

Date: 4-13-22

Tolland Inland Wetlands Commission
Zoom Remote Meeting
Thursday, March 17, 2022 - 7:00 p.m.

Members Present: Raymond Culver, Chairman
Archie Tanner, Vice Chairman
Todd Penney, Regular
Bob Ross, Regular

Members Absent: Gary Hoehne, Regular

Others present: Michael D'Amato, Interim Wetlands Agent
Eric Peterson, engineer representing Fieldstone Ridge
Dori Famiglietti, attorney representing Fieldstone Ridge
George Logan, soil scientist representing Fieldstone Ridge
Sigrun Nicodemus, botanist, representing Fieldstone Ridge
Kevin Santini, representing Fieldstone Ridge
Jim Hutton, 14 14 Torrey Road, citizen
Eugene Koss, representative of Bolton Lakes Watershed Conservation Commission Alliance

1. Call to Order

Meeting recording started. Meeting called to order at 7:01pm.

Culver reviewed the rules for this remote meeting. All public citizens who wish to speak will be limited to 5 minutes each. Chat feature in Zoom will be monitored as well in order to provide opportunity for public citizens to participate.

2. **Seating of Alternate(s)** – none

3. **Additions/Changes/Deletions to Agenda -** none

4. Public Participation – issues of concern not on the agenda (2-minute limit) – none

5. Public Hearing

Penney/Ross: motion to open the public hearing

Culver – Y, Ross – Y, Penney – Y

Unanimously approved

Tanner "arrived" via Zoom

5.1 IWC 22-1, 10 Fieldstone Commons – Requests approval for the construction of buildings, parking areas and storm water management facilities within the upland review area, associated with the construction of a 240 multifamily residential development. Zone: Gateway Design District (GDD) Applicant: Fieldstone Ridge, LLC.

Penney asked D'Amato if the public advertisement for the Public Hearing for Inlands Wetlands Commission 22-1 had been completed. D'Amato said advertisements were placed in the Journal Inquirer. Penney read the announcement into the record.

Famiglietti instructed herself to the Commission. She said all property abutters were notified and notification acknowledgements were received. Famiglietti said the acknowledgements were provided to Town Staff. Famiglietti reviewed the history of pre-application process and that Town Staff were active participants in the development and revisions of the plan.

Famiglietti introduced George Logan, wetlands/soil scientist. Logan reviewed his credentials with the Commissioners. Logan referred to figure A from his report and said, the wetlands were delineated in Dec 2020 and Jan of 2021 and the information was provided to him by Gartner and Peterson. Logan described the property as a peninsula of uplands surrounded by wetlands. Logan reviewed a soils map and indicated that the bulk of the property as till soils, considered from an end moraine. He reviewed all of the different types of soils which he said are glacial outwash. He referred to soils 18 and 17 as organic soils which are 5 or more feet deep in some areas. Logan reviewed the locations of the drainage areas and wetlands on the property. He said there is a very large wetlands system, which is Tolland Marsh. He identified wetlands # 2 and the Skungamaug River as well as a bonified vernal pool on the property. He said the marsh system dates back to at least 1934 based on maps he found in the State record. He also provided maps from a 1965 survey as well. He said the wetlands area is a great resource.

Logan identified the location of an existing dam that was built to pond water from the Skungamaug River for a mill. Logan provided some photos of current conditions of the wetlands, watercourses, verbal pools, swamps, open water. He said there are some areas are semi and permanently flooded. He said a vernal pool survey was completed in March and April of 2021. Logan said the site has been visited 18 times in preparation for this application. He said they spent about 35 total hours on the site.

Logan described wood frog vernal pool on the site which did not include any spotted salamanders. Logan provided photos of the edge of the marsh and reviewed the plantings in this area including mountain laurels. He said the water quality is excellent and a mesotrophic system. He said he observed leather leaf which was not expected but an indicator of good water quality. He said there is a boat launch to access the open water. Logan viewed the present wetlands buffer which he said would remain intact. Logan said wetlands #5 is partially on the site and partially off the site. He said it is not a vernal pool although is looks like it could have been. Logan showed the empounded section and the location of the dam.

Logan then discussed functions and values. Logan said he reviewed the national wetlands inventory which includes mapping of major wetlands. Logan said the wetlands system is between 100-150 acres which is considered a large wetlands system. Logan referred to his report and reviewed the chart of functions. Each wetland was evaluated for principal values. Logan said in April 2020 there were 2

species of special concern, one was a type the spotted turtle and the other was a ribbon snake. Logan said they were not able to photo document them for the State.

Peterson introduced himself as the principal engineer for the project and reviewed the present conditions map. He said the site is 51 acres with the highest point in the northern part of the property and then slopes in all directions. He said there are two drainage systems on this property one is a clean water pipe from the Big Y roof area and the second collects water from the upper section of Fieldstone Common Road. He said there are several catch basins as well as a stormwater separator already on site.

Peterson said they propose to build 21 apartments buildings totaling 240 units. Peterson reviewed the plan including location of the proposed roads, driveways, apartment buildings, clubhouse, maintenance building and pool and walking path which will surround the development. Peterson also reviewed the areas that will be vegetated and what vegetation will not be disturbed during or after construction.

Peterson there will be public sewer and water and has designed several stormwater management components that will treat and detain the water as to not increase the flows. He reviewed the locations of the stormwater basins. He said the total undisturbed area will total 17 acres and there was specific attention placed to preserve any views of the marsh. Peterson said the wetlands are shown on the map with a dark blue line, and he identified the upland review area. Peterson explained the upland review distances change throughout the site due to the nature of the watercourses on the site as well as the slopes based in accordance with Town Regulations. Peterson said the dark green areas on the plan are the areas that are not disturbed. Peterson reviewed the locations of the stormwater basins.

Peterson said the site will accessed by Fieldstone Common Drive. Peterson provide a review of the paved areas and pointed out an area of open space in the center of the development. Peterson said the plan was designed in accordance with the Town's Stormwater Management Design Manual which includes that roof water will be infiltrated back into the ground and that there are 5 stormwater structures for roof top infiltration which will be underground and that have been designed to maintain the same groundwater flows and amount of water entering the watershed.

Culver asked about the infiltration basins. Peterson explained that one of the basins will cover buildings 16 and 17, the parking lot. He said the parking lot to the north will enter a catch basin and hydrodynamic separator before it gets to the underground chambers behind. Peterson said the other components are the 2 storm water basins; the basin 1 on the north side collects water from the northern side of the development and the discharge from Fieldstone Commons Road. He said this design was completed following discussion with the Town's Public Works Director and the Town Engineer. He said one of the basins has 2 cells separated by a berm and the water from the development and the road will be separated. He said the property owner will be providing an easement for the Town to maintain their half of the basin. Peterson said the basin is in an ideal location based on the soils on site. Peterson reviewed the structures including a sediment forebay and an oil separator. Peterson said it is an infiltration basin and explained how the site soils would be mixed to encourage infiltration and that the erosion and sedimentation controls and plantings were chosen with the same goals in mind, water quality and infiltration. Peterson added the plantings will be quick to germinate and stabilize the basin as quickly as possible. He said the basin was designed for a 10-year storm and that anything more than that will discharge to the west. He identified the location of 2 overflow spillways which would eventually run off into the marsh.

Peterson said immediately to the right is a new discharge for the water from the Big Y roof and that this water is considered clean and would not enter the basin. He said the goal will be to prevent erosion by installing a detention basin and rip rap level spreader. He said these structures are outside the review area and in a mostly flat area which should also prevent erosion.

