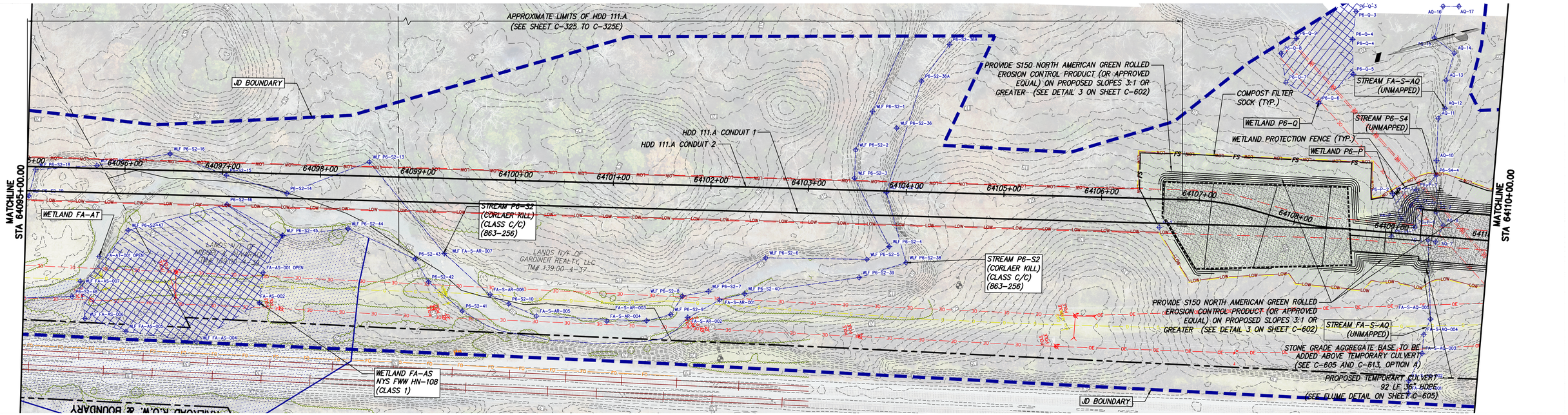
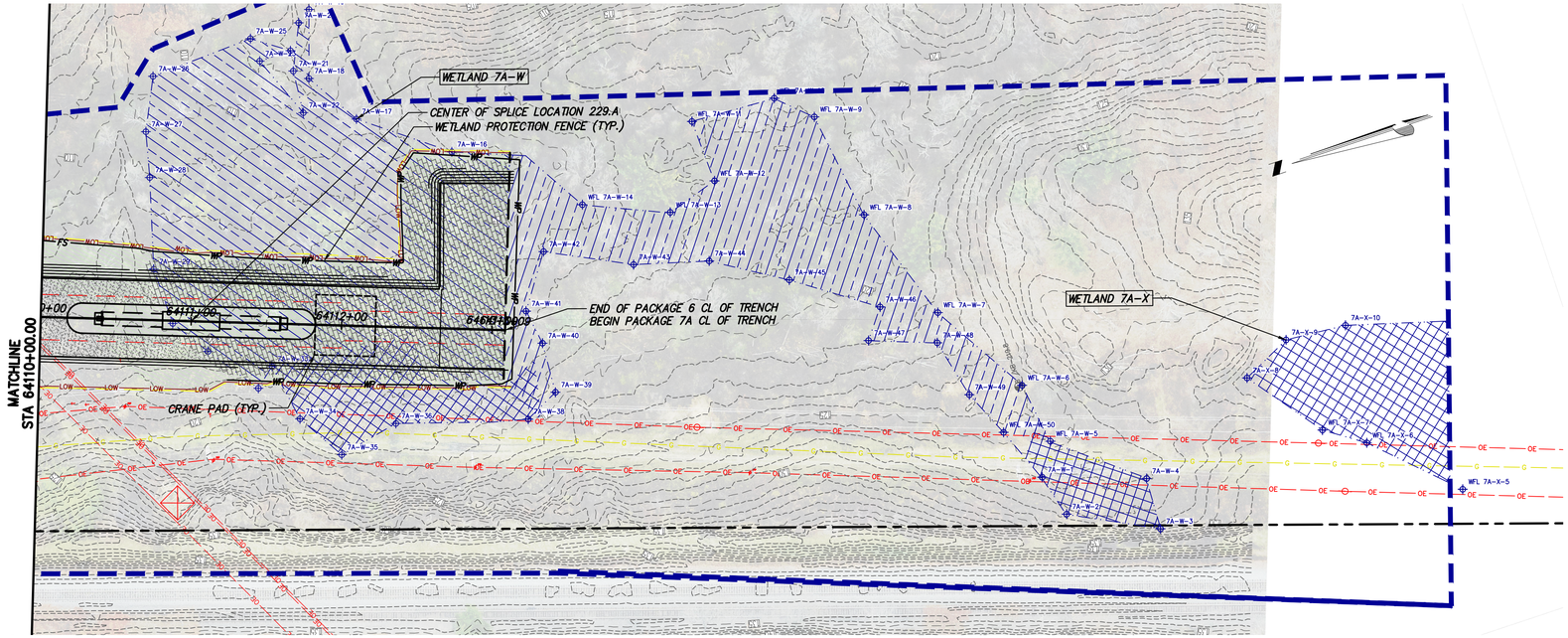


STA. 64095+00 TO STA. 64110+00 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet



STA. 64110+00 TO STA. 64113+17 PLAN VIEW
SCALE: 1" = 50'

0 50 100
Scale in feet

CHPE Champlain Hudson Power Express

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No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
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0	09/29/2023	ISSUED FOR CONSTRUCTION SUBMISSION	TH/AJ	NH

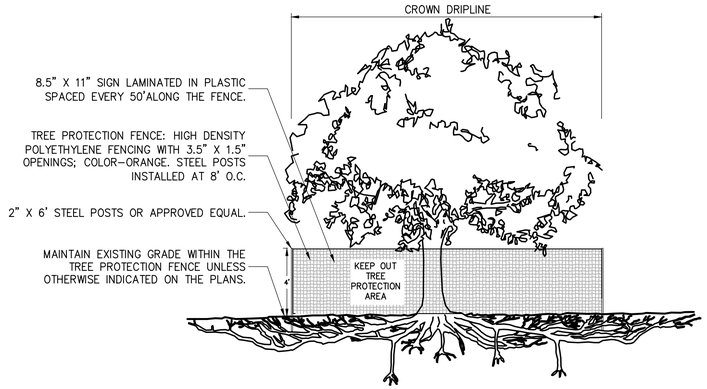
CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL

EROSION AND SEDIMENT CONTROL PLAN
STA. 64095+00 TO STA. 64113+17

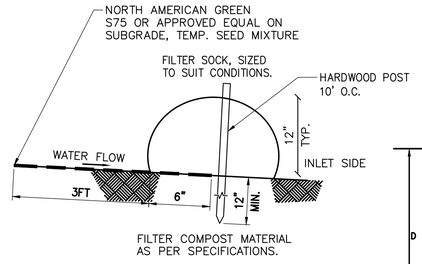
KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	**C-438**

DRAWN BY: TH/AJ | DESIGNED BY: MK | APPROVED BY: NH | SCALE | DATE 9/29/2023 | REV. NO. 0 | SH.NO. OF

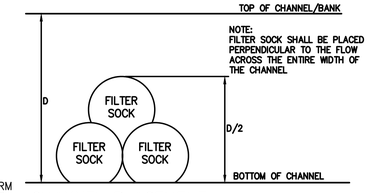


NOTES:
1. CONTRACTOR TO MAINTAIN INTEGRITY OF CONSTRUCTION FENCE FOR DURATION OF PROJECT.
2. NO PRUNING SHALL BE PERFORMED EXCEPT BY APPROVED ARBORIST.
3. NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING INCLUDING DURING FENCE INSTALLATION AND REMOVAL.
4. SEE EROSION CONTROL PLANS FOR LOCATIONS OF TREE PROTECTION AREAS.

1 TREE PROTECTION
NOT TO SCALE

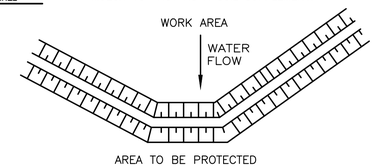


NOTES:
1. ALL MATERIAL TO MEET MANUFACTURER SPECIFICATIONS.
2. ALL FILTER SOCKS SHALL BE 12" DIAMETER OR LARGER.
3. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTER BERM IN A FUNCTIONAL CONDITION AT ALL TIMES AND IT SHALL BE ROUTINELY INSPECTED.
4. WHERE THE BERM REQUIRES REPAIR, IT WILL BE ROUTINELY REPAIRED.
5. THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE BERM WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE BERM, OR AS DIRECTED BY THE OWNERS.
6. THE COMPOST FILTER BERM WILL BE REMOVED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE OWNERS.
7. INSTALL PERPENDICULAR TO FLOW.



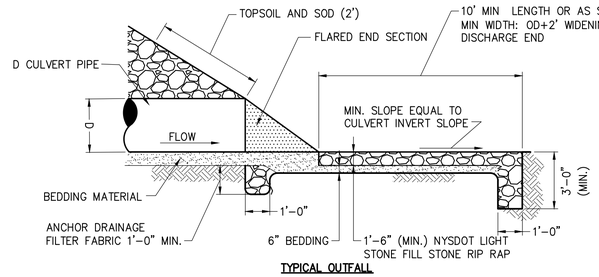
CHANNEL PLACEMENT

MAINTENANCE NOTES:
1. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
2. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES $\frac{1}{3}$ OF THE EXPOSED HEIGHT OF THE PRACTICE AND DISPOSED OF IN ACCORDANCE WITH THE SWPPP.
3. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED IN THE MANNER REQUIRED BY THE MANUFACTURER OR REPLACED WITHIN 24 HOURS OF INSPECTION NOTIFICATION.
4. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTO–DEGRADABLE FILTER SOCKS AFTER 1 YEAR. POLY–PROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
5. UPON STABILIZATION OF THE AREA CONTRIBUTORY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK SHALL BE REMOVED. FOR REMOVAL THE MESH CAN BE CUT AND COMPOST SPREAD AS AN ADDITIONAL MULCH TO ACT AS A SOIL SUPPLEMENT.

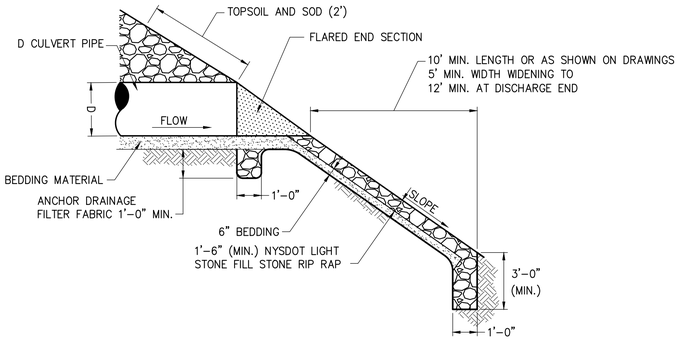


AT GRADE PLACEMENT

2 COMPOST FILTER SOCK DETAIL
SCALE: N.T.S.

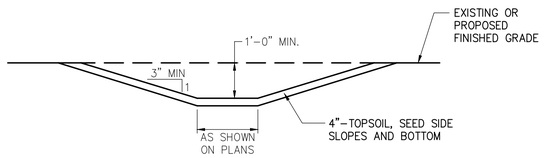


TYPICAL OUTFALL



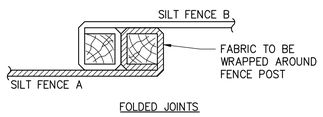
TYPICAL OUTFALL ON SLOPE

4 TYPICAL CULVERT OUTFALL RIP RAP
SCALE: N.T.S.



5 TYPICAL GRASS DRAINAGE SWALE
SCALE: N.T.S.

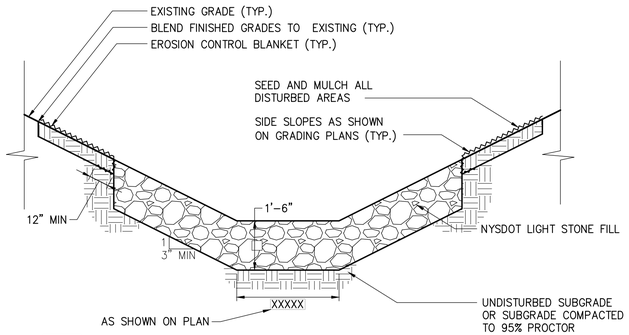
ELEVATION



FOLDED JOINTS

NOTES:
1. TIE FABRIC TO WIRE FENCE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. IF EXTRA STRENGTH FABRIC (GREATER THAN 50#/INCH) IS USED, WIRE CAN BE DELETED IF POST SPACING IS REDUCED TO 6' O.C.
3. AT THE ENDS OF THE FENCING THE FIRST 20' SHALL BE TURNED UP THE SLOPE 2'.
4. POSTS SHOULD BE INCLINED TOWARD THE DIRECTION FLOW CAME FROM.
5. OVERLAP FABRIC A MINIMUM OF 6" AND FOLDED AT JOINTS. ATTACH FILTER FABRIC TO STAKES ALLOWING EXTENSION INTO TRENCH AS SHOWN; SECURE TO STAKES AS NOTED.
6. THE MAXIMUM AREA OF RUNOFF PER 100LF. OF FENCE SHALL NOT EXCEED 0.25 ACRES.
7. MAINTENANCE SHALL BE PERFORMED AS NECESSARY. THE FENCING SHALL BE CHECKED AFTER EVERY STORM TO ENSURE THEIR PROPER FUNCTIONING.
8. WHEN FENCE IS NO LONGER NEEDED, THE ACCUMULATED SILT, THE POSTS AND FABRIC SHALL BE REMOVED AND TRENCH BACK FILLED WITH TOPSOIL AND SEEDED.
9. FENCING SHOULD BE PLACED AS SHOWN ON THE DRAWING OR IF NOT SHOWN, 10' BEYOND THE TOE OF THE SLOPE AND AT A SPACING IN ACCORDANCE WITH THE TABLE.
10. EXCAVATE TRENCH AS PER DETAIL AND SET POSTS AT 10' O.C.
11. BACKFILL WITH COMPACTED, EXCAVATED SOIL FROM TRENCH.

3 SILT FENCE
SCALE: N.T.S.



6 LIGHT STONE–LINED DRAINAGE CHANNEL
SCALE: N.T.S.

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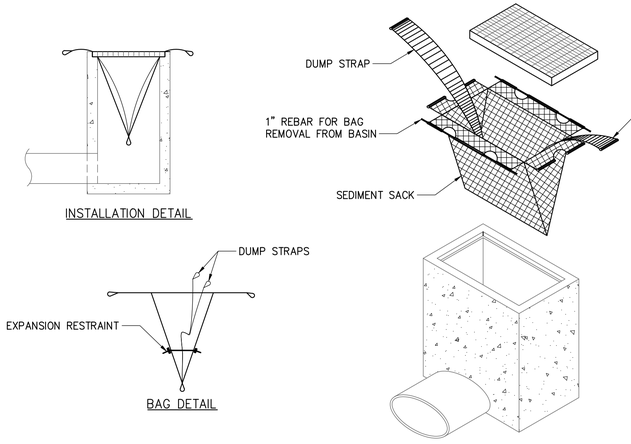
CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL
EROSION AND SEDIMENT CONTROL DETAILS

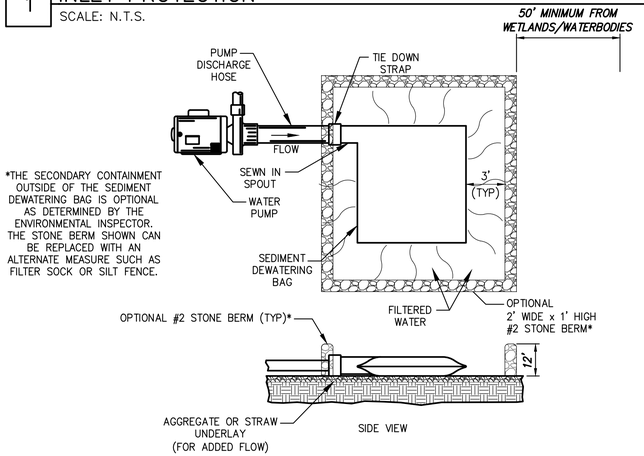
KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	**C-601**

DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. OF



NOTES:
1. SEDIMENT SACK IS TO BE MADE WITH A POLYPROPYLENE WOVEN MONOFILAMENT FABRIC.
2. SEDIMENT SACK SHALL RESIST DEGRADATION DUE TO ULTRAVIOLET LIGHT, BE RESISTANT TO SOIL CHEMICALS, MILDEW AND INSECTS.
3. WHEN RESTRAINT CORD IS NO LONGER VISIBLE THE SACK SHOULD BE EMPTIED.
4. TO REMOVE USE (2) PIECES OF 1" DIAMETER REBAR AND PLACE THROUGH THE LIFTING LOOPS ON EACH SIDE OF THE SACK TO FACILITATE LIFTING.
5. TO EMPTY PLACE UNIT IN APPROVED DISPOSAL AREA. PLACE REBAR THROUGH THE LIFT STRAPS ON THE BOTTOM AND LIFT. CLEAN OUT AND RINSE SACK PRIOR TO PLACEMENT BACK IN THE BASIN.
6. CONTRACTOR MAY USE AN APPROVED EQUAL PER THE NYSDEC EROSION AND SEDIMENT CONTROL BLUE BOOK.

1 INLET PROTECTION
SCALE: N.T.S.

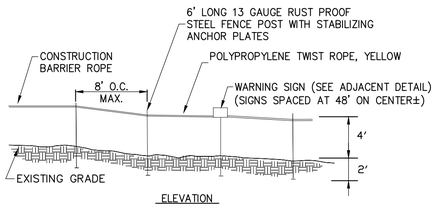


NOTE: THE SEDIMENT DEWATERING BAG WILL BE MANUFACTURED IN THE U.S.A. FROM A NONWOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS:

SEDIMENT DEWATERING BAG SPECIFICATIONS

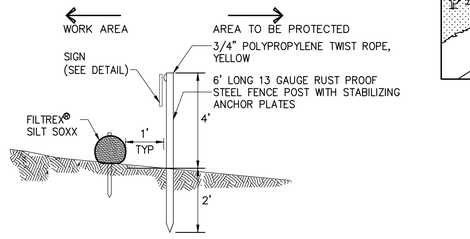
Mechanical Properties	Test Method	Units	MARV
Grab Tensile Strength	ASTM D 4632	kN (lbs)	0.9 (205) x 0.9 (205)
Grab Tensile Elongation	ASTM D 4632	%	50 x 50
Puncture Strength	ASTM D 4833	kN (lbs)	0.58 (130)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	2618 (380)
Trapezoid Tear Strength	ASTM D 4533	kN (lbs)	0.36 (80) X 0.36 (80)
UV Resistence	ASTM D 4355	%	70
Apparent Opening Size	ASTM D 4751	Mm (US Std Sieve)	0.180 (80)
Flow Rate	ASTM D 4491	1/min/m² (gal/min/ft²)	3866 (95)
Permittivity	ASTM D 4491	Sec⁻¹	1.2

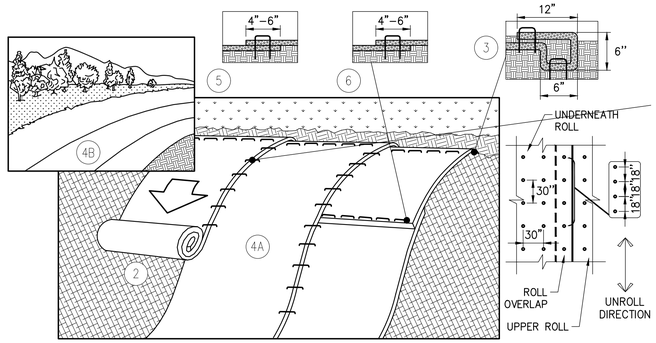
4 SEDIMENT DEWATERING BAG
SCALE: N.T.S.



1. CONSTRUCTION BARRIER FENCE SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS PRIOR TO BEGINNING ANY WORK ADJACENT TO THESE AREAS.
2. THE CONTRACTOR SHALL INSTALL AT THE BEGINNING OF THE CONTRACT, AND MAINTAIN THROUGHOUT ITS DURATION.

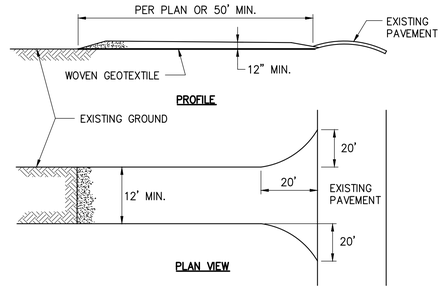
2 WETLAND PROTECTION FENCE
SCALE: N.T.S.





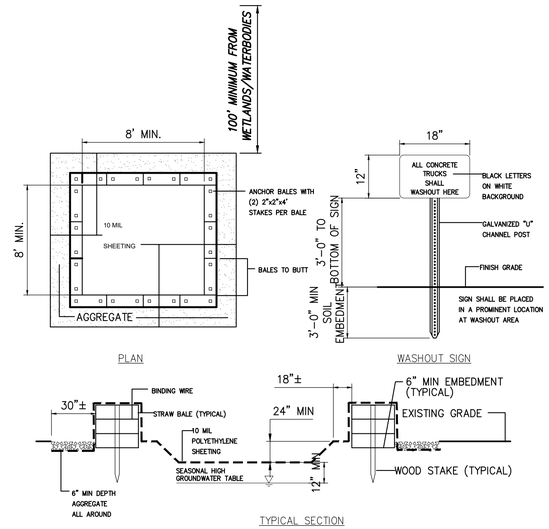
NOTE:
1. EROSION CONTROL BLANKETS TO BE INSTALLED ON SLOPES 3:1 OR GREATER (TYP.)
2. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: DO NOT SEED PREPARED AREA. INSTALL WITH PAPER SIDE DOWN. INSTALL ACCORDING TO MANUFACTURERS INSTRUCTIONS.
3. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP x 6" WIDETRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
4. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
5. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"–5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
6. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPING AREA APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.
7. TO PROPERLY SECURE THE BLANKETS IN LOOSE SOIL CONDITIONS, THE USE OF STAPLES OR STAKES GREATER THAN 6" MAY BE NECESSARY.

3 EROSION CONTROL BANK STABILIZATION DETAIL
SCALE: N.T.S.



1. STONE SIZE–USE AASHTO M43 SIZE 3 COARSE AGGREGATE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS – NOT LESS THAN 12".
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ACCESS TO SITE.
5. WOVEN GEOTEXTILE FABRIC WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. EXISTING ROAD SIDE DRAINAGE SHALL BE MAINTAINED.
7. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
8. MAINTENANCE–THE ACCESS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT OR STONE SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
9. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
10. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

5 STABILIZED CONSTRUCTION ACCESS
SCALE: N.T.S.



MAINTENANCE NOTES:
1. ALL CONCRETE WASHOUT FACILITIES SHALL BE INSPECTED DAILY. DAMAGED OR LEAKING FACILITATES SHALL BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY. EXCESS RAINWATER THAT HAS ACCUMULATED OVER HARDENED CONCRETE SHALL BE PUMPED TO A STABILIZED AREA SUCH AS A GRASS FILTER STRIP.
2. ACCUMULATED HARDENED MATERIAL SHALL BE REMOVED WHEN 75% OF THE STORAGE CAPACITY OF THE STRUCTURE IS FILLED. ANY EXCESS WASH WATER SHALL BE PUMPED INTO A CONTAINMENT VESSEL AND PROPERLY DISPOSED OF OFF SITE.
3. DISPOSAL OF THE HARDENED MATERIAL SHALL BE OFF-SITE IN A CONSTRUCTION/DEMOLITION LANDFILL.
4. THE PLASTIC LINER SHALL BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.
5. INSPECT THE PROJECT SITE FREQUENTLY TO ENSURE THAT NO CONCRETE DISCHARGES ARE TAKING PLACE IN NON-DESIGNATED AREAS.
6. LOCATION(S) TO BE DETERMINED IN THE FIELD BY THE OWNER'S REPRESENTATIVE
7. CONCRETE WASHOUTS SHALL NOT BE LOCATED WITHIN 200' OF ANY KNOWN WELL.

6 CONCRETE WASHOUT AREA
SCALE: N.T.S.

CHPE Champlain Hudson Power Express

Kiewit

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STATE OF NEW YORK · DANIEL DALE PAYNE · 103692 · LICENSED PROFESSIONAL ENGINEER

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL
EROSION AND SEDIMENT CONTROL DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	**C-602**

DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. OF

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DEWATERING PLAN:
CONSTRUCTION ACTIVITY WITHIN THE STREAM SHALL BE PROHIBITED BETWEEN OCTOBER 1 THROUGH MAY 31 FOR ALL STREAMS DESIGNATED AS TROUT WATER OR SUITABLE FOR TROUT SPAWNING.

DEWATERING PROCEDURES:
TRAPPED WATER WITHIN THE TRENCH SHALL BE DISCHARGED INTO A PORTABLE SEDIMENT TANK OR SEDIMENT FILTER BAGS LOCATED AWAY FROM THE WATERBODY TO PREVENT SILT–LADEN WATER FROM FLOWING INTO THE WATERBODY.

DAM AND PUMP CROSSING PROCEDURES:
BEFORE THE INITIATION OF ANY IN–STREAM ACTIVITIES, ALL MATERIAL ASSOCIATED WITH THE DAM AND PUMP SITE SET–UP MUST BE ON–HAND. THESE MATERIALS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

A) WATER BARRIERS
B) DOWNSTREAM SPLASH PLATE
C) PUMPS (PRIMARY AND SECONDARY) AND HOSES
D) FUEL FOR PUMPS (STORED AT LEAST ONE HUNDRED (100) FEET FROM WATERBODY)
E) SPILL PREVENTION AND CONTROL MATERIALS (INCLUDING SECONDARY CONTAINMENT FOR PUMPS LOCATED WITHIN ONE HUNDRED (100) FEET OF WETLAND OR WATERBODY)

ONCE THE NECESSARY MATERIALS ARE ON–LOCATION, SITE SET–UP MAY BEGIN. THE FIRST STEP IS TO SELECT AN APPROPRIATE LOCATION FOR THE PUMP INTAKE HOSE(S) TO BE POSITIONED. DEPENDING UPON THE CHANNEL CHARACTERISTICS, EITHER A NATURALLY OCCURRING DEEP SPOT OR CHANNEL WILL BE SELECTED AS A "SUMP" OR A SUMP MAY NEED TO BE CREATED TO PROVIDE SUFFICIENT WATER DEPTH FOR THE SCREENED HOSE INTAKE(S). IF A NATURAL SUMP IS NOT AVAILABLE FOR THE INTAKE HOSE, AN IN–STREAM SUMP WILL BE CREATED BY EXCAVATING WITHIN THE STREAM CHANNEL AND SURROUNDING THE EXCAVATION USING SANDBAGS.

THE FOLLOWING BMPS SHALL BE IMPLEMENTED AT THE INTAKE OR SUMP SITE:

A) ALL EQUIPMENT, MATERIAL, AND CONSTRUCTION PERSONNEL NECESSARY FOR THE CROSSING SHALL BE ON– SITE BEFORE SET–UP BEGINS
B) UPON COMPLETION OF THE WATERBODY CROSSING ANY SANDBAGS UTILIZED FOR A SUMP SHALL BE REMOVED AND THE STREAM CHANNEL RESTORED TO PRE–CONSTRUCTION CONDITION
C) THE SUMP SHALL BE OF SUFFICIENT DEPTH TO PREVENT THE ENTRAINMENT OF EXCESSIVE AMOUNTS OF SEDIMENT INTO THE SUMP INTAKE, HOSE AND PUMP

DURING THE ASSEMBLY OF THE UPSTREAM AND DOWNSTREAM WATER BARRIERS, THE PUMPING NETWORK SHALL BE SETUP TO BEGIN THE TRANSFER OF WATER AROUND THE CONSTRUCTION WORK AREA.

THE PUMP INTAKE AND DISCHARGE HOSES SHALL BE APPROPRIATELY PLACED AND OF SUFFICIENT LENGTH, BASED UPON SITE–SPECIFIC CONDITIONS. THE INTAKE HOSE SHALL BE SCREENED TO PREVENT THE ENTRAINMENT OF FISH. DISCHARGE HOSES SHALL BE PROVIDED WITH SUPPORT OVER THE DITCH–LINE AS NEEDED TO PREVENT EXCESSIVE SAGGING AND REDUCTION OF PUMPING CAPACITY.

THE NUMBER AND SIZES OF PUMPS TO BE USED AT ANY CROSSING SHALL BE DEPENDENT UPON THE VOLUME OF WATER FLOWING AT THE TIME THE CROSSING IS MADE.

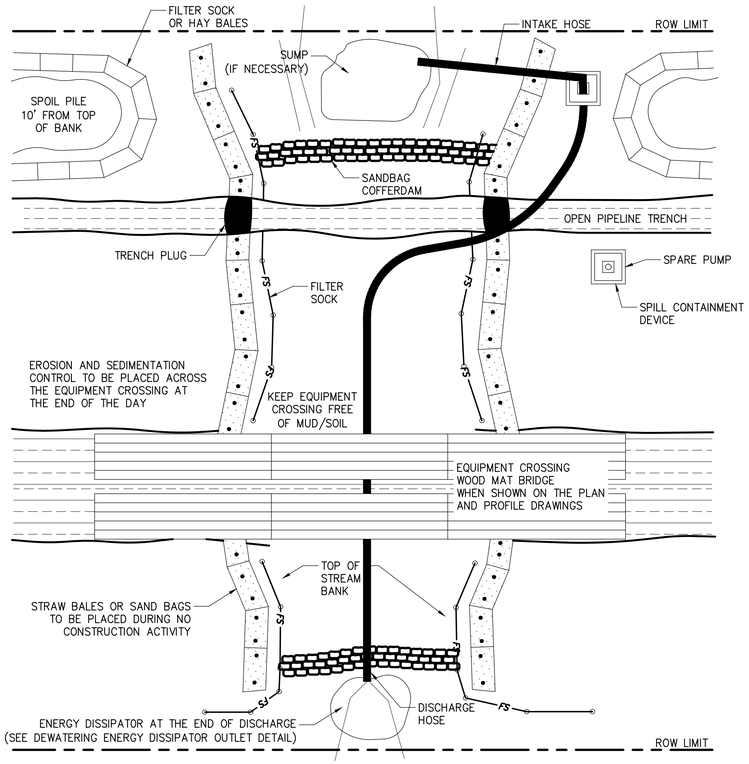
BMPS TO BE IMPLEMENTED DURING PUMP SET–UP INCLUDE:

D) PUMPS SHALL BE FUELED PRIOR TO PLACING THEM IN POSITION
E) IF IT IS NECESSARY TO REFUEL DURING THE PUMP OPERATION, EXTRA CARE SHALL BE TAKEN TO AVOID SPILLAGE AND SPILL CONTROL MATERIALS WILL BE READILY AVAILABLE ON SITE
F) SECONDARY CONTAINMENT SHALL BE PLACED UNDER THE PUMPS AS AN ADDITIONAL PRECAUTIONARY MEASURE TO PROTECT AGAINST ACCIDENTAL LEAKAGE OR SPILL
G) FUEL FOR FILLING THE PUMPS SHALL NOT BE STORED WITHIN ONE HUNDRED (100) FEET OF THE WATERBODY
H) THE INTAKE HOSE SHALL BE SCREENED TO PREVENT THE ENTRAINMENT OF FISH
I) THE END OF THE DISCHARGE HOSE SHALL BE MOUNTED UPON A SPLASH PLATE OR SIMILAR DEVICE OR IN A MANNER THAT WILL DISSIPATE THE ENERGY OF THE DISCHARGING WATER AND REDUCE OR ELIMINATE STREAMBED SCOUR
J) IF HOSES CROSS THE TEMPORARY ACCESS ROAD, THEY SHALL BE PROTECTED FROM TRAVELING EQUIPMENT
K) PUMP(S) SHALL BE OF SUFFICIENT CAPACITY TO TRANSFER TWICE THE CAPACITY OF THE ENTIRE STREAMFLOW AROUND THE CONSTRUCTION WORK AREA
L) RESERVE OR BACKUP PUMP(S) SHALL BE KEPT ON SITE AT ALL TIMES.

WATER BARRIER INSTALLATION:
BETWEEN THE PUMP HOSE INTAKE OR SUMP HOLE AREA AND THE TRENCH, AS WELL AS DOWNSTREAM OF THE TRENCH, DAMS OF RELATIVELY IMPERVIOUS MATERIAL SHALL BE INSTALLED. THE UPSTREAM DAM SHALL BE COMPLETED FIRST. EVERY REASONABLE EFFORT SHALL BE MADE TO CONSTRUCT THE DAMS AS WATER TIGHT AS POSSIBLE.

THE FOLLOWING BMPS WILL BE IMPLEMENTED DURING WATER BARRIER INSTALLATION:

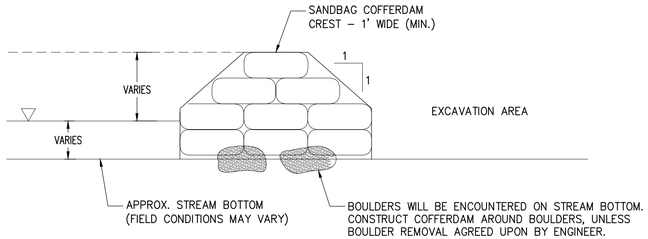
A) DAMS SHALL BE CONSTRUCTED OF EITHER SANDBAGS, WATER BLADDERS, STEEL PLATES, PORTA–DAMS OR EQUIVALENT OR "JERSEY BARRIERS" AND PLASTIC SHEETING OR A COMBINATION THEREOF
B) THE DAMS SHALL BE CONSTRUCTED OF SUFFICIENT HEIGHT TO ALLOW ADEQUATE FREEBOARD UNDER REASONABLY EXPECTED WATER LEVELS OR FLOWS AND PROVIDE FOR SOME IMPOUNDMENT OF WATER
C) PRIOR TO COMPLETION OF THE DAMS, THE PUMP(S) MUST BE STARTED IN ORDER TO PROVIDE DOWNSTREAM FLOW OF WATER AROUND THE CONSTRUCTION WORK AREA
D) THE RATE OF PUMPING SHALL BE MONITORED TO MINIMIZE DRAINING OF THE INTAKE SUMP AND THE RESULTING CESSATION IN FLOW. ALTERNATIVELY, PUMPING SHALL BE MONITORED AND INCREASED AS NECESSARY TO PREVENT OVERTOPPING OF THE DAMS.



