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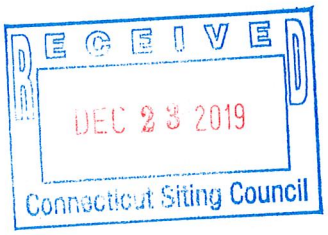


December 19, 2019

VIA ELECTRONIC MAIL & U.S. MAIL

Melanie Bachman
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: PETITION NO. 1385 – Cobb Road LLC petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 1.95-megawatt AC solar photovoltaic electric generating facility on approximately 11.16 acres located at 20-1 Short Hills Road, Old Lyme, Connecticut and associated electrical interconnection.

Dear Ms. Bachman:

I am writing on behalf of my client, Cobb Road LLC ("Cobb Road"), in connection with the above-referenced Petition. With this letter, I am enclosing an original and 15 copies of Cobb Road's Responses to #SmartSolarCT's Set of Interrogatories, dated December 5, 2019.

Should you have any questions concerning this submittal, please contact me at your convenience. I certify that copies of this submittal have been made to all parties on the Petition's service list.

Sincerely,

Lee D. Hoffman

Lee D. Hoffman

Enclosures

cc: Deb Moshier-Dunn (via e-mail)

Petition No. 1385
Responses to Interrogatories
Promulgated by #SmartSolarCT

December 19, 2019

Stormwater Report section of the Petition:

Appendix D and Appendix E:

1. What depth were the infiltration test performed relative to the existing ground surface?

   At each of the four (4) basin locations, infiltration tests were performed at depths of two feet (2') and five feet (5') below the existing ground surface.

2. What equipment was used to conduct the infiltration tests?

   The Petitioner used a mini-excavator to conduct the respective infiltration tests. The following materials were also used in connection therewith: 3" diameter PVC piping, granular bentonite, and potable water.

3. Were the infiltration tests conducted in accordance with ASTM Standard D3385? Provide evidence of compliance with the ASTM standard D3385?

   The Connecticut Department of Environmental Protection's *2004 Connecticut Stormwater Quality Manual* (the "Stormwater Manual") does not require that infiltration tests be conducted in accordance with ASTM Standard D3385. Rather, the Stormwater Manual provides that infiltration rates can be determined through an appropriate field permeability test, which is what the Petitioner performed at the Site via falling head in-situ permeability tests. The infiltration test locations were presaturated with potable water prior to conducting the falling head tests.

4. For Basin B1, an infiltration rate of 3.33"/hr. was used in the hydrologic model. The 2004 CT DEP Storm Water Quality Manual "DEP Manual" requires that the observed infiltration rate be reduced by 50% (page 11-P3-3 of the manual), why did the applicant not provide the required factor of safety as required by the DEP Manual for infiltration basins B-1, B-2, and B-3?

   As the Petitioner indicated in its Petition to the Connecticut Siting Council (the "Council"),[1] the Project was designed in conformance with the recommendations promulgated by the Connecticut Department of Energy and Environmental Protection ("CT DEEP") in its latest guidance document, *Appendix I - Stormwater Management at Solar Array Construction Projects* ("Appendix I"). Therefore, the Petitioner did implement the requisite factor of safety in the Project's design. For the hydrologic analyses,[2] the Petitioner reduced the Hydrologic Soil Group ("HSG") present on-site by one (1) step (e.g., soils of HSG "B" shall be considered HSG "C").

   Moreover, once construction for the Project is complete and the Site is stabilized, the Site is not expected to generate a significant amount of coarse solids (e.g., parking lot sanding), oil, grease, and/or floatable inorganic and organic material(s) that are typical in those commercial developments that experience constant vehicular traffic. As such, any potential for the basins

[1] *See* Sec. 3.4 ("Stormwater Management") of the Petition.
[2] The hydrologic analyses were done to confirm the infiltrative capacity(ies) of the proposed stormwater management measures.

clogging over time will be mitigated through regular inspections (and maintenance, if required) of same, in accordance with the Project's Operation and Maintenance Plan (the "O&M Plan"). Finally, the Petitioner notes that since these are basins, as opposed to trenches filled with stone, their clogging is not a major risk factor.

5. The DEP Manual allows for up to 5 acres to be directed to an infiltration basin, but the Manual also recommends that not more 2 acres are directed to an infiltration basin. How can the applicant justify doubling the recommended 2-acre area?

   The above statement is not accurate. The Petitioner directs the Intervenor to page 11-P3-2 of the Stormwater Manual, which states, in relevant part that, "...[t]he maximum contributing drainage area for infiltration basins should not exceed 25 acres (10 acres is recommended) ." [3]

   Accordingly, given that the Stormwater Manual does not recommend "that not more [than] 2 acres [be] directed to an infiltration basin," the Petitioner will not address the portion of the Interrogatory relating to same. The Petitioner notes, however, that the maximum contributing drainage area for all of the Project's basins does not exceed the actual recommended area of ten (10) acres.