He then referred to the southerly basin which is located behind building 21 and he said designed differently due to soils which require a wet bottom basin. Peterson said there will be a sediment forebay into a settlement area and then discharge to an outlet sump into a level spreader. He said the chosen plantings will help with stormwater treatment and the exiting water will be clean and of a non-erodible velocity.

Peterson deferred back to Logan who said this plan includes the best possible stormwater systems for this site including the two basins which are the best for permeability and stormwater management. Logan said the plantings are specific for the type of basins; the southern basin will have a wet bottom which would create a marsh type system. Logan said 25 trees will be planted and 113 shrubs and 650 emergent perennial plants which like wet roots. He said these plants will tolerate run off and improve the water quality and actually create an extra wetlands environment. Logan referred to building #21 basin and said the basin would provide a wetlands buffer for the natural wetlands and all best management practices were considered. Logan reviewed the seed mixes and planting details are available in the report and plans. Logan said he would be involved with the placement of the plantings during construction.

Peterson referenced the Town's LID manual and stormwater design manual and reviewed how this proposal meets the requirements and recommendations. Peterson reviewed the removal efficiency calculations that are required for the development and that all calculations were included in the report. He reviewed all of the different system elements and calculations as required.

Peterson reviewed construction sequencing and erosion and sedimentation controls. Peterson said sheet 21 has the construction sequencing and scheduling. Peterson said the erosion and sedimentation controls are located on sheets 12-15. Peterson said the construction schedule is lengthy but specific. He said the plan is to cut down all trees at once but stumping them in stages to minimize erosion and destabilization. He said the erosion and sedimentation controls structures will include silt fence and coir logs and that coir logs will be used anywhere near by wetlands. He said based on the site conditions will dictate a regrading of the site. He said stumps will be removed on the northly side first and then the soils will be moved to regrade in the fill areas. He said once the fills are completed, there will be erosion and sedimentation controls downhill of all construction. He said any fill areas will be immediately seeded with a blend of 2 mixes to prevent erosion. He said on the southside the soils will be seeded as they are worked. He reviewed the plantings near the vernal pools.

Logan introduced Sigrun Nicodemus, Botanist, to discuss the plantings and habitats. She reviewed the makeup for a good healthy habitat. She said there is an area of steep slope and she reviewed that the water will be caught to provide water to the plantings and vernal pool. She said the trees and shrubs are important to taking up pollutants and vernal pools are very sensitive to pollution. She reviewed a proposed infiltration and plant uptake berm as well as some of the plant species and how they will protect water quality. She said there are some pitch pines on site that will be sacrificed for the development but many will be replaced and added the planting plan includes excellent plant choices for the site conditions and to generate leaf litter which benefit the tree frogs.

Peterson said he received a memo from D'Amato that summarizes the Town engineers' comments. Peterson said he has spoken to the Town Engineer and expects he will be able to address concerns.

Comment 1 – Peterson said in regards to the northerly stormwater basin, he provided a modified plan to D'Amato as indicated on sheet 4. Peterson summarized and said the Town Engineer requested that the berm between the 2 cells be increased and suggested an increase of an additional foot with the added additional 400 feet of upland review area.

Comment 2 – Peterson referenced the dumpster area and said water from this area was going to run off over the dumpster pad and directed to a catch basin. Peterson said the Town Engineer requested some form of treatment for this water prior to entering the wetlands system. Peterson said the area was re-graded to direct the water into an existing catch basin and then enter the southerly basin.

Comment 3 – Peterson said the Town Engineer expressed concern about erosion in some of the areas of the walking path due to increased slopes in northwesterly area of the property. Peterson said they propose to building the walking path in sections and use a honeycomb matting system so the stone will not get washed away and will help to reduce maintenance. Peterson said they have had success using this system in the Deer Valley North development in Ellington and it has been very successful.

Comment 4 – Peterson said the Town Engineer expressed concern about the outlet of southerly stormwater basin and possible impact to wetlands. Peterson explained that the water coming out of the basin would be clean and then pass through a level spreader and then on undisturbed ground.

Comment 5 and 6 - Peterson said these comments have to do with property management and garbage control. Peterson said the Santini's will provide full time onsite property managers and discussed that the property management team is responsible for maintaining all of the property and removing any liter from all of the open spaces and trails.

Logan reviewed proposed conditions as well as direct and indirect impacts. Logan said there are no direct impacts in the proposed plan but that there would be indirect impacts both temporary and permanent. Logan said the double silt fences and coir logs should help protect the wetlands and watercourses both during and after construction. He added that coir logs are a very effective way to provide extra protection to the wetland areas. Logan then referred to long term indirect impacts. Logan said maintaining a system that preserves water quantity and quality was a main objective. Logan said the design team reviewed water hydrology to ensure water goes where it is supposed to and that a lot of infiltrative practices were included as required.

Logan said he is concerned about the vernal pool as an isolated wetlands but that it has a specific watershed which was a focus of attention to make sure that the vernal pool would be protected and would not dry out. Logan said the proposed plan includes protections for the vernal pool including assurances that no extra water would enter the vernal pool system and includes a "green zone" which provides more than sufficient buffering to allow for continued function and protection of the frogs. He said the area in vernal pool envelop will not be touched with an emphasis to protect an upland habitat and connectivity to the systems. He said 10.2 acres will not be touched and will allow for the frog habitat to be maintained which will also support the previously mentioned species of turtle and snake. Logan also expressed concern for the edge of the marsh but believes by maintaining the existing buffer, the marsh edge will be protected. Logan closed by saying there are no significant impacts to the regulated resources.

Culver opened the meeting to the public.

J. Hutton of 14 Torrey Road asked why the green area in the center of the development was not being used for infiltration. Peterson said based on the location, the area would best be used as a recreation amenity for the residents. Hutton asked if the area could have underground galleys to decrease the size of the planned basins required Peterson said the soils in the open area are not really suited to ground water infiltration and that the infiltration areas were placed in areas where the soils are conducive. Hutton referenced the walking trail and asked if the wooded areas would be disturbed. Peterson said they are not proposing much disturbance and extra effort will be made to place the trail with minimal disturbance and in some areas existing paths are going to be connected. Hutton suggested areas where the trail could be relocated to protect habitat with perhaps offshoot trails to take advantage of the views.

Culver opened the meeting to the Commissioners for comment. Penney asked if the Conservation Commission has the opportunity to comment on applications. D'Amato said the only other commission that issues formal comments is Design Advisory Commission. Hutton said it is part of Conservation Commission's charge is to review development plans informally and present concerns as needed. Penney suggested that the Conservation Commission also to provide feedback to the Planning and Zoning Commission. Penney asked about the proposed slopes. Peterson said they are no greater than 3:1 and identified one area that will be treated with an erosion blanket. Penney referenced the southerly side and the maintenance schedule. Penney asked if this area would be allowed to become wooded and forested and suggested that the area not be mowed routinely. Peterson said there will be shrubs planted and maintained with brush hogging 1-2x per year to allow for the area to be natural but not overgrown. Penney said he would like to see that information included in the Operations and Maintenance Manual. Peterson said he will review the plan and make sure it is included.

Penney asked Logan about the normal, natural habitat of the wood frog. Logan said the frogs like moist soils in the wetlands habitat. Logan said the area that is being preserved is the area the frog needs. Logan said the frogs are very active and do not need a lot of upland habitat. Logan referred to a study by Dr. Michael Clemmons that discussed critical threshold habitat. Logan said you can take more critical threshold habitat out if the pool is a wood frog pool. Penney asked about the location of the infiltration system in regards to the vernal pool. Logan said he is satisfied with the placement of the structures based on the test pit data.