1 DAM AND PUMP AROUND STREAM CROSSING
SCALE: N.T.S.

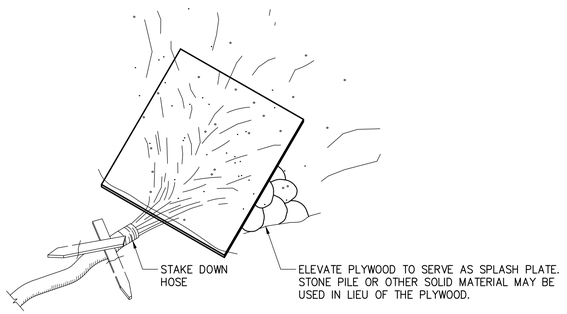
GENERAL SEQUENCE:

1. SCHEDULE CONSTRUCTION DURING LOW FLOW PERIOD, IF POSSIBLE.
2. SET UP PUMP AND HOSE AS SHOWN, OR USE PRACTICAL ALTERNATIVES. PUMP SHOULD HAVE TWICE THE PUMPING CAPACITY OR ANTICIPATED FLOW. HAVE STANDBY PUMP ON SITE. DEPENDING ON STREAM FLOW,DIG SUMP HOLE TO CONCENTRATE WATER AT INTAKE.
3. INSTALL UPSTREAM DAM COMPOSED OF SANDBAGS, METAL PLATING OR A COMBINATION OF BOTH. INSTALL DOWNSTREAM DAM, IF REQUIRED, TO KEEP STREAM BED DRY.
4. AFTER DAMS ARE IN PLACE, IT MAY BE NECESSARY TO USE ADDITIONAL PUMPS TO HANDLE STREAM FLOW.
5. EXCAVATE TRENCH AND LOWER IN PIPE UNDER HOSE. MOVE HOSE AS REQUIRED OR DISCONNECT, IF TEMPORARY FLOW BLOCKAGE IS ACCEPTABLE. BACKFILL TRENCH.
6. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM. KEEP PUMP RUNNING TO MAINTAIN STREAM FLOW.
7. RESTORE STREAM BANKS AND APPROACHES FOR A MINIMUM DISTANCE OF AT LEAST 50 FEET FROM THE STREAM EDGES AND PERMANTENTLY STABLIZE WITHIN 1 DAY OF INITIAL RESTORATION.

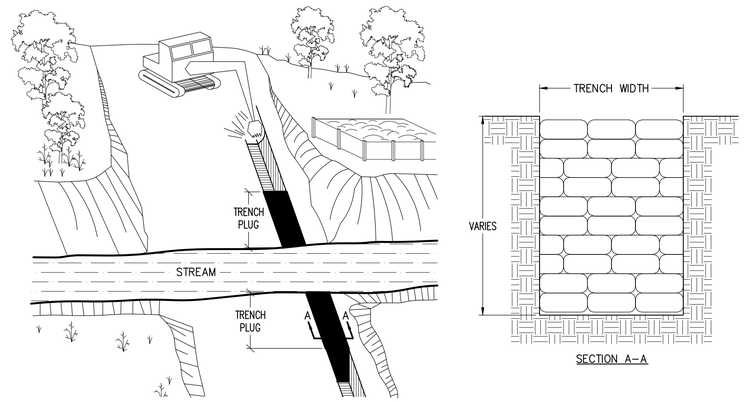


2 SANDBAG COFFERDAM DETAIL
SCALE: N.T.S.

NOTES:
1. SAND BAGS SHALL BE FILTER FABRIC TYPE AND BE DOUBLE BAGGED.
2. PORTADAM, BY PORTADAM, INC. AND AQUADAM, BY AQUADAM, INC. SHALL BE CONSIDERED ACCEPTABLE SUBSTITUTES TO SAND BAGS.



3 DEWATERING ENERGY DISSIPATOR OUTLET DETAIL
SCALE: N.T.S.



4 TRENCH PLUG DETAIL
SCALE: N.T.S.

NOTES:
1. SAND BAGS SHALL BE FILTER FABRIC TYPE AND BE DOUBLE BAGGED.
2. PORTADAM, BY PORTADAM, INC. SHALL BE CONSIDERED ACCEPTABLE SUBSTITUTE TO SAND BAGS.

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Kiewit

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STATE OF NEW YORK · DANIEL DALE TAWNEY · LICENSED PROFESSIONAL ENGINEER · 103692

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL
EROSION AND SEDIMENT CONTROL DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	C-603

DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. | OF

APPLICATION NOTES:

A. THE PRIMARY PURPOSE OF A CHECK DAM IS TO REDUCE EROSION IN A CHANNEL BY REDUCING FLOW VELOCITY IN THE CHANNEL.
B. CHECK DAMS WILL CAPTURE SEDIMENT THAT FALLS OUT OF SUSPENSION BEHIND THE UPSTREAM SIDE OF THE CHECK DAM DUE TO DECREASED VELOCITY.
C. CHECK DAMS ARE NOT INTENDED TO, AND WILL NOT, FILTER SEDIMENT FROM TURBID WATER.
D. SLOPES EXCEEDING 10% SHALL INCLUDE A CHANNEL PROTECTIVE LINING.
E. AVOID PLACEMENT OF STONE CHECK DAMS WITHIN ROADWAY CLEAR ZONES, INSTEAD CONSIDER SEDIMENT FILTER LOG CHECK DAMS OR PREFABRICATED CHECK DAM.
F. CHECK DAMS SHALL BE ANCHORED IN THE CHANNEL BY A CUT OFF TRENCH 1.5 FEET WIDE AND 0.5 FEET DEEP AND LINED WITH FILTER FABRIC TO PREVENT SOIL MIGRATION.
G. THE UPSTREAM DAM TOE SHALL BE AT EQUAL ELEVATION TO THE DOWN STREAM DAM CREST.

GENERAL NOTES:

1. MAXIMUM DRAINAGE AREA CONTRIBUTING TO TEMPORARY STONE CHECK DAM SHALL BE 2 ACRES.
2. MEASURES SHALL BE INSPECTED EVERY (7) CALENDAR DAYS AND SHOULD BE INSPECTED AFTER EACH RUNOFF EVENT. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED.
3. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE-HALF OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF AS UNSUITABLE MATERIAL.
4. COARSE AGGREGATE FACING MATERIAL FOR THE STONE CHECK DAM SHALL MEET THE GRADATION REQUIREMENTS OF SIZE DESIGNATION #1 OR #2 OF TABLE 703-4 FROM SECTION 703-02 OF THE NYSDOT STANDARD SPECIFICATIONS. STONE FILLING CORE MATERIAL FOR THE STONE CHECK DAM SHALL MEET THE GRADATION REQUIREMENTS OF LIGHT STONE FILLING.
5. THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM SHALL BE PROTECTED FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. DURING INSPECTIONS ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCE BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
7. REFER TO SECTION 733-21 OF THE NYSDOT STANDARD SPECIFICATIONS FOR LIGHT STONE FILL GRADATION.

STONE CHECK DAM PLACEMENT INTERVAL *	
DITCH SLOPE	PLACEMENT INTERVAL (I) (BASED ON 2" HEIGHT)
1 %	200'
2 %	100'
3 %	66'
4 %	50'
5 %	40'
6 %	33'
8 %	25'
10 %	20'

* I = H / S

WHERE:

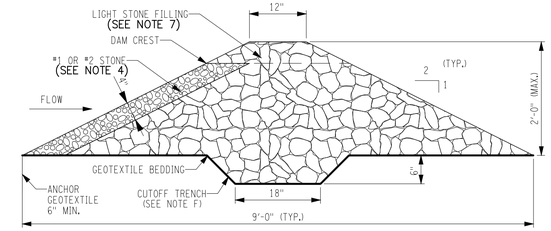
I = CHECK DAM SPACING INTERVAL

H = CHECK DAM HEIGHT

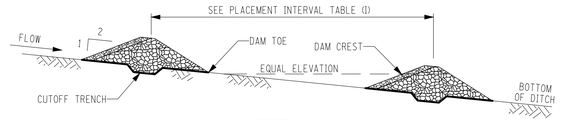
S = CHANNEL SLOPE

TEMPORARY CHECK DAM VOLUMES	
DITCH SIDE SLOPE	VOLUME (CY)
1 : 2	3.45 CY ±
1 : 3	4.25 CY ±
1 : 4	5.43 CY ±
1 : 6	7.81 CY ±

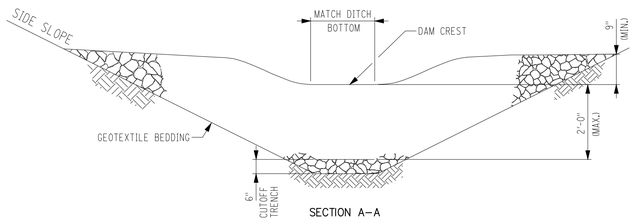
BASED ON V SHAPED DITCH SECTION
FOR TRAPEZOIDAL DITCH, ADD
1.70 CUBIC YARD / YARD OF DITCH WIDTH



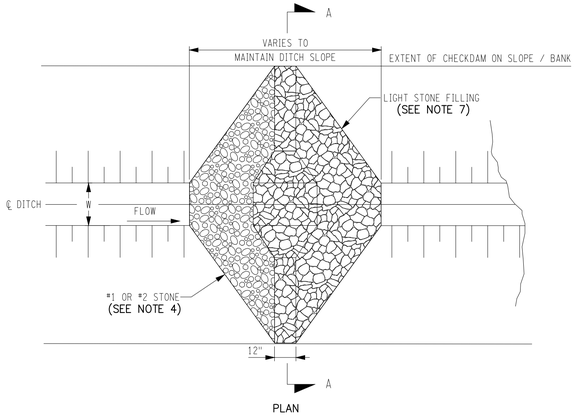
CROSS SECTION



PROFILE



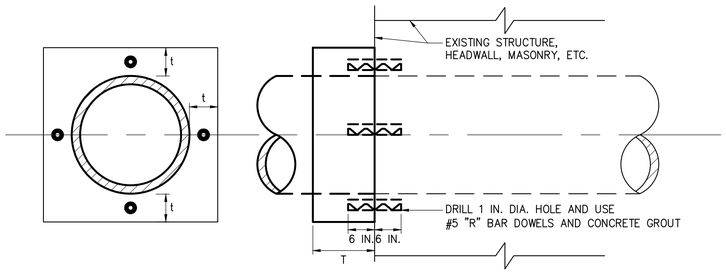
SECTION A-A



PLAN

1 TEMPORARY CHECK DAM DETAIL

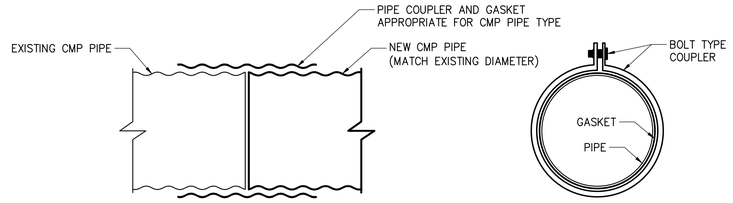
SCALE: N.T.S.



INSIDE DIA. IN.	"t" IN.	"T" IN.	NO. DOWLES REQUIRED *
THRU 19	9	12	4
20 – 29	9	12	4
30 – 39	9	12	6
40 – 49	9	12	8
50 – 59	12	18	8
60 – 69	12	18	8
70 – 79	12	18	10
80 – 89	12	18	12

* SPACE EVENLY AROUND PIPE AS INDICATED.

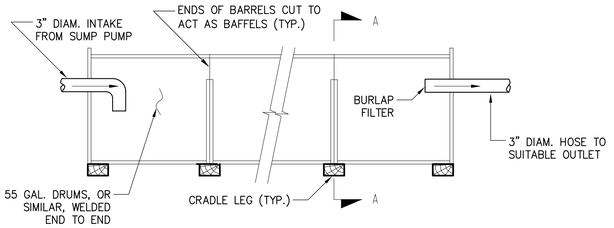
CONCRETE COLLARS FOR PIPE EXTENSIONS

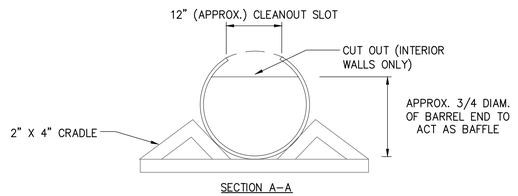


CORRUGATED METAL PIPE EXTENSIONS

2 PIPE EXTENSION DETAIL

SCALE: N.T.S.





SECTION A-A

CONSTRUCTION SPECIFICATIONS

1. CLEAN OUT THE SEDIMENT TANK WHEN ONE THIRD (1/3) FILLED WITH SILT.
2. STEEL DRUMS ARE USED AS AN EXAMPLE DUE TO THEIR READY AVAILABILITY. ANY TANKS MAY BE USED, PROVIDING THAT THE VOLUME REQUIREMENTS ARE MET.
3. ALL SEDIMENT COLLECTED IN THE TANK SHALL BE DISPOSED OF IN A SEDIMENT TRAPPING DEVICE OR AS APPROVED BY THE INSPECTOR.

3 PORTABLE SEDIMENT TANK

SCALE: N.T.S.

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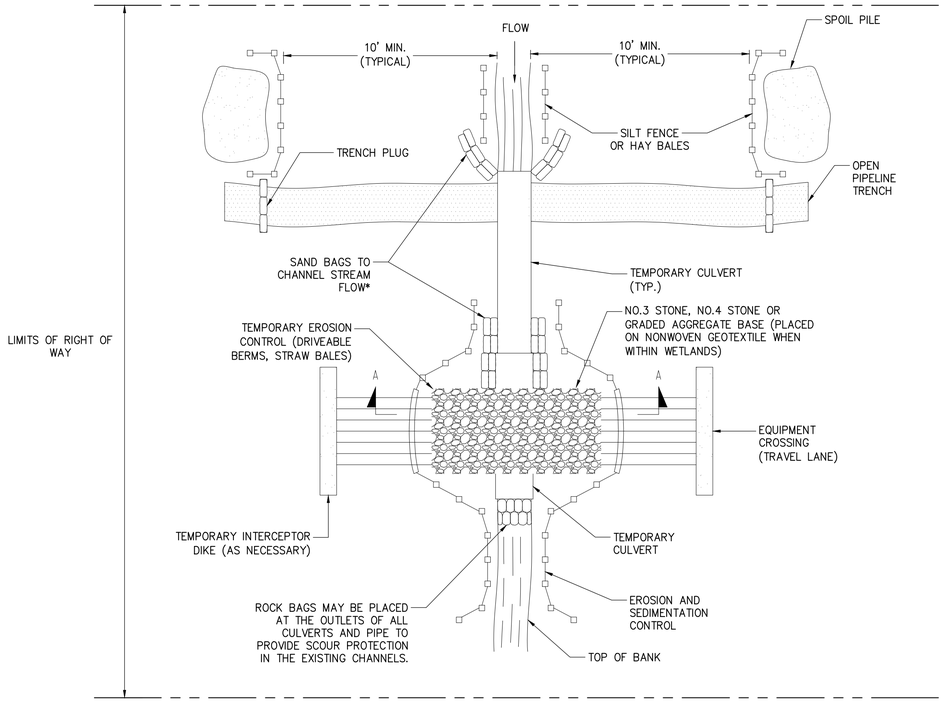
CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL

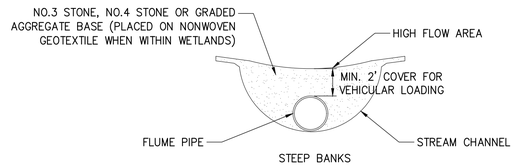
EROSION AND SEDIMENT CONTROL DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	C-604

DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. | OF



PLAN VIEW



SECTION A–A

1 FLUMED CROSSING DETAIL

SCALE: N.T.S.

* IF WELDED PIPE IS USED SAND BAGS AT JOINTS NOT REQUIRED. ACTUAL NUMBERS OF FLUMES AND CULVERT PIPE REQUIRED TO BE DETERMINED BY STREAM WIDTH.

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SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL

EROSION AND SEDIMENT CONTROL DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	**C-605**

DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. OF

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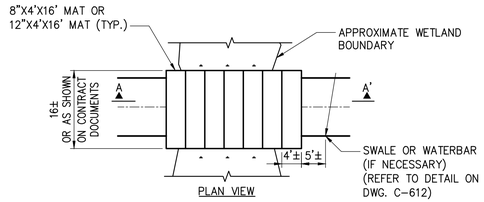

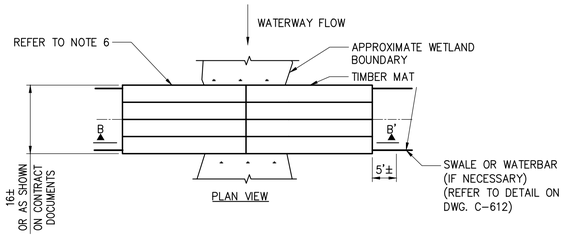

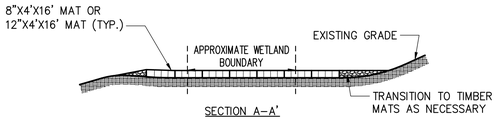

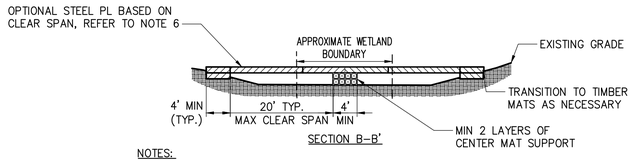

NOTES:
1. TIMBER MATS SHOULD BE INSTALLED IN WETLANDS AND OTHER AREAS IF NECESSARY TO PREVENT RUTTING.
2. FOR CROSSINGS WITH LARGER SPANS THE CONTRACTOR SHALL CONSULT WITH THE TEMPORARY STRUCTURES AND CONSTRUCTION DEVICES ENGINEER.
3. TIMBER MAT SURFACE SHOULD BE LEVEL TO PREVENT EQUIPMENT AND VEHICLES FROM SLIDING OFF DURING MUDDY OR ICING CONDITIONS, AND PREVENT TIMBERS FROM BREAKING.
4. SEDIMENT TRACKED ONTO TIMBER MATTING SHOULD BE REMOVED AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING WETLAND DURING RAIN EVENTS. SEDIMENT SHOULD BE REMOVED TO A STABILIZED SOIL STOCKPILE OR OTHER APPROVED LOCATION.
5. PERIMETER EROSION AND SEDIMENT CONTROLS ARE REQUIRED TO BE INSTALLED PRIOR TO PLACING TIMBER MATTING.
6. UNLESS PERMITTED FROM REMOVAL, STUMPS WITHIN THE WETLAND SHOULD REMAIN. THIS MAY REQUIRE ADDITIONAL TIMBERS TO BRIDGE ABOVE.
7. UPON REMOVAL OF TIMBER MATTING ALL SPLINTERED WOOD SHOULD BE REMOVED. IF EXPOSED SOILS ARE PRESENT STRAW MULCH SHOULD BE APPLIED.
8. ALL EQUIPMENTS SHOULD MAINTAIN A MINIMUM OF 2 FT SETBACK FROM EDGE OF THE MATS WHILE CROSSING.
9. SINGLE OR MULTIPLE LAYERS OF MATS SHALL BE PLACED BASED ON EXISTING SOIL CONDITIONS.

NOTES:
1. IN-STREAM EXCAVATION SHOULD BE COMPLETED IN ACCORDANCE WITH "TEMPORARY ACCESS WATERWAY CROSSING" ON PAGE 2.32 OF THE 2016 NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (OR NEWEST VERSION) AND IN ACCORDANCE WITH SECTION 9.1 WATER BODIES IN THE PROJECT EM&CP.
2. THE CONSTRUCTION OF ANY CROSSING SHOULD NOT CAUSE A SIGNIFICANT WATER LEVEL DIFFERENCE BETWEEN THE UPSTREAM AND DOWNSTREAM WATER SURFACE ELEVATIONS. FISH SPAWNING OR MIGRATION DATES CAN VARY ACROSS NEW YORK, AND RESTRICTIONS IMPOSED BY THE NYSDEC MY VARY AND MUST BE VERIFIED. REFER TO CERTIFICATE OF CONDITIONS.
3. ALL FILL MATERIALS ASSOCIATED WITH THE ROADWAY APPROACH SHOULD BE LIMITED TO A MAXIMUM HEIGHT OF 2 FT ABOVE THE EXISTING FLOOD PLAIN ELEVATION.
4. A WATER DIVERTING STRUCTURE SUCH AS A SWALE OR WATER BAR SHOULD BE CONSTRUCTED (ACROSS THE ROADWAY ON BOTH ROADWAY APPROACHES) 50 FEET (MAXIMUM) ON EITHER SIDE OF THE WATERWAY CROSSING. THIS WILL PREVENT ROADWAY SURFACE RUNOFF FROM DIRECTLY ENTERING THE WATERWAY. THE 50 FEET MEASURED IS MEASURED FROM THE TOP OF THE WATERWAY BANK. IF THE ROADWAY APPROACH IS CONSTRUCTED WITH A REVERSE GRADE AWAY FROM THE WATERWAY, A SEPARATE DIVERTING STRUCTURE IS NOT REQUIRED.
5. ALL EQUIPMENTS SHOULD MAINTAIN A MINIMUM OF 2 FT SETBACK FROM EDGE OF THE MATS WHILE CROSSING.
6. CONTRACTOR SHALL CONSULT WITH TEMPORARY STRUCTURES AND CONSTRUCTION DEVICES ENGINEER FOR APPROPRIATE MATTING SIZES AND LENGTHS AND REQUIRED SOIL BEARING PRESSURES.

○ OPTION "A"
NOT TO SCALE

○ OPTION "B"
NOT TO SCALE

1 TIMBER MATTING (WETLAND CROSSING)
SCALE: N.T.S.

GENERAL NOTES:

1. TIMBER SHALL BE SELECT STRUCTURAL MIXED OAK WITH A MINIMUM BENDING STRESS OF 1250 PSI OR BETTER.
2. CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO COMMENCING WORK. ANY ERRORS, OMISSIONS, OR UNUSUAL CONDITIONS ARE TO BE REPORTED TO THE TEMPORARY STRUCTURES AND CONSTRUCTION DEVICES ENGINEER IMMEDIATELY.

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Luling.Yang

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CHAMPLAIN HUDSON POWER EXPRESS
SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL
WETLAND CROSSING DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	C-611

DRAWN BY: | DESIGNED BY: LY | APPROVED BY: LZ | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. OF

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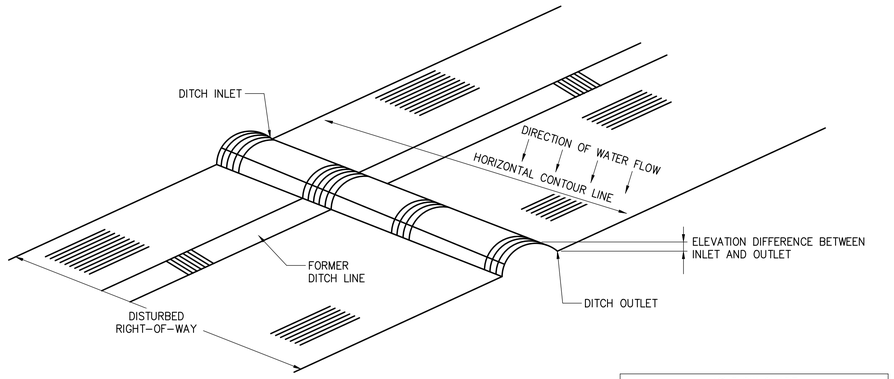


WATER SHALL BE DIVERTED OFF THE DISTURBED RIGHT-OF-WAY AT AN OUTSLOPE OF THREE TO FIVE PERCENT BY CONSTRUCTING DIVERSION DITCH ACCORDING TO THE FOLLOWING PROCEDURES:

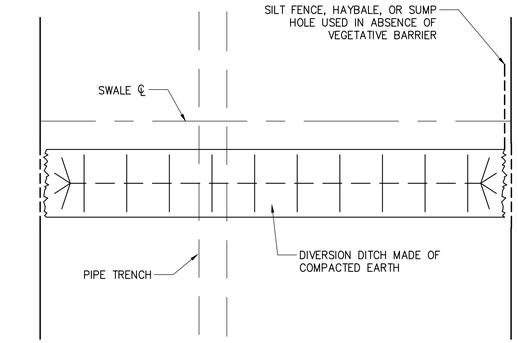
1. AT THE PROPOSED INTERCEPTOR DITCH LOCATION ESTABLISH A HORIZONTAL CONTOUR LINE (USING A POCKET TRANSIT OR HAND LEVEL) WHICH EXTENDS COMPLETELY ACROSS THE DISTURBED RIGHT-OF-WAY. THIS LINE WILL ALWAYS BE PERPENDICULAR TO THE DIRECTION OF WATER FLOW AND SHOULD BE PARALLEL TO THE MAP CONTOURS SHOWN ON THE PLAN DRAWINGS.
2. DETERMINE WHICH SIDE OF THE RIGHT-OF-WAY IS BEST SUITED FOR THE DITCH OUTLET (EVALUATE VEGETATION DENSITY, LOCAL TOPOGRAPHY, ETC.) AND DEVIATE DIKE AWAY FROM THE HORIZONTAL CONTOUR LINE SLIGHTLY DOWNWARD TOWARD THE SELECTED OUTLET SIDE MAINTAINING A THREE TO FIVE PERCENT SLOPE. AS AN EXAMPLE, THE CHART AT THE RIGHT SHOWS DIMENSIONS ASSUMING A FOUR PERCENT SLOPE.
3. WHEN OUTLETTING NEAR WATER BODIES, STREAMS, DITCHES, & CROP FIELDS, A FILTER FENCE OR STRAW BALE FENCE SHOULD BE PLACED ON OUTLET END OF THE DIVERSION DITCH.

4% FLOW CHART	
HORIZONTAL DISTANCE BETWEEN WATERBAR INLET & OUTLET (FEET)	ELEVATION DISTANCE BETWEEN WATERBAR INLET AND OUTLET (FEET)
75	3
100	4
125	5
150	6
175	7

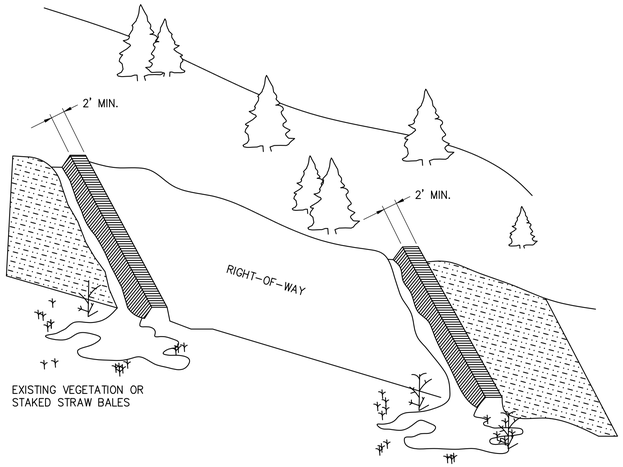
TEMPORARY DRAINAGE DITCH

NOTES:

1. TEMPORARY DIVERSION DITCH SHOULD BE BUILT SIMILAR TO THE PERMANENT DITCH CONFIGURATION BUT THE DIMENSION CAN BE SCALED BACK.
2. MAXIMUM HEIGHT SHOULD BE 12" AND SHOULD BE COMPACTED.
3. SPACING BETWEEN DIVERSION DITCHES AND SKEW OF THE DIVERSION DITCHES CAN VARY FROM THE PERMANENT DIVERSION DITCHES.
4. WHEN CONSTRUCTING TEMPORARY DIVERSION DITCHES THEY SHOULD BE FUNCTIONAL, WHILE MAINLINE CONSTRUCTION IS PROCEEDING, UNTIL RESTORATION BEGINS AND PERMANENT DIVERSION DITCHES ARE THEN CONSTRUCTED.

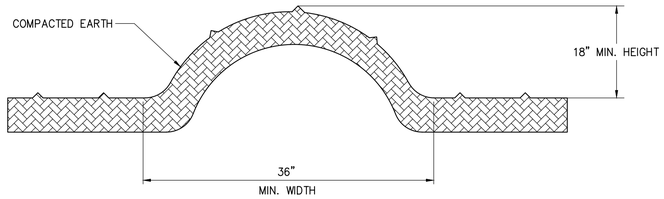


OVERHEAD VIEW



1 PERMANENT DIVERSION DITCH DETAIL

SCALE: N.T.S.



2 MINIMAL HEIGHT & WIDTH DIMENSIONS FOR WATERBAR CONSTRUCTION

SCALE: N.T.S.

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

STATE OF NEW YORK — NATHANIEL DALE HERBERT — 103692 — LICENSED PROFESSIONAL ENGINEER

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
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0	09/29/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	NH

CHAMPLAIN HUDSON POWER EXPRESS

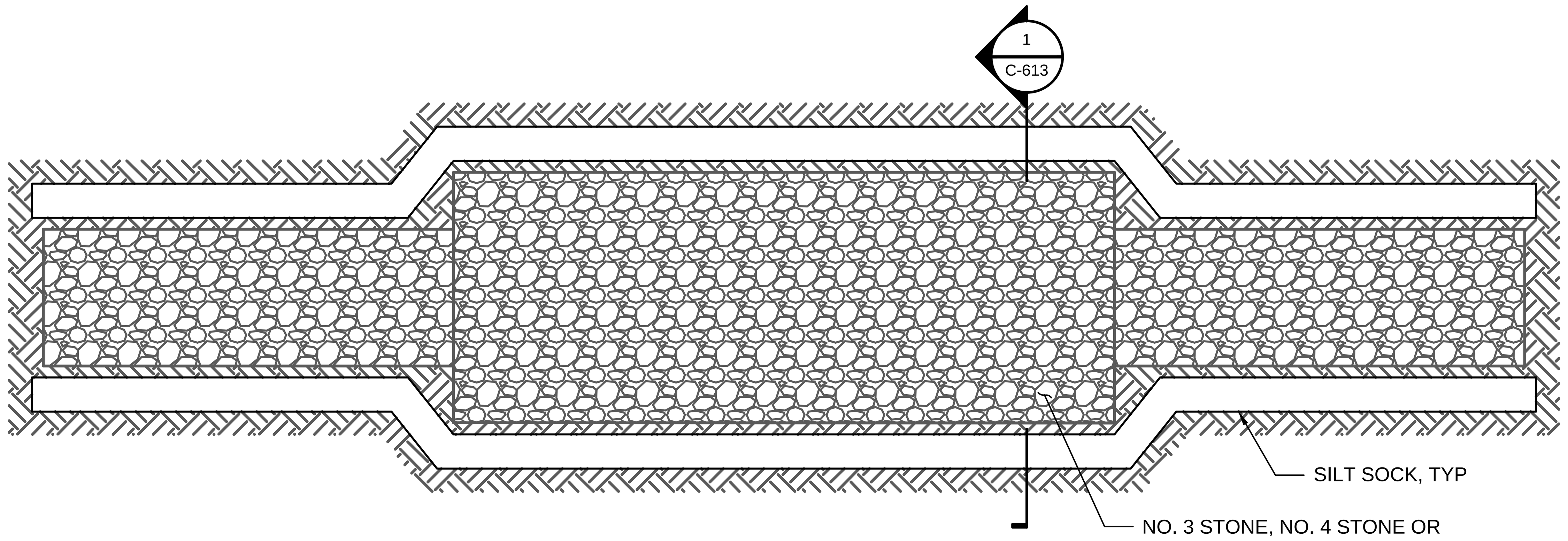
SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL

WATERBAR DETAILS

KIEWIT PROJECT NO.	21162
KC PROJECT NO.	120174
DRAWING NO.	C-612

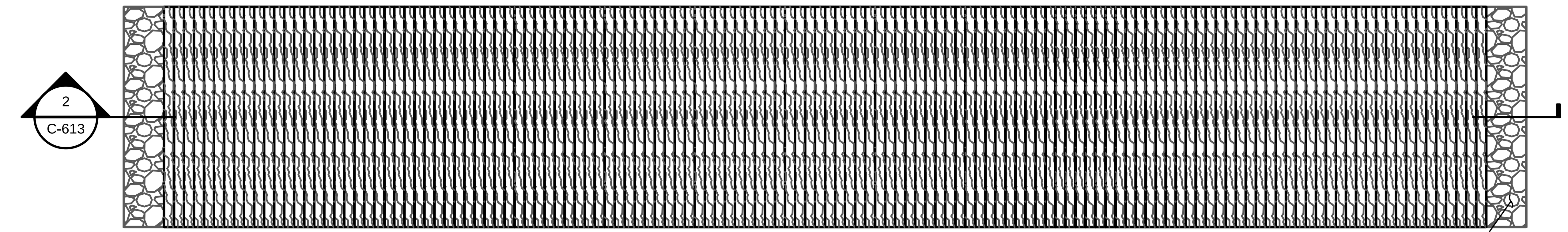
DRAWN BY: | DESIGNED BY: MK | APPROVED BY: NH | SCALE AS SHOWN | REV. NO. 0 | DATE 9/29/2023 | SH.NO. | OF

File: P:\120174-CHPE_CABLE_INSTALL-KIEWIT\60_CAD\20_ENGINEERING_CAD_FILES\PACKAGE_6\NY_ENVIRONMENTAL_(EROSION_CONTROL)\01_KCE\SHEET_FILES\ Saved: 9/27/2023 3:55:33 PM Plotted: 9/28/2023 1:47:10 PM Current User: Algasimu Jallow LastSavedBy: thao

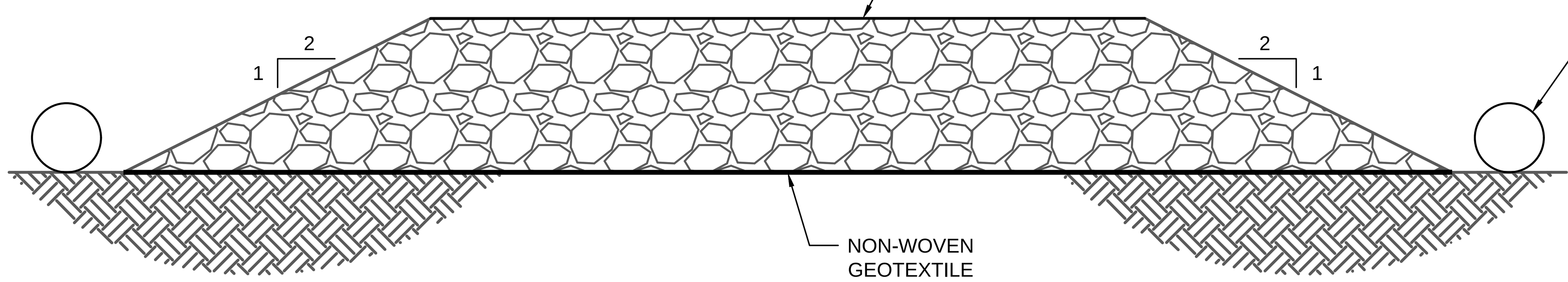


WETLAND AND AGRICULTURAL LANDS WORKING SURFACE PLAN - OPTION A

NOT TO SCALE



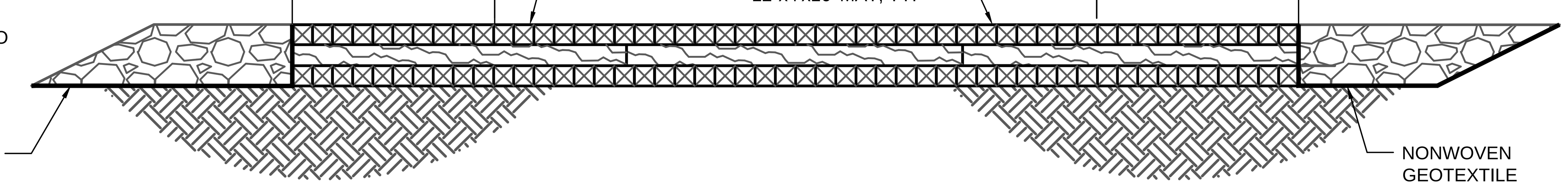
WETLAND AND AGRICULTURAL LANDS WORKING SURFACE PLAN - OPTION B



1 C-613 **SECTION**

NOTES:

1. UNDERCUT AND REMOVE TOP SOIL PRIOR TO PLACING GEOTEXTILE FABRIC.
2. A LAYER OF CLEAN CRUSHED STONE SHALL BE LAID ON TOP OF THE GEOTEXTILE FABRIC.
3. SUITABLE CROSS DRAINAGE SHALL BE PROVIDED ACROSS THE ROAD FOR STREAM CHANNELS AND SURFACE FLOW.
4. REFER TO EM+CP PLANS FOR EROSION CONTROL DETAILS.
5. WETLANDS AND AGRICULTURAL LANDS TO BE RESTORED IN ACCORDANCE WITH THE EM+CP.