6. The DEP Manual states "one field test and one test pit or soil boring should be performed per 5,000 square feet of basin area. A minimum of three field tests and test pits or soil borings should be performed at each basin. The design of the basin should be based on the slowest rate obtained from the field tests performed at the site." Why have no test pits been performed as required by the DEP Manual?

   The Petitioner has performed the requisite test pits at the Site; the Petitioner performed three (3) test pits at each designated basin location. Per the requirements of the Stormwater Manual, the Petitioner then used the slowest rate, as determined by said testing, to design the basin(s).

7. How can it be verified that the bottom of the infiltration basin is located at least three feet (3') above the seasonally high groundwater table or bedrock as demonstrated by on-site soil testing?

   Please see the Test Pit Summary Information sheet (the "Test Pit Summary"), attached hereto as Exhibit 1, which verifies that the bottom of each basin is located at least three (3) feet from any groundwater table or bedrock.

8. The DEP Manual on page 11-P3-6 states that pretreatment should be required to accommodate 25% of the calculated water quality volume. What is the required pretreatment system for the four proposed infiltration basins?

   There is no required pretreatment system for the four (4) proposed infiltration basins. The Stormwater Manual pertinently states that, "[p]retreatment generally consists of a sediment forebay to capture coarse particulate pollutants, floatables, and oil and grease."[4] Because these infiltration basins are not servicing a commercial development, where the aforementioned items would be present, a sediment forebay is not necessary for the Project.

9. It is further stated that pretreatment is required for soils with infiltration rates over 3.0" per hours. [sic] As this condition exists for basins B-1, B-3, and B-4, what is the applicant's

[3] *See* CT DEP Stormwater Manual (2004), p. 11-P3-2 (under that portion that reads, "Siting Considerations, Drainage Area").
[4] *See* CT DEP Stormwater Manual (2004), p. 11-P3-6.

justification for not providing the required pretreatment per the DEP Manual?

As stated on page 11-P3-6 of the Stormwater Manual, pretreatment generally consists of a sediment forebay to capture coarse particulate pollutants, floatables, oil, and grease. Because these items are not present at the Project Site, such pretreatment is not required.

10. Where are the calculations to define the Basin Dimensions as required by the DEP Manual on page 11-P3-8?

The proposed basins are designed for combined infiltration/flood control; as such, the equation(s)/calculations contained in the Stormwater Manual are not applicable to same. The basins meet the required volumes for water quality volume plus the precipitation that falls within the basin(s) during the water quality design storm event of one (1) inch. *See* attached calculations (Exhibit 2). The depth of the basin(s) from the bottom to the spillway do(es) not exceed three (3') feet.

11. Do the applicant's four infiltration basins meet the basin dimensional requirements found in the DEP Manual?

As indicated in the Petitioner's response to Interrogatory #10 above, the proposed basins are designed for combined infiltration/flood control; therefore, the Stormwater Manual's dimensional requirements are not applicable. Notwithstanding the foregoing, the Project's four (4) infiltration basins meet the dimensional requirements found on page 11-P3-8 of the Stormwater Manual.

12. The DEP Manual states on page 11-P3-9 "Infiltration practices should not be used as temporary sediment basins during construction", yet this is exacting [sic] what the applicant is proposing. How can the applicant justify using the infiltration basins as temporary sediment basins without adversely affecting the short and long term functionality of the infiltration basins?

As the Petitioner explained in its responses to Interrogatories #10 and #11 above, the basins are designed as combined infiltration/flood control. Therefore, the Stormwater Manual's provisions relating to infiltration basins/practices, and the Intervenor's concerns relating to same, are inapplicable.

13. Why are the actual solar panels not considered impervious as required by Appendix I document from the CT DEEP in the post-development hydrologic models?

As a preliminary matter, the Petitioner objects to the Intervenor's interpretation of Appendix I as it relates to its characterization of the above detail as a "requirement" for post-development hydrologic models. Appendix I, in its current form, is a guidance document, not a regulation or permit requirement. Interrogatory 13 also requires a legal conclusion, to which a response is not required, therefore, the Petitioner also objects to this Interrogatory on those grounds.

Notwithstanding the foregoing objections, the Petitioner responds as follows. The solar panels are not considered effective impervious cover, as the Project meets the design conditions of Appendix I "Design and Construction Requirements," No. 1 (a) through (e).

14. Why was 4.81 acres of impervious area used in the Water Quality Volume calculations when only 0.009 acres of impervious area was used in the Hydrologic Model?

Please refer to the Petitioner's response to Interrogatory # 13 above.

Site Plans:

Sheet GP-1:

15. How will the applicant prevent the movement of fine particles from the 20' gravel driveway from washing into the infiltration basins B-1 and B-2 and clogging the bottom of the infiltration basin?

    The gravel driveway, at the completion of construction, will be stable per the requirement of the Plans; therefore, the movement of fine particles is not expected. In the unlikely event that this situation occurs, it will be handled in accordance with the Project's O&M Plan.

16. Where are the sizing calculations for the proposed swale shown on this plan at the northeast corner of Basin B-1?

    The sizing calculations for the proposed swale (Basin B-1) are attached as Exhibit 3.