Penney said he is satisfied with the plan and agrees with the plan for the 2 basins. Penney asked about whether infiltration was considered for the Big Y roof. Peterson said no. Peterson said they are infiltrating water from fieldstone common road which is not being done now and considers that a significant improvement from present conditions. Penney asked about the existing discharge. Peterson said the Big Y one is not holding up very well which is why the plan includes measures to decrease velocities. Peterson said they accomplished this by placing the discharge in an area that is flatter which should help decrease erosion or channeling.

Penney asked the capacity of the basins. Peterson said they were designed for a 10-year storm because it could be infiltrated. Penney asked if any alternative locations were considered for the basin near buildings 19, 20 and 21 because of the proximity to wetlands #2. Logan said the closer to the Skungamaug the better it gets. Logan said the location of building 21 was chosen based on the site slopes. Logan said the walking trail location is nearby but that plantings could be added to enhance the buffer. Penney asked about the grade

near wetlands #2. Logan said it is fairly flat and the water flows in a southerly direction. Logan said some trees will be removed during construction. Penney requested some shading to be restored.

Peterson said they are aware of the zoning setback and that the Santini's attempted to purchase a piece of property which would improve the plan but the neighbor was not willing to sell.

Culver referenced comment #26 from the Town Engineer's memo and asked if there could be more infiltration that area. Peterson said he would prefer for pristine water only to be directed towards the vernal pool and said they are very concerned about changing the habitat. Logan said the vernal pool does overflow in a south, southwesterly direction and because of the overflow direction there is little risk of overwatering the area. Logan said he would prefer that pavement runoff not be directed towards the vernal pool.

Culver asked about the construction and infiltration basins and whether 5 acres or less are going into each of the traps. Peterson said the trap by building #5 is the only one close to 5 acres, the rest are significantly less.

Penney asked about total site disturbance. Peterson said 34 out of 51 acres would be disturbed.

Tanner recommended leaving the public hearing open at this time. Famiglietti said the comments the from the Town Engineer were addressed in the memo from Peterson. Famiglietti suggested the public hearing could be closed and all concerns could be addressed as conditions of approval. Culver asked if any of the commissioners had read the entire memo from the Town Engineer. Tanner said he had read the entire memo. Culver said he would like to review the memo again and cross check some of the calculations. Ross said he would like comments and concerns to be addressed more formally.

D'Amato asked if the Commission would consider a special meeting. Penney said he is not available on for a special meeting on March 28th. D'Amato said a special meeting would require additional advertisement, Commissioners discussed their schedules for a possible special meeting on April 7th, Commissioners discussed continuing with Zoom format.

Famiglietti asked which comments would need to be addressed. Penney said he wanted comments about buildings 19 and 20 to be addressed including alternatives. Penney asked about the swimming pool and nearby retaining wall and proximity to the wetlands. Peterson said behind the pool, the wall is about 20-22 feet tall. Peterson said he has done the best he could and believes he has been mindful of protecting the resources on and near the property. Penney asked if there are alternatives. Peterson said this is the best alternative after all options were considered. Penney asked Logan about the quality of the wetlands.

Famiglietti asked if there are specific parts of the Town Engineer's memo that need to be presented and addressed prior to the special meeting. Penney said the only the comments as related to the wetlands for this Commission.

Culver asked if there is a plan for top of the basin walls. Penney asked about the driveway to the detention basins. Peterson said gravel is proposed. Penney asked about the slopes. Peterson said he would provide additional information but that the grades are about 12%. Culver said CHA (engineer) recommended super elevating the road. Penney asked about the crown, Peterson said about 2-3%. Penney asked about sediment entering the detention basins. Penney asked if the maintenance road could be paved. Peterson said paving might be better. Penney asked Peterson to submit a plan for that.

Nicodemus said there are a lot more plantings on the slope above the infiltration basin than what is shown on the overview plan and recommended commissioners review the landscape plan. Culver asked if the planting plan was including in the plan set. Famiglietti said she would make sure the Commission has planting plan.

Penney/Ross: motion to continue the public hearing until the special meeting on April 7, 2022 at 7pm. Meeting to be held virtually via Zoom.

Culver – Y, Penney – Y, Tanner – Y, Ross – Y

Unanimously approved.

6. New Business

6.1 Presentation by Anthony Harkins; Eagle Scout Project at Knofla Conservation.

Hutton said Harkins needed to leave the meeting due to the late hour. Hutton said he is prepared to present the information regarding the project. Hutton provided the map and indicated the location of a trail, pond and dam on the Knofla property. Hutton reviewed the topography. Hutton said while Harkin was investigating another project it came to his attention that there was ongoing beaver activity which could eventually compromise the dam. Hutton said Harkin changed the focus of his Eagle Scout project to protect the dam with the use of 2 beaver management devices.

Hutton said the dam was constructed as an earthen dam with a spillway and was completed in 1959. Hutton said Harkin's research indicated that the dam was overtopped only once in its history. Hutton said Harkin approached the Conservation Commission about the project because the beavers had modified the dam itself and created an additional dam in the emergency spillway. Hutton said DEEP was consulted for beaver management strategies which did not include harming the animals or active relocation. Hutton played a video of the structures being considered; one is a trapezoid fence structure and the second series of pipes. Culver asked about the pipe diameter. Hutton said they would use 6" pipes. Hutton said almost all of the work will be done with hand tools. He said only mechanical saws might considered if needed but they would be the only mechanical tools considered for the project. Culver said he has no objection to the project. Commissioners agreed the work should be covered by the blanket permit issued to the Conservation Commission.

Penney asked if the beavers would be deterred. Hutton said it allows for coexistence. Hutton said the Conservation Commission is charged with maintaining the dam and they will be inspected this year. Commissioners agreed this work meets the requirements of the blanket permit. Commissioners requested the Harkin present a review of the work completed after the project has been completed.

Penney/Tanner: motion that the work meets the requirements of the blanket permit.

Culver – Y, Penney – Y, Tanner – Y, Ross – Y

Unanimously approved.

6.2 IWC #22-2, 17 Stonehedge Drive – Request to install a 16' by 37' in ground pool 50 feet from a watercourse. Applicant: Sabrina Pools.

Commissioners agreed this is receipt only for this application. Commissioners requested a more delineated plan for the formal discussion. D'Amato said there was more submitted with the zoning permit which he would provide to the Commission for the next meeting

7. Old Business - none

8. Wetlands Agent Report

9. Other Business

10. **Correspondence - none**

11. Approval of Minutes – February 17, 2022 Meeting Minutes

Penney/Tanner: Motion to approve the minutes from February 17, 2022 regular meeting minutes as presented.

Culver – Y, Tanner – Y, Ross – Y, Penney - abstain

Unanimously approved.

12. Adjourn

Ross/Penney: motion to adjourn.

Culver – Y, Tanner – Y, Penney – Y, Ross - Y

Unanimously approved.

Meeting adjourned at 9:55p.m.

Respectfully submitted,

June Kausch
Clerk, Inland Wetlands Commission

Tolland Inland Wetlands Commission
Special Meeting
Zoom Remote Meeting
Thursday, April 7, 2022 - 7:00 p.m.

Members Present: Raymond Culver, Chairman
Archie Tanner, Vice Chairman
Todd Penney, Regular
Bob Ross, Regular
Gary Hoehne, Regular

Members Absent: None

Others present: Michael D'Amato, Interim Wetlands Agent
Eric Peterson, engineer representing Fieldstone Ridge
Dori Famiglietti, attorney representing Fieldstone Ridge
George Logan, soil scientist representing Fieldstone Ridge
Sigrun Nicodemus, botanist, representing Fieldstone Ridge
Kevin Santini, representing Fieldstone Ridge
Eric Santini, representing Fieldstone Ridge

1. Call to Order

Meeting recording started. Meeting called to order at 7:01pm.