2 C-613 **SECTION**

NOTES:

1. TIMBER MATS SHOULD BE INSTALLED IN WETLANDS, AGRICULTURAL LANDS AND OTHER AREAS IF NECESSARY TO PREVENT RUTTING.
2. BASED ON ACTUAL SITE CONDITIONS, NUMBER OF TIMBER MAT LAYERS TO BE DETERMINED ON SITE.
3. TIMBER MAT SURFACE SHOULD BE LEVEL TO PREVENT EQUIPMENT AND VEHICLES FROM SLIDING OFF DURING MUDDY OR ICING CONDITIONS, AND PREVENT TIMBERS FROM BREAKING.
4. SEDIMENT TRACKED ONTO TIMBER MATTING SHOULD BE REMOVED AS NECESSARY TO PREVENT SEDIMENT FROM ENTERING WETLAND AND AGRICULTURAL LAND DURING RAIN EVENTS. SEDIMENT SHOULD BE REMOVED TO A STABILIZED SOIL STOCKPILE OR OTHER APPROVED LOCATION.
5. PERIMETER EROSION AND SEDIMENT CONTROLS ARE REQUIRED TO BE INSTALLED PRIOR TO PLACING TIMBER MATTING.
6. UNLESS PERMITTED FROM REMOVAL, STUMPS WITHIN THE WETLAND SHOULD REMAIN. THIS MAY REQUIRE ADDITIONAL TIMBERS TO BRIDGE ABOVE.
7. UPON REMOVAL OF TIMBER MATTING ALL SPLINTERED WOOD SHOULD BE REMOVED. IF EXPOSED SOILS ARE PRESENT STRAW MULCH SHOULD BE APPLIED.
8. REFER TO EM+CP PLANS FOR EROSION CONTROL DETAILS.
9. WETLANDS AND AGRICULTURAL LANDS TO BE RESTORED IN ACCORDANCE WITH THE EM+CP.

GENERAL NOTES:

1. TIMBER:
   TIMBER SHALL BE SELECT STRUCTURAL MIXED OAK WITH A MINIMUM BENDING STRESS OF 1250 PSI OR BETTER.
2. CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO COMMENCING WORK. ANY ERRORS, OMISSIONS, OR UNUSUAL CONDITIONS ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
3. NONWOVEN GEOTEXTILE SHALL BE MIRAFI 180N OR EQUIVALENT APPROVED BY EOR.

CHPE Champlain Hudson Power Express

Kiewit

Engineering and Land Surveying, P.C.

STATE OF NEW YORK · LULING YANG · 101896-1 · LICENSED PROFESSIONAL ENGINEER

Luling.Yang

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

No.	DATE	SUBMITTAL / REVISION DESCRIPTION	DB	APP
0	09/29/2023	ISSUED FOR CONSTRUCTION SUBMISSION	MK	YL

CHAMPLAIN HUDSON POWER EXPRESS

SEGMENT 10 (PACKAGE 6) - SELKIRK RAIL YARD BYPASS TO CATSKILL

WETLAND WORKING SURFACE

KIEWIT PROJECT NO. 21162
KC PROJECT NO. 120174
DRAWING NO. C-613

DRAWN BY: | DESIGNED BY: | APPROVED BY: YL | SCALE AS SHOWN | REV. NO. 0 | DATE 9/22/2023 | SH.NO. OF

Appendix M Temporary Drainage Report

Champlain Hudson Power

Segment 10 (Packages 6)

Temporary Drainage Analysis

Selkirk/ Catskill

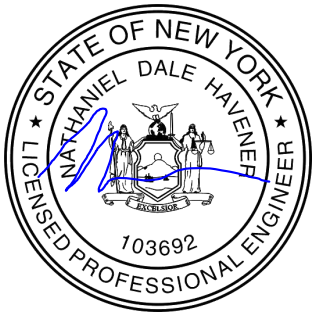
KC Engineering Project Number: 120174

Prepared for:

Transmission
Developers Inc. 1301
Avenue of the Americas, 26th
Floor
New York, NY 10019

Prepared by:

KC Engineering and Land Surveying ,P.C.
7 Penn Plaza, Suite 1604
New York 10001



September 2023

Table of Contents:

Appendices:

- Appendix A – Project Location Map
- Appendix B – Drainage Feature Model Input Data and Analysis
- Appendix C – NRCS Soil Survey Map
- Appendix D – NYSDOT Highway Design Manual Exhibits
- Appendix E – StreamStats Reports

Project Description:

The proposed Champlain Hudson Power Express (CHPE) project involves the construction of ±339 miles of high voltage direct current underground and underwater transmission line from Montreal, Canada to Queens, New York. It will bring 1,250 megawatts of hydropower to replace the use of fossil fuel, reduce carbon emission, and to help achieve clean renewable energy by the year 2025.

The proposed +/- 20.90 miles of upland cable instillation for Segments 10 (Package 6) begins in Selkirk and ends at the Catskill. Refer to Appendix A for the Project Location Map. Proposed work consists of installing two 8-inch-diameter PVC casings. All trenching activities and directional drilling work will be located within public roadway and railroad Right-Of-Ways (ROWs). All temporary construction storage and staging areas will also be accomplished within the grounds of the existing ROWs or agreement with private landowners.

Limits of proposed disturbances and restoration areas are identified on the plans and reference site specific details regarding the required restoration. Once the construction activity is completed, all disturbed grounds will be topsoiled, seeded, and stabilized. The proposed grading of the roads and side slopes on site will have minimal ground disturbance to the greatest extent practical while maintaining existing drainage patterns.

Background:

The following report details the temporary drainage and hydraulic analysis prepared for Champlain Hudson Power Express Segment 10 (Package 6) located within Selkirk/ Catskill.

The purpose of this report is to identify the areas where temporary swales or temporary culverts will be required in order to maintain existing flow patterns and to avoid any additional runoff entering onto private properties and railroads along the project limit during construction. All procedures related to dewatering methods are described in Section 4.3.2 of the Environmental Management and Construction Plan (EM&CP) and Spill Prevention Control & Countermeasures Plan (SPCC) in Appendix K of the EM&CP.

Backup calculations have been prepared and are provided within Appendix B of this report that demonstrate the temporary swales and culverts have been sized appropriately during the duration of the project. All temporary drainage practices will be removed in final conditions and the site will be restored to pre-construction conditions.

Project Soils:

A variety of soil types are present within the project limits, See detail in Appendix C for the NRCS soils map within the project area.

Field Observations/ Research:

A combination of survey base mapping and google street view were utilized to confirm record plan information to the greatest extent possible. Location of the proposed temporary swales and culverts were delineated from base mapping based on existing & proposed temporary grading. The basis for temporary swales and culverts is to avoid additional flow from entering onto private properties and railroad as well as maintain existing flow patterns during construction.

Hydrology:

Drainage basins were delineated based on the existing ground survey provided. The hydrological analysis method used for peak flow analysis is Rational Method, because of the size of all contributing basins being smaller than 80 hectares (197 acres). The Rational Method predicts peak flows based on the rainfall intensity and the contributing drainage area. Runoff coefficients(C) used were consistent with New York State Department of Transportation (NYSDOT) Highway Design Manual (HDM) Exhibit 8-4. The times of concentration were based on NYSDOT guidelines, and a minimum time of concentration of 6 minutes was used. A 25-year design storm frequency was selected for the culverts and the ditches in accordance with HDM Exhibit 8-3.

The rainfall intensity (R) was calculated from the NOAA Atlas 14 precipitation frequency estimates.

Based on the Rational Method, total runoff from the system was calculated using Q = CiA (ft3/s). A combination of the U.S. Department of Transportation Federal Highway Administration's HY-8 Culvert Hydraulic Analysis Program and HydroCAD were used to develop peak flows.

For culverts where the drainage basins exceeded 197 acres, the watershed and flow parameters were determined using the USGS StreamStats Application. These reports can be found in Appendix E.

The storm event analysis output files for the Hydraulic Toolbox and HY-8 models are attached in Appendix B. The proposed temporary drainage was designed to meet NYSDOT Highway Design Manual Chapter 8 requirements.

Summary of Drainage:

A summary of the temporary swales and culverts that will be utilized in Package 6 are shown below. All temporary culverts will range in size from 9" to 48" diameter high density polyethylene pipe (HDPE) and all temporary swales will be V-shaped with 3:1 side slopes. The minimum depth of the temporary swales is 1'. Temporary check dams will be installed within the temporary swales in accordance with New York State Standards and Specifications for Erosion and Sediment Control.

TABLE 1 - STORMWATER SUMMARY

Location	Type of Temporary Drainage	Length (Ft)	Pipe Diameter/ Swale Side Slope	Flow Depth (Ft)	Material	Tributary Area (sf)	25-Yr Rainfall Intensity (in/hr)	Total Flow in 25 Yr Storm Event (cfs)
61255+00 AR 6-06	Culvert Extension	10(East) 6(West)	36"	N/A	HDPE	N/A	8.47	N/A
61310+00	Culvert	52	15"	0.59	HDPE	17901	8.47	1.22
61326+25 – 61329+50	V-Shaped Swale	412	3:1	0.61	Earth	64963	8.47	4.43
61356+70	Culvert	56	15"	0.77	HDPE	30478	8.47	2.08
61416+50	Culvert Extension	10	9"	N/A	HDPE	N/A	8.47	N/A
62455+30	Culvert Extension	18	12"	N/A	HDPE	N/A	8.47	N/A
62472+50	Culvert Extension	28	48"*	N/A	HDPE	N/A	8.47	N/A
62537+00	Culvert	76	36"	2.01	HDPE	2665175**	8.47	19.2
62539+00	Culvert	52	24"	1.61	HDPE	1215498**	8.47	9.47
62569+50	Culvert	40	15"	1.05	HDPE	47004	8.47	3.20
62570+00	Culvert	68	18"	1.41	HDPE	84469	8.47	5.75
64109+35	Culvert	92	36"	1.84	HDPE	2305543**	8.47	17.8
33+85 AR 6-18	Culvert Extension	28	24"	N/A	HDPE	N/A	8.47	N/A

***Pipe size estimated based on expected discharge from 48" culvert immediately preceding the swale**
****Flow provided from StreamStats**

References:

Highway Design Manual, Chapter 8, NYSDOT, 50 Wolf Road, Albany, NY 12232.

https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-8

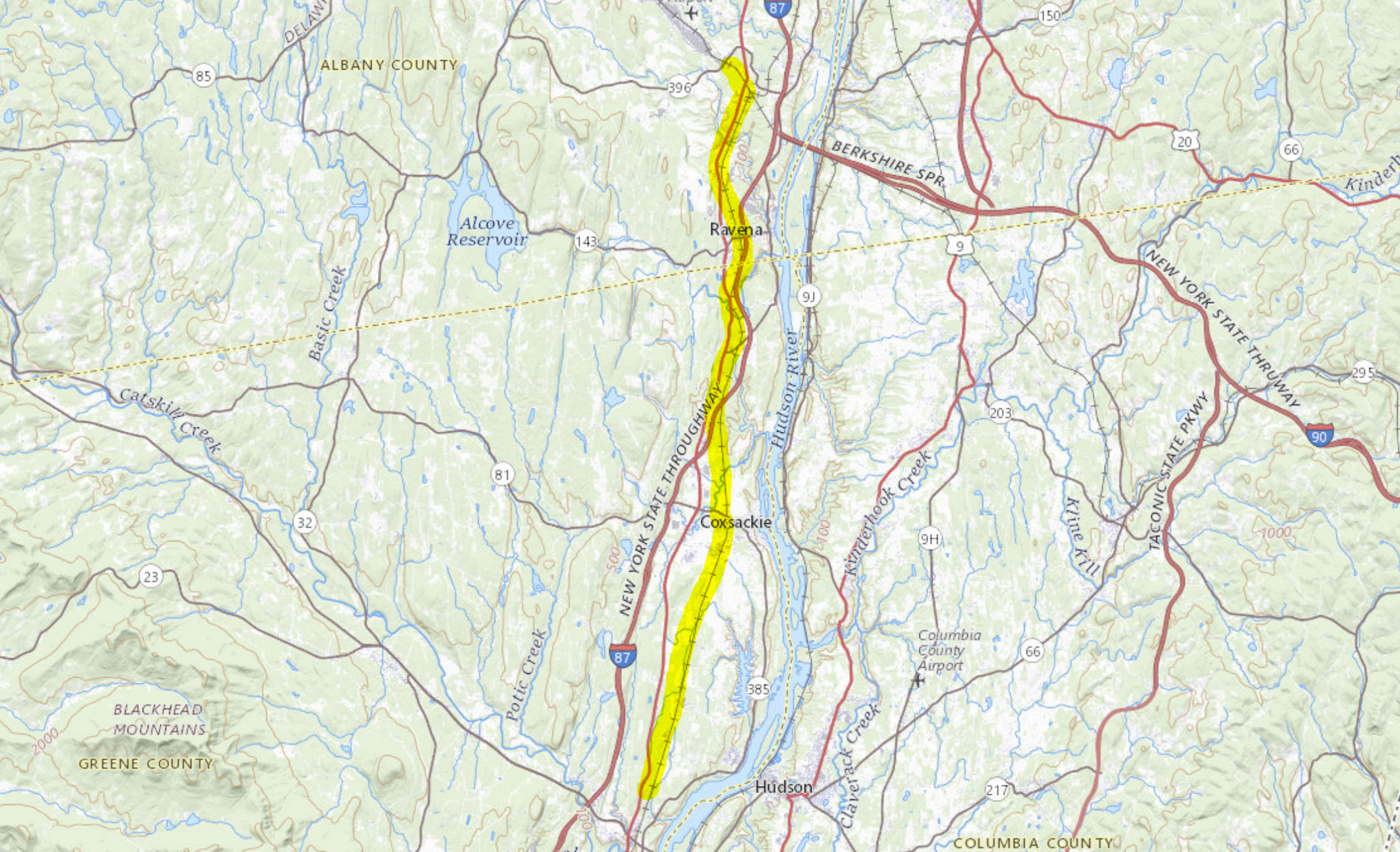
Standard Specifications, Construction and Materials, NYSDOT, 50 Wolf Road, Albany, NY 12232.

https://www.dot.ny.gov/main/business-center/engineering/specifications

Hydraulic Engineering Circular No. 22, 2nd Edition, Urban Drainage Design Manual, August 2001, FHWA

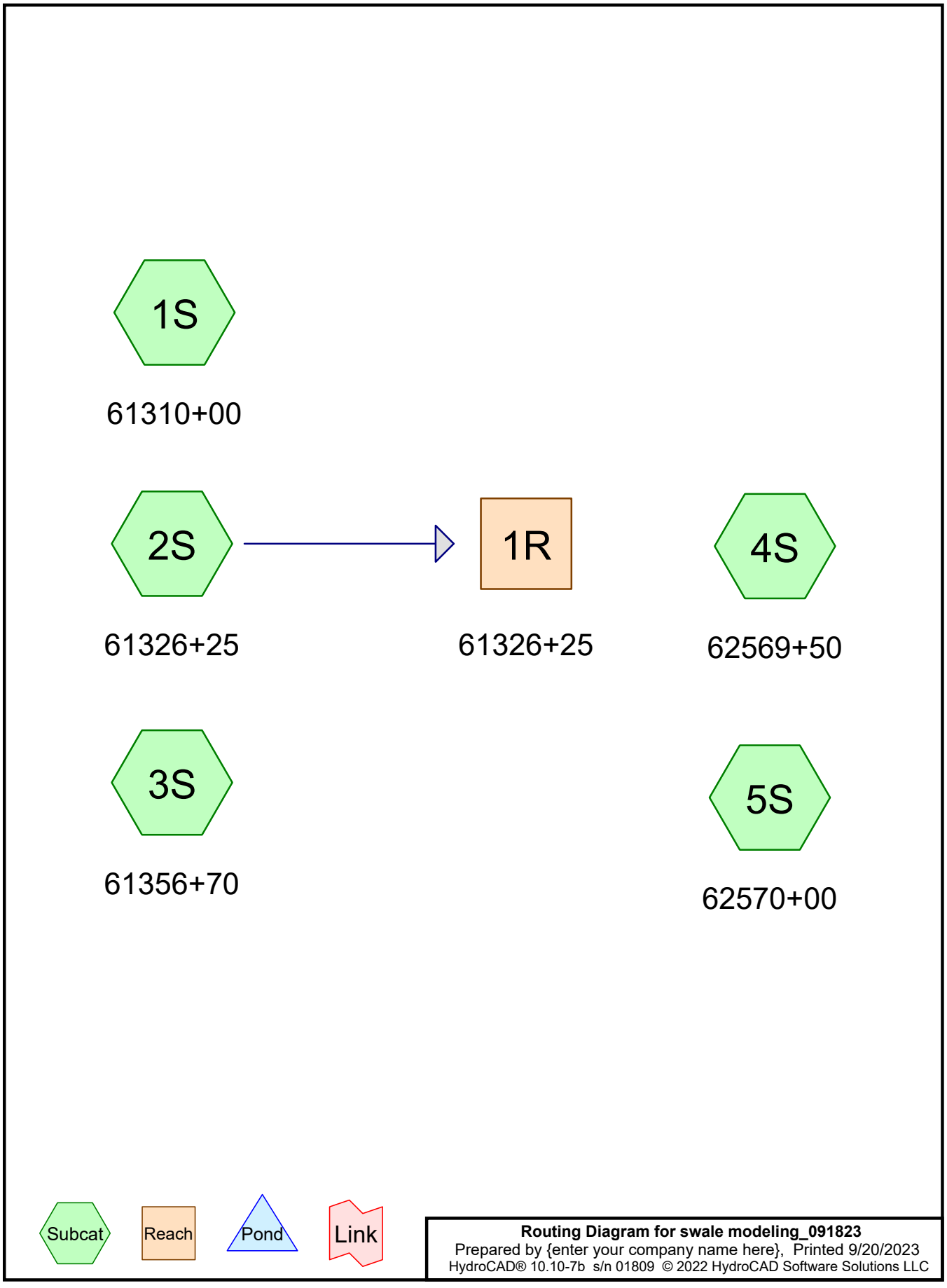
APPENDIX A

PROJECT LOCATION MAP


ALBANY COUNTY
GREENE COUNTY
COLUMBIA COUNTY
Alcove Reservoir
Basic Creek
Catskill Creek
Potic Creek
Hudson River
Kinderhook Creek
Claverack Creek
Kline Kill
Ravena
Coxsackie
Hudson
Columbia County Airport
BLACKHEAD MOUNTAINS
NEW YORK STATE THROUGHWAY
NEW YORK STATE THRUWAY
TACONIC STATE PKWY
BERKSHIRE SPR
85
396
87
150
20
66
143
9
9J
81
32
23
203
295
90
9H
385
217
2000
1000
500
100

APPENDIX B

DRAINAGE FEATURE MODEL INPUT DATA AND ANALYSIS



Routing Diagram for swale modeling_091823
Prepared by {enter your company name here}, Printed 9/20/2023

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
5.620	0.36	Woods/grass comb., Fair, HSG C (1S, 2S, 3S, 4S, 5S)
5.620	**0.36**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
5.620	HSG C	1S, 2S, 3S, 4S, 5S
0.000	HSG D	
0.000	Other	
5.620		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	5.620	0.000	0.000	5.620	Woods/grass comb., Fair	1S, 2S, 3S, 4S, 5S
0.000	**0.000**	**5.620**	**0.000**	**0.000**	**5.620**	**TOTAL AREA**	

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 61310+00 Runoff Area=0.411 ac 0.00% Impervious Runoff Depth=0.21"
Tc=5.0 min C=0.36 Runoff=1.00 cfs 0.007 af

Subcatchment2S: 61326+25 Runoff Area=64,963 sf 0.00% Impervious Runoff Depth=0.21"
Tc=5.0 min C=0.36 Runoff=3.64 cfs 0.026 af

Subcatchment3S: 61356+70 Runoff Area=30,478 sf 0.00% Impervious Runoff Depth=0.21"
Tc=5.0 min C=0.36 Runoff=1.71 cfs 0.012 af

Subcatchment4S: 62569+50 Runoff Area=47,004 sf 0.00% Impervious Runoff Depth=0.21"
Tc=5.0 min C=0.36 Runoff=2.63 cfs 0.019 af

Subcatchment5S: 62570+00 Runoff Area=84,469 sf 0.00% Impervious Runoff Depth=0.21"
Tc=5.0 min C=0.36 Runoff=4.73 cfs 0.034 af

Reach 1R: 61326+25 Avg. Flow Depth=0.57' Max Vel=2.81 fps Inflow=3.64 cfs 0.026 af
n=0.022 L=412.0' S=0.0100 '/' Capacity=78.26 cfs Outflow=2.71 cfs 0.026 af

Total Runoff Area = 5.620 ac Runoff Volume = 0.098 af Average Runoff Depth = 0.21"
100.00% Pervious = 5.620 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: 61310+00

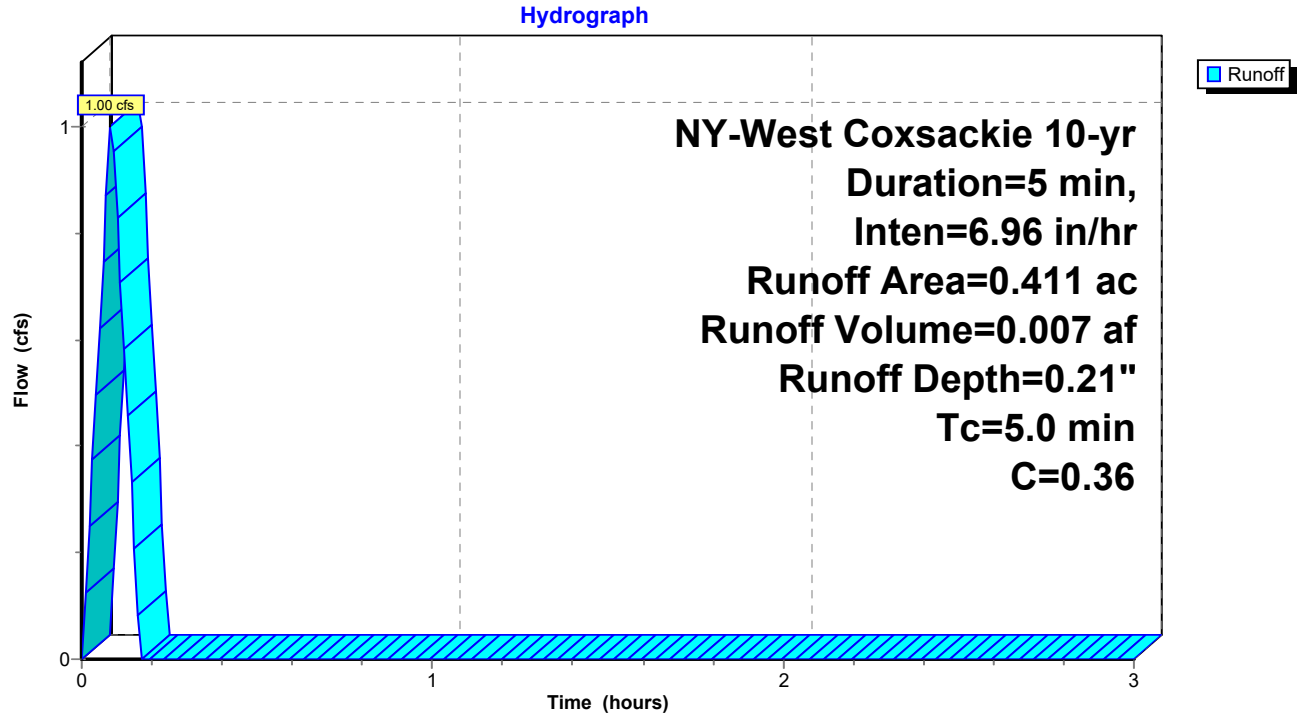
Runoff = 1.00 cfs @ 0.08 hrs, Volume= 0.007 af, Depth= 0.21"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 10-yr Duration=5 min, Inten=6.96 in/hr

Area (ac)	C	Description
0.411	0.36	Woods/grass comb., Fair, HSG C
0.411		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 61310+00



Summary for Subcatchment 2S: 61326+25

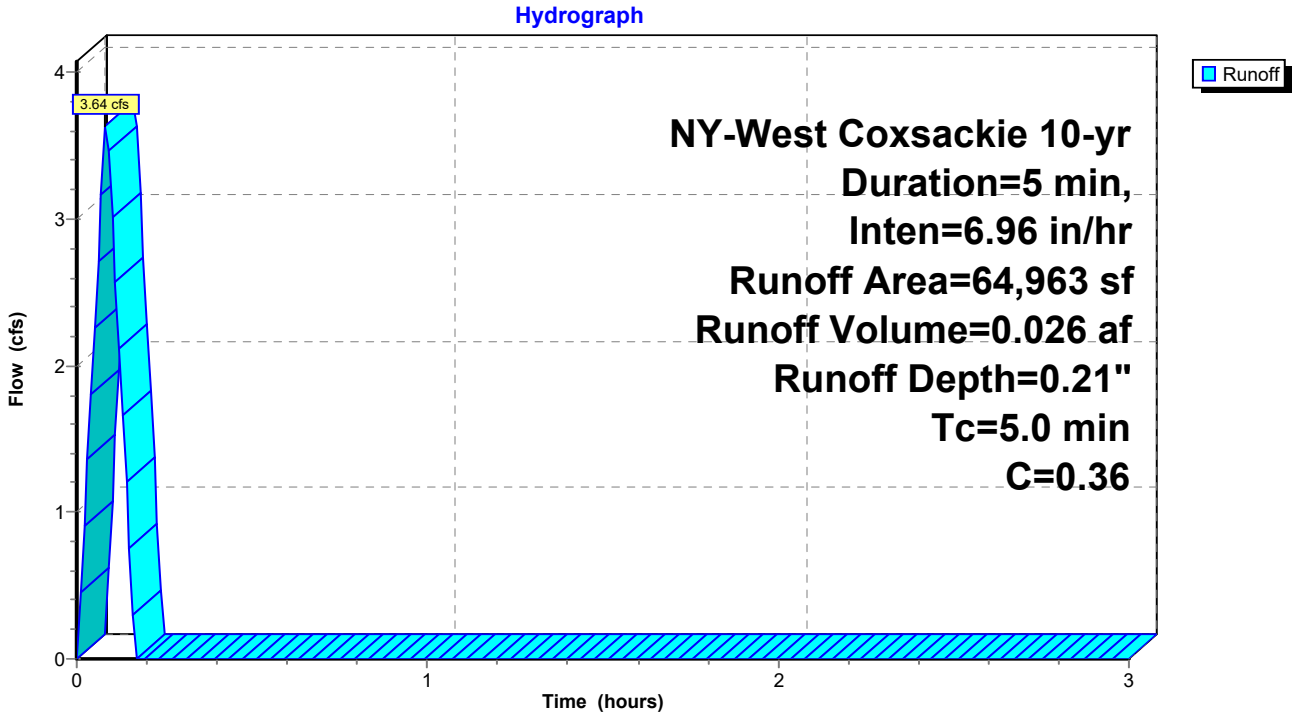
Runoff = 3.64 cfs @ 0.08 hrs, Volume= 0.026 af, Depth= 0.21"
Routed to Reach 1R : 61326+25

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 10-yr Duration=5 min, Inten=6.96 in/hr

Area (sf)	C	Description
64,963	0.36	Woods/grass comb., Fair, HSG C
64,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: 61326+25



Summary for Subcatchment 3S: 61356+70

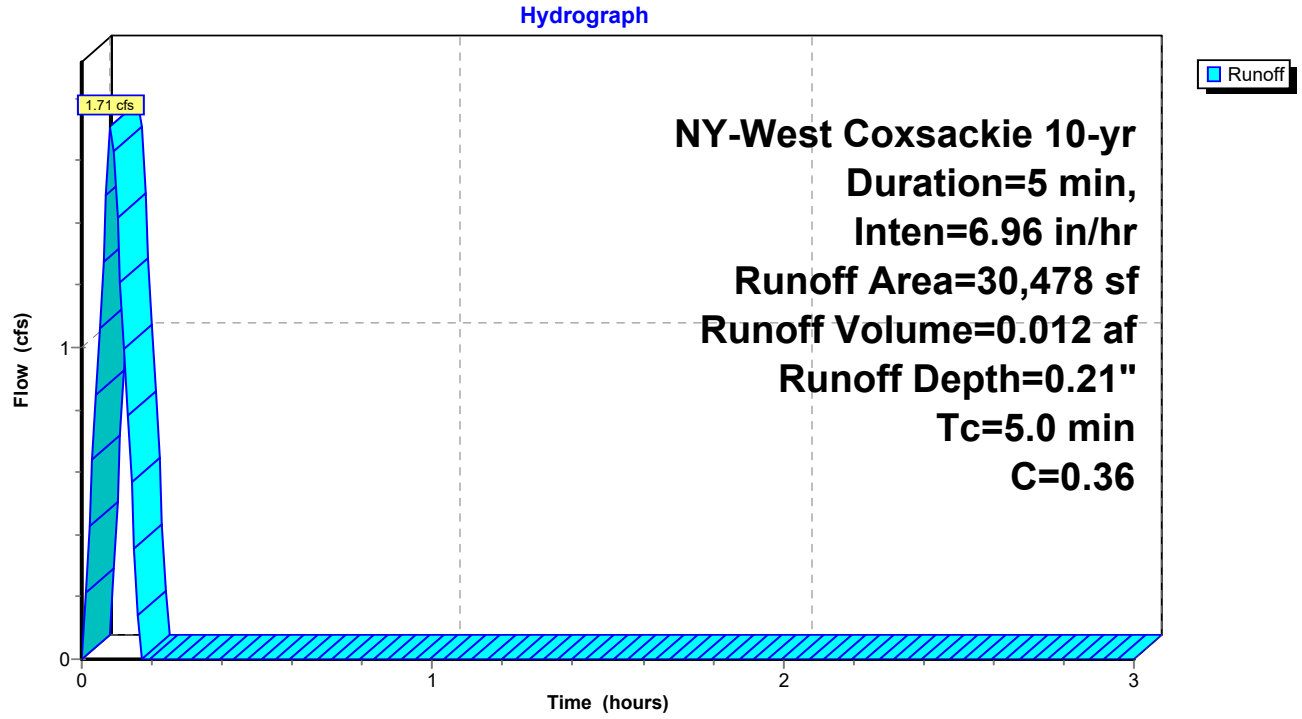
Runoff = 1.71 cfs @ 0.08 hrs, Volume= 0.012 af, Depth= 0.21"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 10-yr Duration=5 min, Inten=6.96 in/hr

Area (sf)	C	Description
30,478	0.36	Woods/grass comb., Fair, HSG C
30,478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: 61356+70



Summary for Subcatchment 4S: 62569+50

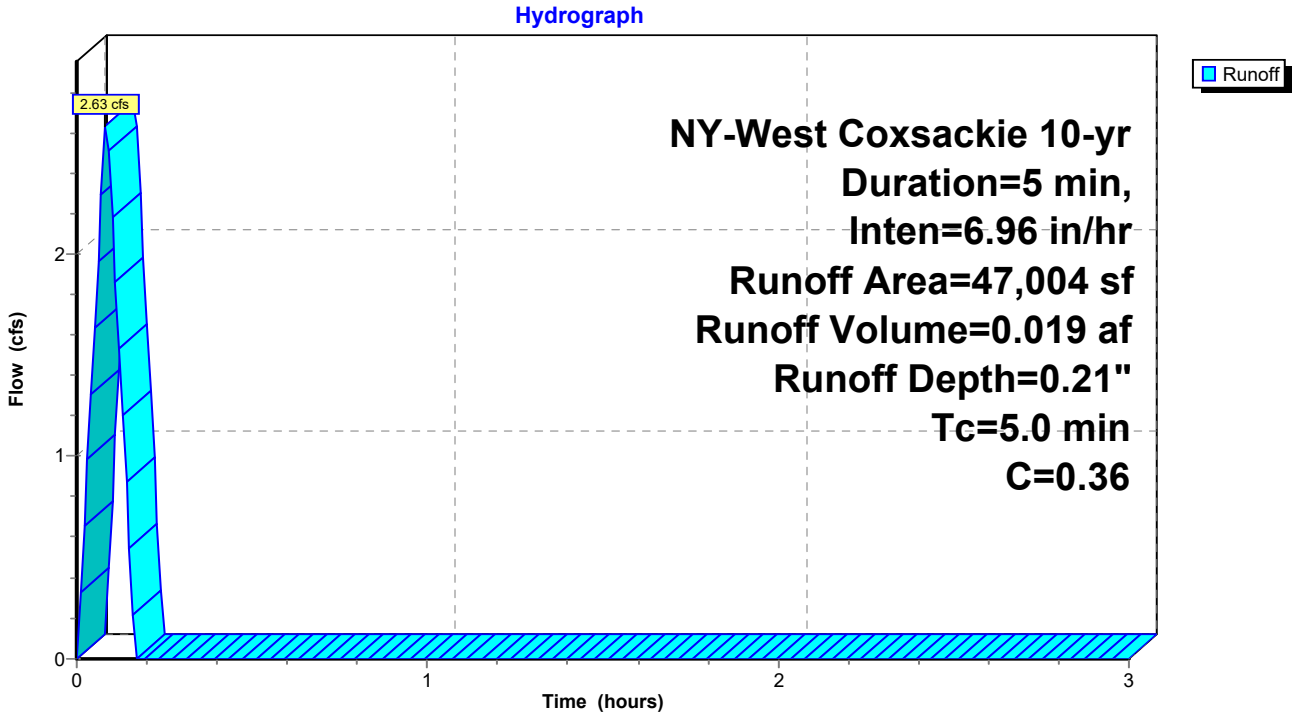
Runoff = 2.63 cfs @ 0.08 hrs, Volume= 0.019 af, Depth= 0.21"
Routed to nonexistent node 16P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 10-yr Duration=5 min, Inten=6.96 in/hr

Area (sf)	C	Description
47,004	0.36	Woods/grass comb., Fair, HSG C
47,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: 62569+50



Summary for Subcatchment 5S: 62570+00

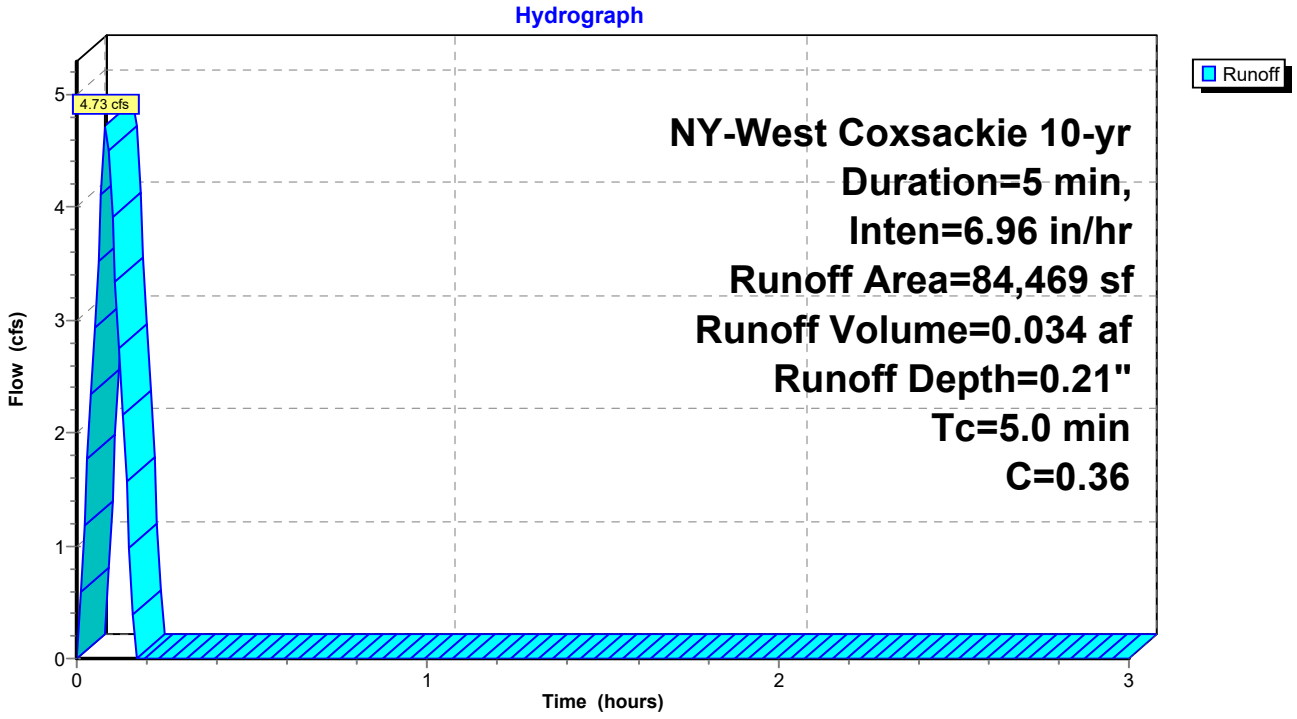
Runoff = 4.73 cfs @ 0.08 hrs, Volume= 0.034 af, Depth= 0.21"
Routed to nonexistent node 15P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 10-yr Duration=5 min, Inten=6.96 in/hr