Sheet GP-2:

17. Where are the sizing calculations for the proposed swale shown on this plan at the southeast corner of Basin B-4?

    The sizing calculations for the proposed swale (Basin B-4) are attached as Exhibit 3.

18. Where is the evidence that the bottom of Basin B-3 which is excavated at least two feet (2') below existing grade will provide a three foot (3') vertical separation to seasonal high groundwater or bedrock?

    Please refer to the Test Pit Summary for this evidence. It verifies that the bottom of Basin B-3 has three (3) feet of vertical separation from seasonal high groundwater or bedrock.[5]

19. Where is the evidence that the bottom of Basin B-4 which is excavated at least four feet (4') below existing grade will provide a three foot (3') vertical separation to seasonal high groundwater or bedrock?

    Please refer to the Test Pit Summary for this evidence. It verifies that the bottom of Basin B-4 has three (3) feet of vertical separation from seasonal high groundwater or bedrock.[6]

20. How will the applicant prevent the movement of fine particles from the 20' gravel driveway from washing into the infiltration basins B-3 and B-4 and clogging the bottom of the infiltration basin?

    The gravel driveway, at the completion of construction, will be stable per the requirement of the Plans; therefore, the movement of fine particles is not expected. In the unlikely event that this situation occurs, it will be handled in accordance with the Project's O&M Plan.

Sheet EC-1:

21. Why are temporary stockpile locations shown just above the temporary sediment traps where a

[5] The subject test pits were excavated at depths of five (5) feet and eight (8) feet, respectively.
[6] The subject test pits were excavated at depths of five (5) feet and eight (8) feet, respectively.

failure of the erosion control measure around the stockpile would result in a large discharge of suspended material into the temporary sediment trap?

The temporary stockpile locations are necessary for the Phase 1 construction of the temporary sediment traps and for stockpiling soil while the remainder of the Site has not been grubbed (i.e., disturbed). The Petitioner expects that, after the temporary sediment traps have been constructed, those stockpiles will no longer be needed.

22. Is the topsoil or other material being stripped from within the area of the solar array which necessitates the number of stockpiles shown on this plan?

    As the Petitioner stated in its response to the Council's Interrogatory #54, the existing topsoil will be stripped from the Site *only* in those limited areas within the stormwater basins. No other topsoil from the Site shall be stripped. In the areas within the stormwater basins, the topsoil will be stored in a stockpile which will then be spread over disturbed areas on the Site. Once grading is complete, the entire Site will be stabilized with permanent vegetation. The number of stockpiles shown on the Plan were an estimation based on the anticipated construction practices/activities on the Site.

23. Where will the chipped material be stockpiled on the site? Where and when will the chipped material be used on the site?

    The Petitioner expects that it will store the chipped material in one of the Site's temporary stockpile locations. In the event that chipped material is used on the Site, it would be solely for temporary stabilization purposes.

24. The applicant shows compost socks to be installed perpendicular to contours which will result in concentrated flow along them. Why does the applicant have compost socks located perpendicular to contours?

    The compost filter socks shown perpendicular to the concours on the outer limits of the Plan are to prevent any edge sediment from leaving the Site. Since the compost filter socks are shown perpendicular to the contours, concentrated flow along them is not expected. In the unlikely event that this occurs, this will be maintained as required by the Plans.

25. How will the applicant prevent concentrated flow and the resultant erosion on the gravel driveways which are perpendicular to contours?

    The Site's gravel access road is level (meaning, "dug in") with existing grades—as opposed to built on top—so there is no potential for concentrated flow (and correspondingly, resultant erosion) along the gravel driveways.

Sheet EC-2:

26. Why are temporary stockpile locations shown just above the temporary sediment traps where a failure of the erosion control measure around the stockpile would result in a large discharge of suspended material into the temporary sediment trap?

    Interrogatory #26 is duplicative of Interrogatory #21; accordingly, see the Petitioner's response to Interrogatory #21 above.

27. Is the topsoil or other material being stripped from within the area of the solar array which

necessitates the number of stockpiles shown on this plan?

Interrogatory #27 is duplicative of Interrogatory #22; accordingly, see the Petitioner's response to Interrogatory #22 above.

28. Where will the chipped material be stockpiled on the site? Where and when will the chipped material be used on the site?

Interrogatory #28 is duplicative of Interrogatory #23; accordingly, see the Petitioner's response to Interrogatory #23 above.

29. The applicant shows compost socks to be installed perpendicular to contours which will result in concentrated flow along them. Why does the applicant have compost socks located perpendicular to contours?

Interrogatory #29 is duplicative of Interrogatory #24; accordingly, see the Petitioner's response to Interrogatory #24 above.

30. How will the applicant prevent concentrated flow and the resultant erosion on the gravel driveways which are perpendicular to contours?

Interrogatory #30 is duplicative of Interrogatory #25; accordingly, see the Petitioner's response to Interrogatory #25 above.