Culver reviewed the rules for this remote meeting. All public citizens who wish to speak will be limited to 5 minutes each. Chat feature in Zoom will be monitored as well in order to provide opportunity for public citizens to participate.

2. **Seating of Alternate(s)** – none

3. Public Participation – issues of concern not on the agenda (2-minute limit) – none

4. Public Hearing

4.1 IWC 22-1, 10 Fieldstone Commons – Requests approval for the construction of buildings, parking areas and storm water management facilities within the upland review area, associated with the construction of a 240 multifamily residential development. Zone: Gateway Design District (GDD) Applicant: Fieldstone Ridge, LLC. ***(Continued from 03/24/2022)***

Continuation of Public Hearing

Famiglietti said this continuation will be to address received comments and those from the previous meetings. Peterson provided an updated plan which include relevant changes to the plan. He said the first revision was in the area of building of 20 and 21 and the southerly stormwater basin. He said in response to the Commission and CHA comments, building 21 and storm water basin was able to be moved further from the wetlands in a northerly direction and was able to increase the elevation of the basin such that the basin outlet would be over 15 feet further from the wetlands than it was before. He said in response to a comment provided by D'Amato, plantings will be added near the outlet. He said the landscape architects recommended red choke berry because it would be useful for bank stabilization. He added that slopes would also receive additional plantings to assist with stabilization and that the maintenance schedule was updated to will include the maintenance to the southerly slopes.

D'Amato asked if these changes were made on the third set of plan revisions. Peterson said yes. Peterson said the dumpster area concerns, despite being outside of the upland review area, were also addressed. He said the area elevation was increased and the nearby catch basin area would run off and enter into the waste water system for treatment prior to discharge.

Peterson said based on CHA comments, 5 additional test pits were evaluated in the area of the underground stormwater chambers. The elevations were adjusted based on soil conditions. Chambers are between 19 and 20 and 20 and 17. These changes will meet the design standards of the Town.

Peterson said the path close to the marsh was relocated to bring it to the edge of the clearing and connects into an existing path which heads down to the marsh and then connects to an additional new path. He said a few finger paths were added near buildings one and 2 to allow people to get closer to the marsh for recreational enjoyment. He said where the paths are have steep slopes, they will be installing a matting underneath the surface to improve stability.

He referenced the northerly stormwater basin and said in response to Commission and CHA comments he cross sloped to the maintenance driveway and regraded the drive so it does not exceed 10%; not exceeding 10% would allow for a gravel driveway and less impervious surface. Peterson said CHA also requested widening the berm in the basin to 5 feet wider which is also included in the revised plan. Peterson said that there are 3 temporary sediment basins proposed for construction. CHA requested an additional basin during the construction phase to control sediment. Peterson said CHA expressed concern about future infiltration. Peterson said they have chosen an alternate site for the basin which will include a swale in the area of building one. Peterson said he did not submit this change but would recommend it as a condition of approval.

Peterson said CHA recommended in the area of the southerly basin the removal of a storm manhole, deep sump catch basin and trap hood and replace it with a hydro dynamic separator. He said the calculations were better for pollution removal with the hydrodynamic separator and would be included in the plan. Peterson said CHA requested that some of the erosion control blankets be replaced with heavier duty mats on the slopes which the applicant agrees to. Petersons referenced D'Amato's memo and said identifying the limits of tree clearing and work would be completed onsite prior to the initiation of construction. Peterson said the remaining comments were Planning and Zoning Commission comments or other small revisions to the notes section on the plans.

Culver said his comments were addressed. Culver asked about comment 26 and the concern that stormwater was going to be collected, treated and then released on the periphery of the property. Culver asked if any alternatives were discussed, and if they were could they be reviewed. Penney said he was pleased with the changes and that his concerns in the southerly area were addressed. Penney asked for a review of the construction sequencing and construction management of the site. Penney said previously erosion and sedimentation controls inspections should be completed and said this project is proposed to take 3 years and expressed concern that there are no intermediate dates in the sequencing plan. Penney reviewed that the northly part of the project would be completed first. Penney asked how long until the southerly part of the project would take to be initiated.

Logan said he is responsible for discussing the comments provided by the Conservation Commission as they relate to the Inlands Wetlands Commission including a discussion of the hydrology of the Tolland Marsh. Logan agreed with the significance of the Marsh as a town resource. Logan said the issues were addressed in the provided wetlands report. He said this project is in compliance with the 2004 CT DEEP hydrology and water quality guidelines. He said the watershed and marsh and river are a very large system and may make it less sensitive than a smaller system in terms of wetlands hydrology and water quality. He said he consulted the CT DEEP GIS maps revised in 2021 and the project is not within or adjacent or upstream to any protected aquifer system in Tolland. Logan said the infiltration systems and hydrology of the area will not be significantly different from present conditions. Logan said the best site areas were chosen for infiltration based on site and present conditions. Logan reviewed groundwater recharge areas and said he did not think additional infiltration areas are necessary. Logan referenced comment #4 and said changing

the pavement to be more pervious was not necessary because the stormwater system is designed to take advantage of the best site conditions for infiltration. Logan discussed a concern raised about salting pavement and sidewalks. Logan said the Conservation Commission authors recommended participation in the UCONN snow program. He said research about winter road treatments found that most areas were not over salted and that sand is no longer used and referenced a product called "magic salt" which is what the State uses in liquid form on highways. He said the state uses anti icing and deicing protocols. He said compared to what enters the wetlands system from the highway, this additional treatment from this development would be minimal/negligible. He said the chloride is very soluble and goes right through soils and because of the amount of water in the system there is a high dilution potential. He said he did some research and found there is general agreement that chloride does not pose a threat to wetlands systems especially cases with large watersheds. He referred to Colorado review meta-analysis and their own study data from when they switched road products, "the field and laboratory studies of Magnesium Chloride deicers were proceeded by a lit review. The review showed that Magnesium and Chloride which are the main ingredients of Magnesium Chloride deicer are unlikely to produce adverse environmental effects except in under very unusual circumstances. Chloride may damage vegetation very close to roadways but it is diluted by run off to such an extent that it is very unlikely to see concentration that are harmful to aquatic life." Logan said they did what they could in regards to the trails to protect the marsh and vernal pool. Logan said there is a very dense thicket of understory. He said the study mentioned has to do with larger trails like rails to trails with a lot of traffic. He said there will be no impact to the frogs or verbal pools. Logan said in regards to the trails, there is really a net benefit.

Penney asked for Peterson and/or the Santinis to review the construction sequencing. Peterson said based on the Santinis' history in other towns with similar projects, once the Santinis get started they continue to move through the project as quickly as feasible until the project is complete and operational. In regards to the specific construction schedule, the plan is to open areas, including stumping and regrading, in phases. Slopes will be seeded and stabilized and then foundations will be dug, first coats of pavement will then be done. Once foundations are finished the framers will be brought in to continue on. Santini said specific timing is still in process. He said the slopes will be stabilized and maintained throughout the construction process. Santini said the quicker the slopes are stabilized and built the better it is for them because they recognize how important site cleanliness is to them maintaining their reputation in the community. Santini said they put down binder course of pavement very early on again to assist with cleanliness and prevent runoff and erosion. Santini said as soon as each slope is prepared, it will be stabilized. Penney said there is a 3-year window and asked if that is attainable. Santini said he believes so, but it is the most aggressive timeline for project completion but added that the site work could definitely be done in 3 years.