Area (sf)	C	Description
37,465	0.36	Woods/grass comb., Fair, HSG C
47,004	0.36	Woods/grass comb., Fair, HSG C
84,469	0.36	Weighted Average
84,469		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: 62570+00



Summary for Reach 1R: 61326+25

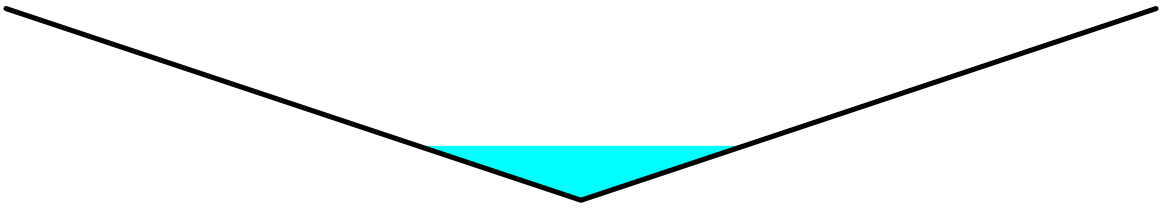
[65] Warning: Inlet elevation not specified

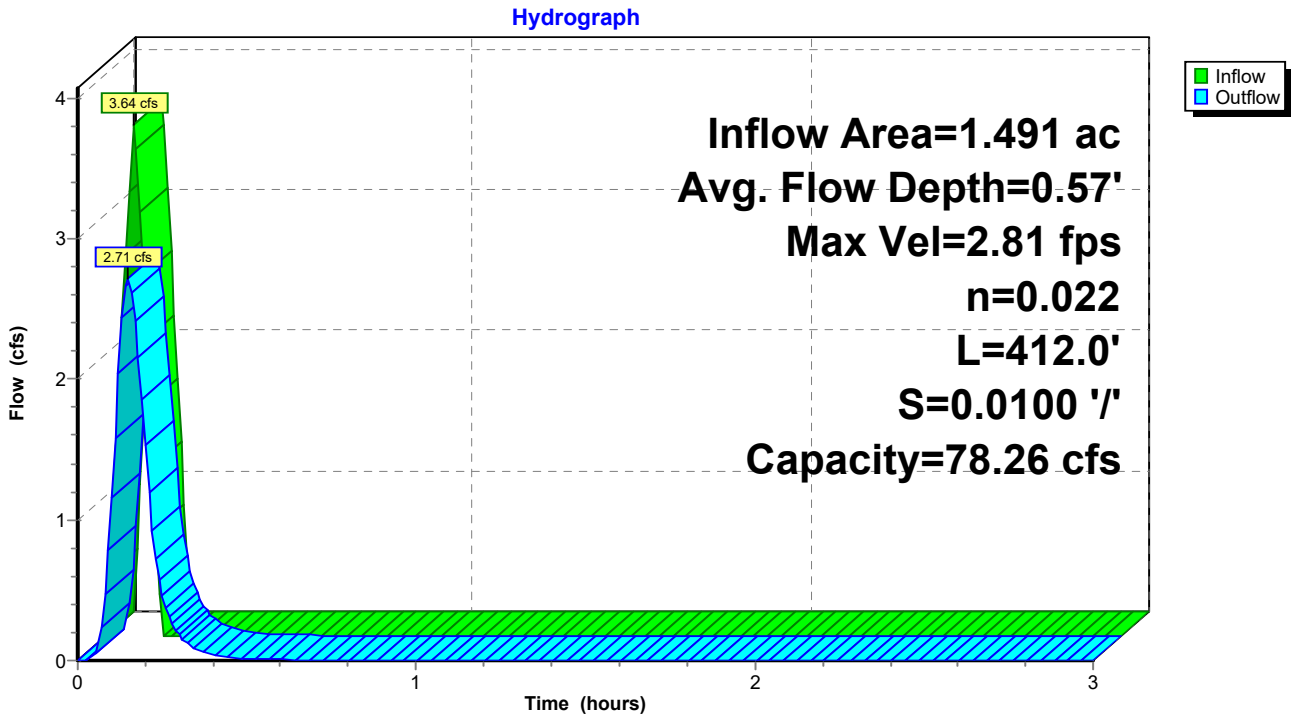
Inflow Area = 1.491 ac, 0.00% Impervious, Inflow Depth = 0.21" for 10-yr event
Inflow = 3.64 cfs @ 0.08 hrs, Volume= 0.026 af
Outflow = 2.71 cfs @ 0.15 hrs, Volume= 0.026 af, Atten= 25%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.81 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.66 fps, Avg. Travel Time= 10.4 min

Peak Storage= 398 cf @ 0.11 hrs
Average Depth at Peak Storage= 0.57' , Surface Width= 3.40'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 78.26 cfs

0.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 12.00'
Length= 412.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -4.12'





Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 61310+00 Runoff Area=0.411 ac 0.00% Impervious Runoff Depth=0.25"
Tc=5.0 min C=0.36 Runoff=1.22 cfs 0.009 af

Subcatchment2S: 61326+25 Runoff Area=64,963 sf 0.00% Impervious Runoff Depth=0.25"
Tc=5.0 min C=0.36 Runoff=4.43 cfs 0.032 af

Subcatchment3S: 61356+70 Runoff Area=30,478 sf 0.00% Impervious Runoff Depth=0.25"
Tc=5.0 min C=0.36 Runoff=2.08 cfs 0.015 af

Subcatchment4S: 62569+50 Runoff Area=47,004 sf 0.00% Impervious Runoff Depth=0.25"
Tc=5.0 min C=0.36 Runoff=3.20 cfs 0.023 af

Subcatchment5S: 62570+00 Runoff Area=84,469 sf 0.00% Impervious Runoff Depth=0.25"
Tc=5.0 min C=0.36 Runoff=5.75 cfs 0.041 af

Reach 1R: 61326+25 Avg. Flow Depth=0.61' Max Vel=2.97 fps Inflow=4.43 cfs 0.032 af
n=0.022 L=412.0' S=0.0100 '/' Capacity=78.26 cfs Outflow=3.37 cfs 0.032 af

Total Runoff Area = 5.620 ac Runoff Volume = 0.119 af Average Runoff Depth = 0.25"
100.00% Pervious = 5.620 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: 61310+00

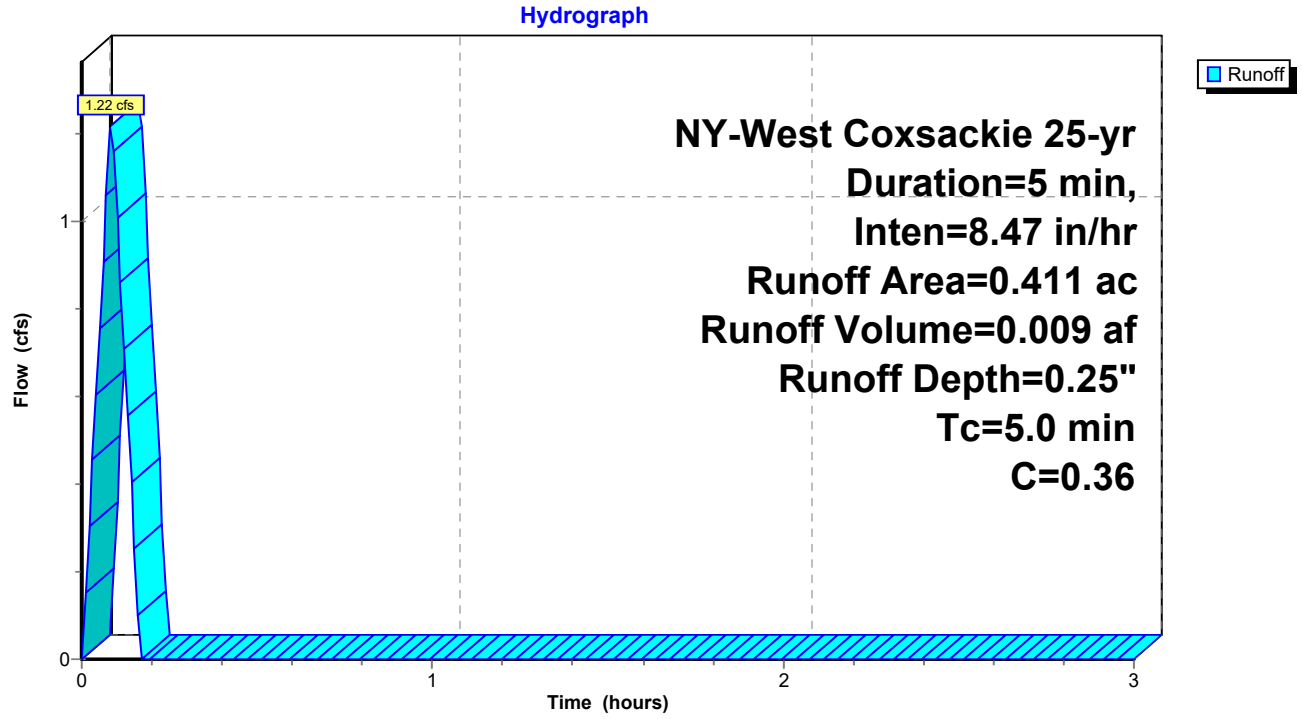
Runoff = 1.22 cfs @ 0.08 hrs, Volume= 0.009 af, Depth= 0.25"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 25-yr Duration=5 min, Inten=8.47 in/hr

Area (ac)	C	Description
0.411	0.36	Woods/grass comb., Fair, HSG C
0.411		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 61310+00



Summary for Subcatchment 2S: 61326+25

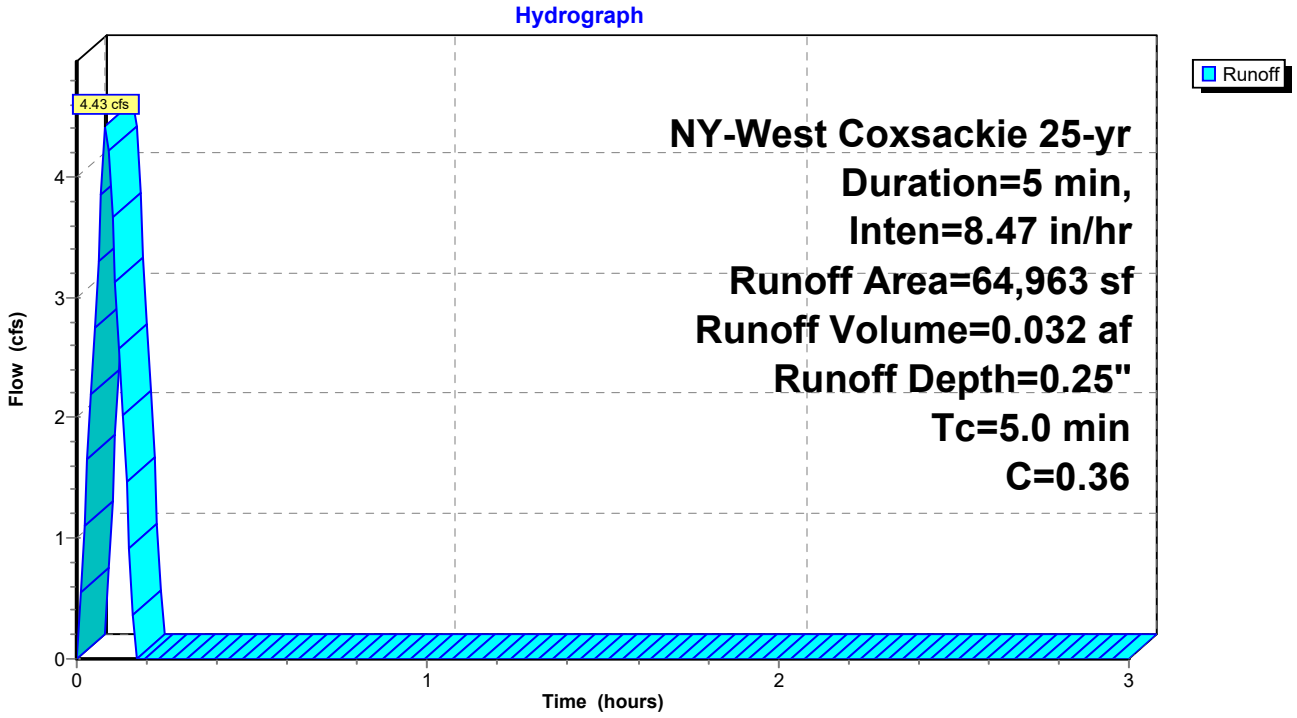
Runoff = 4.43 cfs @ 0.08 hrs, Volume= 0.032 af, Depth= 0.25"
Routed to Reach 1R : 61326+25

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 25-yr Duration=5 min, Inten=8.47 in/hr

Area (sf)	C	Description
64,963	0.36	Woods/grass comb., Fair, HSG C
64,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: 61326+25



Summary for Subcatchment 3S: 61356+70

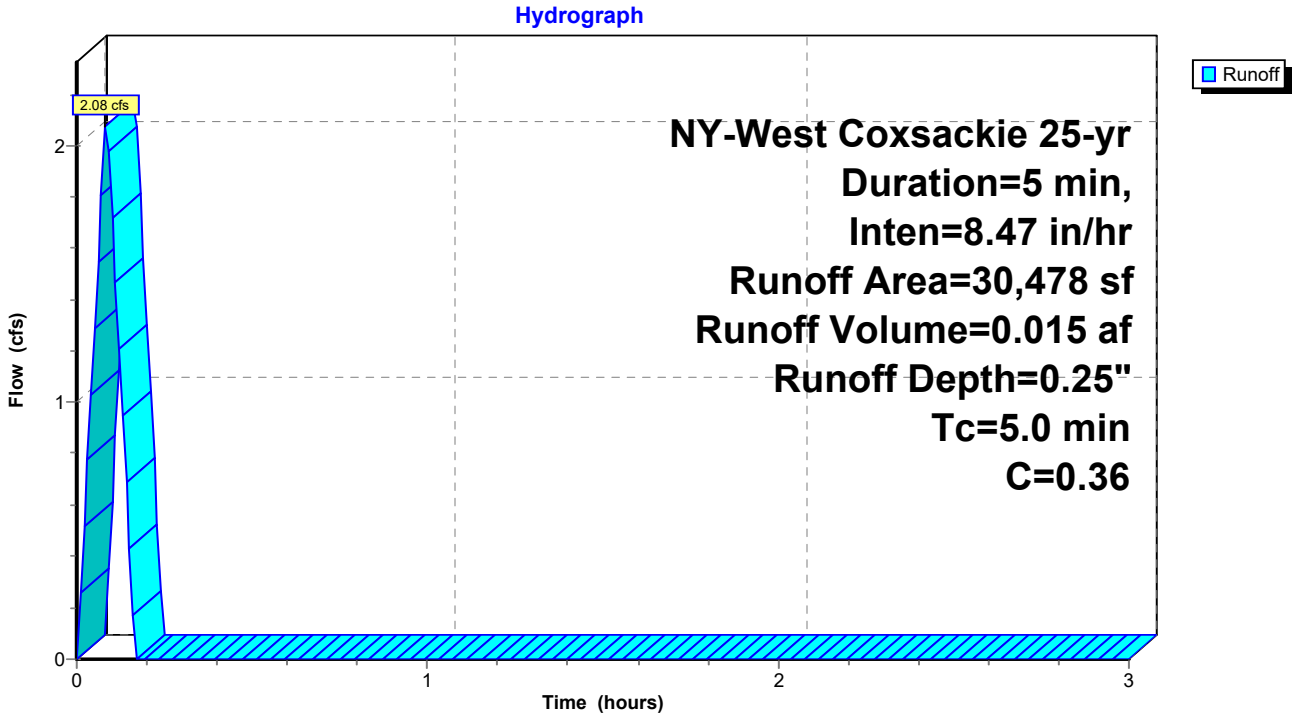
Runoff = 2.08 cfs @ 0.08 hrs, Volume= 0.015 af, Depth= 0.25"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 25-yr Duration=5 min, Inten=8.47 in/hr

Area (sf)	C	Description
30,478	0.36	Woods/grass comb., Fair, HSG C
30,478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: 61356+70



Summary for Subcatchment 4S: 62569+50

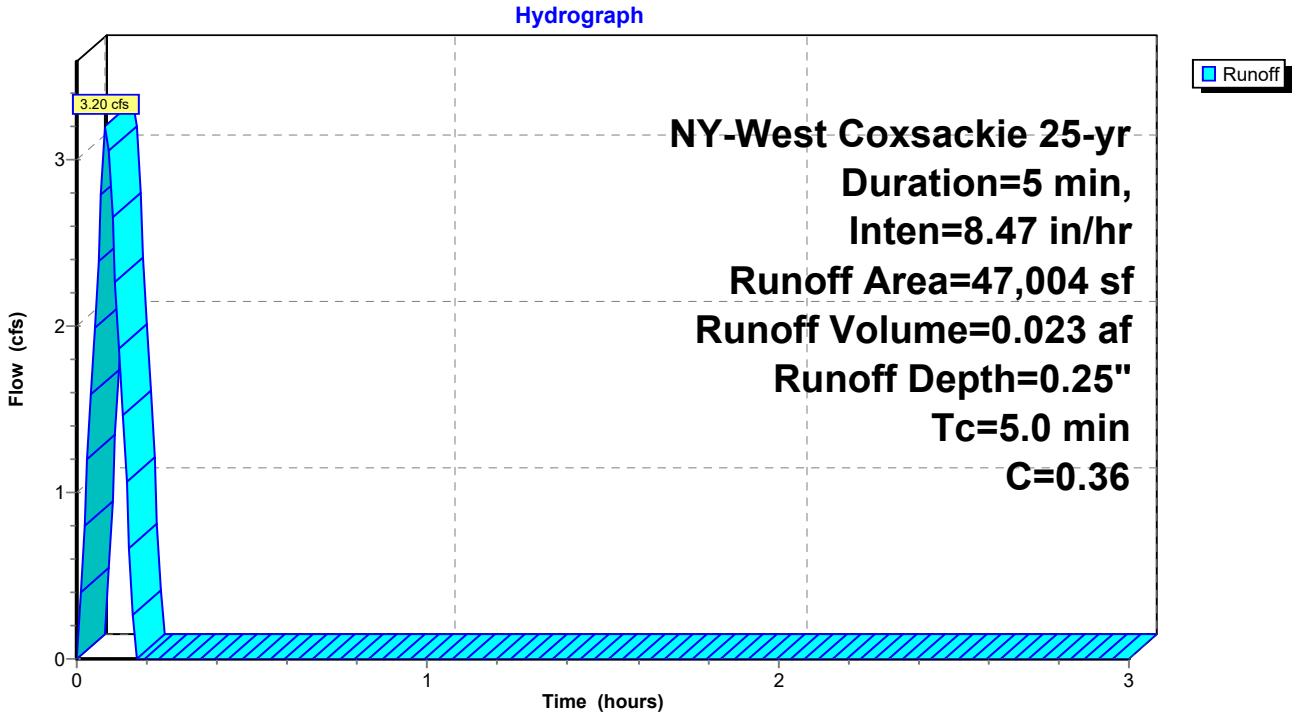
Runoff = 3.20 cfs @ 0.08 hrs, Volume= 0.023 af, Depth= 0.25"
Routed to nonexistent node 16P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 25-yr Duration=5 min, Inten=8.47 in/hr

Area (sf)	C	Description
47,004	0.36	Woods/grass comb., Fair, HSG C
47,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: 62569+50



Summary for Subcatchment 5S: 62570+00

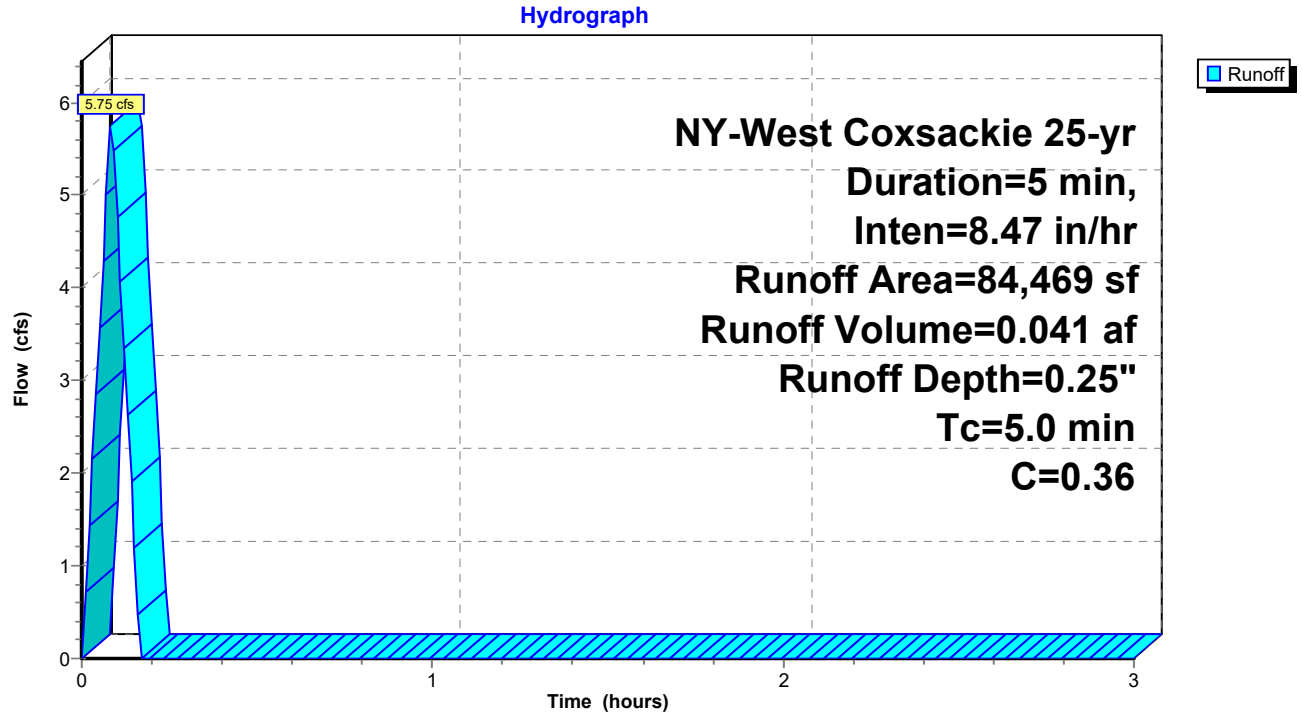
Runoff = 5.75 cfs @ 0.08 hrs, Volume= 0.041 af, Depth= 0.25"
Routed to nonexistent node 15P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 25-yr Duration=5 min, Inten=8.47 in/hr

Area (sf)	C	Description
37,465	0.36	Woods/grass comb., Fair, HSG C
47,004	0.36	Woods/grass comb., Fair, HSG C
84,469	0.36	Weighted Average
84,469		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: 62570+00



Summary for Reach 1R: 61326+25

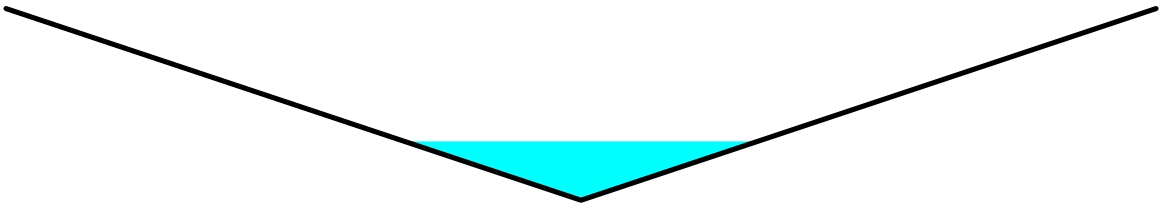
[65] Warning: Inlet elevation not specified

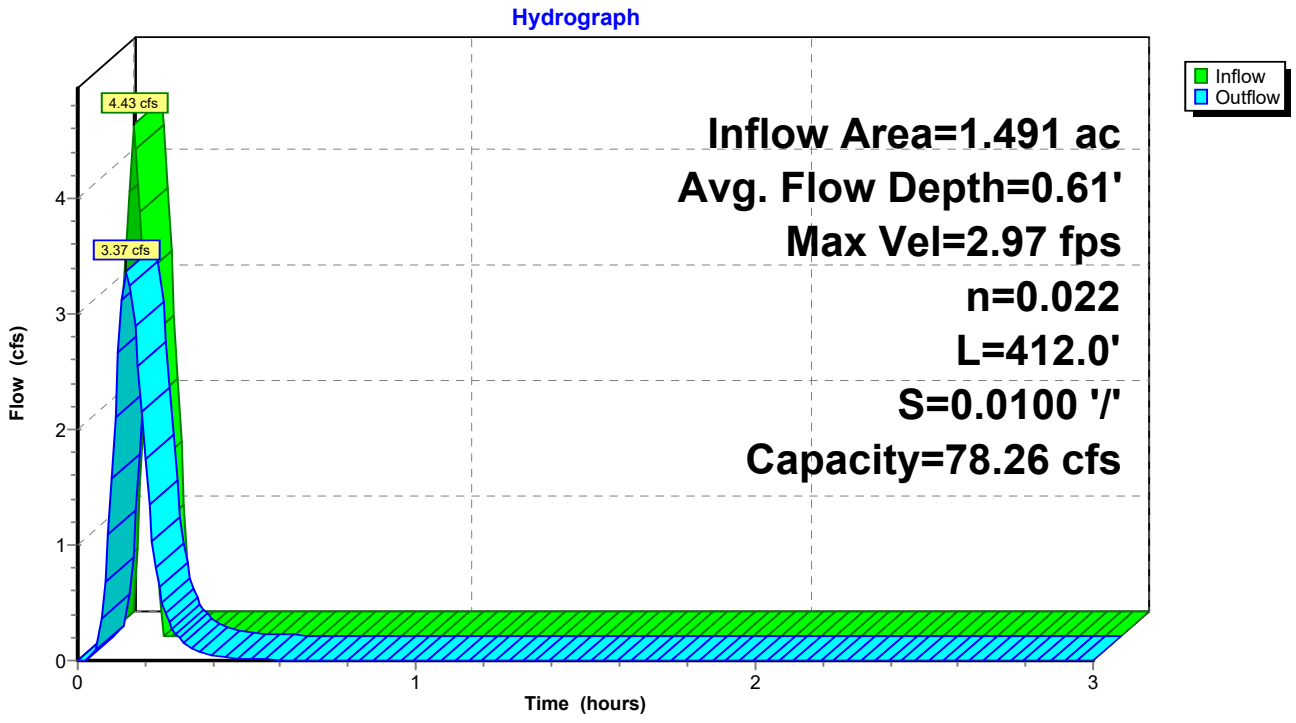
Inflow Area = 1.491 ac, 0.00% Impervious, Inflow Depth = 0.25" for 25-yr event
Inflow = 4.43 cfs @ 0.08 hrs, Volume= 0.032 af
Outflow = 3.37 cfs @ 0.14 hrs, Volume= 0.032 af, Atten= 24%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 10.2 min

Peak Storage= 467 cf @ 0.11 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 3.69'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 78.26 cfs

0.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 12.00'
Length= 412.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -4.12'





Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: 61310+00 Runoff Area=0.411 ac 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min C=0.36 Runoff=1.55 cfs 0.011 af

Subcatchment2S: 61326+25 Runoff Area=64,963 sf 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min C=0.36 Runoff=5.64 cfs 0.040 af

Subcatchment3S: 61356+70 Runoff Area=30,478 sf 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min C=0.36 Runoff=2.65 cfs 0.019 af

Subcatchment4S: 62569+50 Runoff Area=47,004 sf 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min C=0.36 Runoff=4.08 cfs 0.029 af

Subcatchment5S: 62570+00 Runoff Area=84,469 sf 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min C=0.36 Runoff=7.34 cfs 0.052 af

Reach 1R: 61326+25 Avg. Flow Depth=0.68' Max Vel=3.17 fps Inflow=5.64 cfs 0.040 af
n=0.022 L=412.0' S=0.0100 '/' Capacity=78.26 cfs Outflow=4.36 cfs 0.040 af

Total Runoff Area = 5.620 ac Runoff Volume = 0.152 af Average Runoff Depth = 0.32"
100.00% Pervious = 5.620 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: 61310+00

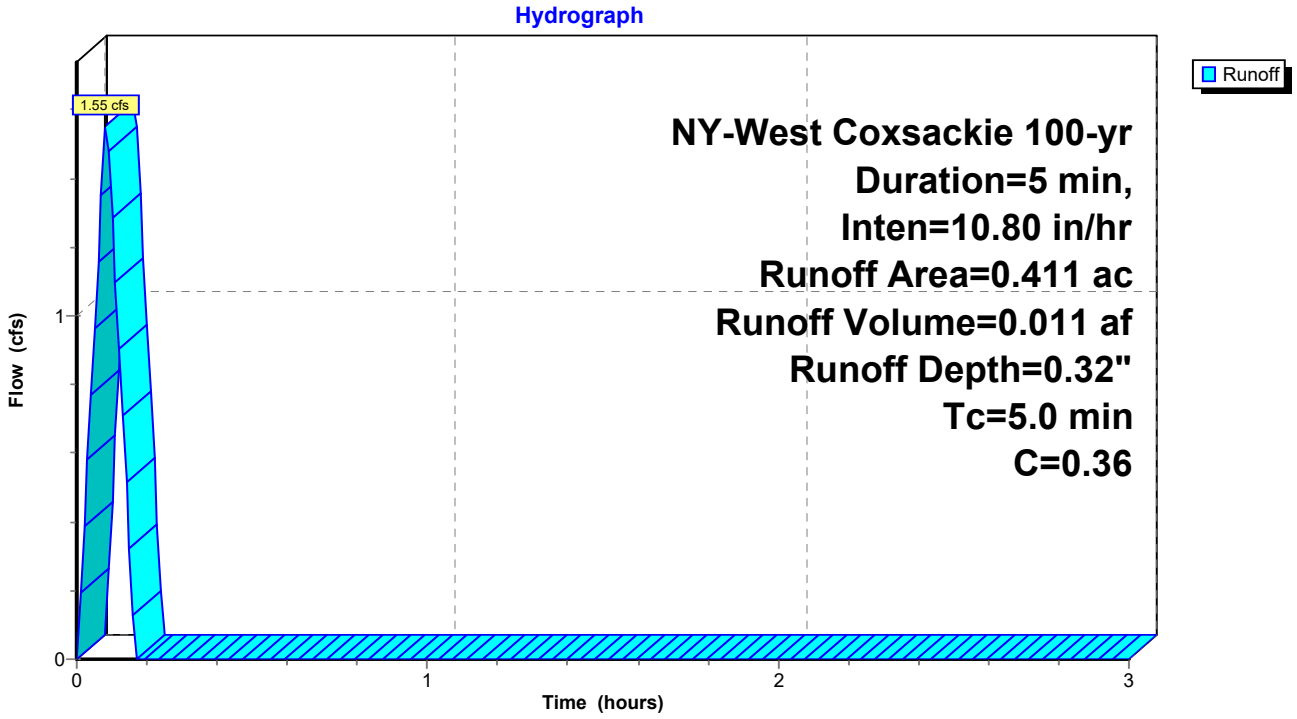
Runoff = 1.55 cfs @ 0.08 hrs, Volume= 0.011 af, Depth= 0.32"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 100-yr Duration=5 min, Inten=10.80 in/hr

Area (ac)	C	Description
0.411	0.36	Woods/grass comb., Fair, HSG C
0.411		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 61310+00



Summary for Subcatchment 2S: 61326+25

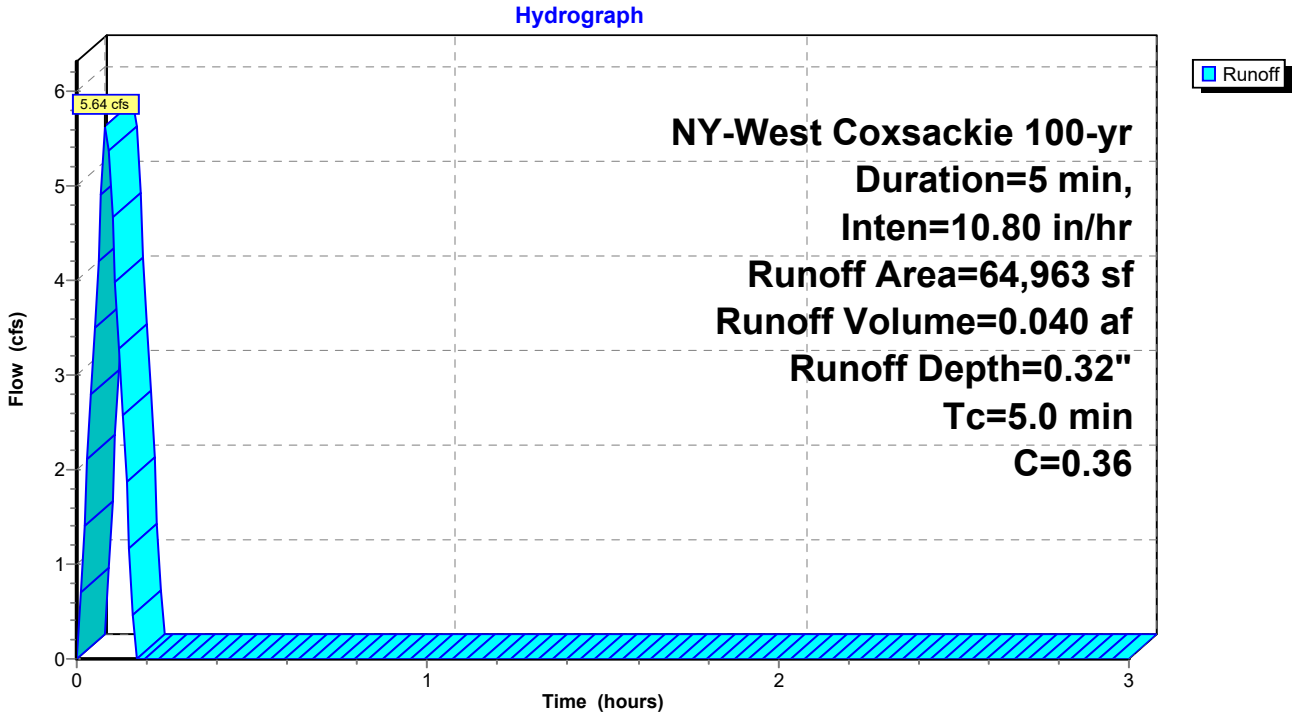
Runoff = 5.64 cfs @ 0.08 hrs, Volume= 0.040 af, Depth= 0.32"
Routed to Reach 1R : 61326+25