Sheet EC-3:

31. According to this plan, the entire area of the solar array will be disturbed at one time which is in contradiction to the notations shown on Sheets EC-1 and EC-2? Which approach is correct? If the information of Sheet EC-3 is correct then an Individual Permit, not the General Permit from CT DEEP will be required. Has the applicant applied for an individual permit?

As a preliminary matter, the Petitioner notes that certain portions of Interrogatory #31 contain statements and/or legal conclusions to which no response is required; specifically, those sentences that read "[a]ccording to this plan, the entire area of the solar array will be disturbed at one time which is in contradiction to the notations shown on Sheets EC-1 and EC-2" and "[i]f the information of Sheet EC-3 is correct then an Individual Permit, not the General Permit from CT DEEP will be required." As such, Petitioner objects to this interrogatory. Notwithstanding the foregoing objection, Petitioner responds as follows:

To the extent that a response is required, the Petitioner states that, based upon the statements contained in this Interrogatory, it appears that the Intervenor does not understand the Petitioner's proposed construction plan(s) (and, correspondingly, the information/ notation(s) contained in Sheets EC-1, EC-2, and EC-3, respectively). Sheet EC-3 clearly states that the subject trees would be cleared, but no grubbing (i.e., ground disturbance) can occur during such time.

Moreover, regarding that portion of the Interrogatory relating to the veracity of the information contained in Sheet EC-3, and the necessity of obtaining an Individual Permit from the CT DEEP, the Petitioner maintains that Sheet EC-3 and the information contained therein is accurate; and, in spite of the Intervenor's contention(s) to the contrary, a General Permit is appropriate, and an Individual Permit is not required. As such, the Petitioner will apply for a General Permit from the CT DEEP, not an Individual Permit.

32. This plan also notes that the only impervious areas are the concrete pads for electrical equipment. How can the applicant justify this position when the plans have to comply with Appendix I from the DEEP?

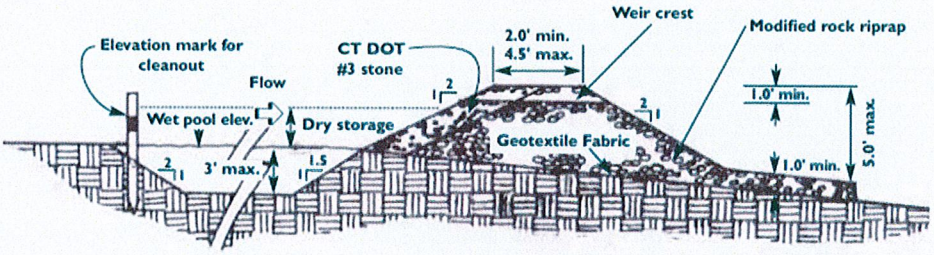
    Please refer to the Petitioner's response to Interrogatory # 13 above.

Sheet EC-4:

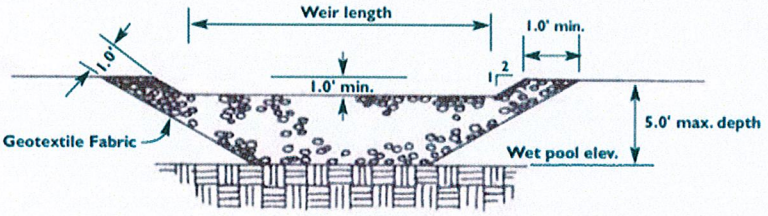
33. The detail for the outlet from the temporary sediment trap shows that the bottom of the spillway is only 12" below the top of the berm. How is the applicant providing a freeboard of 1' which is standard engineering practice for any water impoundment structure?

    The detail used in EC-4 referred to by the Intervenor is derived from the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* (the "E&S Guidelines"), which were promulgated by the Connecticut Council on Soil and Water Conservation in conjunction with the CT DEEP. More specifically, this detail was derived from page 5-11-29 of the E&S Guidelines, Figure TST-4 "Views of a Temporary Sediment Trap Outlet," which is reproduced below:

Figure TST-4 Views of a Temporary Sediment Trap Outlet



X – Section A-A
(not to scale)



X – Section B-B
(not to scale)

Per the CT DEEP: "[the E&S Guidelines] are required as the technical standard to be complied with in many municipal planning and zoning regulations and in many permits issued by the Connecticut Department of Energy and Environmental Protection associated with land development."[7] Accordingly, the subject detail is in fact the technical standard. To that end, the Petitioner is unsure what source(s) the Intervenor is consulting for its "standard engineering practice[s]."

34. How will the proposed plywood baffle system prevent runoff from going under the plywood barrier as proposed?

The proposed plywood baffle system (the "Baffle System") will improve the efficiency of the Project's temporary sediment traps by lengthening the respective flow path(s) of the runoff. The E&S Guidelines recommend the use of baffles when "site constraints prohibit the design of an adequate [effective flow] length."[8]

That said, the Baffle System ensures that the respective storage area(s) for the temporary sediment traps adhere(s) to the minimum 2:1 ratio recommended by the E&S Guidelines. *See* E&S Guidelines, p. 5-11-25 (providing, "[t]ry to provide a storage area which has a minimum 2:1 length to width ratio (measured from point of maximum runoff introduction to outlet)."