D'Amato said he has been putting together a list of conditions for a possible motion based on site conditions. Culver said Peterson had mentioned that all of the comments may not be on the most recent set of plan revisions and asked D'Amato if those things are included in the potential conditions.

Famiglietti provided information about prior permit conditions that could be including 3-year the preconstruction meeting with Town Staff condition. Penney said this is a large construction site with a long-time horizon and he is concerned that the staff levels in Tolland may not be able to support necessary monitoring. Penney asked what regulatory authority does the Commission have to possible bring in a third party to monitor the work and construction overall. D'Amato said one of the possible conditions could have what was enacted at College View including a quarterly wetlands scientist report which would include discussion of erosion and sedimentation controls on the property. D'Amato said the reports could be required more often with modifications for seasons and construction windows. D'Amato said a condition could be for the engineer to provide certifications and updates that the temporary construction sediment basins were constructed and installed correctly per the plans and that project engineer provide certification at the end of construction that the basins and outfalls are in the right place. D'Amato said the Commission has discretion to require updates based on the duration of the project. Culver asked about the general stormwater permit and asked about the frequency of those inspections. Culver asked the applicant would be willing to provide those reports to the Commission since they are already required. Famiglietti said for the DEEP there is some self reporting and inspecting and that Peterson and Logan will be completing routinely, and they would be willing to provide reports to the Inlands Wetlands Commission. Famiglietti said there will be a significant erosion and control

bonds for the site. She spoke to the integrity of the work that has been completed by the Santinis' at other locations. Santini said during a project in Vernon the Town's wetlands agent did routinely visit the site to ensure compliance. Santini said he actively manages all of their projects. Penney said having the quarterly reports by Peterson and Logan will allow the Commission monitor the progress. Penney said based on the size of the project, oversite is necessary. Santini stressed that the site will be open in small phases and then stabilized as they go. Penney said because of the proximity to the marsh and Skungamaug which are major resources requires active oversite. Commissioners agreed to quarterly reporting and site visits by the Town's wetlands agent.

D'Amato reviewed 3 findings:

Findings:

1. The Commission finds that the application is complete, and that sufficient information has been provided by the applicant to allow the Commission to reach a decision.
2. The Commission has given due consideration to the reports received, particularly the Wetland Assessment & Impact Analysis Prepared by REMA Ecological Services, LLC.
3. The Commission finds that there are no feasible or prudent alternatives that would reduce or eliminate any adverse impacts of the proposed activity, which alternatives have not been incorporated into the plans during the course of the application process, or which are required under the conditions of this approval.

D'Amato suggested the following conditions:

Conditions:

1. The plans shall be revised to:
    a. Incorporate the requested revisions as outlined in a memo provided by consulting Town Engineer Chuck Eaton dated 04-06-22
    b. Include a vegetated buffer between the outfall of the southerly stormwater basin and the wetland line as presented during the public hearing.
    c. Modify the construction sequencing schedule to include the installation of activity limit staking where clearing, grading, construction, or any other site work is proposed within 25ft of a delineated wetland or watercourse.
    d. Include additional erosion controls, to the satisfaction of Town staff adjacent to the walking path in areas of steeper slopes.
    e. Incorporate a copy of this approval.
2. All work and all regulated activities conducted pursuant to this authorization shall be consistent with the terms and conditions of this permit. Any structures, excavation, fill, obstructions, encroachments or regulated activities not specifically identified and authorized herein shall constitute a violation of this permit and may result in its modification, suspension, or revocation. Upon initiation of the activities authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions of this permit.
3. This permit is not transferrable without the written consent of the Commission or its Agent.
4. In evaluation of this application, the Commission has relied on information provided by the applicant and, if such information subsequently proves to be false, deceptive, incomplete, and/or inaccurate, this permit may be modified, suspended, or revoked.
5. The permittee shall notify the Town's wetland agent immediately upon the commencement of site work.
6. An Erosion & Sedimentation control bond, subject to review by the Town Engineer shall be

provided prior to the commencement of site work.

7. All "limits of disturbance" shall be field staked by the permittee and inspected by the Commission's agent before the commencement of site work. Any violation of the limitation that no work be performed, or equipment moved beyond the limit of disturbance shall immediately be reported by the permittee to the designated agent who is authorized to order immediate cessation of work to allow for evaluation of appropriate remedial actions including but not limited to revocation of the permit.
8. Adequate protection shall be provided within the upland review area for any existing/mature trees to ensure that root damage does not occur during site grading.
9. Straw bales used for erosion control shall be certified to be free of invasives.
10. Prior to the release of the Erosion & Sedimentation control bond, the applicant's engineer shall certify that the drainage structures within the upland review area have been installed in conformance with the approved plans.
11. The applicant's engineer shall provide certification that the temporary sedimentation basins to be utilized during construction have been installed in accordance with the approved plans and in accordance with the construction schedule.
12. The delineated wetland limits and upland review areas as shown on the approved plans shall be included on the final as-built plan.
13. Any modification or deviation from the approved plan shall require prior review by the Commission
14. The applicant's Professional Wetland Scientist shall provide quarterly project reports to the Town to certify compliance with the approved plans is maintained, to include erosion and sedimentation control measures, wetlands and the upland review areas.
15. Copies of any/all reporting required by CT DEEP shall be provided to the Commission's agent.
16. The Commission or its agents may make regular inspections, at reasonable hours, of all regulated activities for which permits have been issued under these regulations.

Penney asked D'Amato if there are standard values for erosion and sedimentation controls. D'Amato said the values are provided by the applicant and reviewed for adequacy by Town Consulting Engineer. Penney asked if those are erosion and sedimentation controls measures for the whole site, or only areas of purview. D'Amato said there will be one bond. Penney recognized the thoroughness of the findings and conditions suggested by D'Amato.

Penney/Tanner: motion to close the public hearing.

Culver – Y, Penney – Y, Tanner – Y, Ross – Y, Hoefne - abstain

Unanimously approved.

5. Old Business

5.1 Possible action Inlands Wetlands Commission # 22-1, 10 Fieldstone Commons.

Penney/Ross: motion to approve IWC 22-1 – 10 Fieldstone Commons consistent with the April 7th 2022 memo from Mike D'Amato and the conditions and findings referenced in that memo and as listed above.

Penney said he believes the plan is very good and a very large project for the Town in proximity to a very important valuable natural resource. He said the Commission is entrusting the Santinis with this development and that their design has incorporated the best possible stormwater mitigation and that the Santinis will be stewards of the land going forward. He wished them luck and appreciated their accommodations of this Commission with the site plan.

Culver – Y, Penney – Y, Tanner – Y, Ross – Y, Hoefne - abstain

Unanimously approved.

6. Adjourn

Penney/Tanner: motion to adjourn.

Culver – Y, Tanner – Y, Penney – Y, Ross – Y, Hoefne - Y

Unanimously approved.

Meeting adjourned at 8:10p.m.

Respectfully submitted,

June Kausch
Clerk, Inland Wetlands Commission

PROSPECT ENTERPRISES LLC

REAL ESTATE MANAGEMENT AND DEVELOPMENT

March 18, 2022

Mr. Andy Powell, Chairman
The Town of Tolland Planning and Zoning Commission
21 Tolland Green
Tolland, CT 06084

Re: Application of Fieldstone Ridge, LLC, 10 Fieldstone Commons – Special Permit and Site Plan per section 10-3.B to allow for a multi-family development at 10 Fieldstone Commons.