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 100-yr Duration=5 min, Inten=10.80 in/hr

Area (sf)	C	Description
64,963	0.36	Woods/grass comb., Fair, HSG C
64,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: 61326+25



Summary for Subcatchment 3S: 61356+70

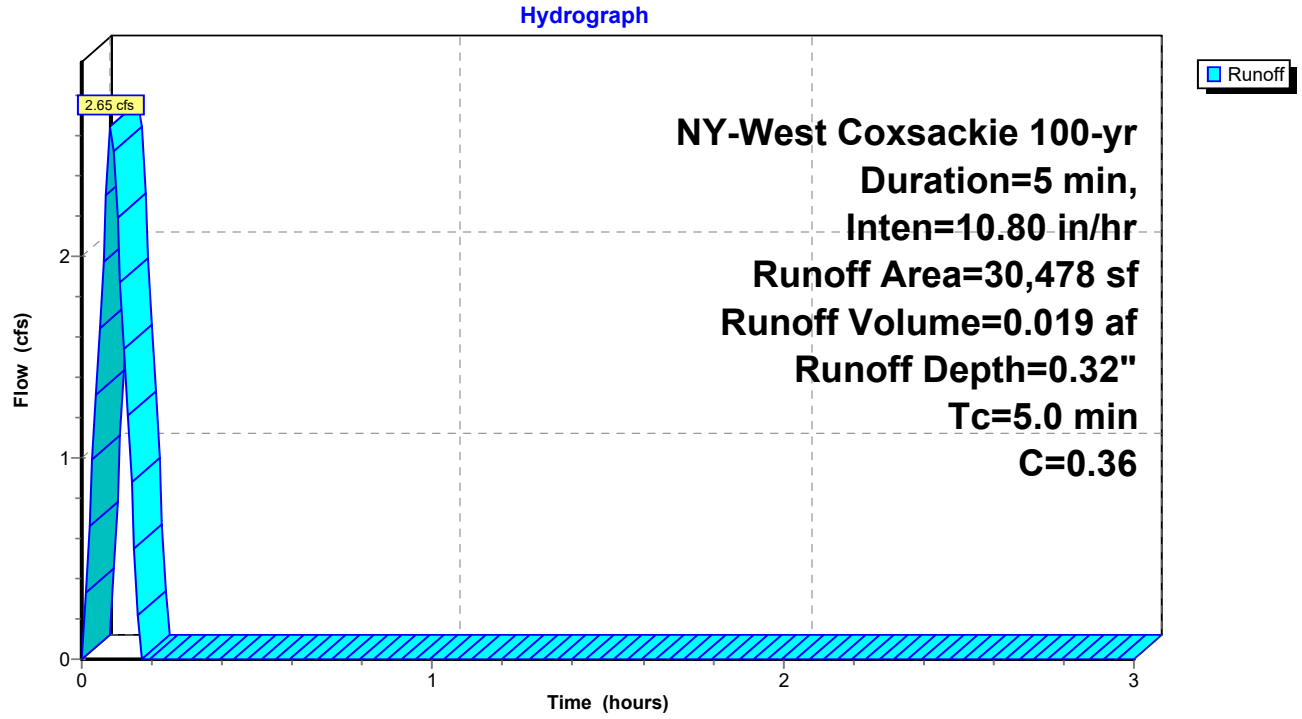
Runoff = 2.65 cfs @ 0.08 hrs, Volume= 0.019 af, Depth= 0.32"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 100-yr Duration=5 min, Inten=10.80 in/hr

Area (sf)	C	Description
30,478	0.36	Woods/grass comb., Fair, HSG C
30,478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: 61356+70



Summary for Subcatchment 4S: 62569+50

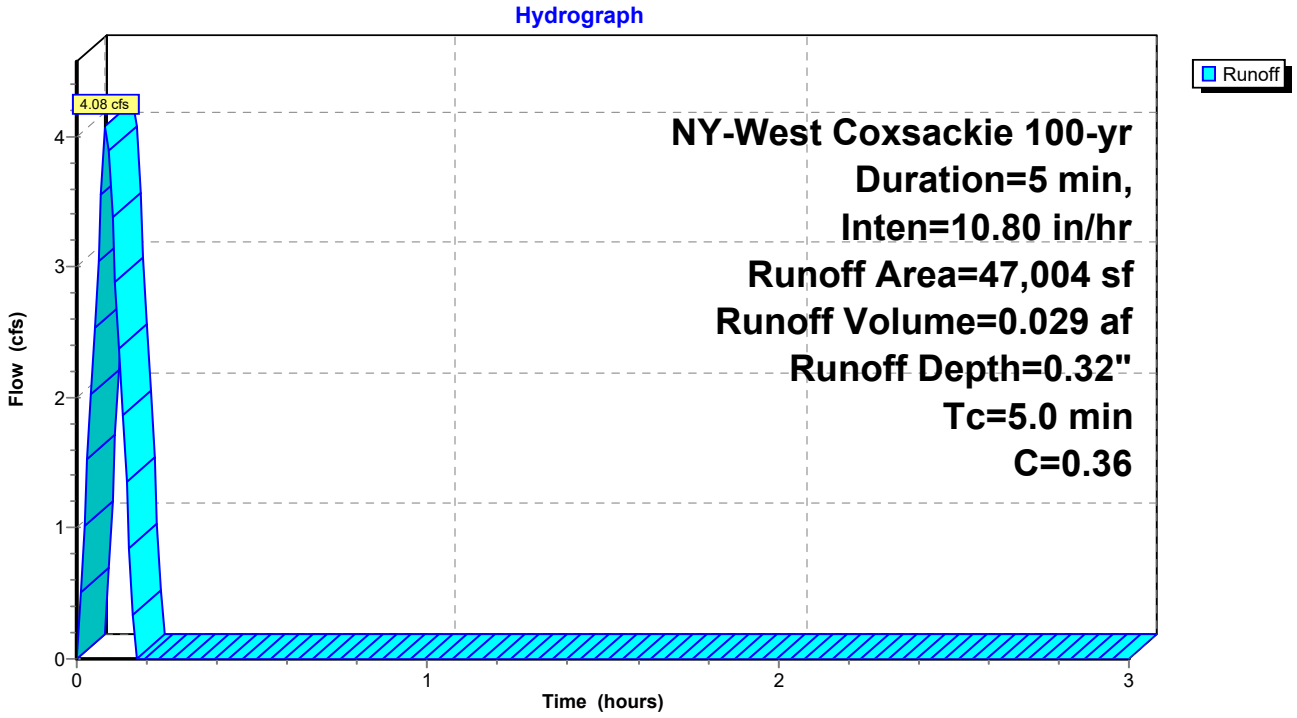
Runoff = 4.08 cfs @ 0.08 hrs, Volume= 0.029 af, Depth= 0.32"
Routed to nonexistent node 16P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 100-yr Duration=5 min, Inten=10.80 in/hr

Area (sf)	C	Description
47,004	0.36	Woods/grass comb., Fair, HSG C
47,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: 62569+50



Summary for Subcatchment 5S: 62570+00

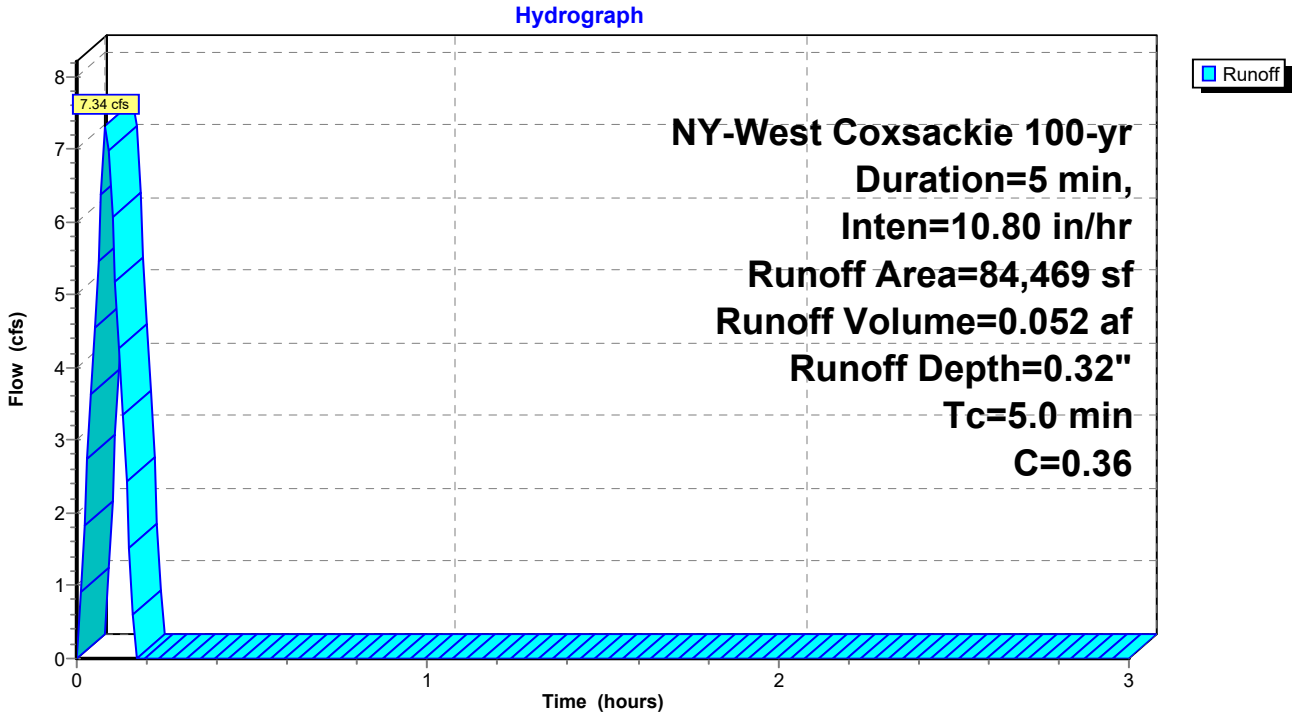
Runoff = 7.34 cfs @ 0.08 hrs, Volume= 0.052 af, Depth= 0.32"
Routed to nonexistent node 15P

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
NY-West Coxsackie 100-yr Duration=5 min, Inten=10.80 in/hr

Area (sf)	C	Description
37,465	0.36	Woods/grass comb., Fair, HSG C
47,004	0.36	Woods/grass comb., Fair, HSG C
84,469	0.36	Weighted Average
84,469		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: 62570+00



Summary for Reach 1R: 61326+25

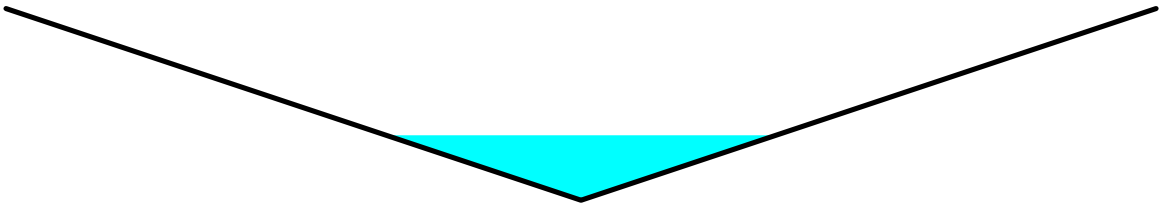
[65] Warning: Inlet elevation not specified

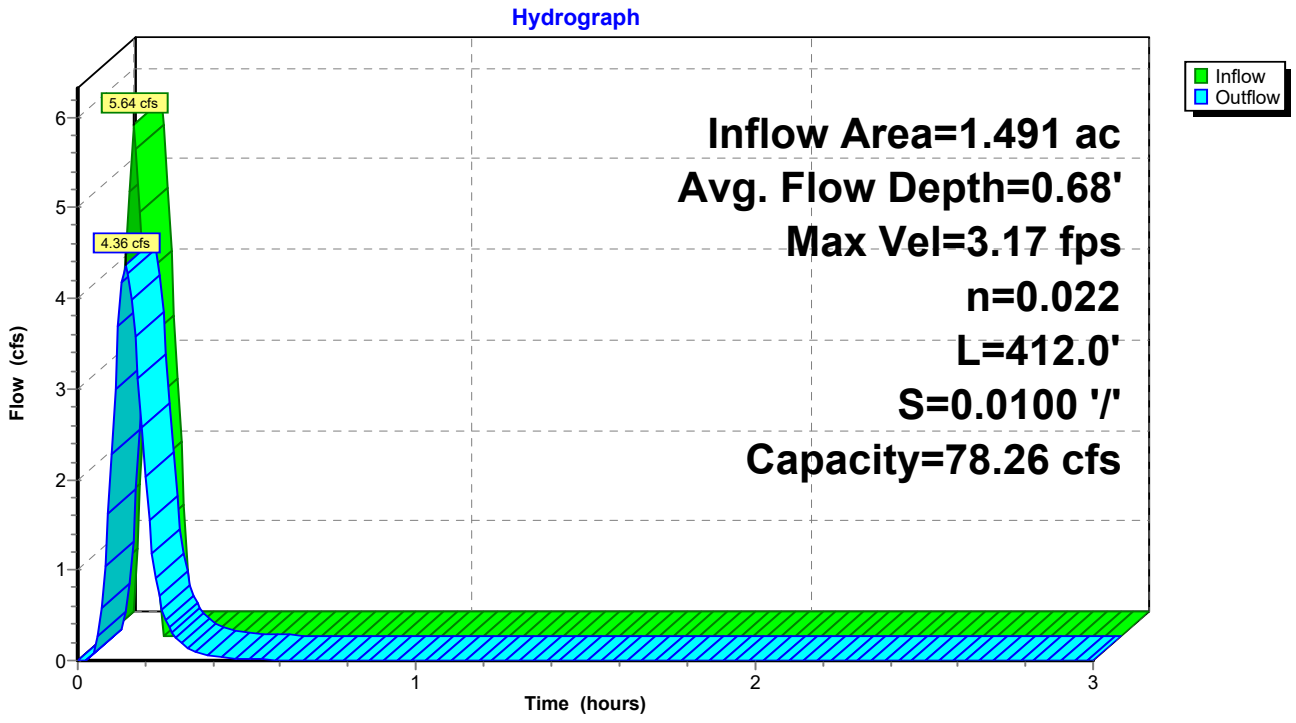
Inflow Area = 1.491 ac, 0.00% Impervious, Inflow Depth = 0.32" for 100-yr event
Inflow = 5.64 cfs @ 0.08 hrs, Volume= 0.040 af
Outflow = 4.36 cfs @ 0.14 hrs, Volume= 0.040 af, Atten= 23%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 9.9 min

Peak Storage= 570 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.68' , Surface Width= 4.08'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 78.26 cfs

0.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 12.00'
Length= 412.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -4.12'





HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 2.63 cfs
Design Flow: 3.2 cfs
Maximum Flow: 4.08 cfs

Table 1 - Summary of Culvert Flows at Crossing: 62569+50

Headwater Elevatio	Total Discharge (c	62569+50 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
131.13	2.63	2.63	0.00	1
131.16	2.77	2.77	0.00	1
131.19	2.92	2.92	0.00	1
131.23	3.06	3.06	0.00	1
131.25	3.20	3.20	0.00	1
131.29	3.36	3.36	0.00	1
131.32	3.50	3.50	0.00	1
131.35	3.65	3.65	0.00	1
131.38	3.79	3.79	0.00	1
131.41	3.94	3.94	0.00	1
131.45	4.08	4.08	0.00	1
132.80	8.28	8.28	0.00	Overtopping

Rating Curve Plot for Crossing: 62569+50

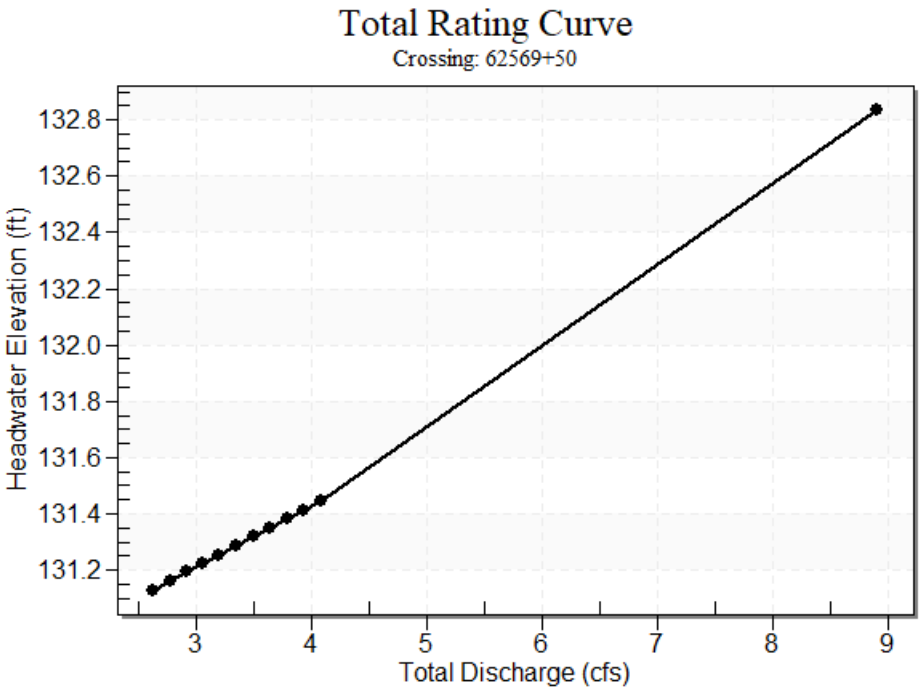


Table 2 - Culvert Summary Table: 62569+50

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2.63	2.63	131.13	0.930	0.0*	1-S2r	0.334	0.650	0.345	0.294	9.537	4.763
2.77	2.77	131.16	0.962	0.0*	1-S2r	0.343	0.669	0.356	0.302	9.645	4.832
2.92	2.92	131.19	0.994	0.0*	1-S2r	0.353	0.687	0.366	0.309	9.742	4.901
3.06	3.06	131.23	1.026	0.0*	1-S2r	0.361	0.704	0.377	0.317	9.836	4.966
3.20	3.20	131.25	1.055	0.0*	1-S2r	0.369	0.720	0.384	0.323	9.989	5.024
3.36	3.36	131.29	1.088	0.0*	1-S2r	0.378	0.738	0.396	0.331	10.044	5.087
3.50	3.50	131.32	1.119	0.0*	1-S2r	0.387	0.755	0.406	0.338	10.130	5.144
3.65	3.65	131.35	1.151	0.0*	1-S2r	0.395	0.771	0.415	0.345	10.221	5.200
3.79	3.79	131.38	1.183	0.0*	1-S2r	0.403	0.787	0.424	0.351	10.338	5.256
3.94	3.94	131.41	1.215	0.0*	1-S2r	0.411	0.802	0.433	0.358	10.420	5.307
4.08	4.08	131.45	1.247	0.0*	1-S2r	0.419	0.817	0.442	0.364	10.513	5.359

* Full Flow Headwater elevation is below inlet invert.

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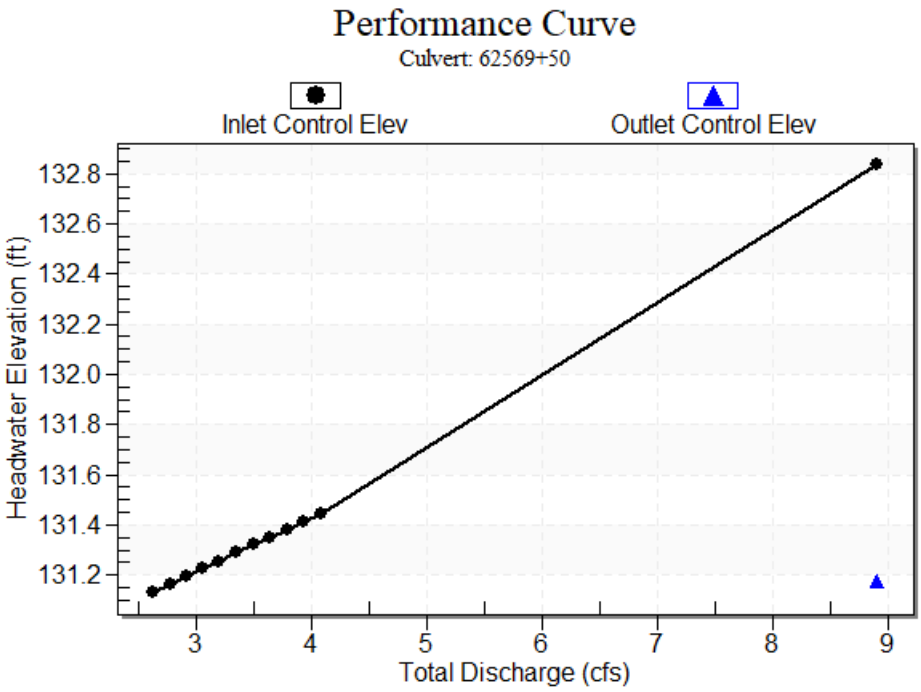
Straight Culvert

Inlet Elevation (invert): 130.20 ft, Outlet Elevation (invert): 127.90 ft

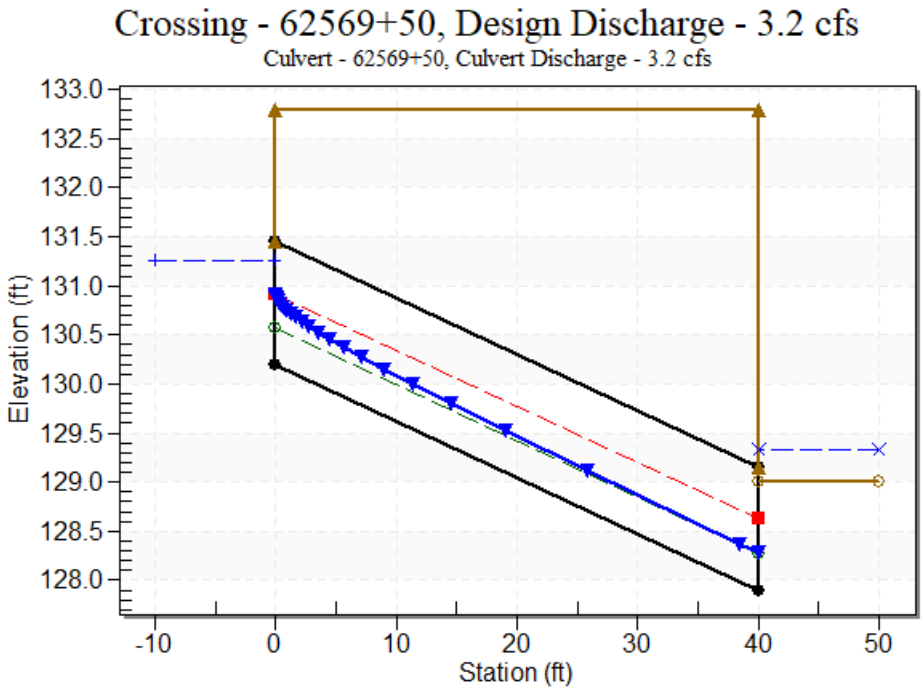
Culvert Length: 40.07 ft, Culvert Slope: 0.0575

****

Culvert Performance Curve Plot: 62569+50



Water Surface Profile Plot for Culvert: 62569+50



Site Data - 62569+50

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 130.20 ft
Outlet Station: 40.00 ft
Outlet Elevation: 127.90 ft
Number of Barrels: 1

Culvert Data Summary - 62569+50

Barrel Shape: Circular
Barrel Diameter: 1.25 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: 62569+50)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s	Shear (psf)	Froude Number
2.63	129.29	0.29	4.76	1.05	1.88
2.77	129.30	0.30	4.83	1.08	1.88
2.92	129.31	0.31	4.90	1.11	1.89
3.06	129.32	0.32	4.97	1.14	1.90
3.20	129.32	0.32	5.02	1.16	1.90
3.36	129.33	0.33	5.09	1.19	1.91
3.50	129.34	0.34	5.14	1.21	1.91
3.65	129.34	0.34	5.20	1.24	1.92
3.79	129.35	0.35	5.26	1.26	1.92
3.94	129.36	0.36	5.31	1.28	1.93
4.08	129.36	0.36	5.36	1.31	1.93

Tailwater Channel Data - 62569+50

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0575
Channel Manning's n: 0.0250
Channel Invert Elevation: 129.00 ft

Roadway Data for Crossing: 62569+50

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 24.00 ft
Crest Elevation: 132.80 ft
Roadway Surface: Paved
Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 4.73 cfs
Design Flow: 5.75 cfs
Maximum Flow: 7.34 cfs

Table 4 - Summary of Culvert Flows at Crossing: 62570+00

Headwater Elevatio	Total Discharge (c	62570+00 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
126.25	4.73	4.73	0.00	1
126.29	4.99	4.99	0.00	1
126.33	5.25	5.25	0.00	1
126.37	5.51	5.51	0.00	1
126.41	5.75	5.75	0.00	1
126.46	6.04	6.04	0.00	1
126.50	6.30	6.30	0.00	1
126.55	6.56	6.56	0.00	1
126.59	6.82	6.82	0.00	1
126.64	7.08	7.08	0.00	1
126.69	7.34	7.34	0.00	1
131.00	19.64	19.64	0.00	Overtopping

Rating Curve Plot for Crossing: 62570+00

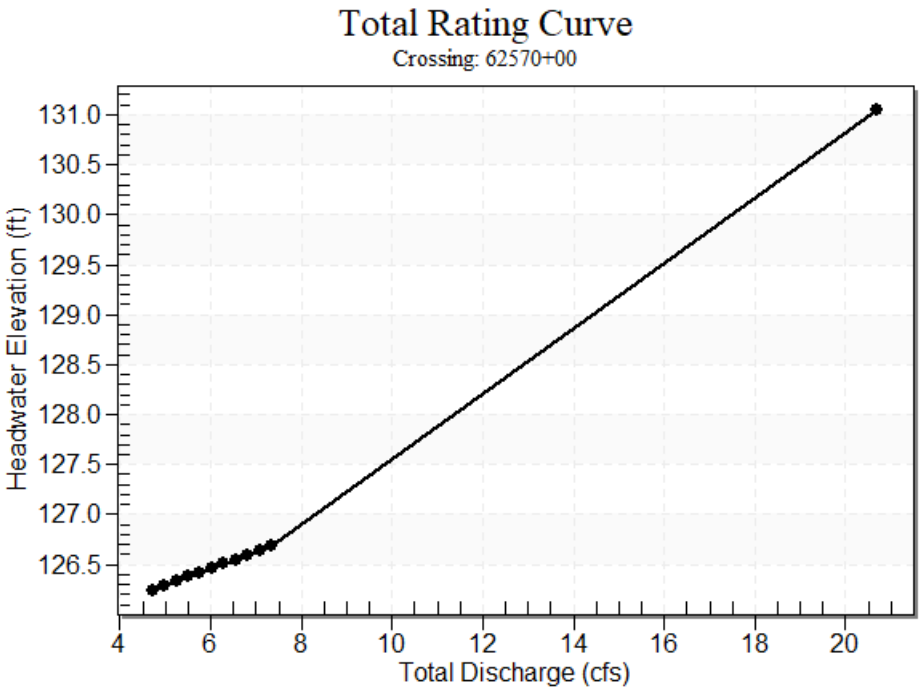


Table 5 - Culvert Summary Table: 62570+00

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
4.73	4.73	126.25	1.245	0.859	1-JS1	0.605	0.836	1.500	0.575	2.677	3.015
4.99	4.99	126.29	1.288	0.905	1-JS1	0.623	0.859	1.500	0.590	2.824	3.057
5.25	5.25	126.33	1.331	0.953	1-JS1	0.641	0.883	1.500	0.603	2.972	3.098
5.51	5.51	126.37	1.374	1.002	1-JS1	0.658	0.905	1.500	0.617	3.120	3.137
5.75	5.75	126.41	1.413	1.048	1-JS1	0.674	0.925	1.500	0.629	3.254	3.170
6.04	6.04	126.46	1.461	1.104	1-JS1	0.693	0.949	1.500	0.642	3.415	3.210
6.30	6.30	126.50	1.505	1.157	5-JS1	0.710	0.970	1.500	0.655	3.563	3.244
6.56	6.56	126.55	1.549	1.212	5-JS1	0.727	0.990	1.500	0.667	3.711	3.279
6.82	6.82	126.59	1.595	1.268	5-JS1	0.744	1.010	1.500	0.678	3.858	3.311
7.08	7.08	126.64	1.642	1.325	5-JS1	0.760	1.030	1.500	0.690	4.006	3.344
7.34	7.34	126.69	1.689	1.384	5-JS1	0.777	1.049	1.500	0.701	4.154	3.375

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Straight Culvert

Inlet Elevation (invert): 125.00 ft, Outlet Elevation (invert): 124.00 ft

Culvert Length: 68.01 ft, Culvert Slope: 0.0147

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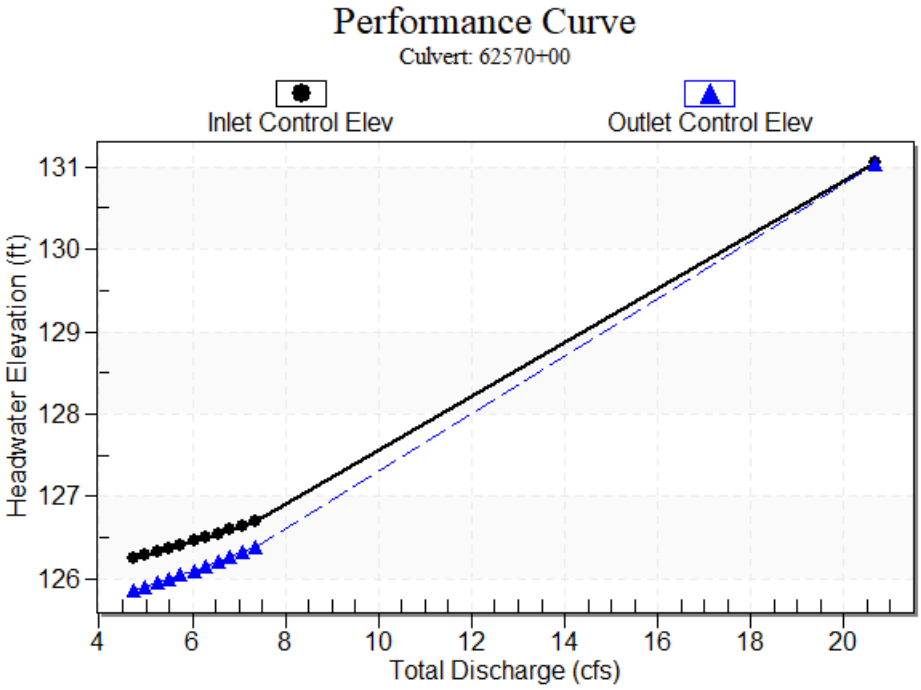
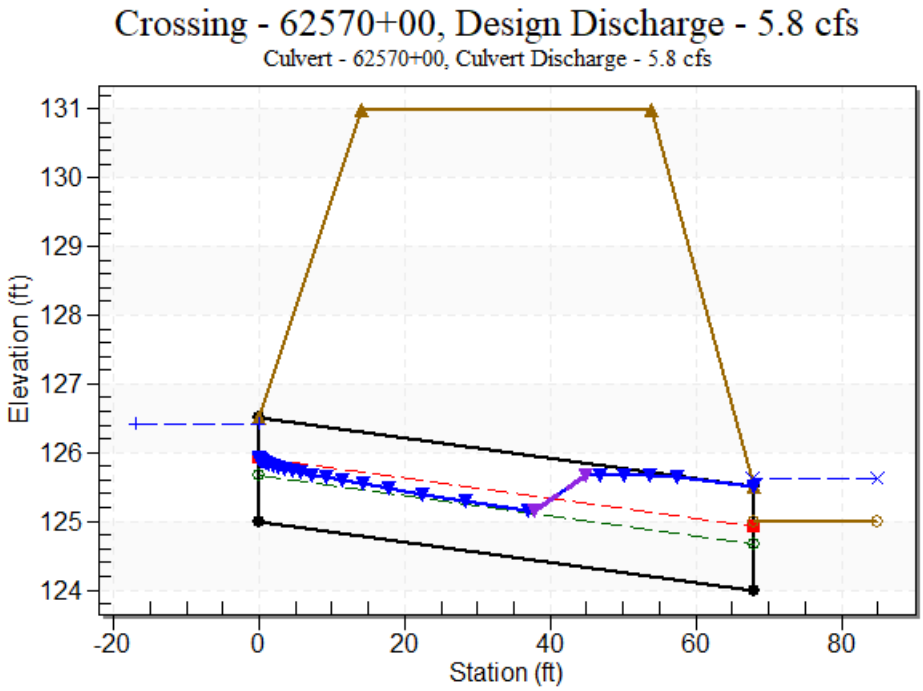
Culvert Performance Curve Plot: 62570+00



Water Surface Profile Plot for Culvert: 62570+00



Site Data - 62570+00

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 125.00 ft
Outlet Station: 68.00 ft
Outlet Elevation: 124.00 ft
Number of Barrels: 1

Culvert Data Summary - 62570+00

Barrel Shape: Circular
Barrel Diameter: 1.50 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 6 - Downstream Channel Rating Curve (Crossing: 62570+00)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s	Shear (psf)	Froude Number
4.73	125.58	0.58	3.02	0.53	0.90
4.99	125.59	0.59	3.06	0.54	0.90
5.25	125.60	0.60	3.10	0.55	0.90
5.51	125.62	0.62	3.14	0.57	0.90
5.75	125.63	0.63	3.17	0.58	0.91
6.04	125.64	0.64	3.21	0.59	0.91
6.30	125.65	0.65	3.24	0.60	0.91
6.56	125.67	0.67	3.28	0.61	0.91
6.82	125.68	0.68	3.31	0.62	0.92
7.08	125.69	0.69	3.34	0.63	0.92
7.34	125.70	0.70	3.37	0.64	0.92

Tailwater Channel Data - 62570+00

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0147
Channel Manning's n: 0.0290
Channel Invert Elevation: 125.00 ft

Roadway Data for Crossing: 62570+00

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 24.00 ft
Crest Elevation: 131.00 ft
Roadway Surface: Paved
Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 14 cfs
Design Flow: 19.2 cfs
Maximum Flow: 28.6 cfs

Table 7 - Summary of Culvert Flows at Crossing: 62537+00

Headwater Elevatio	Total Discharge (c	60537+00 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
128.65	14.00	14.00	0.00	1
128.75	15.46	15.46	0.00	1
128.86	16.92	16.92	0.00	1
128.96	18.38	18.38	0.00	1
129.01	19.20	19.20	0.00	1
129.15	21.30	21.30	0.00	1
129.24	22.76	22.76	0.00	1
129.32	24.22	24.22	0.00	1
129.41	25.68	25.68	0.00	1
129.50	27.14	27.14	0.00	1
129.58	28.60	28.60	0.00	1
136.00	94.01	94.01	0.00	Overtopping