Without the Baffle System, the length to width ratio for the Project's temporary sediment traps would have been 1:4.5. With the addition of the Baffle System, however, the length to width ratio is now 3:1—thereby surpassing the recommended 2:1 figure. *See* E&S Guidelines, pp. 5-11-7 and 5-11-15. The addition of the Baffle System allows for an added factor of safety during construction—a safety measure that, the Petitioner notes, is not a requirement under Appendix I or the E&S Guidelines.

The proposed plywood barrier detail is similarly derived from the E&S Guidelines. *See* E&S Guidelines, Figure SB-7 "Sediment Basin Baffle Details," p. 5-11-15.

Petitioner Responses to Council Interrogatories:

35. **Council Question 48**. What effect would runoff from the drip edge of each row of solar panels have on the or site drainage patterns? Would channelization below the drip edge be expected? If not, why not?
Petitioner Answer: The rows of solar panels are not considered "closed systems," because there are "gaps" between each module (both north/south and east/west). As such, the drip edge of each solar panel will not have an impact on the Site's drainage patterns, as stormwater will flow off of the panels in various locations as the panels follow the contours of the existing land. In the case of this Project since the solar panels will be in four up landscape orientation increasing the lower drip edge from two in portrait to four in landscape, reducing in half the amount of runoff encountered at each drip edge. Furthermore, once the Site is fully stabilized post-construction, channelization along the drip edge is not expected. The Petitioner expects that the only time that channelization along the drip edge may be of concern is during construction in those areas that are not fully stabilized; however, such would be rectified upon final stabilization of the Site. **Our Response:** The answer is wrong, runoff from the panels will follow parallel to the panel rows like East Lyme and cause concentrated flow. This flow will concentrate more and more as it moves

[7] *See* the Connecticut Department of Energy & Environmental Protection, *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*, https://www.ct.gov/deep/cwp/view.asp?a=2720&q=325660&deepNav_GID=1654.
[8] *See* 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (the "E&S Guidelines"), p. 5-11-7.

down the hill. It has to cross the gravel driveway above the basins and will likely erode the gravel surface and deposit this material in the basins. Fine layers of this type of sediment will clog the infiltrative surface of the basins. How can this be corrected based on actual data gathered from the East Lyme resulting runoff?

The Petitioner stands by its original Interrogatory #48 response to the Council. As such, the Petitioner respectfully disagrees with the Intervenor's position(s) to the contrary, including the reasoning offered in support thereof.

In addition, the Petitioner objects to the Intervenor's reference to the East Lyme Project. Because the Petitioner is not, nor ever has been, involved with and/or affiliated to the East Lyme Project, the Intervenor's reference to same is inappropriate. Moreover, the Intervenor has provided no evidence regarding the East Lyme Project into the record of this Petition. As such, the Petitioner will neither respond to, nor comment on, the East Lyme Project or anything relating thereto.

36. **Council Question 56**. Has a comprehensive geotechnical study been completed for the site to determine if site conditions support the overall Project design? If so, summarize the results. If not, has the Petitioner anticipated and designed the Project with assumed subsurface conditions? What are these assumed conditions?
Petitioner Answer: The racking manufacture TerraSmart does not require a comprehensive geotechnical study to be completed to support their structural design as their pre-drilled foundation screw holes can accommodate any subsurface conditions. The Project has completed test pit and soil analysis for the stormwater basins to support the stormwater management design. Those results can be found in the Stormwater Management Report. **Our Response:** If shallow bedrock is encountered, like less than 4' below grade, then any support system will NOT be adequate to hold up the panels, if they are drilling holes into the ground to whatever depth they need, then the study may not be needed, but should be done anyway so that the applicant knows what type of material he is dealing with. I did not see deep test pit data in stormwater report, only infiltration data, which led to my questions.

The Petitioner stands by its original Interrogatory #56 response to the Council. Because the Interrogatory contains only statements and does not pose a question to the Petitioner, the Petitioner will not address same, other than to note that the Project will comply with Connecticut's Building Code.

General questions:

37. Why was this undeveloped forested property chosen for the facility when an area at the brown field Old Lyme transfer station on Four Mile River Road would have offered a similar ease of connection to the Eversource electric power system?

As the Petitioner explained in its Petition to the Council, the Project Site was selected based on a number of important considerations; the relative ease of connection to the Eversource electric power system being only one.

That having been said, the Petitioner encourages the Intervenor to read that section of the Petition relating to site selection considerations, which begins on page 3. To the Intervenor's point about the "undeveloped forested property," the Petitioner directs the Intervenor to page 4 of the Petition—specifically, bullet points 3 and 4.

38. Is this proposed facility consistent with the Town of Old Lyme's Plan of Conservation and

Development?