Dear Chairman Powell and Members of the Planning and Zoning Commission of the Town of Tolland:

We are the Owner/Manager of Fieldstone Commons Big Y Shopping Center. We are writing to express our support of the application of Fieldstone Ridge, LLC to develop the 51 acres directly adjacent to the shopping center into 240 multi-family residential apartment units.

We have reviewed the submittals attached to the application and we consider the proposed use, the level of density and the overall high quality of the proposal to be appropriate for the location and in keeping with what we have worked to achieve in our development over the past fifteen years. And, of course, we welcome the additional traffic that the development will bring to the shopping center.

The project will make a significant contribution toward sustaining the economic viability of the businesses located within the shopping center and elsewhere in the Gateway Development District, and will ensure that the Town of Tolland will continue to maintain its vital and vibrant community core.

It is our sincere hope that the Commission will act favorably on the applicant's plan.

Very truly yours,

PROSPECT ENTERPRISES, LLC FOR CAPITOL VENTURES, LLC

231 FARMINGTON AVENUE
FARMINGTON, CT 06032
(860) 249-2242

Conservation Commission comments and concerns on the proposed Fieldstone Ridge residential apartments development located behind (west of) the existing Big-Y shopping plaza.

1. The project appears to be well thought out and addresses stormwater management in an appropriate manner consistent with Town regulations, however, such a dramatic change from undeveloped woodland to mostly impermeable surfaces (access driveways, parking areas, and buildings) will have a significant impact on the hydrogeology of the adjacent Tolland Marsh which is in a Town of Tolland Natural Resource Protection Area, and partially overlaps more than one Aquifer Protection Area. Since the project is located in natural resource areas that are of high value to the Town of Tolland, it is important that the developers do all they can to protect those resources. We note that changes in marsh water quality could potentially impact future drinking water resources in Tolland. Also, water in the marsh is part of a continuum of riparian habitat that extends miles downstream, so impacts to the marsh hydrology and ecology will certainly impact downstream wildlife habitat, not just habitat local to the marsh.
2. Stormwater infiltration is proposed mainly at the detention/retention basins at the north and south ends of the site, with small amounts of infiltration from a few building roofs scattered throughout the site. The proposed infiltration of stormwater will be dramatically different from a forested landscape, where infiltration happens throughout the site currently, and may impact the ecological health of the adjacent wetland. Additional means of stormwater infiltration scattered throughout the site would lessen the impact of the development on the adjacent wetlands. The Conservation Commission requests the Inland Wetlands & Watercourses Commission and Planning & Zoning Commission consider additional stormwater infiltration measures noted in comments 3 & 4, below when reviewing the developer's application.
3. There is a central open space within the development that appears to be planned as a flat lawn area. Infiltration galleys buried beneath this lawn area could infiltrate significant amounts of stormwater rather than diverting it to the two ends of the site.
4. There is no mention of permeable pavement for the project. Permeable pavement (see EPA website https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement) in parking areas could allow for significant amounts of precipitation to infiltrate into soils throughout the site and could reduce the amount of stormwater diverted to the retention/detention basins at either end of the site. Permeable pavement has been used successfully at many area developments (see University of Connecticut Planning and Development website for examples on the UConn Storrs Campus).
5. Paved parking areas and roadways are likely to be salted in the winter to melt snow. Salt can have a significant negative impact on the water quality of the Tolland Marsh and the Skungamaug River, so it is important that the developer's plans include infrastructure (e.g., permeable pavement) and a maintenance plan that reduces the use of road salt to the extent practical while maintaining safe conditions for residents, visitors, and staff. Has the developer considered having their staff and snow plowing contractors participate in the UConn "Snow Pro" program which educates snow plow crews on how to reduce salt use and maintain safe winter conditions? The Conservation Commission highly recommends the UConn program to the developer and to Town Public Works staff that plow roads in the vicinity of water resources.

6. The project proposes a walking path through the wooded areas adjacent to the Tolland Marsh. The Conservation Commission supports the idea of additional walking paths in Town and allowing some access to the edge of the marsh for viewing, but it is well known that walking trails create a "corridor of influence" where the normal activities of reptiles, amphibians, birds, and mammals are disturbed by the presence of humans (see the Trail Impacts to Wildlife section of the Trails for People And Wildlife research paper at the following website: https://wildlife.state.nh.us/trails/). Moving the walking trail to the edge of the tree cut that has been proposed by the development, with perhaps one or two short access trails going to the marsh edge for viewing at the north and south ends of the development, would keep the majority of the marsh edge undisturbed and would reduce the area impacted by the trail's corridor of influence. If the developer would consider modifying the location of the walking trail, it would be of significant benefit to the ecology of the Tolland Marsh while maintaining the benefit for future residents of the development. Also, the existing plan for the walking trail cuts the vernal pool off from wetlands associated with the marsh which will have a significant negative impact on fauna that breed in the vernal pool, but live in the nearby marsh the rest of the year. Cutting the vernal pool off with the walking trail will likely result in significant loss of fauna and irreparable damage to the vernal pool. The importance of the wooded area between a vernal pool and an adjacent marsh (that is wet permanently, or wet for most of the year) is well described at the following website maintained by the University of New Hampshire: https://extension.unh.edu/resource/vernal-pools

Planning and Zoning Two Month Look Ahead

Meeting Date	Upcoming Items			
Monday April 25, 2022	22- 3 10 Fieldstone Commons			
Monday, May 9, 2022	Signs			
Monday, May 23, 2022	22-4 Drive Throughs	22- 5 Affordable Housing extension		
Monday, June 13, 2022				

KEY

TO BE RECEIVED
HEARINGS
NEW/OLD BUSINESS
OTHER

Future Items:

Training - To Be Scheduled

PLANNING & ZONING COMMISSION
TOLLAND, CONNECTICUT
REGULAR MEETING MINUTES OF APRIL 11, 2022

MEMBERS PRESENT: Andy Powell, Chair
Marilee Beebe, Vice Chair (remote)
Deb Goetz, Secretary
Joe Matteis
Erin Stavens

OTHERS PRESENT: David Corcoran, Director of Planning & Development
Lou Luba, Town Council Liaison (remote)
Public (remote)

1. **Call to Order**: Andy Powell, Chair, called the hybrid meeting to order in Council Chambers at 7:00 p.m.

2. **Pledge of Allegiance**: Recited

3. **Seating of Alternates**: None.

4. **Additions to Agenda**: Ms. Goetz asked that an update on Mr. Powell's letter to Mr. Taylor be included in the evening's discussion. This was added under Item 8, New Business.

5. **Public Comment**: None.

6. **Public Hearing(s)**: None.

7. Old Business

7.1 Discussion on Drive-Through Regulations: Mr. Corcoran reviewed the text and map changes he re-drafted as a result of their last discussion.

Ms. Beebe referenced the noise discussion from their last meeting. She pulled information from a large Department of Transportation project she worked on in her job. She noted it is publicly provided information and while she is an engineer by trade, it was provided as advisory information only. Ms. Beebe said when you do a noise ordinance, you must register it with the Department of Energy and Environmental Protection (DEEP), and Tolland did this for theirs. She said she did a cursory review and Tolland's noise ordinance is not out of character with other area towns.

Ms. Beebe said she felt a 300 foot separation distance for menu boards from a zone might be excessive but it is worth discussing. With the technology and monitoring they have today, she felt they could stay within sound restrictions even at 75 feet.

Ms. Goetz reminded everyone that they cannot tie the town ordinance to the sound restrictions because that falls under the Town Council's purview. Ms. Beebe noted, however, that the town noise ordinance does

not stipulate decibel levels for commercial zones. She said they could stipulate a decibel level for residential zones if they so choose.