Rating Curve Plot for Crossing: 62537+00

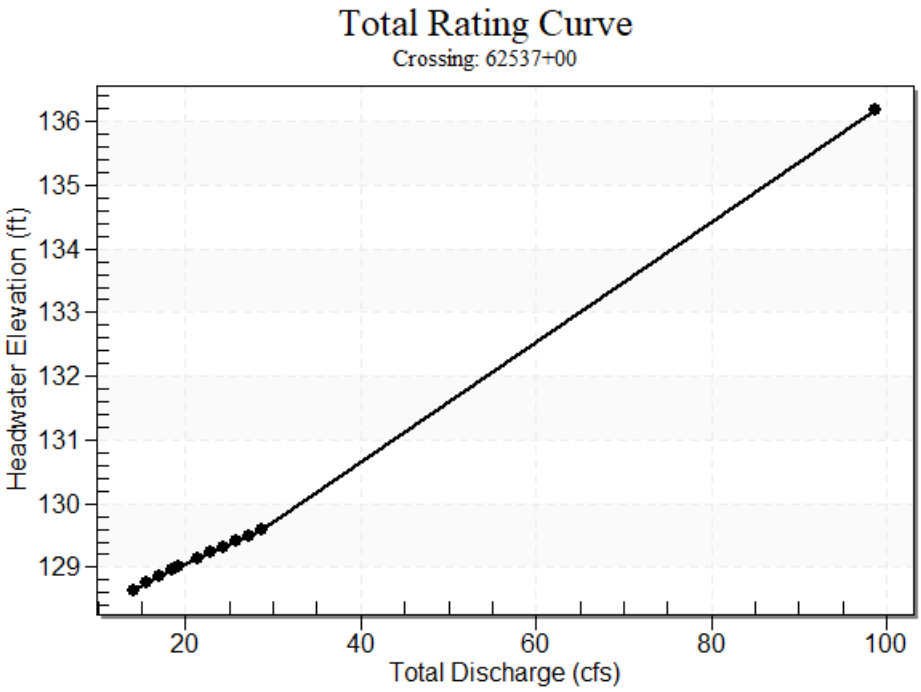


Table 8 - Culvert Summary Table: 60537+00

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
14.00	14.00	128.65	1.646	0.888	1-JS1	0.699	1.191	2.768	0.768	2.054	5.519
15.46	15.46	128.75	1.755	0.948	1-JS1	0.734	1.254	2.802	0.802	2.251	5.659
16.92	16.92	128.86	1.858	1.009	1-JS1	0.769	1.315	2.834	0.834	2.447	5.791
18.38	18.38	128.96	1.957	1.071	1-JS1	0.802	1.373	2.865	0.865	2.644	5.913
19.20	19.20	129.01	2.011	1.106	1-JS1	0.820	1.405	2.881	0.881	2.754	5.979
21.30	21.30	129.15	2.146	1.199	1-JS1	0.865	1.483	2.922	0.922	3.035	6.138
22.76	22.76	129.24	2.236	1.265	1-JS1	0.895	1.535	2.948	0.948	3.235	6.242
24.22	24.22	129.32	2.324	1.332	1-JS1	0.924	1.586	2.974	0.974	3.426	6.341
25.68	25.68	129.41	2.410	1.402	1-JS1	0.952	1.636	2.999	0.999	3.633	6.435
27.14	27.14	129.50	2.496	1.472	1-JS1	0.980	1.684	3.000	1.022	3.840	6.526
28.60	28.60	129.58	2.581	1.545	1-JS1	1.008	1.730	3.000	1.046	4.046	6.613

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Straight Culvert

Inlet Elevation (invert): 127.00 ft, Outlet Elevation (invert): 125.00 ft

Culvert Length: 76.03 ft, Culvert Slope: 0.0263

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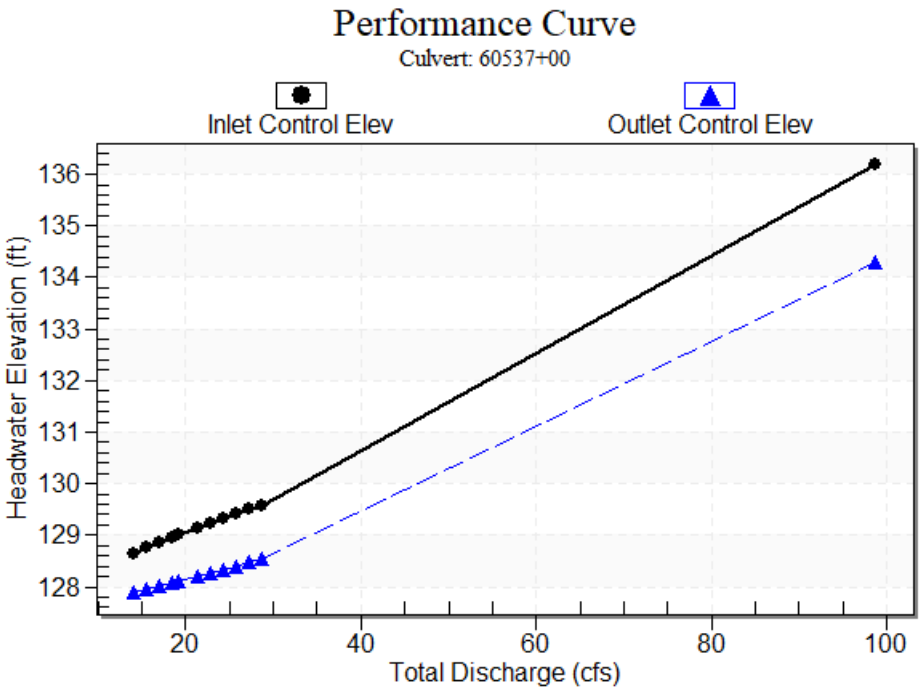
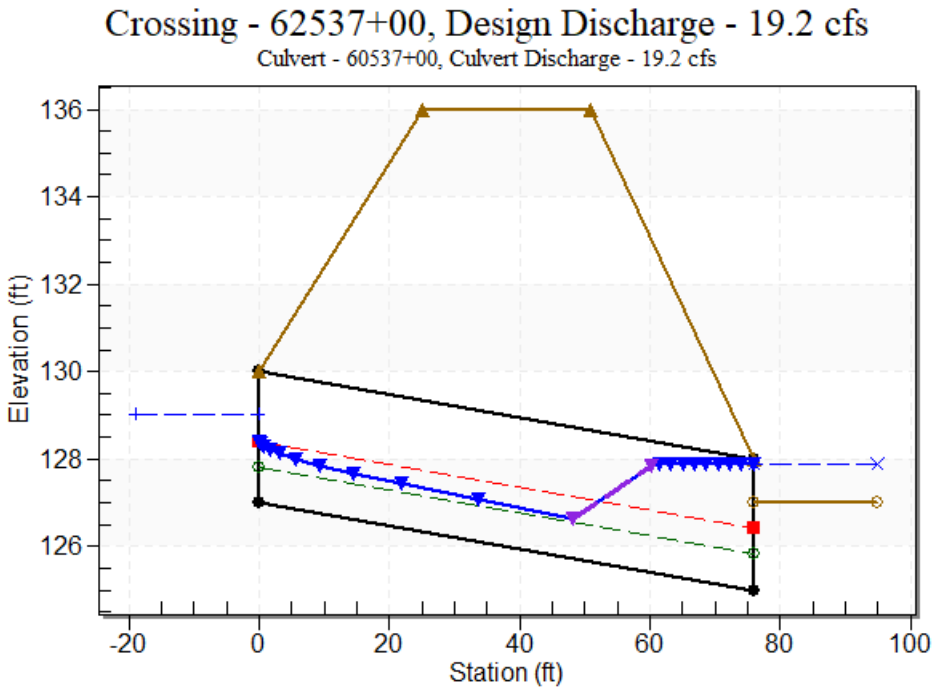
Culvert Performance Curve Plot: 60537+00



Water Surface Profile Plot for Culvert: 60537+00



Site Data - 60537+00

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 127.00 ft
Outlet Station: 76.00 ft
Outlet Elevation: 125.00 ft
Number of Barrels: 1

Culvert Data Summary - 60537+00

Barrel Shape: Circular
Barrel Diameter: 3.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 9 - Downstream Channel Rating Curve (Crossing: 62537+00)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
14.00	127.77	0.77	5.52	1.26	1.45
15.46	127.80	0.80	5.66	1.32	1.45
16.92	127.83	0.83	5.79	1.37	1.46
18.38	127.86	0.86	5.91	1.42	1.47
19.20	127.88	0.88	5.98	1.45	1.47
21.30	127.92	0.92	6.14	1.51	1.48
22.76	127.95	0.95	6.24	1.56	1.49
24.22	127.97	0.97	6.34	1.60	1.50
25.68	128.00	1.00	6.44	1.64	1.50
27.14	128.02	1.02	6.53	1.68	1.51
28.60	128.05	1.05	6.61	1.72	1.51

Tailwater Channel Data - 62537+00

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0263
Channel Manning's n: 0.0250
Channel Invert Elevation: 127.00 ft

Roadway Data for Crossing: 62537+00

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 16.00 ft
Crest Elevation: 136.00 ft
Roadway Surface: Gravel
Roadway Top Width: 26.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 12.9 cfs
Design Flow: 17.8 cfs
Maximum Flow: 26.6 cfs

Table 10 - Summary of Culvert Flows at Crossing: 64109+35

Headwater Elevatio	Total Discharge (c	64109+35 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
113.99	12.90	12.90	0.00	1
114.09	14.27	14.27	0.00	1
114.19	15.64	15.64	0.00	1
114.29	17.01	17.01	0.00	1
114.34	17.80	17.80	0.00	1
114.47	19.75	19.75	0.00	1
114.56	21.12	21.12	0.00	1
114.64	22.49	22.49	0.00	1
114.73	23.86	23.86	0.00	1
114.81	25.23	25.23	0.00	1
114.89	26.60	26.60	0.00	1
117.00	57.40	57.40	0.00	Overtopping

Rating Curve Plot for Crossing: 64109+35

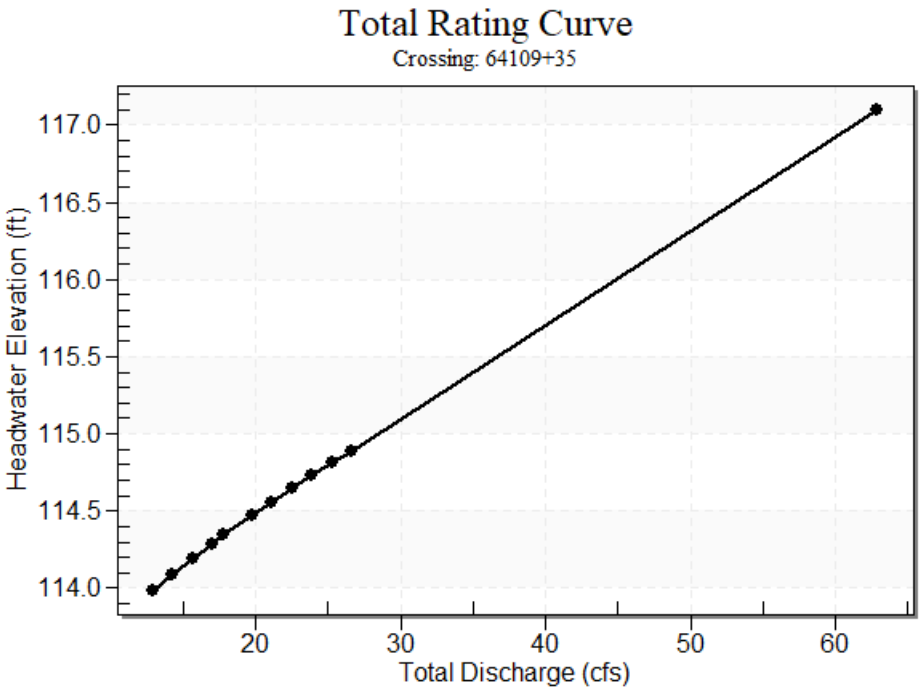


Table 11 - Culvert Summary Table: 64109+35

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
12.90	12.90	113.99	1.489	0.671	1-JS1	0.516	1.142	3.000	0.584	1.825	8.026
14.27	14.27	114.09	1.592	0.722	1-JS1	0.543	1.203	3.000	0.611	2.019	8.236
15.64	15.64	114.19	1.693	0.774	1-JS1	0.567	1.262	3.000	0.637	2.213	8.432
17.01	17.01	114.29	1.790	0.827	1-JS1	0.591	1.318	3.000	0.661	2.406	8.616
17.80	17.80	114.34	1.844	0.858	1-JS1	0.605	1.350	3.000	0.675	2.518	8.716
19.75	19.75	114.47	1.972	0.937	1-JS1	0.636	1.426	3.000	0.707	2.794	8.951
21.12	21.12	114.56	2.060	0.994	1-JS1	0.658	1.476	3.000	0.728	2.988	9.104
22.49	22.49	114.64	2.144	1.053	1-JS1	0.679	1.526	3.000	0.749	3.182	9.251
23.86	23.86	114.73	2.227	1.114	1-JS1	0.700	1.574	3.000	0.769	3.375	9.392
25.23	25.23	114.81	2.309	1.176	1-JS1	0.719	1.621	3.000	0.788	3.569	9.527
26.60	26.60	114.89	2.390	1.240	1-JS1	0.739	1.666	3.000	0.806	3.763	9.655

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Straight Culvert

Inlet Elevation (invert): 112.50 ft, Outlet Elevation (invert): 105.50 ft

Culvert Length: 92.27 ft, Culvert Slope: 0.0761

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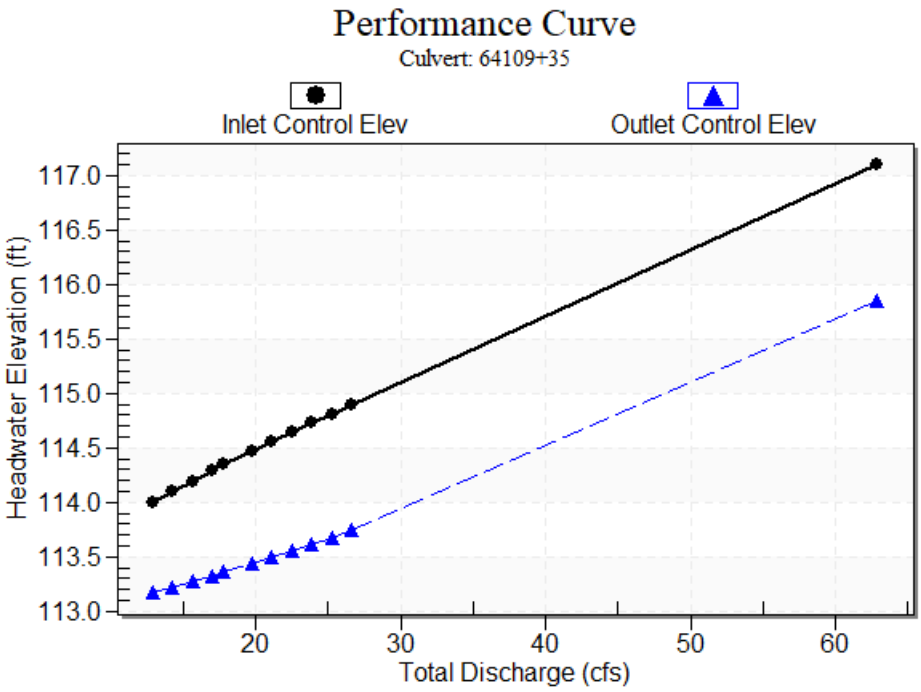
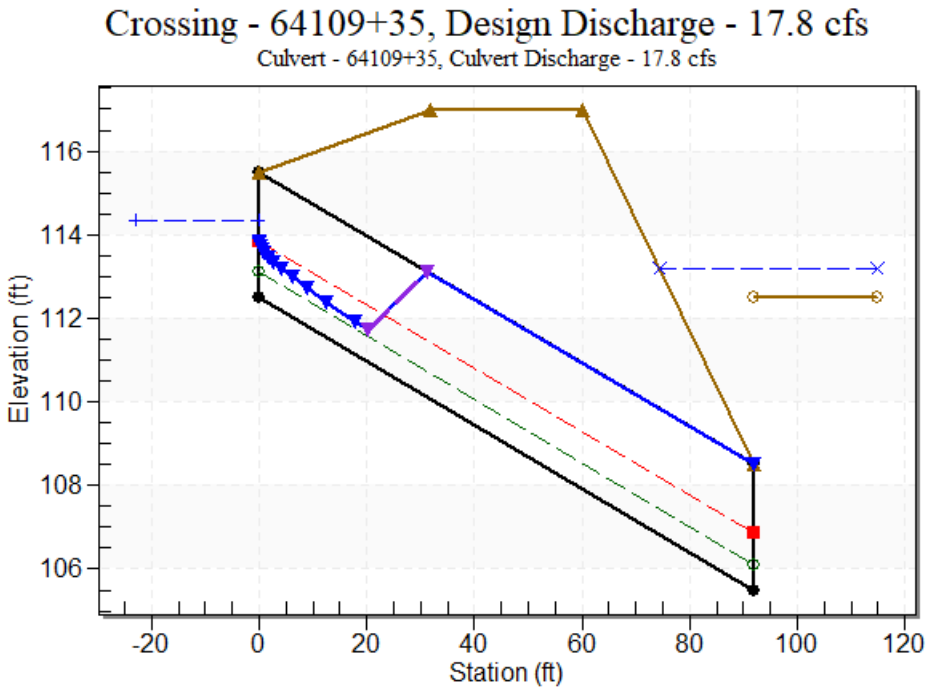
Culvert Performance Curve Plot: 64109+35



Water Surface Profile Plot for Culvert: 64109+35



Site Data - 64109+35

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 112.50 ft
Outlet Station: 92.00 ft
Outlet Elevation: 105.50 ft
Number of Barrels: 1

Culvert Data Summary - 64109+35

Barrel Shape: Circular
Barrel Diameter: 3.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 12 - Downstream Channel Rating Curve (Crossing: 64109+35)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
12.90	113.08	0.58	8.03	2.77	2.37
14.27	113.11	0.61	8.24	2.90	2.38
15.64	113.14	0.64	8.43	3.03	2.40
17.01	113.16	0.66	8.62	3.14	2.41
17.80	113.18	0.68	8.72	3.21	2.42
19.75	113.21	0.71	8.95	3.36	2.43
21.12	113.23	0.73	9.10	3.46	2.44
22.49	113.25	0.75	9.25	3.56	2.45
23.86	113.27	0.77	9.39	3.65	2.46
25.23	113.29	0.79	9.53	3.74	2.47
26.60	113.31	0.81	9.65	3.83	2.48

Tailwater Channel Data - 64109+35

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0761
Channel Manning's n: 0.0250
Channel Invert Elevation: 112.50 ft

Roadway Data for Crossing: 64109+35

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 52.00 ft
Crest Elevation: 117.00 ft
Roadway Surface: Gravel
Roadway Top Width: 28.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 1 cfs
Design Flow: 1.22 cfs
Maximum Flow: 1.55 cfs

Table 13 - Summary of Culvert Flows at Crossing: 61310+00

Headwater Elevatio	Total Discharge (c	61310+00 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
204.53	1.00	1.00	0.00	1
204.55	1.05	1.05	0.00	1
204.56	1.11	1.11	0.00	1
204.58	1.17	1.17	0.00	1
204.59	1.22	1.22	0.00	1
204.61	1.27	1.27	0.00	1
204.62	1.33	1.33	0.00	1
204.64	1.39	1.39	0.00	1
204.65	1.44	1.44	0.00	1
204.67	1.50	1.50	0.00	1
204.69	1.55	1.55	0.00	1
206.00	6.70	6.70	0.00	Overtopping

Rating Curve Plot for Crossing: 61310+00

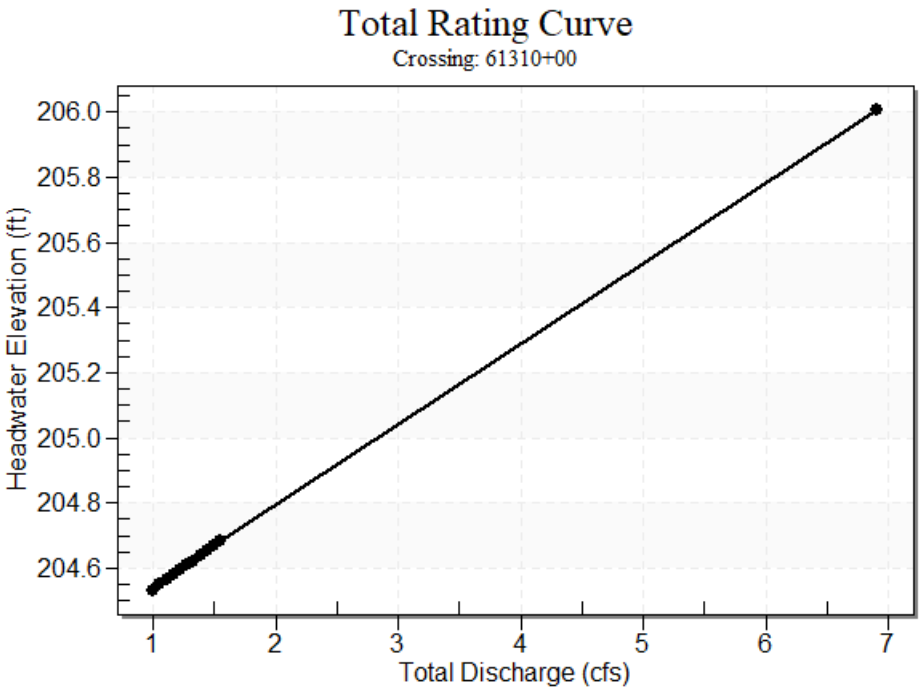


Table 14 - Culvert Summary Table: 61310+00

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1.00	1.00	204.53	0.533	0.264	1-JS1	0.270	0.393	1.238	0.238	0.815	2.454
1.05	1.05	204.55	0.549	0.273	1-JS1	0.278	0.404	1.244	0.244	0.860	2.492
1.11	1.11	204.56	0.564	0.283	1-JS1	0.285	0.415	1.250	0.251	0.905	2.526
1.17	1.17	204.58	0.578	0.292	1-JS1	0.292	0.425	1.250	0.257	0.949	2.561
1.22	1.22	204.59	0.593	0.302	1-JS1	0.299	0.435	1.250	0.263	0.994	2.592
1.27	1.27	204.61	0.607	0.311	1-JS1	0.305	0.446	1.250	0.269	1.039	2.625
1.33	1.33	204.62	0.621	0.321	1-JS1	0.312	0.455	1.250	0.275	1.084	2.655
1.39	1.39	204.64	0.637	0.330	1-JS1	0.319	0.465	1.250	0.280	1.129	2.684
1.44	1.44	204.65	0.653	0.340	1-JS1	0.325	0.475	1.250	0.286	1.173	2.712
1.50	1.50	204.67	0.669	0.349	1-JS1	0.331	0.484	1.250	0.291	1.218	2.741
1.55	1.55	204.69	0.685	0.359	1-JS1	0.337	0.493	1.250	0.296	1.263	2.769

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Straight Culvert

Inlet Elevation (invert): 204.00 ft, Outlet Elevation (invert): 203.00 ft

Culvert Length: 52.01 ft, Culvert Slope: 0.0192

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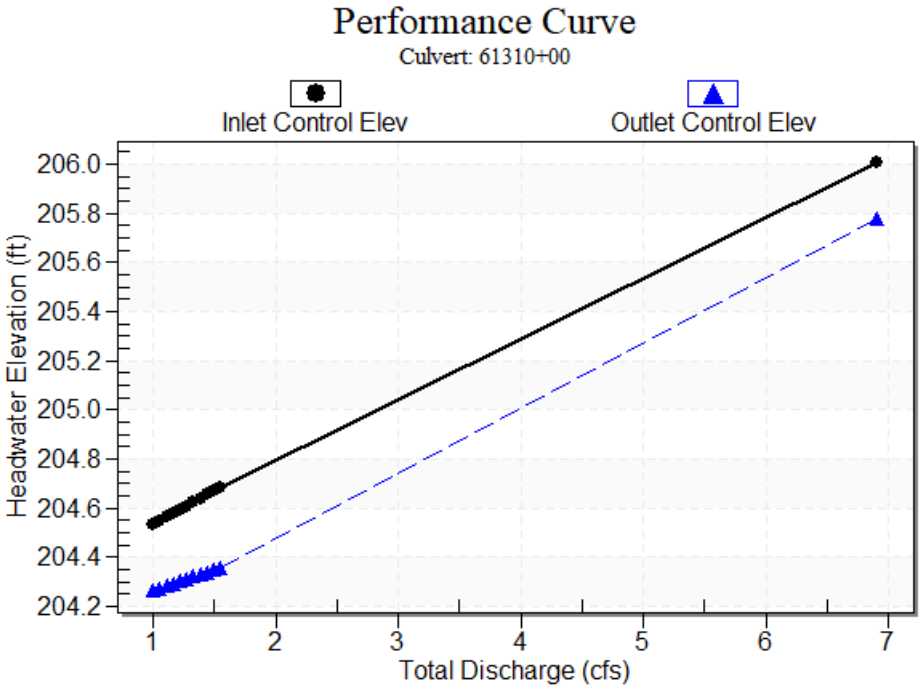
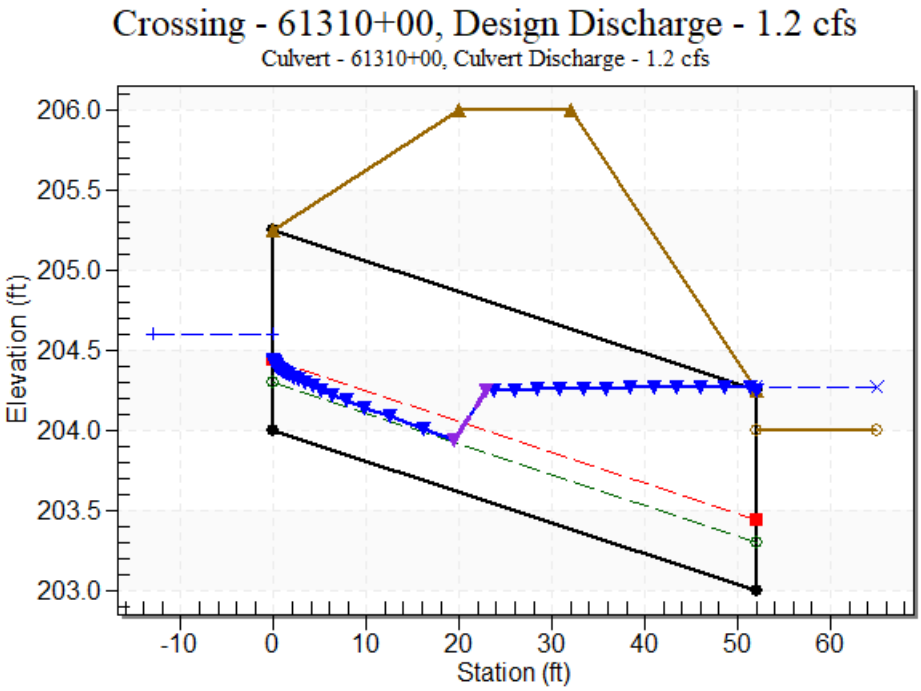
Culvert Performance Curve Plot: 61310+00



Water Surface Profile Plot for Culvert: 61310+00



Site Data - 61310+00

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 204.00 ft
Outlet Station: 52.00 ft
Outlet Elevation: 203.00 ft
Number of Barrels: 1

Culvert Data Summary - 61310+00

Barrel Shape: Circular
Barrel Diameter: 1.25 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 15 - Downstream Channel Rating Curve (Crossing: 61310+00)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
1.00	204.24	0.24	2.45	0.28	1.06
1.05	204.24	0.24	2.49	0.29	1.06
1.11	204.25	0.25	2.53	0.30	1.06
1.17	204.26	0.26	2.56	0.31	1.07
1.22	204.26	0.26	2.59	0.32	1.07
1.27	204.27	0.27	2.62	0.32	1.07
1.33	204.27	0.27	2.65	0.33	1.08
1.39	204.28	0.28	2.68	0.34	1.08
1.44	204.29	0.29	2.71	0.34	1.08
1.50	204.29	0.29	2.74	0.35	1.08
1.55	204.30	0.30	2.77	0.36	1.09

Tailwater Channel Data - 61310+00

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0192
Channel Manning's n: 0.0250
Channel Invert Elevation: 204.00 ft

Roadway Data for Crossing: 61310+00

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 84.00 ft
Crest Elevation: 206.00 ft
Roadway Surface: Gravel
Roadway Top Width: 12.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 1.71 cfs
Design Flow: 2.08 cfs
Maximum Flow: 2.65 cfs

Table 16 - Summary of Culvert Flows at Crossing: 61356+70

Headwater Elevatio	Total Discharge (c	61356+70 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
201.17	1.71	1.71	0.00	1
201.19	1.80	1.80	0.00	1
201.22	1.90	1.90	0.00	1
201.24	1.99	1.99	0.00	1
201.26	2.08	2.08	0.00	1
201.29	2.18	2.18	0.00	1
201.31	2.27	2.27	0.00	1
201.33	2.37	2.37	0.00	1
201.35	2.46	2.46	0.00	1
201.37	2.56	2.56	0.00	1
201.40	2.65	2.65	0.00	1
203.50	9.22	9.22	0.00	Overtopping

Rating Curve Plot for Crossing: 61356+70

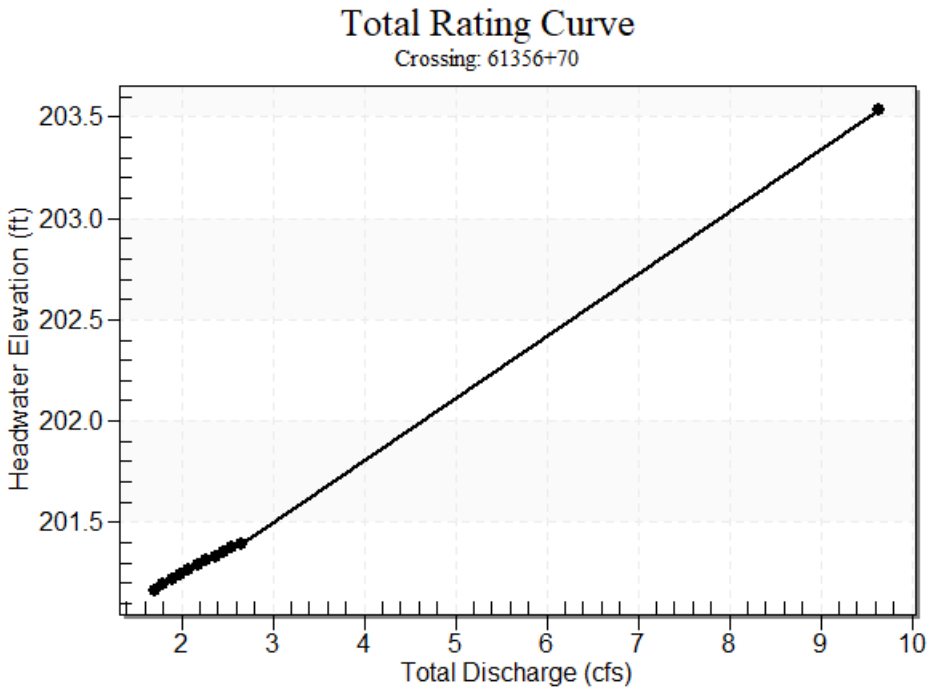


Table 17 - Culvert Summary Table: 61356+70

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1.71	1.71	201.17	0.667	0.227	1-JS1	0.225	0.519	1.250	0.196	1.393	5.509
1.80	1.80	201.19	0.692	0.241	1-JS1	0.230	0.534	1.250	0.201	1.470	5.595
1.90	1.90	201.22	0.716	0.256	1-JS1	0.236	0.548	1.250	0.206	1.547	5.677
1.99	1.99	201.24	0.740	0.271	1-JS1	0.242	0.562	1.250	0.212	1.623	5.751
2.08	2.08	201.26	0.762	0.285	1-JS1	0.247	0.575	1.250	0.216	1.695	5.825
2.18	2.18	201.29	0.787	0.302	1-JS1	0.253	0.589	1.250	0.222	1.776	5.901
2.27	2.27	201.31	0.809	0.318	1-JS1	0.258	0.602	1.250	0.227	1.853	5.972
2.37	2.37	201.33	0.831	0.335	1-JS1	0.264	0.615	1.250	0.232	1.930	6.036
2.46	2.46	201.35	0.853	0.352	1-JS1	0.269	0.628	1.250	0.236	2.006	6.101
2.56	2.56	201.37	0.874	0.369	1-JS1	0.274	0.640	1.250	0.241	2.083	6.165
2.65	2.65	201.40	0.896	0.386	1-JS1	0.279	0.653	1.250	0.245	2.159	6.231

****

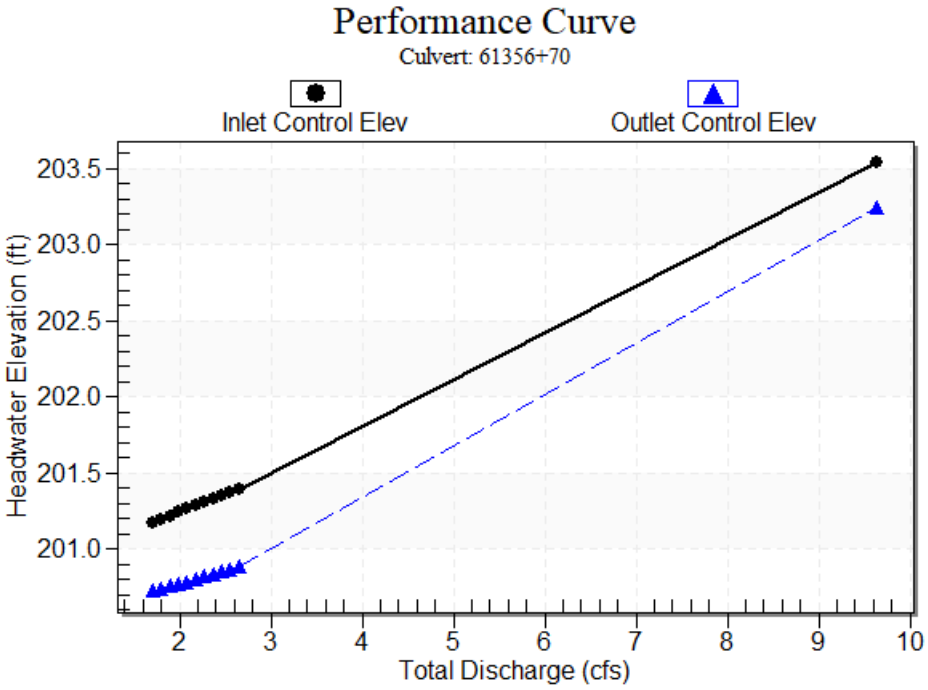
Straight Culvert

Inlet Elevation (invert): 200.50 ft, Outlet Elevation (invert): 193.80 ft

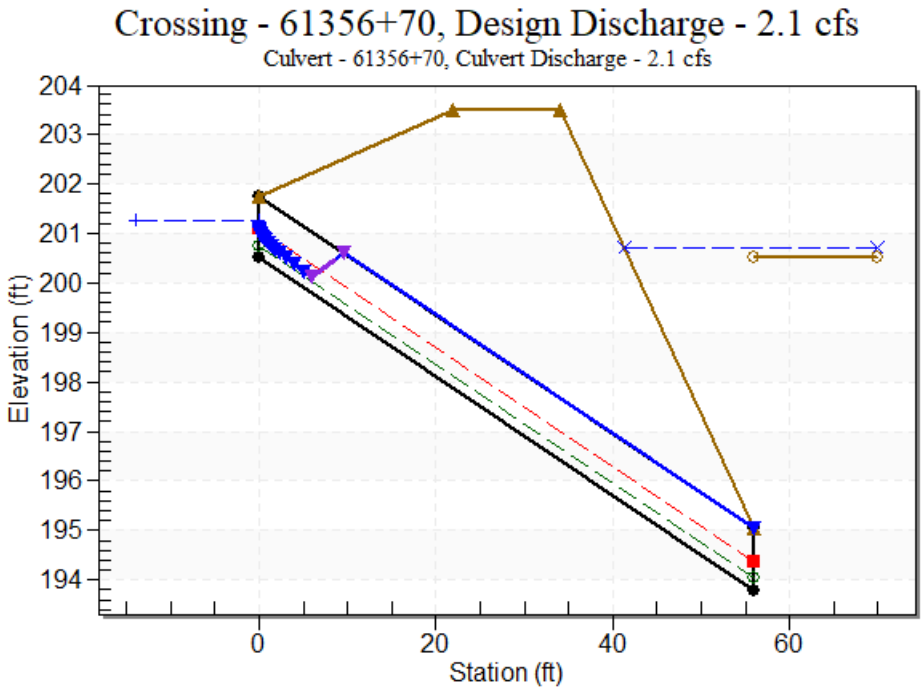
Culvert Length: 56.40 ft, Culvert Slope: 0.1196