This Interrogatory calls for a legal conclusion to which no response is required; therefore, the Petitioner will not address same. The Petitioner does, however, refer the Intervenor to those sections contained in Title 16, Chapter 277A of the Connecticut General Statutes.

39. Is this proposed facility consistent with the Town of Old Lyme's zoning regulations?

This Interrogatory calls for a legal conclusion to which no response is required; therefore, the Petitioner will not address same. The Petitioner does, however, refer the Intervenor to those sections contained in Title 16, Chapter 277A of the Connecticut General Statutes.

40. Can the Petitioner show how the Project "1.95 + / - MW AC" output was calculated, including references for all data used in the calculation?

The Petitioner detailed how the Project's 1.95 +/- MW AC output was calculated in its Response to Interrogatory #28 from the Council. Therein, the Petitioner provided the following:

The Solectria XGI 1500 line of string inverters has three (3) options for the nameplate rating: 125 kW-AC, 150 kW-AC, and 166 kW-AC. The string inverters selected for this Project are a combination of nine (9) of the 166 kW-AC model (XGI 1500-166/166) and three (3) of the 150 kW-AC model (XGI 1500-150/166). Therefore, the twelve (12) inverters selected for this Project have a combined output rating of 1.944 MW-AC (rounded to 1.95 MW-AC).

41. What level of uncertainty does the "+ / -" indicate in the calculation of electrical output for this Project? What is the acceptable range for this uncertainty?

The Petitioner disagrees with the Intervenor's mischaracterization of the "+/-" as an indicator of "uncertainty" regarding the Project's calculated output. Please refer to the Petitioner's response to Interrogatory #40 above.

42. What is the design DC output for this facility?

Please refer to Sheet SP-0 of the Site Plans submitted as part of this Petition.

43. What is the expected operational lifetime for this Project?

As the Petitioner indicated in its Interrogatory #12 response to the Council, the Petitioner anticipates that the operational life of the Facility will be at least twenty-five (25) years.

44. Is Independence Solar, LLC an affiliate, subsidiary, or otherwise owned by another corporation or series of corporations? If so, provide the corporate ownership(s) and location(s) of their main headquarters. If not, is this Project being financed by another entity?

The Petitioner objects to this Interrogatory as the Interrogatory exceeds the scope of a petition for declaratory ruling pursuant to Conn. Gen. Stat. §§4-176 and 16-50K. Subject to the foregoing objection, the Petitioner states that, Independence Solar, LLC is not owned by another corporation or series of corporations.

45. Is the statement about the solar panels being recycled after the end of the life of this facility an

expectation or is it grounded in fact? (I.e., are there any solar panels presently being recycled anywhere in the United States?) What will be done with a panel or panels that are broken during construction or during the life of the Project?

As the Petitioner explained in its Interrogatory #13 response to the Council, presently the panels are recyclable. While the Petitioner believes this will still be the case at the end of the Project's useful life after at least 25 years, the Petitioner obviously cannot guarantee that this will be the result. Panels that break during construction and/or during the life of the Project will either be recycled or disposed of in accordance with the procedures delineated in the Petitioner's Decommissioning Plan (Appendix B of the Petition).

With respect to the Intervenor's inquiry re: whether any solar panels are presently being recycled in the United States, there are a number of solar module recycling companies in the United States. A few of these include: Complete Recycling Solutions, Cleanlites Recycling, CMK Recycling, Dynamic Lifecycle Innovations, Echo Environmental, Exotech, and Recycle PV.

The Petitioner encourages the Intervenor to review some of the many sources available online which discuss the current state of solar panel recycling in the United States.

46. What materials used in the manufactured solar panels for this project can presently be recycled?

The following solar panel materials are that are presently recyclable include: the solar cells, metal frames, glass, wire(s), and plastic.

47. Why hasn't the petitioner provided a detailed decommissioning plan for this facility, including engineering and environmental aspects with appropriate cost estimates? The property is within a strategically protected area with core forest. If it is not decommissioned properly, invasive species will grow affecting the surrounding flora and fauna. What experts will be consulted to ensure "the restoration of the property to pre-Project conditions."

The Petitioner refers the Intervenor to the Decommissioning Plan it submitted with its Petition (Appendix B). The Petitioner appreciates that, when the time comes for decommissioning the Project, the Council will enforce the appropriate standards at that time, and the Petitioner will abide by same.

48. What entity will bear the cost of eventual decommissioning and solar panel recycling? Will there be a bond posted to bear the costs of these efforts? If so, at what amount?

The Petitioner will bear the eventual cost(s) of decommissioning the Facility and recycling the solar panels associated therewith. There is no requirement for the Petitioner to post a decommissioning bond for the Project at this time.

49. Are any of the materials used in the solar panels for this project considered to be hazardous to human health or toxic to humans, wildlife, and the environment?

Solar panels are closed systems. Therefore, any potentially hazardous materials contained therein are not anticipated to present any undue concern(s) to human health, wildlife, and/or the environment. The Petitioner will note that solar panels have been installed in sensitive locations

throughout the world, such as water treatment facilities.