Mr. Corcoran said if they come to a consensus, they could set a public hearing for this under Item 8.2. Ms. Goetz suggested they concentrate on the impact on residential zones.

There was discussion as to whether they should include the Community Commercial Zone (CCZ) for drive-through restaurants. Mr. Matteis said he felt they should. He noted it would still require a Special Permit, so they would retain greater control. In general, he said he would want to open more areas up for drive-throughs.

The Commission discussed how well the Dunkin Donuts drive-through has worked out. Ms. Beebe noted they have an exceptionally long queuing area, which is helpful. They also discussed Section 7.1, Page 5 – Items b. and c. The wording created some confusion, and they realized that b. refers to stacking while c. discusses allowing for adequate widths and lengths for stacking for straight areas and curves. It was determined that clarifying language is needed.

The Commission also discussed the safety of pedestrian traffic getting through drive through areas when these queues typically circle the building. Ms. Beebe said in her experience this tends to be a business decision to discourage patrons from coming into the building, and they can choose to accept their business models or push for a more community-oriented model.

Mr. Matteis noted that cars stacking in a drive-through are barely moving so pose little safety risk as compared to the many other shopping areas in town where people have to walk through the parking area where cars are moving more quickly, such as the Big Y grocery store. Ms. Beebe said one of the concerns with stacking queues that past Commissions had was also the idling of vehicles and the fact that they would be building up pollutants in those areas.

Mr. Matteis said he disagreed with Item 2.b. as he has never seen parking and driving separated. He said this just adds another restriction on developers making it harder for them. Mr. Powell suggested leaving Item 2.b. in and discussing it further during the public hearing. Mr. Corcoran said they would then need to take it out and add it in during the public hearing because you can make regulations more restrictive, but not less restrictive. Ms. Goetz noted the landscaping section covers other things that would allow them to create options for separation.

Ms. Goetz asked what standalone parking areas are as referenced under Item 2.c. Mr. Corcoran said he was not sure what was meant there as there is no definition for them in the regulations. It was noted that some years back Dunkin Donuts had expressed an interest in being connected to the neighboring commuter lot, but the Department of Transportation denied their request. Mr. Corcoran said he did not see any need to discourage the connectivity but that there is no need to require it.

Ms. Stavens suggested striking 2.c. All were in agreement. The Commission discussed 2.d., and they all agreed to keep that item in. They then discussed 2.e. and were in agreement that 50 decibels may be too low a noise limit. Mr. Corcoran said when he tested the Dunkin Donuts menu board, the ambient sound on a windy day was 52 decibels.

Mr. Matteis said the reason they don't have a noise ordinance in the commercial zones is because they are commercial zones. He said they need to focus only on restricting noise that butt up against residential zones. He also said he was concerned that they not make unworkable regulations so that twenty years down the road, they still don't have any development.

Ms. Stavens suggested switching the order of Items e. and f. They should first set the standard of distance from zones, then address the loudness. Mr. Matteis noted, however, that f. is in reference to residential zones, but e. is in reference to the closest property lines no matter what zone.

Mr. Corcoran said they may want to consider whether people who live in mixed use development areas should have a higher expectation of noise levels than those living in purely residential zones. The Commission agreed to strike 2.e and address distances instead. Ms. Beebe noted also that because these applications would require a Special Permit, they could always ask the applicant to provide additional information on noise levels.

The Commission discussed Item 2.f. and whether menu boards should be located 150 feet or 300 feet from adjacent residential zones. Ms. Stavens suggested 300 feet in the Tolland Village Area (TVA) only to protect the Woodfields neighborhood. Mr. Matteis said it wouldn't be feasible for a developer to try to fit a drive-through in the parcel closest to the Woodfields neighborhood. After further discussion, the Commission agreed to go with a 150 foot minimum distance requirement and they could potentially increase that distance during the public hearing after getting input from the public.

Ms. Goetz noted that presently drive-throughs are limited in the TVA only to existing restaurants, and the same for a Master Plan Overlay Zone (MPOZ) in the TVA. However, a drive-through would be permitted in an MPOZ in the Technology Campus Zone (TCZ). Mr. Matteis suggested if they are considering changing the regulations, they should open up drive-throughs to all properties in the TVA and not just existing restaurants.

The Commission discussed notifications for the public hearing. Mr. Corcoran said it would be a lot but they could notify all residents who have property abutting commercial zones where drive-throughs might be allowed. Either way, a legal notice would need to be published. Ms. Goetz noted that this can also be sent out in the public notice registry.

There was agreement to amend Section 16-5 Drive Through Service to prohibit drive through menu boards within 150 feet of residential zones, clarify the allowed locations for drive-throughs and modify Section 14-3 Table of Uses to allow drive throughs in the CCZ and new drive throughs in the TVA-GD and drive-through gas stations as a Special Permit in the GDD.

7.2 Discussion on Signs – Mr. Corcoran reviewed two court cases relevant to sign regulations and discussed the need to ensure content neutrality.

Mr. Matteis said he felt Tolland's sign regulations are too restrictive and need some relaxing. He said he would like them to allow businesses at least one sandwich board sign to be used whenever they want even if they have to take it in at the end of each work day. Mr. Corcoran noted that he never sees anyone come in for a permit for a sandwich board sign. Mr. Matteis suggested allowing one sandwich board sign for the 1st 200 feet of frontage with no fee, and then a permit for any additional signs.

Ms. Stavens said they should consider whether to keep the moratorium in place until after they hold a public hearing or end it now. The Commission also discussed feather signs. Ms. Stavens, Ms. Goetz and Mr. Matteis said they had no issues with them. Ms. Beebe provided a little history on them and why they were prohibited. She said there were concerns about businesses having too many of them and other type "signs" like the inflatable moving men that are used at car lots. There was concern that the whole town could start looking like a used car lot.

Mr. Matteis suggested setting time limits on how long you can have a feather sign up. His concern was that signage decisions not be made unilaterally. Ms. Beebe said that to be fair, when they did a major overhaul

on sign regulations several years ago, they did a great deal of investigation on what other towns did with their signage and they brought in experts to help them craft new regulations.

Ms. Goetz asked Mr. Corcoran if he reviewed their sign regulations. Mr. Corcoran said he did and that they may want to discuss sign lighting for permanent signs as technology has changed, as well as which applications should come before the Commission and which can be handled at the staff level. He said he found their regulations to be quite flexible, noting that most regulations can be waived with four favorable votes from the Commission. He said this may be delving somewhat into the ZBA's authority.

Mr. Matteis said he is afraid they might be opening a can of worms if one Commission can approve a waiver for one business owner and deny the same request of another. He said he favored continuing the moratorium on enforcement until they have good sign regulations in place. Ms. Goetz asked Mr. Corcoran if he has seen any great abuse of the existing regulations. Mr. Corcoran said he had not.

Ms. Goetz asked for an explanation of what content neutrality is. Mr. Corcoran said they can regulate the height, size, and location of signage but not what is written on them. Mr. Powell asked if they can restrict signs from out-of-town businesses. Mr. Corcoran said they can continue to restrict signs placed in the ROW or on town or state property and they can pull them. He said case law still distinguishes between on and off-premise signage so they can restrict them. They can also regulate the number of signs allowed on commercial properties. Ms. Goetz asked that they have their town attorney review their sign regulations.

7.3 Affordable Housing discussion – Both Ms. Stavens and Mr. Powell said they felt the discussion at the joint meeting with the Town Council was productive. They noted that at the meeting, Mr. Corcoran had recommended extending the July deadline to establish an affordable housing fund. Mr. Matteis said he felt they should not change their regulations until the Town Council establishes the fund.