****

Culvert Performance Curve Plot: 61356+70



Water Surface Profile Plot for Culvert: 61356+70



Site Data - 61356+70

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 200.50 ft
Outlet Station: 56.00 ft
Outlet Elevation: 193.80 ft
Number of Barrels: 1

Culvert Data Summary - 61356+70

Barrel Shape: Circular
Barrel Diameter: 1.25 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 18 - Downstream Channel Rating Curve (Crossing: 61356+70)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
1.71	200.70	0.20	5.51	1.46	2.57
1.80	200.70	0.20	5.59	1.50	2.58
1.90	200.71	0.21	5.68	1.54	2.59
1.99	200.71	0.21	5.75	1.58	2.60
2.08	200.72	0.22	5.83	1.62	2.60
2.18	200.72	0.22	5.90	1.66	2.61
2.27	200.73	0.23	5.97	1.69	2.62
2.37	200.73	0.23	6.04	1.73	2.63
2.46	200.74	0.24	6.10	1.76	2.63
2.56	200.74	0.24	6.17	1.80	2.64
2.65	200.75	0.25	6.23	1.83	2.65

Tailwater Channel Data - 61356+70

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.1196
Channel Manning's n: 0.0250
Channel Invert Elevation: 200.50 ft

Roadway Data for Crossing: 61356+70

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 16.00 ft
Crest Elevation: 203.50 ft
Roadway Surface: Gravel
Roadway Top Width: 12.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow
Minimum Flow: 6.88 cfs
Design Flow: 9.47 cfs
Maximum Flow: 14.1 cfs

Table 19 - Summary of Culvert Flows at Crossing: 62539+00

Headwater Elevatio	Total Discharge (c	62539+00 Dischar (cfs)	Roadway Dischar (cfs)	Iterations
134.32	6.88	6.88	0.00	1
134.40	7.60	7.60	0.00	1
134.49	8.32	8.32	0.00	1
134.57	9.05	9.05	0.00	1
134.61	9.47	9.47	0.00	1
134.72	10.49	10.49	0.00	1
134.80	11.21	11.21	0.00	1
134.87	11.93	11.93	0.00	1
134.95	12.66	12.66	0.00	1
135.03	13.38	13.38	0.00	1
135.11	14.10	14.10	0.00	1
140.00	37.43	37.43	0.00	Overtopping

Rating Curve Plot for Crossing: 62539+00

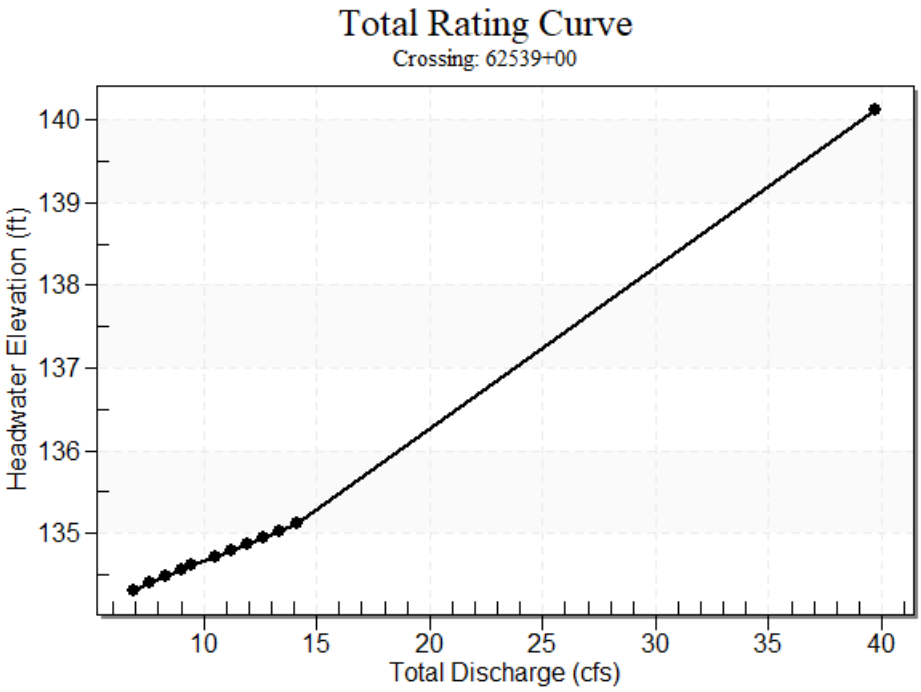


Table 20 - Culvert Summary Table: 62539+00

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (f	Outlet Control Depth (f	Flow Type	Normal Depth (f	Critical Depth (f	Outlet Depth (f	Tailwater Depth (f	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
6.88	6.88	134.32	1.318	0.663	1-JS1	0.511	0.930	2.000	0.512	2.190	5.299
7.60	7.60	134.40	1.403	0.721	1-JS1	0.537	0.980	2.000	0.536	2.420	5.439
8.32	8.32	134.49	1.485	0.780	1-JS1	0.563	1.028	2.000	0.559	2.650	5.568
9.05	9.05	134.57	1.565	0.842	1-JS1	0.587	1.074	2.000	0.580	2.879	5.687
9.47	9.47	134.61	1.611	0.880	1-JS1	0.601	1.100	2.000	0.592	3.014	5.755
10.49	10.49	134.72	1.720	0.974	1-JS1	0.634	1.160	2.000	0.621	3.339	5.908
11.21	11.21	134.80	1.797	1.043	1-JS1	0.656	1.201	2.000	0.639	3.569	6.010
11.93	11.93	134.87	1.874	1.115	1-JS1	0.678	1.241	2.000	0.657	3.799	6.107
12.66	12.66	134.95	1.953	1.189	1-JS1	0.699	1.279	2.000	0.675	4.029	6.199
13.38	13.38	135.03	2.033	1.267	5-JS1	0.721	1.316	2.000	0.692	4.258	6.287
14.10	14.10	135.11	2.115	1.347	5-JS1	0.741	1.352	2.000	0.708	4.488	6.372

****

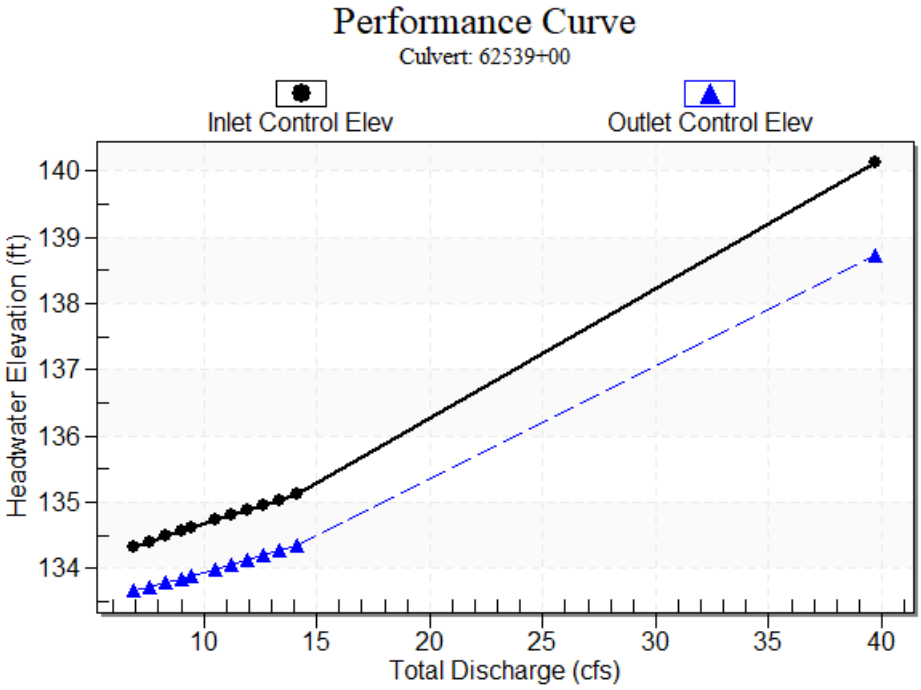
Straight Culvert

Inlet Elevation (invert): 133.00 ft, Outlet Elevation (invert): 131.00 ft

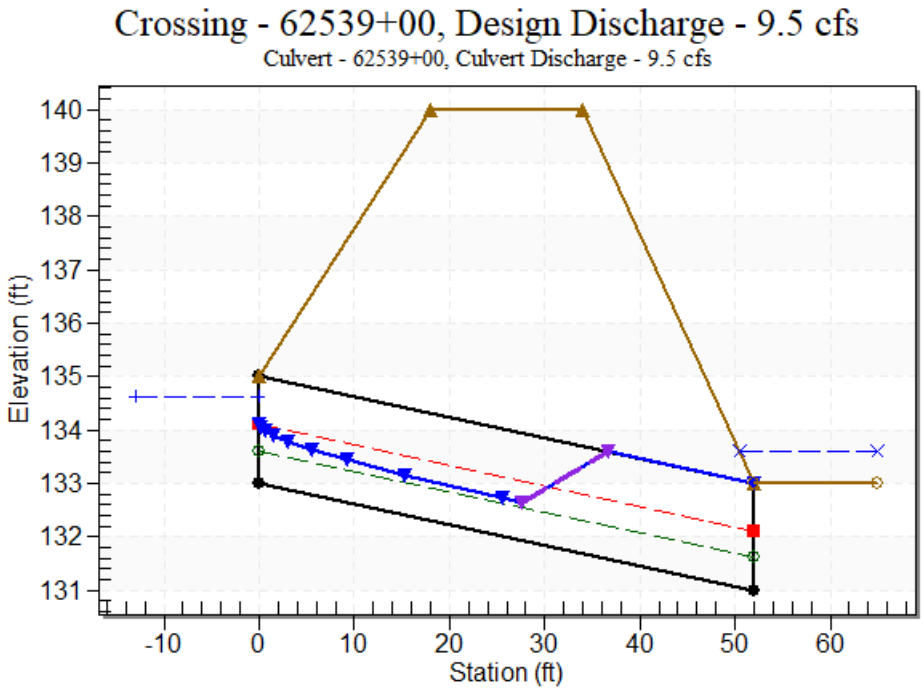
Culvert Length: 52.04 ft, Culvert Slope: 0.0385

****

Culvert Performance Curve Plot: 62539+00



Water Surface Profile Plot for Culvert: 62539+00



Site Data - 62539+00

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 133.00 ft
Outlet Station: 52.00 ft
Outlet Elevation: 131.00 ft
Number of Barrels: 1

Culvert Data Summary - 62539+00

Barrel Shape: Circular
Barrel Diameter: 2.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

Table 21 - Downstream Channel Rating Curve (Crossing: 62539+00)

Flow (cfs)	Water Surfac Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
6.88	133.51	0.51	5.30	1.23	1.65
7.60	133.54	0.54	5.44	1.29	1.66
8.32	133.56	0.56	5.57	1.34	1.67
9.05	133.58	0.58	5.69	1.39	1.68
9.47	133.59	0.59	5.76	1.42	1.69
10.49	133.62	0.62	5.91	1.49	1.70
11.21	133.64	0.64	6.01	1.54	1.71
11.93	133.66	0.66	6.11	1.58	1.71
12.66	133.67	0.67	6.20	1.62	1.72
13.38	133.69	0.69	6.29	1.66	1.72
14.10	133.71	0.71	6.37	1.70	1.73

Tailwater Channel Data - 62539+00

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.00 ft
Side Slope (H:V): 3.00 (_:1)
Channel Slope: 0.0385
Channel Manning's n: 0.0250
Channel Invert Elevation: 133.00 ft

Roadway Data for Crossing: 62539+00

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 16.00 ft
Crest Elevation: 140.00 ft
Roadway Surface: Gravel
Roadway Top Width: 16.00 ft

APPENDIX C

NRCS SOIL SURVEY MAP

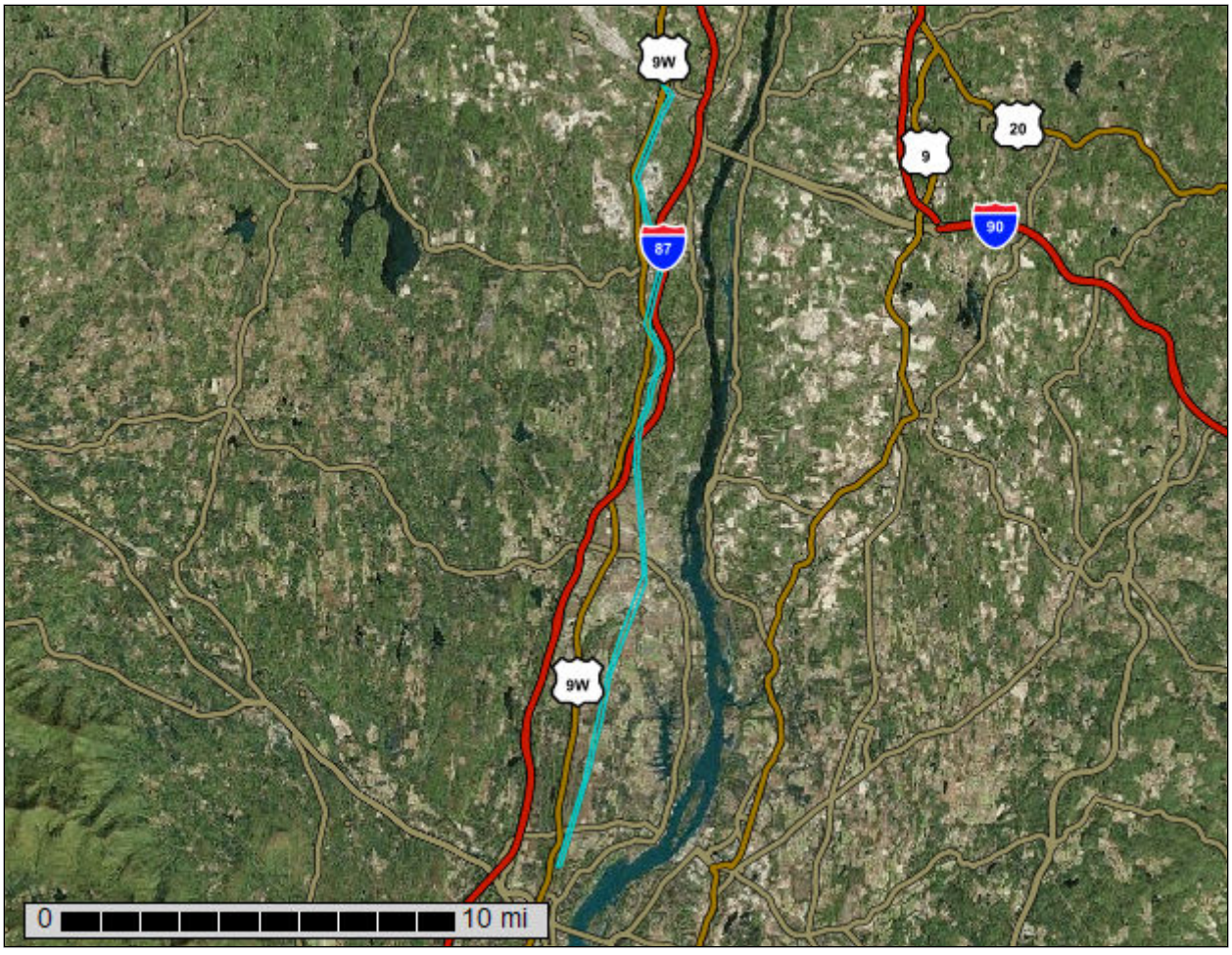
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Albany County, New York, and Greene County, New York



February 7, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

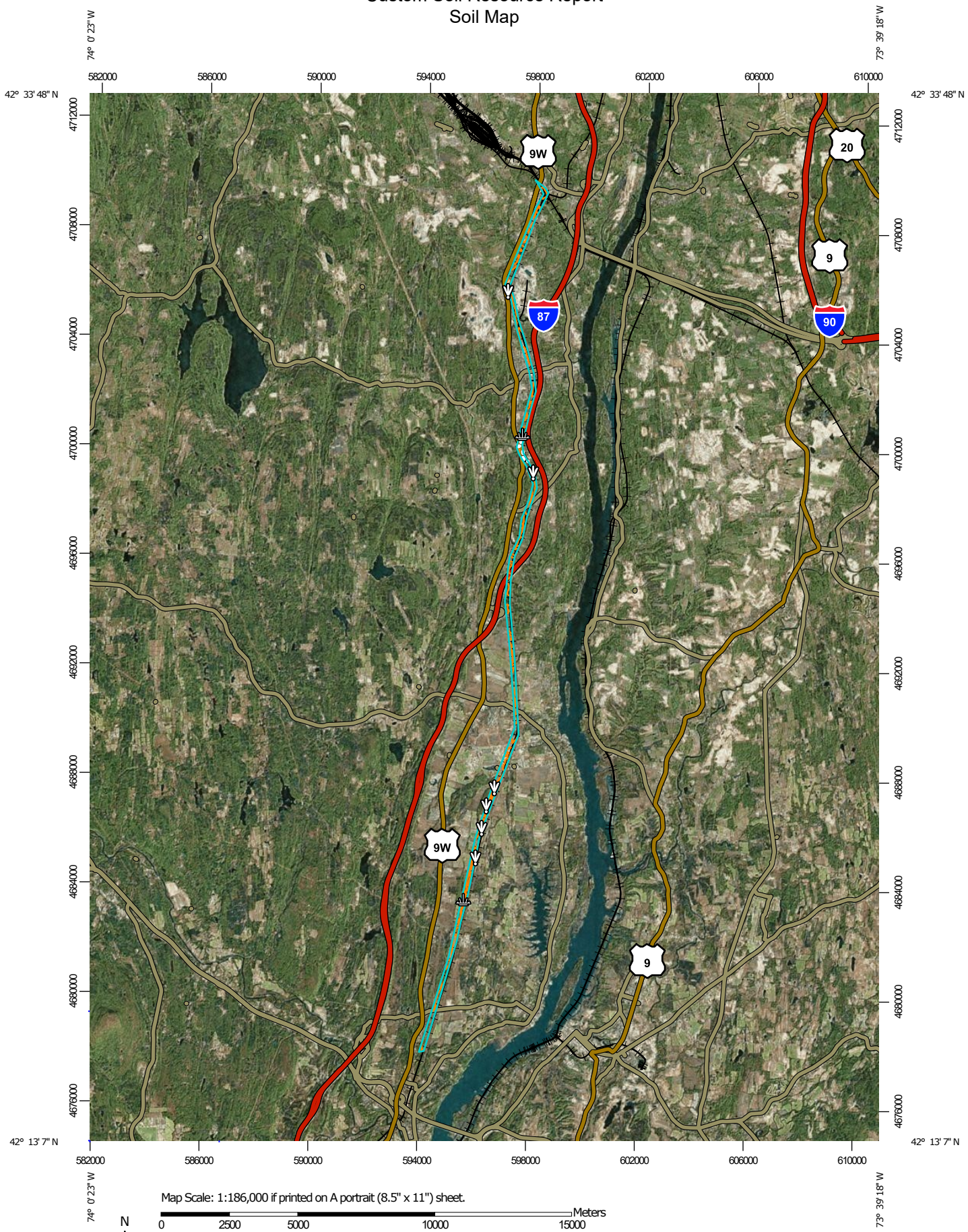
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:186,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 2500 5000 10000 15000

Feet
0 5000 10000 20000 30000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Albany County, New York
Survey Area Data: Version 20, Sep 10, 2022

Soil Survey Area: Greene County, New York
Survey Area Data: Version 21, Sep 10, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ClA	Claverack loamy fine sand, 0 to 3 percent slopes	3.6	0.3%
ClB	Claverack loamy fine sand, 3 to 8 percent slopes	0.3	0.0%
CoB	Colonie loamy fine sand, 3 to 8 percent slopes	3.8	0.3%
EnA	Elnora loamy fine sand, 0 to 3 percent slopes	27.2	2.1%
HuB	Hudson silt loam, 3 to 8 percent slopes	15.4	1.2%
HuC	Hudson silt loam, 8 to 15 percent slopes	6.5	0.5%
HuD	Hudson silt loam, hilly	6.3	0.5%
HuE	Hudson silt loam, 25 to 45 percent slopes	15.2	1.2%
Ma	Madalin silt loam, 0 to 3 percent slopes	0.9	0.1%
NaB	Nassau channery silt loam, undulating	2.7	0.2%
NuB	Nunda silt loam, 3 to 8 percent slopes	0.5	0.0%
NuC	Nunda silt loam, 8 to 15 percent slopes	5.4	0.4%
Ra	Raynham very fine sandy loam	2.1	0.2%
RhA	Rhinebeck silty clay loam, 0 to 3 percent slopes	107.3	8.2%
RhB	Rhinebeck silty clay loam, 3 to 8 percent slopes	9.4	0.7%
Ud	Udipsamments, smoothed	12.5	0.9%
Uf	Udipsamments-Urban land complex	4.0	0.3%
Ug	Udorthents, loamy	37.6	2.9%
Uh	Udorthents, clayey-Urban land complex	4.9	0.4%
Uk	Udorthents, loamy-Urban land complex	0.7	0.1%
Ut	Urban land-Udorthents complex, 0 to 8 percent slopes	60.5	4.6%
Wa	Wakeland silt loam	7.1	0.5%
Subtotals for Soil Survey Area		**333.9**	**25.4%**
Totals for Area of Interest		**1,313.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Covington and Madalin soils	176.1	13.4%
Du	Dumps, landfill	1.9	0.1%
EnB	Elmridge very fine sandy loam, 3 to 8 percent slopes	2.6	0.2%
FaE	Farmington gravelly silt loam, steep, rocky	0.1	0.0%
Fu	Fluvaquents-Udifluvents complex, frequently flooded	2.5	0.2%
HvB	Hudson and Vergennes soils, 3 to 8 percent slopes	81.9	6.2%
HvC	Hudson and Vergennes soils, 8 to 15 percent slopes	14.4	1.1%
HvE	Hudson and Vergennes soils, 25 to 50 percent slopes	17.5	1.3%
HwC3	Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded	6.3	0.5%
HwD3	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	27.5	2.1%
KrA	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	275.4	21.0%
KrB	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	87.0	6.6%
NaC	Nassau channery silt loam, rolling	15.9	1.2%
NrC	Nassau channery silt loam, rolling, very rocky	31.5	2.4%
NrD	Nassau channery silt loam, hilly, very rocky	18.2	1.4%
NrE	Nassau channery silt loam, steep, very rocky	4.1	0.3%
NuB	Nunda silt loam, 3 to 8 percent slopes	0.3	0.0%
RhA	Riverhead loam, 0 to 3 percent slopes	6.5	0.5%
RhB	Riverhead loam, 3 to 8 percent slopes	0.8	0.1%
RhC	Riverhead loam, rolling	48.1	3.7%
Sh	Shaker very fine sandy loam	39.0	3.0%
Ta	Tioga loam	0.8	0.1%
TvB	Tunkhannock gravelly loam, fan, 3 to 8 percent slopes	0.7	0.1%
Ur	Udorthents, loamy	9.9	0.8%
VdB	Valois-Nassau complex, undulating	24.4	1.9%
VdD	Valois-Nassau complex, hilly	38.1	2.9%
W	Water	1.5	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Wa	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	46.4	3.5%
Subtotals for Soil Survey Area		**979.3**	**74.6%**
Totals for Area of Interest		**1,313.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Albany County, New York

ClA—Claverack loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9pf9
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Claverack and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Claverack

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciolacustrine deposits, derived primarily from non-calcareous sandstone or granite, that overlie clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 26 inches: loamy fine sand
H3 - 26 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F101XY006NY - Moist Outwash
Hydric soil rating: No

Minor Components

Cosad
Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge
Percent of map unit: 2 percent
Hydric soil rating: No

Elnora
Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed soils
Percent of map unit: 1 percent

Stafford
Percent of map unit: 1 percent
Hydric soil rating: No

ClB—Claverack loamy fine sand, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9pfb
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Claverack and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Claverack

Setting
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciolacustrine deposits, derived primarily from non-calcareous sandstone or granite, that overlie clayey glaciolacustrine deposits

Typical profile
H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 26 inches: loamy fine sand
H3 - 26 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F101XY006NY - Moist Outwash
Hydric soil rating: No

Minor Components

Elnora

Percent of map unit: 5 percent
Hydric soil rating: No

Colonie

Percent of map unit: 3 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 2 percent

Cosad

Percent of map unit: 2 percent
Hydric soil rating: No

Stafford

Percent of map unit: 1 percent
Hydric soil rating: No

CoB—Colonie loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9pfd
Elevation: 150 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Colonie and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colonie

Setting

Landform: Deltas, beach ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or eolian deposits

Typical profile

H1 - 0 to 7 inches: loamy fine sand
H2 - 7 to 68 inches: loamy fine sand
H3 - 68 to 74 inches: loamy fine sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 7 percent

Elnora

Percent of map unit: 5 percent
Hydric soil rating: No

Claverack

Percent of map unit: 3 percent
Hydric soil rating: No

EnA—Elnora loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9pfn
Elevation: 50 to 430 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elnora and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elnora

Setting

Landform: Deltas, beach ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciofluvial, eolian, or deltaic deposits

Typical profile

H1 - 0 to 11 inches: loamy fine sand
H2 - 11 to 27 inches: fine sand
H3 - 27 to 65 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F101XY006NY - Moist Outwash
Hydric soil rating: No

Minor Components

Stafford
Percent of map unit: 5 percent
Hydric soil rating: No

Colonie
Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils
Percent of map unit: 4 percent

Granby
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

HuB—Hudson silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9pg5
Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Hudson and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile
H1 - 0 to 11 inches: silt loam
H2 - 11 to 16 inches: silty clay loam
H3 - 16 to 31 inches: silty clay
H4 - 31 to 60 inches: clay

Properties and qualities
Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 2 percent

Madalin

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Claverack

Percent of map unit: 1 percent
Hydric soil rating: No

HuC—Hudson silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9pg6
Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hudson and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 16 inches: silty clay loam
H3 - 16 to 31 inches: silty clay
H4 - 31 to 60 inches: clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Rhinebeck

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 4 percent

Madalin

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

HuD—Hudson silt loam, hilly

Map Unit Setting

National map unit symbol: 9pg7
Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hudson, hilly, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson, Hilly

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 16 inches: silty clay loam
H3 - 16 to 31 inches: silty clay
H4 - 31 to 60 inches: clay

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Unnamed soils
Percent of map unit: 6 percent

Rhinebeck
Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils, eroded
Percent of map unit: 4 percent

HuE—Hudson silt loam, 25 to 45 percent slopes

Map Unit Setting
National map unit symbol: 9pg8
Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Hudson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile
H1 - 0 to 11 inches: silt loam
H2 - 11 to 16 inches: silty clay loam
H3 - 16 to 31 inches: silty clay
H4 - 31 to 60 inches: clay

Properties and qualities
Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Unadilla

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 5 percent

Colonie

Percent of map unit: 3 percent
Hydric soil rating: No

Udifluvents

Percent of map unit: 1 percent
Hydric soil rating: No

Fluvaquents

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Ma—Madalin silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2spk0
Elevation: 230 to 930 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Madalin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Madalin

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Brown clayey glaciolacustrine deposits derived from calcareous shale

Typical profile

Ap - 0 to 8 inches: silt loam
Btg1 - 8 to 16 inches: silty clay loam
Btg2 - 16 to 25 inches: silty clay
Btg3 - 25 to 33 inches: silty clay
C - 33 to 79 inches: stratified silt to clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F101XY010NY - Wet Lake Plain Depression
Hydric soil rating: Yes

Minor Components

Rhinebeck

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Canandaigua

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Fonda

Percent of map unit: 4 percent
Landform: Depressions

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Cosad

Percent of map unit: 2 percent
Landform: Lake plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

NaB—Nassau channery silt loam, undulating

Map Unit Setting

National map unit symbol: 9pgy
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nassau, undulating, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau, Undulating

Setting

Landform: Till plains, ridges, benches
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 16 inches: very channery silt loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Manlius

Percent of map unit: 8 percent
Hydric soil rating: No

Greene

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 3 percent

Hornell

Percent of map unit: 2 percent
Hydric soil rating: No

Lordstown

Percent of map unit: 2 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: Unranked

NuB—Nunda silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ph2
Elevation: 400 to 1,600 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nunda and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunda

Setting

Landform: Till plains, hills, drumlinoid ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: A silty mantle over loamy till derived from calcareous shale and siltstone

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 20 inches: silt loam
2B/E - 20 to 28 inches: silt loam
2Bt - 28 to 44 inches: silty clay loam
2C - 44 to 64 inches: clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.03 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F101XY013NY - Moist Till
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent

Burdett

Percent of map unit: 5 percent
Hydric soil rating: No

Angola

Percent of map unit: 3 percent
Hydric soil rating: No

Ilion

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

NuC—Nunda silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ph3
Elevation: 400 to 1,600 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nunda and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunda

Setting

Landform: Till plains, hills, drumlinoid ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: A silty mantle over loamy till derived from calcareous shale and siltstone

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 20 inches: silt loam
2B/E - 20 to 28 inches: silt loam
2Bt - 28 to 44 inches: silty clay loam
2C - 44 to 64 inches: clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.03 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F101XY013NY - Moist Till

Hydric soil rating: No

Minor Components

Burdett
Percent of map unit: 5 percent
Hydric soil rating: No

Angola
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils
Percent of map unit: 1 percent

Ilion
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Ra—Raynham very fine sandy loam

Map Unit Setting
National map unit symbol: 9phg
Elevation: 50 to 500 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Raynham, poorly drained, and similar soils: 50 percent
Raynham, somewhat poorly drained, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynham, Poorly Drained

Setting
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Glaciolacustrine, eolian, or old alluvial deposits, comprised mainly of silt and very fine sand

Typical profile
H1 - 0 to 11 inches: very fine sandy loam
H2 - 11 to 24 inches: very fine sandy loam
H3 - 24 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F101XY010NY - Wet Lake Plain Depression
Hydric soil rating: Yes

Description of Raynham, Somewhat Poorly Drained

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Glaciolacustrine, eolian, or old alluvial deposits, comprised mainly of silt and very fine sand

Typical profile

H1 - 0 to 11 inches: very fine sandy loam
H2 - 11 to 24 inches: very fine sandy loam
H3 - 24 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F101XY010NY - Wet Lake Plain Depression
Hydric soil rating: No

Minor Components

Unnamed soils, somewhat poorly drained
Percent of map unit: 8 percent

Scio
Percent of map unit: 5 percent
Hydric soil rating: No

Birdsall
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed soils
Percent of map unit: 2 percent

Shaker
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Cosad
Percent of map unit: 1 percent
Hydric soil rating: No

RhA—Rhinebeck silty clay loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 9phh
Elevation: 80 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Rhinebeck and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhinebeck

Setting
Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 34 inches: silty clay
H3 - 34 to 64 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Raynham

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

RhB—Rhinebeck silty clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9phj
Elevation: 80 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Rhinebeck and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rhinebeck

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 34 inches: silty clay
H3 - 34 to 64 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Raynham

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Claverack

Percent of map unit: 5 percent
Hydric soil rating: No

Ud—Udipsamments, smoothed

Map Unit Setting

National map unit symbol: 9phy
Elevation: 100 to 410 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments, smoothed, and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments, Smoothed

Typical profile

H1 - 0 to 70 inches: coarse sand

Properties and qualities

Slope: 0 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Urban land

Percent of map unit: 10 percent
Hydric soil rating: Unranked

Colonie

Percent of map unit: 5 percent
Hydric soil rating: No

Elnora

Percent of map unit: 5 percent
Hydric soil rating: No

Uf—Udipsamments-Urban land complex

Map Unit Setting

National map unit symbol: 9pj0
Elevation: 70 to 440 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 50 percent
Urban land: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments

Typical profile

H1 - 0 to 70 inches: coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Psammaquents

Percent of map unit: 10 percent
Landform: Depressions
Hydric soil rating: Yes

Ug—Udorthents, loamy

Map Unit Setting

National map unit symbol: 9pj1
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Uh—Udorthents, clayey-Urban land complex

Map Unit Setting

National map unit symbol: 9pj2
Elevation: 20 to 310 feet

Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, clayey, and similar soils: 40 percent
Urban land: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Clayey

Typical profile

H1 - 0 to 18 inches: silty clay
H2 - 18 to 72 inches: stratified silt loam to clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Scio

Percent of map unit: 10 percent
Hydric soil rating: No

Hudson

Percent of map unit: 10 percent
Hydric soil rating: No

Rhinebeck

Percent of map unit: 7 percent
Hydric soil rating: No

Madalin

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Uk—Udorthents, loamy-Urban land complex

Map Unit Setting

National map unit symbol: 9pj3
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 40 percent
Urban land: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Minor Components

Nunda

Percent of map unit: 10 percent
Hydric soil rating: No

Valois

Percent of map unit: 10 percent
Hydric soil rating: No

Riverhead

Percent of map unit: 9 percent
Hydric soil rating: No

Ilion

Percent of map unit: 1 percent

Landform: Depressions
Hydric soil rating: Yes

Ut—Urban land-Udorthents complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9pjb
Elevation: 0 to 460 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 50 percent
Udorthents and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Description of Udorthents

Typical profile

H1 - 0 to 4 inches: channery loam
H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Minor Components

Unnamed soils, poorly

Percent of map unit: 10 percent

Unnamed soils, moderately well

Percent of map unit: 10 percent

Wa—Wakeland silt loam

Map Unit Setting

National map unit symbol: 9pjh
Elevation: 340 to 950 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Wakeland and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wakeland

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 62 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F144AY015NY - Wet Silty Low Floodplain
Hydric soil rating: No

Minor Components

Wayland
Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Teel
Percent of map unit: 5 percent
Hydric soil rating: No

Raynham
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed soils
Percent of map unit: 3 percent

Rhinebeck
Percent of map unit: 2 percent
Hydric soil rating: No

Greene County, New York

Co—Covington and Madalin soils

Map Unit Setting

National map unit symbol: 9sg1
Elevation: 50 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Covington and similar soils: 45 percent
Madalin and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Covington

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous clayey glaciolacustrine deposits or glaciomarine deposits

Typical profile

H1 - 0 to 7 inches: silty clay
H2 - 7 to 28 inches: clay
H3 - 28 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: F142XB007VT - Wet Clayplain Depression
Hydric soil rating: Yes

Description of Madalin

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 30 inches: silty clay
H3 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Vergennes

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: No

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Hudson

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: No

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Du—Dumps, landfill

Map Unit Setting

National map unit symbol: 9sg2
Elevation: 100 to 1,600 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps, landfill: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps, Landfill

Typical profile

H1 - 0 to 24 inches: silt loam
H2 - 24 to 70 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Burdett

Percent of map unit: 5 percent
Hydric soil rating: No

Tunkhannock

Percent of map unit: 5 percent
Hydric soil rating: No

Wellsboro

Percent of map unit: 5 percent
Hydric soil rating: No

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

EnB—Elmridge very fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9sgb
Elevation: 330 to 2,460 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elmridge and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elmridge

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy over clayey glaciolacustrine or marine deposits