50. Are the solar panels combustible or flammable? If so, what gaseous or particulate by-products might be expected if they are subject to burning in a fire? Can a fire on the array be put out by water or is foam required?

    Solar panels are combustible, not flammable, similar to the existing vegetation in the area of the Site. In the event that an array catches on fire, the preferred approach for a ground-mounted array is to contain the fire within the fenced area, and not attempt to put it out with any type of fire fighting medium.

    The Petitioner also notes that (and as was indicated in its Interrogatory #37 response to the Council), the Project will be designed to comply with all applicable safety codes and standards, including the National Electrical Code ("NEC") and those codes and standards promulgated by the National Fire Protection Association ("NFPA"). The Project's conformance with the foregoing greatly mitigates the chance(s) of a fire event happening.

51. Will there be an emergency response plan for use by local or state personnel prepared for this facility by Cobb Road, LLC or will that be left up to the Town of Old Lyme? Will Cobb Road, LLC be responsible for updating the Town's Hazard Plan? (e.g, Who is responsible for clean-up and removal of damaged panels and infrastructure that lands off the Site in the event of a catastrophic storm?)

    Yes, the Petitioner will provide a Facility emergency response plan to local/state personnel, as applicable. Please refer to the Petitioner's Interrogatory #41 response to the Council for more information regarding same.

    To address the Intervenor's question re: whether Cobb Road LLC will be responsible for updating the Town of Old Lyme's Hazard Plan - it is the Petitioner's present understanding that the Southeastern Connecticut Council of Governments ("SCCOG") is the organization largely responsible for the Town of Old Lyme's Hazard Mitigation Plan (including making updates thereto). That said, however, if so requested by the SCCOG, the Petitioner would be willing to offer the input it may have regarding potential mitigative efforts.

52. Has an engineering analysis been completed for this project that provides information regarding possible outcomes or damages to the solar panels and infrastructure in the event of a hurricane, tornado, or similar large wind event?

    The Project is designed in accordance with applicable building codes. For the Town of Old Lyme, the ultimate design wind speed is 125 MPH per the CT State Building Code.

53. How will possible lightning strikes to the solar panels or other electrical equipment be attenuated? What is the possibility that a lightning strike could initiate a fire onsite?

    The Project will be designed to comply with all applicable safety codes and standards of the NEC and the NFPA, which includes those provisions relating to lightning and mitigating the effects thereof.

Regarding the possibility of a lightning strike (and resultant fire to the array(s)) - the Petitioner is unable to calculate the probability of such event happening. However, as lightning generally strikes objects that are higher, as opposed to lower, to the ground, and considering that the Facility will not stand greater than ten (10) feet with many taller objects in the near vicinity (trees, utility power poles/lines, etc.), the Petitioner expects that the possibility of a direct strike is low.

54. As much of this parcel will remain forested, what provisions will be made to deal with downed trees or other obstructions for fire or other emergency vehicles to access the site?

As the Petitioner explained in Section 3.6 ("Operation and Maintenance") of the Petition: routine inspection tasks will be conducted regularly at the Site to ensure that its access/egress locations are free of obstructions and hazards. The access roads to the Site are also used by the landowner (and related kin) to access their residence on the property, and they will also report any issues they observe regarding access to the Site to the Petitioner.

55. Will Cobb Road, LLC post a bond with the appropriate authorities in the event that there may be environmental damages resulting from this project or liabilities associated with its operation or decommissioning (not just during construction)?

Please see the Petitioner's response to Interrogatory #48 above.

56. What is the petitioner's plan and schedule for monitoring the site's infiltration basins and their outflows?

The Petitioner's plan and schedule for monitoring the Site's infiltration basins, including their respective outflows, was addressed in page 10 of the Petition. Therein, the Petitioner provided the following:

> *Ongoing site maintenance activities will occur regularly to ensure proper Facility operations, on-site and public safety, and prevent shading impacts to the Facility. Cobb Road is based in Essex, Connecticut, and will use personnel that will be responsible for all required Project monitoring and maintenance activities. Facility monitoring is performed continually via an online system to confirm proper performance and operation, including the use of remote telemetry for energy metering.*
>
> *The Project Area will be thoroughly inspected by Cobb Road O & M personnel, at a designated frequency, for evaluation of potential issues associated with security, safety, and environmental protection. Routine, general inspection tasks include: verifying that Safety and Identification labeling is present and legible; inspecting and confirming Site access/egress locations are free of obstructions and hazards; checking security means and installation methods; verifying equipment access lanes are free of obstructions and hazards; and, inspecting for changes in environmental conditions, such as nearby construction activity, agricultural activities, water table changes, acts of vandalism, and shading.*
>
> *In addition to general inspections, Cobb Road O & M personnel will perform inspections of mechanical systems (e.g., racking, modules); the DC and AC electrical system (e.g., DC collection panels, AC collection panels, safety disconnect switches); inverters; the stormwater management system (e.g., where applicable, drainage swales, basins); and the data acquisition system. Issues found during inspection visits, and deemed readily repairable, will be promptly addressed.*

57. As this Site is surrounded by protected lands with a robust wildlife population, is it possible to create wildlife corridors in the fencing to allow all wildlife (not just small mammals) to traverse the array in a number of areas?