Mr. Corcoran said if they take no action, then the regulations kick in July 1st. He said there are still provisions in the Gateway Design District, but none in the Tolland Village Area.

Mr. Matteis said he also felt their earlier discussions on the fund did not get fully conveyed to the Town Council by the former liaison, so they should give the Town Council more time to digest it. Mr. Corcoran said they would need to have a public hearing to extend the deadline. The Commission asked Town Council liaison Lou Luba how much additional time he felt the Town Council might need. Mr. Luba suggested extending it another six months, pushing it out to January 1.

Mr. Powell said during that time, the Commission will need to address the algorithm so that smaller developers won't be unduly hurt by the program. Mr. Luba said they might also want to look at options for builders and talk to them about how they might want to proceed. Ms. Goetz noted that at the joint meeting, Steve Williams had spoken about building affordable housing and paying a fee and she asked that they make sure he understands it would be one or the other—not both.

Ms. Goetz said that the Economic Development Commission could invite developers to one of their meetings to provide their input. Mr. Corcoran said he has found the EDC to be somewhat reluctant as they have found developers will push back against any type of ask. Ms. Beebe said one of the big problems for developers is that gas service is not available in Tolland.

Ms. Goetz asked if they might want to go back to offering incentives to build affordable housing. She said Ellington offers them. Mr. Matteis said they discussed abatements at the meeting. He said he felt the Town Council could come up with some incentive mechanisms as can the PZC, and he didn't feel they needed to eliminate the fund but come up with a better structure. Ms. Stavens said it should be reachable but also something that builders will consider doing. Ms. Goetz said they have to both allow and encourage it.

8. New Business

8.1 Notice requirements for Text Amendment discussion – Mr. Corcoran referenced Section 20-7, Page 20-4 where notice requirements are listed. Ms. Goetz said she was concerned that residents living adjacent to the TVA were not notified when they were discussing adding an MPOZ to the TVA. She said while they don't have to send individual notices, they do have the option to do so and she was in favor of sending out notices for these types of public hearings.

Mr. Matteis asked when individual notifications are required. He was told that if an applicant applies for a Special Permit or variance, then that applicant needs to send out individual notifications. Mr. Matteis said that if they require an applicant to send out notices for such changes, then the Town should have to do them as well for the same type of applications. Ms. Goetz disagreed. She said these are the Town rules that would be changing. Mr. Powell said he didn't feel certified mail was necessary but that they should send out individual mailings.

Ms. Goetz said they need to simply be aware that this regulation is on the books. She said they need to follow 25-C-2 and decide on a case by case basis whether or not the full mailing should be required. She felt they should vote each time on it as necessary.

8.2 **PZC #22-4, Zoning Regulation Amendment** – Request to amend Section 16-5 Drive-Through Service to remove the requirement that drive-through menu boards are 300 feet from any residential structure, add a requirement to comply with the Tolland Noise Ordinance, and clarify allowed locations for drive-throughs. Applicant: Town of Tolland. *Receive and set public hearing for Monday, May 23, 2022.*

MOTION: Erin Stavens/Joe Matteis to amend Section 16-5 Drive-Through Service to remove the requirement that drive-through menu boards are 300 feet from any residential structure, add a requirement to comply with the Tolland Noise Ordinance, and clarify allowed locations for drive-throughs, setting a public hearing for Monday, May 23, 2022.

The Commission discussed the motion and made some amendments.

MOTION: Joe Matteis/Erin Stavens to amend the previous motion as follows: Request to amend Section 16-5 Drive Through Service to prohibit drive through menu boards within 150 feet of residential zones, clarify allowed locations for drive-thrus, and modify Section 14-3 Table of Uses to allow for drive throughs in the CCZ and new drive throughs in the TVA-GD and drive-thru gas stations as a Special Permit in the GDD, setting a public hearing for Monday, May 23, 2022.

A vote was taken on the amended motion. Ms. Goetz, Ms. Stavens, Mr. Matteis, Ms. Beebe and Mr. Powell voted in favor. Motion carried.

8.3 Follow up with letter to Mr. Taylor – Mr. Powell said he will confirm and check back with Mr. Taylor on the letter sent.

8.4 Amendment for Affordable Housing fund

MOTION: Deb Goetz/Erin Stavens to Amend Section 16-17 and other associated sections to modify the effective date of the affordable housing provisions to January 1st, 2023.

Mr. Matteis, Ms. Stavens, Ms. Goetz, Ms. Beebe and Mr. Powell voted in favor. Motion carried.

9. Reports

9.1 Town Council Liaison – Mr. Luba said there was nothing further to report on the joint session as it was well covered during this meeting. He said the Town Council has passed a budget which will now go to referendum. Mailings will go out shortly. There is a potential for a reduction in the mill rate but an increase in overall spending.

9.2 Economic Development Liaison – No report.

9.3 Capitol Region Council of Governments – Ms. Goetz reported that they met on March 24 and were introduced to their new Executive Director, Matt Hart. They heard a presentation by DeSegregate CT and there was talk about a bill on transit-oriented development that is not going forward at this time. In the future they will be pursuing minimum lot sizes. They will also be looking into the feasibility of combining PZCs & ZBAs.

Ms. Goetz said there was also discussion by some towns on various issues they are dealing with such as storm water and an abundance of distribution centers and warehouses creating problems due to more trucks than docks available. There were also discussions on various towns' efforts to create multi-family housing. Ms. Goetz said Mr. Corcoran needed to complete a form and on it, they need to designate an alternate. Mr. Powell volunteered for the role.

9.4 Zoning Enforcement Report – Mr. Corcoran said they are continuing to deal with a rooster issue. The other issue with too many unregistered vehicles on a property is starting to resolve itself. The property owner has been removing vehicles and is starting to move into compliance.

9.5 Planning Update – Mr. Corcoran reported that the Fieldstone Ridge project has gotten approvals from the Wetlands Commission. They also went before the Design Advisory Board again, and they will be coming before the PZC for their Public Hearing on April 25. The engineer will be doing a final review. The PZC will also be working on sign regulations. Mr. Powell noted he will be out of town on April 25, so Ms. Beebe will be chairing that meeting.

Mr. Matteis asked about the status of the water issue on Kingsbury Avenue. Mr. Corcoran said there continues to be a civil issue between the Senior Moments business, a storage facility and an autobody business. He said further up the road, there had been a site plan approved at 65 Kingsbury Avenue before he started with the Town that required an easement to drain onto a neighboring property. The property owner who granted the easement has since changed his mind about it and that condition may need to be modified. They are working with the engineer and town attorney on it.

On a separate note, Ms. Goetz asked that Mr. Corcoran reference the Section in the regulations they will be discussing when he puts together his Agendas.

10. **Other**: None.

11. **Correspondence**: Ms. Goetz noted she received a copy of the letter Julie Cusson of 10 Lamont Lane read at their last meeting.

12. **Public Participation**: None.

13. **Approval of Minutes** – March 28, 2022 Regular Meeting

    MOTION: Erin Stavens/Joe Matteis to approve the regular meeting minutes of March 28, 2022. Ms. Goetz, Ms. Stavens, Mr. Matteis, Ms. Beebe and Mr. Powell voted in favor. Motion carried.

14. Adjournment

MOTION: Joe Matteis/Deb Goetz to adjourn the meeting and pay the clerk at 9:55 p.m. Mr. Matteis, Ms. Stavens, Ms. Goetz, Ms. Beebe and Mr. Powell voted in favor. Motion carried.

Respectfully submitted,

Annie Gentile
Clerk