Typical profile

H1 - 0 to 9 inches: very fine sandy loam
H2 - 9 to 28 inches: fine sandy loam
H3 - 28 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 40 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Shaker
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Madalin
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Nassau
Percent of map unit: 5 percent
Hydric soil rating: No

Rhinebeck
Percent of map unit: 5 percent
Hydric soil rating: No

FaE—Farmington gravelly silt loam, steep, rocky

Map Unit Setting
National map unit symbol: 9sgf
Elevation: 100 to 900 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Farmington and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Farmington

Setting
Landform: Benches, till plains, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till or congeliturbate derived from limestone, dolomite, shale, and sandstone, and in many places mixed with wind and water deposits

Typical profile
H1 - 0 to 8 inches: gravelly silt loam
H2 - 8 to 13 inches: silt loam
H3 - 13 to 17 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F144AY035MA - Shallow Semi-Rich Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Arnot

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Galway

Percent of map unit: 5 percent
Hydric soil rating: No

Nassau

Percent of map unit: 5 percent
Hydric soil rating: No

Tuller

Percent of map unit: 5 percent
Hydric soil rating: No

Fu—Fluvaquents-Udifluvents complex, frequently flooded

Map Unit Setting

National map unit symbol: 9sgg
Elevation: 100 to 3,000 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Typical profile

H1 - 0 to 5 inches: gravelly silt loam
H2 - 5 to 70 inches: gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F140XY015NY - Wet Low Floodplain
Hydric soil rating: Yes

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 70 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A
Ecological site: F140XY014NY - Low Floodplain
Hydric soil rating: No

Minor Components

Ochrepts

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Medisaprists

Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Carlisle

Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Basher

Percent of map unit: 5 percent
Hydric soil rating: No

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

HvB—Hudson and Vergennes soils, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9sgr
Elevation: 50 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Hudson and similar soils: 40 percent
Vergennes and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 13 inches: silt loam
H3 - 13 to 30 inches: silty clay loam
H4 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Vergennes

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey calcareous glaciolacustrine, glaciomarine, or estuarine deposits

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 17 inches: clay loam

H3 - 17 to 34 inches: clay
H4 - 34 to 60 inches: stratified silty clay to silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F142XB005VT - Clayplain
Hydric soil rating: No

Minor Components

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Nunda

Percent of map unit: 5 percent
Hydric soil rating: No

HvC—Hudson and Vergennes soils, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9sgs
Elevation: 50 to 1,800 feet

Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hudson and similar soils: 40 percent
Vergennes and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 13 inches: silt loam
H3 - 13 to 30 inches: silty clay loam
H4 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Vergennes

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey calcareous glaciolacustrine, glaciomarine, or estuarine deposits

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 17 inches: clay loam
H3 - 17 to 34 inches: clay
H4 - 34 to 60 inches: stratified silty clay to silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F142XB005VT - Clayplain
Hydric soil rating: No

Minor Components

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Nunda

Percent of map unit: 5 percent
Hydric soil rating: No

HvE—Hudson and Vergennes soils, 25 to 50 percent slopes

Map Unit Setting

National map unit symbol: 9sgt
Elevation: 50 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hudson and similar soils: 45 percent
Vergennes and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 13 inches: silt loam
H3 - 13 to 30 inches: silty clay loam
H4 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain

Hydric soil rating: No

Description of Vergennes

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey calcareous glaciolacustrine, glaciomarine, or estuarine deposits

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 17 inches: clay loam
H3 - 17 to 34 inches: clay
H4 - 34 to 60 inches: stratified silty clay to silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F142XB005VT - Clayplain
Hydric soil rating: No

Minor Components

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Nunda

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Shaker

Percent of map unit: 5 percent

Landform: Depressions
Hydric soil rating: Yes

HwC3—Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 9sgv
Elevation: 50 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hudson and similar soils: 45 percent
Vergennes and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 30 inches: silty clay loam
H3 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Vergennes

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey calcareous glaciolacustrine, glaciomarine, or estuarine deposits

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 34 inches: clay
H3 - 34 to 60 inches: stratified silty clay to silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F142XB005VT - Clayplain
Hydric soil rating: No

Minor Components

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Nunda

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Burdett

Percent of map unit: 5 percent
Hydric soil rating: No

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

HwD3—Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 9sgw
Elevation: 50 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hudson and similar soils: 50 percent
Vergennes and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 30 inches: silty clay loam
H3 - 30 to 60 inches: silty clay

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Vergennes

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey calcareous glaciolacustrine, glaciomarine, or estuarine deposits

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 34 inches: clay
H3 - 34 to 60 inches: stratified silty clay to silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F142XB005VT - Clayplain
Hydric soil rating: No

Minor Components

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Burdett

Percent of map unit: 5 percent
Hydric soil rating: No

Kingsbury

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

KrA—Kingsbury and Rhinebeck soils, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9sgx
Elevation: 80 to 1,000 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kingsbury and similar soils: 40 percent
Rhinebeck and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingsbury

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Calcareous, clayey glaciomarine deposits or glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: clay loam
H2 - 7 to 14 inches: silty clay loam
H3 - 14 to 36 inches: clay
H4 - 36 to 70 inches: stratified silty clay loam to silt loam to very fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Rhinebeck

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 19 inches: silty clay loam
H3 - 19 to 32 inches: silty clay
H4 - 32 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Covington

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Hudson

Percent of map unit: 5 percent
Hydric soil rating: No

Shaker
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Elmridge
Percent of map unit: 5 percent
Hydric soil rating: No

Vergennes
Percent of map unit: 5 percent
Hydric soil rating: No

KrB—Kingsbury and Rhinebeck soils, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9sgy
Elevation: 80 to 1,000 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Kingsbury and similar soils: 45 percent
Rhinebeck and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingsbury

Setting
Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Calcareous, clayey glaciomarine deposits or glaciolacustrine deposits

Typical profile
H1 - 0 to 7 inches: clay loam
H2 - 7 to 14 inches: silty clay loam
H3 - 14 to 36 inches: clay
H4 - 36 to 70 inches: stratified silty clay loam to silt loam to very fine sandy loam

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Description of Rhinebeck

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 19 inches: silty clay loam
H3 - 19 to 32 inches: silty clay
H4 - 32 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY018NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Covington

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Elmridge
Percent of map unit: 5 percent
Hydric soil rating: No

Hudson
Percent of map unit: 5 percent
Hydric soil rating: No

Vergennes
Percent of map unit: 5 percent
Hydric soil rating: No

Madalin
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

NaC—Nassau channery silt loam, rolling

Map Unit Setting
National map unit symbol: 9sj5
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Nassau and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau

Setting
Landform: Benches, till plains, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities
Slope: 5 to 15 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Lordstown

Percent of map unit: 5 percent
Hydric soil rating: No

Arnot

Percent of map unit: 5 percent
Hydric soil rating: No

Oquaga

Percent of map unit: 5 percent
Hydric soil rating: No

Tuller

Percent of map unit: 5 percent
Hydric soil rating: No

NrC—Nassau channery silt loam, rolling, very rocky

Map Unit Setting

National map unit symbol: 9sj6
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Nassau and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau

Setting

Landform: Benches, till plains, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: Unranked

Arnot

Percent of map unit: 5 percent
Hydric soil rating: No

Tuller

Percent of map unit: 5 percent
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Hydric soil rating: No

Oquaga

Percent of map unit: 5 percent
Hydric soil rating: No

NrD—Nassau channery silt loam, hilly, very rocky

Map Unit Setting

National map unit symbol: 9sj7
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Nassau and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau

Setting

Landform: Benches, till plains, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Valois
Percent of map unit: 5 percent
Hydric soil rating: No

Lordstown
Percent of map unit: 5 percent
Hydric soil rating: No

Arnot
Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: Unranked

Tuller
Percent of map unit: 5 percent
Hydric soil rating: No

Oquaga
Percent of map unit: 5 percent
Hydric soil rating: No

NrE—Nassau channery silt loam, steep, very rocky

Map Unit Setting
National map unit symbol: 9sj8
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Nassau and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau

Setting
Landform: Benches, till plains, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: Unranked

Lordstown

Percent of map unit: 5 percent
Hydric soil rating: No

Arnot

Percent of map unit: 5 percent
Hydric soil rating: No

Oquaga

Percent of map unit: 5 percent
Hydric soil rating: No

Tuller

Percent of map unit: 5 percent
Hydric soil rating: No

NuB—Nunda silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9sj9
Elevation: 400 to 1,600 feet
Mean annual precipitation: 36 to 44 inches

Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nunda and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunda

Setting

Landform: Hills, drumlinoid ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: A silty mantle over loamy till derived from calcareous shale and siltstone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 15 inches: silt loam
H3 - 15 to 40 inches: gravelly silty clay loam
H4 - 40 to 65 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F140XY025NY - Rich Till Uplands
Hydric soil rating: No

Minor Components

Burdett

Percent of map unit: 10 percent
Hydric soil rating: No

Hudson

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent
Hydric soil rating: No

RhA—Riverhead loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9sjx
Elevation: 590 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riverhead and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Deltas, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam
H3 - 24 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY023CT - Well Drained Outwash

Hydric soil rating: No

Minor Components

Tioga
Percent of map unit: 5 percent
Hydric soil rating: No

Udifluvents
Percent of map unit: 5 percent
Hydric soil rating: No

Chenango
Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge
Percent of map unit: 5 percent
Hydric soil rating: No

Hudson
Percent of map unit: 5 percent
Hydric soil rating: No

RhB—Riverhead loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9sjy
Elevation: 590 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Riverhead and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting
Landform: Deltas, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Typical profile
H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam

H3 - 24 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F140XY021NY - Dry Outwash
Hydric soil rating: No

Minor Components

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Tioga

Percent of map unit: 5 percent
Hydric soil rating: No

Hudson

Percent of map unit: 5 percent
Hydric soil rating: No

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Udifluvents

Percent of map unit: 5 percent
Hydric soil rating: No

RhC—Riverhead loam, rolling

Map Unit Setting

National map unit symbol: 9sjz
Elevation: 590 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Riverhead and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Deltas, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam
H3 - 24 to 60 inches: loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY023CT - Well Drained Outwash
Hydric soil rating: No

Minor Components

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Hydric soil rating: No

Hudson

Percent of map unit: 5 percent
Hydric soil rating: No

Udifluvents

Percent of map unit: 5 percent

Hydric soil rating: No

Sh—Shaker very fine sandy loam

Map Unit Setting

National map unit symbol: 9sk1
Elevation: 330 to 2,460 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Shaker and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shaker

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy over clayey glaciolacustrine or glaciomarine deposits

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 20 inches: fine sandy loam
H3 - 20 to 31 inches: silty clay loam
H4 - 31 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 40 inches to strongly contrasting textural stratification
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain

Hydric soil rating: No

Minor Components

Rhinebeck

Percent of map unit: 5 percent
Hydric soil rating: No

Alden

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Madalin

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Ta—Tioga loam

Map Unit Setting

National map unit symbol: 9sk3
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Tioga and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tioga

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy alluvium

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 34 inches: fine sandy loam
H3 - 34 to 44 inches: loamy fine sand

H4 - 44 to 60 inches: stratified gravel to loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Ecological site: F140XY013PA - High Floodplain
Hydric soil rating: No

Minor Components

Middlebury

Percent of map unit: 10 percent
Hydric soil rating: No

Udifluvents

Percent of map unit: 5 percent
Hydric soil rating: No

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

TvB—Tunkhannock gravelly loam, fan, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9skd
Elevation: 160 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Tunkhannock and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tunkhannock

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from reddish sandstone, siltstone, and shale

Typical profile

H1 - 0 to 7 inches: gravelly loam
H2 - 7 to 25 inches: very gravelly loam
H3 - 25 to 60 inches: stratified extremely gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F140XY021NY - Dry Outwash
Hydric soil rating: No

Minor Components

Basher

Percent of map unit: 5 percent
Hydric soil rating: No

Barbour

Percent of map unit: 5 percent
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Hydric soil rating: No

Wellsboro

Percent of map unit: 5 percent
Hydric soil rating: No

Lackawanna

Percent of map unit: 5 percent
Hydric soil rating: No

Ur—Udorthents, loamy

Map Unit Setting

National map unit symbol: 9skh
Elevation: 160 to 1,970 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Typical profile

H1 - 0 to 4 inches: gravelly silt loam
H2 - 4 to 70 inches: gravelly silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wellsboro

Percent of map unit: 5 percent
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent

Hydric soil rating: No

Tunkhannock

Percent of map unit: 5 percent
Hydric soil rating: No

VdB—Valois-Nassau complex, undulating

Map Unit Setting

National map unit symbol: 9skq
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Valois and similar soils: 50 percent
Nassau and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valois

Setting

Landform: Valley sides, lateral moraines, end moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 34 inches: gravelly loam
H3 - 34 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Description of Nassau

Setting

Landform: Benches, till plains, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Manlius

Percent of map unit: 5 percent
Hydric soil rating: No

Wellsboro

Percent of map unit: 5 percent
Hydric soil rating: No

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

VdD—Valois-Nassau complex, hilly

Map Unit Setting

National map unit symbol: 9skr
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Valois and similar soils: 41 percent
Nassau and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valois

Setting

Landform: End moraines, lateral moraines, valley sides
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 34 inches: gravelly loam
H3 - 34 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F140XY027NY - Well Drained Till Uplands
Hydric soil rating: No

Description of Nassau

Setting

Landform: Benches, till plains, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 9sl3
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Wa—Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2srgt
Elevation: 160 to 1,970 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wayland and similar soils: 60 percent
Wayland, very poorly drained, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wayland

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam

Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F140XY015NY - Wet Low Floodplain
Hydric soil rating: Yes

Description of Wayland, Very Poorly Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

A - 0 to 9 inches: mucky silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam
Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D
Ecological site: F140XY015NY - Wet Low Floodplain
Hydric soil rating: Yes

Minor Components

Holderton

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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APPENDIX D

NYSDOT Highway Design Manual Exhibits

Exhibit 8-3 Design Flood Frequencies (in years) For Drainage Structures and Channels[1]

Road type or Functional Class	Culvert[2]	Storm Drainage Systems	Driveway Culverts	Ditches [4]
Interstates and Other Freeways	50	10[5]	n/a	25
Principal Arterials	50	10[5]	25	25
Minor Arterials	50[6]	5[7]	10	10
Major Collectors	50[6]	5[7]	10	10
Minor Collectors	50[6]	5[7]	10	10
Local Roads & Streets w/ AADT>400	50[6]	5[7]	10	10
A or B type highways (AADT < 400) [8, 10]	50[6]	5[7]	10	10
C [8,9,10]				

NOTES

1. The values in this table are typical. The selected value for a project should be based upon an assessment of the likely damage to the highway and adjacent landowners from a given flow and the costs of the drainage facility. Note: 100-year requirements must be checked if the proposed highway is in an established regulatory floodway or floodplain.
2. The check flow, used to assess the performance of the facility, should be the 100 year storm event.
3. Relocated natural channels should have the same flow characteristics (geometrics and slope) as the existing channel and should be provided with a lining having roughness characteristics similar to the existing channel.
4. Including lining material (All ditches should have a lining material and not be left untreated).
5. As per 23CFR650A, and Table 1-1 of HDS 2, a 50-year frequency shall be used for stormwater design at the following locations where no overflow relief is available:
   a. sag vertical curves connecting negative and positive grades.
   b. other locations such as underpasses, depressed roadways, etc.
6. A design flood frequency of 10 or 25 years is acceptable if documented in the Design Approval Document, and when identified after design approval, in the drainage report. A design flood frequency of 10 or 25 years should be used in the design of driveway culverts and similar structures.
7. Use a 25-year frequency at the following locations where no overflow relief is available:
   a. sag vertical curves connecting negative and positive grades.
   b. other locations such as underpasses, depressed roadways, etc.
8. Dead end highways should use the Local Road Standard as a minimum for sizing, but the roadway and structure should be armored to handle a larger event without washing out.
9. Existing structures are considered acceptable unless there are known flooding issues which require a more detailed design. In such a case, the A/B standard should be followed.
10. See HDM Chapter 4, Table 4-1 for the definition of Type A, B and C Low Volume Highways.

A. Rational Method

This method is recommended to determine the peak discharge, or runoff rate, from drainage areas up to 200 acres. If a hydrograph is required to consider the effects of storage, use the Modified Soil Cover Complex method, or a similar method.

The Rational Method assumes the following:

1. Peak discharge occurs when all of the drainage area is contributing,
2. A storm that has a duration equal to the time of concentration (T_c) produces the highest peak discharge for the selected frequency,
3. Intensity is uniform over a duration of time equal to or greater than the T_c, and
4. The frequency of the peak flow is equal to the frequency of the intensity.

The rational method formula is:

$Q = CiA$, where:

Q = peak discharge or rate of runoff (cfs)
C = runoff coefficient
i = intensity (in/hr)
A = drainage area (acres)

1. Runoff coefficient. The runoff coefficient selected shall represent the characteristics of the drainage area being analyzed. A weighted runoff coefficient (C_w) should be used in the Rational formula for drainage areas having different runoff characteristics. C_w should be calculated as follows:

$C_w = \sum C_i A_i / A$, where

C_i = runoff coefficient for subarea "i"
A_i = subarea

Refer to Exhibit 8-4 for recommended runoff coefficients.

Exhibit 8-4 Values of Runoff Coefficient (C) for Use in the Rational Method

Type of Surface	Runoff Coefficient (C)[1]
Rural Areas	
Concrete, or Hot Mix Asphalt pavement	0.95 - 0.98
Gravel roadways or shoulders	0.4 - 0.6
Steep grassed areas (1:2, vert.:horiz.)	0.6 - 0.7
Turf meadows	0.1 - 0.4
Forested areas	0.1 - 0.3
Cultivated fields	0.2 - 0.4
Urban/Suburban Areas	
Flat residential, @ 30% of area impervious	0.40
Flat residential, @ 60% of area impervious	0.55
Moderately steep residential, @ 50% of area impervious	0.65
Moderately steep built up area, @ 70% of area impervious	0.80
Flat commercial, @ 90% of area impervious	0.80

NOTE

1. For flat slopes and/or permeable soil, use lower values. For steep slopes and/or impermeable soil, use the higher values.

2. Intensity. Determine intensity i.e., the rate of rainfall upon the drainage area, using intensity-duration-frequency (IDF) curves developed for the area being analyzed, a duration equal to the time of concentration (T_c), and a frequency equal to the design flood frequency.

   IDF relationships are based upon statistical analysis of rainfall data. They describe, for a given flood frequency, the average intensity of rainfall for a storm of a given duration (equal to the time of concentration). The statistical data for New York State is based upon "Technical Paper No. 40" (TP-40) and the "NOAA Technical Memorandum NWS HYDRO-35". The methodology for developing IDF curves is presented in "Drainage of Highway Pavements", Highway Engineering Circular (HEC) No. 12. To construct a set of IDF curves for a given location, HEC-12 uses six data points from HYDRO-35: the 2-year 5, 15 and 60 minute rainfalls and the 100-year 5, 15 and 60 minute rainfalls. the 60 minute rainfall for each intermediate return period is calculated from these points, and then the rainfall intensities for other durations are calculated. IDF curves for some locations are available from the Regional Design Group or should be constructed from known rainfall data.

   To obtain the intensity, the T_c must first be estimated. The T_c is defined as the time required for water to travel from the most remote point in the watershed to the point of interest. The time of concentration path is the longest in time, and is not necessarily the longest in distance. Various methods can be used to determine the T_c of a drainage area. The method used to determine the T_c should be appropriate for the flow path (sheet flow, concentrated flow, or channelized flow). The minimum T_c used shall be 5 minutes.

APPENDIX E

StreamStats Report

StreamStats Report

Region ID: NY
Workspace ID: NY20230615131134427000
Clicked Point (Latitude, Longitude): 42.39668, -73.81967
Time: 2023-06-15 09:13:45 -0400

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	596956.8	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	4694568.3	meters
CSL1085LO	10-85 slope of lower half of main channel in feet per mile.	81.3	feet per mi
DRNAREA	Area that drains to a point on a stream	0.0956	square miles
EL1200	Percentage of basin at or above 1200 ft elevation	0	percent
JULAVPRE	Mean July Precipitation	3.72	inches
JUNAVPRE	Mean June Precipitation	4.01	inches
JUNMAXTMP	Maximum June Temperature, in degrees F	78.7	degrees F
LAGFACTOR	Lag Factor as defined in SIR 2006-5112	0.00595	dimensionless

Parameter Code	Parameter Description	Value	Unit
LENGTH	Length along the main channel from the measuring location extended to the basin divide	0.51	miles
MAR	Mean annual runoff for the period of record in inches	15	inches
MAYAVPRE	Mean May Precipitation	4.05	inches
PRJUNAUG00	Basin average mean precip for June to August from PRISM 1971-2000	11.5	inches
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	0	percent
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [2006 Full Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	1.93	996
LAGFACTOR	Lag Factor	0.00595	dimensionless	0.014	6.997
STORAGE	Percent Storage	0	percent	0	11.88
MAR	Mean Annual Runoff in inches	15	inches	16.03	33.95

Peak-Flow Statistics Disclaimers [2006 Full Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [2006 Full Region 2]

Statistic	Value	Unit
80-percent AEP flood	3.79	ft^3/s
66.7-percent AEP flood	4.73	ft^3/s
50-percent AEP flood	6.11	ft^3/s
20-percent AEP flood	10.4	ft^3/s
10-percent AEP flood	14	ft^3/s
4-percent AEP flood	19.2	ft^3/s

Statistic	Value	Unit
2-percent AEP flood	23.7	ft^3/s
1-percent AEP flood	28.6	ft^3/s
0.5-percent AEP flood	34	ft^3/s
0.2-percent AEP flood	42.1	ft^3/s

Peak-Flow Statistics Citations

Lumia, Richard, Freehafer, D.A., and Smith, M.J.,2006, Magnitude and Frequency of Floods in New York: U.S. Geological Survey Scientific Investigations Report 2006–5112, 152 p. (http://pubs.usgs.gov/sir/2006/5112/)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Statewide duration flows excl LongIsl 2014 5220]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	3.14	4780
JUNAVPRE	Mean June Precipitation	4.01	inches	3.59	5.33
CENTROIDX	CENTROIDX	596956.8	meters	166000	658000
CENTROIDY	CENTROIDY	4694568.3	meters	4560000	4920000
CSL1085LO	10-85 slope of lower half of main channel	81.3	feet per mi	1.56	152
LENGTH	Main Channel Length	0.51	miles	0.88	305
MAR	Mean Annual Runoff in inches	15	inches	11.6	37.4
SSURGOB	SSURGO Percent Hydrologic Soil Type B	0	percent	1.14	65.7
JULAVPRE	Mean July Precipitation	3.72	inches	3.2	5.26
MAYAVPRE	Mean May Precipitation	4.05	inches	3.15	5.68
PRJUNAUG00	Basin average mean precip for June to August	11.5	inches	10.5	15.5
JUNMAXTMP	Maximum June Temperature	78.7	degrees F	68.8	78.8
SSURGOA	SSURGO Percent Hydrologic Soil Type A	0	percent	0.62	51.2
EL1200	Percentage of Basin Above 1200 ft	0	percent	0	100

Flow-Duration Statistics Flow Report [Statewide duration flows excl LongIsl 2014 5220]

Statistic	Value	Unit

Flow-Duration Statistics Citations

Bankfull Statistics

Bankfull Statistics Parameters [Bankfull Region 3 SIR2009 5144]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	0.42	329

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	0.07722	940.1535

Bankfull Statistics Parameters [Valley and Ridge P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	0.100386	395.999604

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	0.07722	59927.7393

Bankfull Statistics Disclaimers [Bankfull Region 3 SIR2009 5144]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [Bankfull Region 3 SIR2009 5144]

Statistic	Value	Unit
Bankfull Area	12.2	ft^2
Bankfull Depth	1.01	ft
Bankfull Streamflow	17	ft^3/s
Bankfull Width	12.1	ft

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	5.74	ft

Statistic	Value	Unit
Bieger_D_channel_depth	0.571	ft
Bieger_D_channel_cross_sectional_area	3.3	ft^2

Bankfull Statistics Disclaimers [Valley and Ridge P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [Valley and Ridge P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	5.09	ft
Bieger_P_channel_depth	0.503	ft
Bieger_P_channel_cross_sectional_area	2.87	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	5.42	ft
Bieger_USA_channel_depth	0.731	ft
Bieger_USA_channel_cross_sectional_area	4.81	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bankfull Area	12.2	ft^2
Bankfull Depth	1.01	ft
Bankfull Streamflow	17	ft^3/s
Bankfull Width	12.1	ft
Bieger_D_channel_width	5.74	ft
Bieger_D_channel_depth	0.571	ft
Bieger_D_channel_cross_sectional_area	3.3	ft^2
Bieger_P_channel_width	5.09	ft
Bieger_P_channel_depth	0.503	ft
Bieger_P_channel_cross_sectional_area	2.87	ft^2
Bieger_USA_channel_width	5.42	ft
Bieger_USA_channel_depth	0.731	ft
Bieger_USA_channel_cross_sectional_area	4.81	ft^2

Bankfull Statistics Citations

Mulvihill, C.I., Baldigo, B.P., Miller, S.J. , and DeKoskie, Douglas,2009, Bankfull Discharge and Channel Characteristics of Streams in New York State: U.S. Geological Survey Scientific Investigations Report 2009-5144, 51 p. (http://pubs.usgs.gov/sir/2009/5144/)
Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PI

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0956	square miles	0.1	10000

Maximum Probable Flood Statistics Disclaimers [Crippen Bue Region 4]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 4]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	514	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

Application Version: 4.15.0

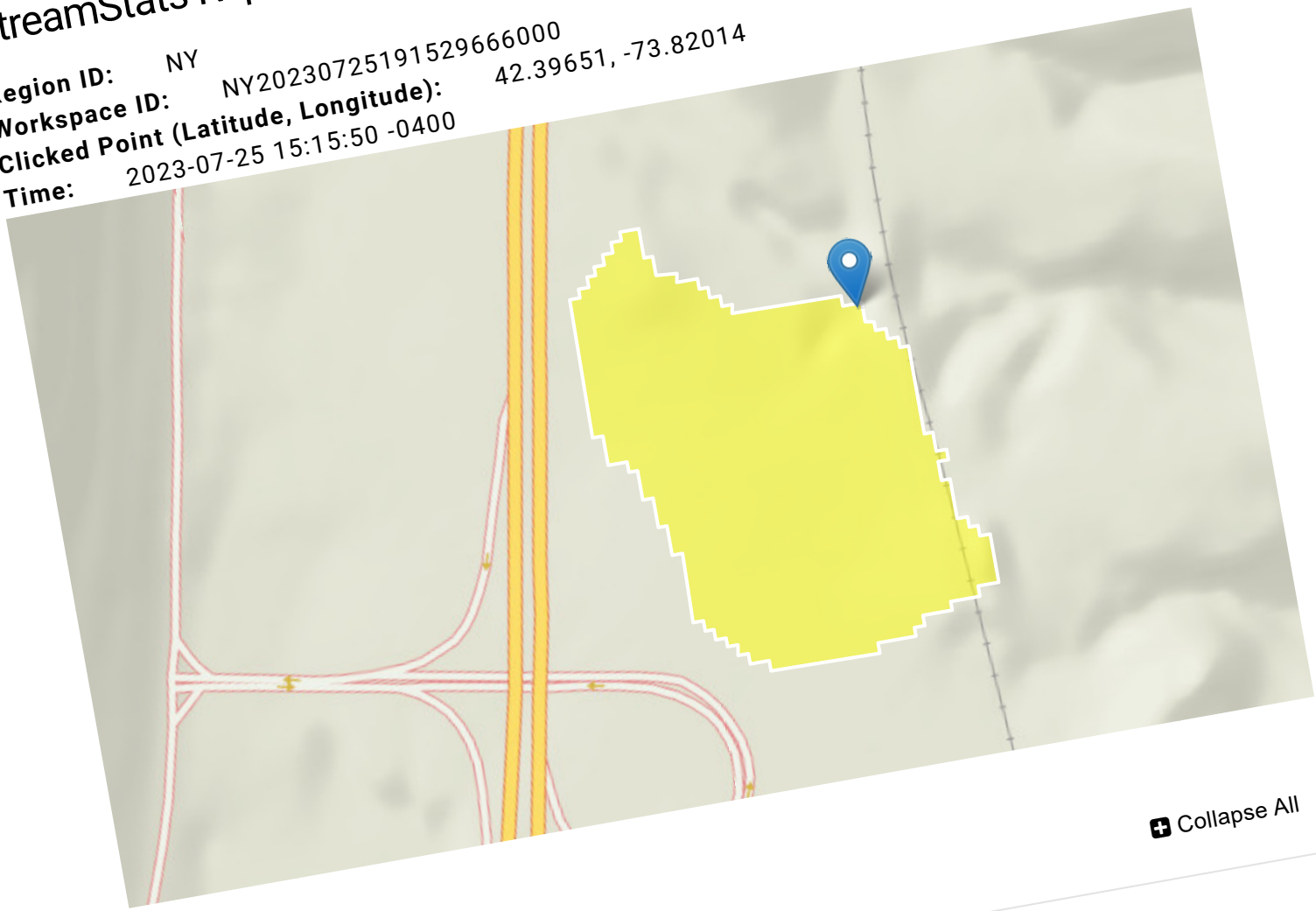
StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

:17 PM

StreamStats Report

Region ID: NY
Workspace ID: NY20230725191529666000
Clicked Point (Latitude, Longitude): 42.39651, -73.82014
Time: 2023-07-25 15:15:50 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0436	square miles
LAGFACTOR	Lag Factor as defined in SIR 2006-5112	0.0032	dimensionless
MAR	Mean annual runoff for the period of record in inches	15	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [2006 Full Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0436	square miles	1.93	996
LAGFACTOR	Lag Factor	0.0032	dimensionless	0.014	6.997
STORAGE	Percent Storage	0	percent	0	11.88
MAR	Mean Annual Runoff in inches	15	inches	16.03	33.95

Peak-Flow Statistics Disclaimers [2006 Full Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [2006 Full Region 2]

Statistic	Value	Unit
80-percent AEP flood	1.81	ft^3/s
66.7-percent AEP flood	2.27	ft^3/s
50-percent AEP flood	2.95	ft^3/s
20-percent AEP flood	5.09	ft^3/s
10-percent AEP flood	6.88	ft^3/s
4-percent AEP flood	9.47	ft^3/s
2-percent AEP flood	11.7	ft^3/s
1-percent AEP flood	14.1	ft^3/s
0.5-percent AEP flood	16.8	ft^3/s
0.2-percent AEP flood	20.9	ft^3/s

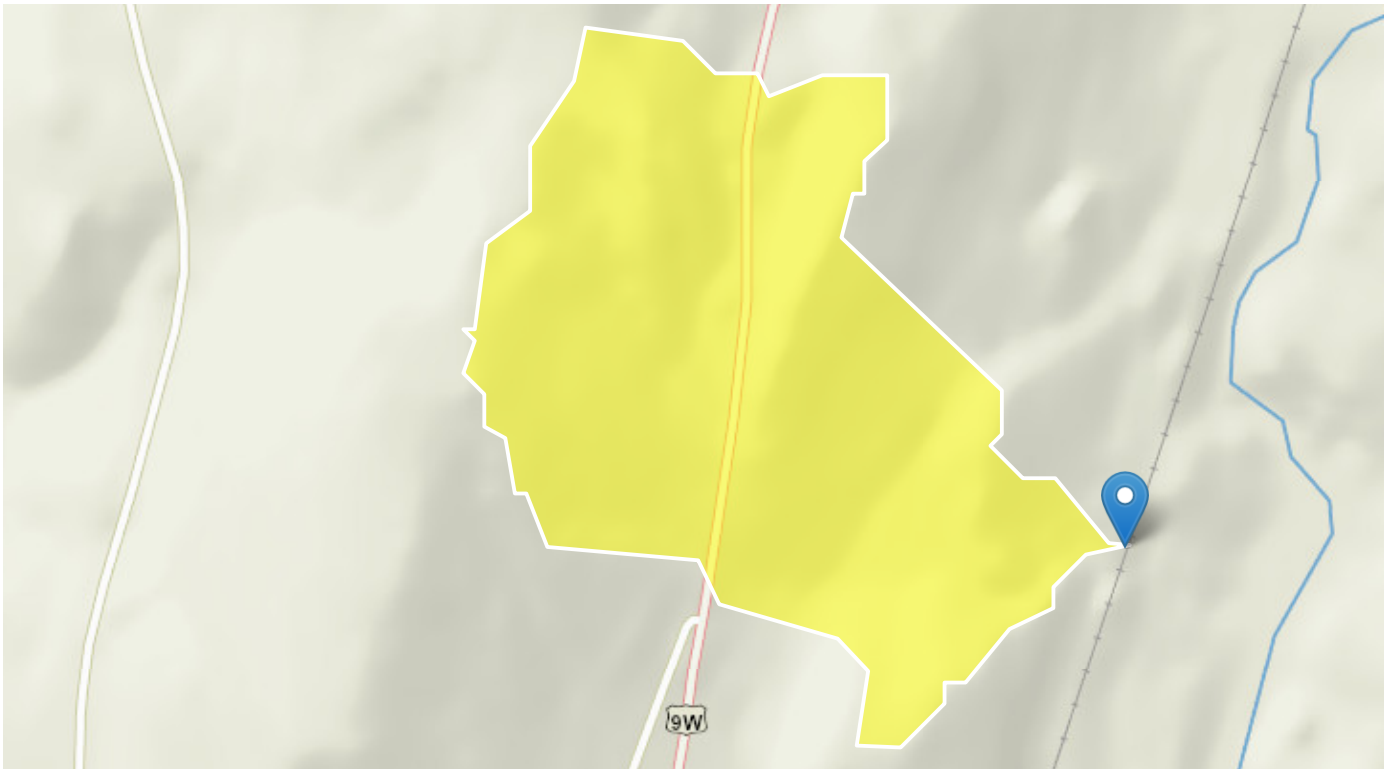
Peak-Flow Statistics Citations

Lumia, Richard, Freehafer, D.A., and Smith, M.J.,2006, Magnitude and Frequency of Floods in New York: U.S. Geological Survey Scientific Investigations Report 2006–5112, 152 p. (http://pubs.usgs.gov/sir/2006/5112/)

Application Version: 4.16.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report

Region ID: NY
Workspace ID: NY20230626234342665000
Clicked Point (Latitude, Longitude): 42.24579, -73.85883
Time: 2023-06-26 19:46:26 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0827	square miles
LAGFACTOR	Lag Factor as defined in SIR 2006-5112	0.00267	dimensionless
MAR	Mean annual runoff for the period of record in inches	15.8	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [2006 Full Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0827	square miles	1.93	996
LAGFACTOR	Lag Factor	0.00267	dimensionless	0.014	6.997
STORAGE	Percent Storage	0	percent	0	11.88
MAR	Mean Annual Runoff in inches	15.8	inches	16.03	33.95

Peak-Flow Statistics Disclaimers [2006 Full Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [2006 Full Region 2]

Statistic	Value	Unit
80-percent AEP flood	3.41	ft^3/s
66.7-percent AEP flood	4.28	ft^3/s
50-percent AEP flood	5.56	ft^3/s
20-percent AEP flood	9.59	ft^3/s
10-percent AEP flood	12.9	ft^3/s
4-percent AEP flood	17.8	ft^3/s
2-percent AEP flood	22	ft^3/s
1-percent AEP flood	26.6	ft^3/s
0.5-percent AEP flood	31.7	ft^3/s
0.2-percent AEP flood	39.3	ft^3/s

Peak-Flow Statistics Citations

Lumia, Richard, Freehafer, D.A., and Smith, M.J.,2006, Magnitude and Frequency of Floods in New York: U.S. Geological Survey Scientific Investigations Report 2006–5112, 152 p. (http://pubs.usgs.gov/sir/2006/5112/)

Application Version: 4.16.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1