    Creating a narrow corridor for large mammals through the middle of the proposed array field would likely create more of a hazard for those large animals from being confined in a small passage rather than being beneficial. For larger species, such as deer, walking around the perimeter of the proposed array should not be a significant impediment given the distances they typically travel in their normal movement patterns. Introducing large animal wildlife corrdiors through the middle of a project is typically implemented with much larger installations that cover vast areas of land.

58. The Council on Environmental Quality (CEQ) has noted in its October 28, 2019 letter (corrected) to the Council that the Petitioner has not done an on-site survey of State Listed Species. Will the Petitioner conduct such a survey prior to any disturbance to the Site to answer the question of whether the "absence of listed species indicates that they were not present or that they were not looked for"?

    The Petitioner has met its regulatory obligation(s) with respect to State-listed species. As an initial step, the Petitioner reviewed the publicly-available CTDEEP NDDB mapping to determine if any State-listed species and/or critical habitats occur at, or within, the vicinity of the Site. According to the applicable NDDB map (i.e., covering the Town of Old Lyme), the nearest NDDB buffer area is located approximately 0.86 miles from the Project. Per the CT DEEP's criteria, there is no need to consult with the NDDB unless a project site either contains, is intersected by, or is within 0.25 miles of an NDDB buffer area.

    Notwithstanding the above, the Petitioner appreciates that the NDDB maps are intended as a prescreening tool. As such, the Petitioner performed extensive field surveys over a four (4)-month period[9] to document existing habitat(s), and evaluate potential wildlife use(s) of the Site during critical migration, breeding, and foraging times of the year. The Petitioner's wildlife surveys focused on interior forest habitat(s), vernal pools, and old field (i.e., utility ROW) habitat(s).[10] No State-listed species were observed; and those species of conservation concern observed on the Site—including, several forest-dwelling birds, along with common vernal pool indicator species—were noted in the Petitioner's report.

    Lastly, while no surveys for State-listed plants were conducted at the Site, the vast majority of State-listed plants and invertebrates in the coastal zone ecoregion of Connecticut occur in early-successional (i.e., non-forested) wetland and upland habitats. On the Site, such suitable habitat lies only within the maintained utility line ROW, which will not be impacted by the Project.

59. Has the Petitioner and the Petitioner's engineering team and construction company reviewed the engineering and construction failures that occurred resulting in adverse environmental impacts at the solar installations in East Lyme (Petition 1056 which resulted in ongoing litigation from downstream landowners and Pomfret (Petition 1328 which resulted in a DEEP Consent Order

[9] March through June of 2019.

[10] Per the 2015 Connecticut Wildlife Action Plan, these habitats represent those most likely to reveal the presence of State-listed species, or species of conservation concern.

due to failures in storm water mitigation). Can lessons learned from these failures be used to ensure that the poor stormwater planning, engineering and design are not repeated in this development both during and post construction? Link here for Pomfret Consent Order: https://www.ct.gov/deep/lib/deep/enforcement/consentorder/COWRSW18003.pdf

The Petitioner objects to this Interrogatory as it is irrelevant to the Petitioner and its Project. Subject to the foregoing objection, the Petitioner states that it is not, nor ever has been, involved with and/or affiliated to the East Lyme or Pomfret projects. Therefore, the Intervenor's various references to same in this document are inappropriate. The Petitioner will neither respond to, nor comment on, the East Lyme or Pomfret projects or anything relating thereto. The Petitioner is committed to ensuring that the design of the Project meets its objective to comply with all environmental protection requirements, including adopting best practices and lessons learned in the design and construction of such facilities.

" = "3" "ACTIVE/80421.1/LHOFFMAN/8560513v2" "" ACTIVE/80421.1/LHOFFMAN/8560513v2

Exhibit 1
Test Pit Summary – Power Lines Solar, Old Lyme, CT

Down to Earth Consulting, LLC
Test Pit Summary – July 24, 2019
Power Lines Solar – Old Lyme, CT

TP-A-1:

0'-0.5': Topsoil/Forest Debris
0.5'-2': Subsoil
2'-5': Glacial Till (gray-brown, f/c SAND and GRAVEL, some Silt, with cobbles and boulders)
Groundwater Not Encountered
Infiltration Test @ 5 feet below grade

TP-A-2:

0'-0.8': Topsoil/Forest Debris
0.8'-3': Subsoil
3'-7': Glacial Till
Refusal on Inferred Boulder
Groundwater Encountered @ about 6 feet below grade.

TP-A-3:

0'-0.5': Topsoil/Forest Debris
0.5'-2': Subsoil (orange-brown, fine to coarse SAND and SILT, some f/c Gravel, trace (-) Roots, with cobbles and boulders)
Groundwater Not Encountered
Infiltration Test @ 2 feet below grade

TP-B-1:

0'-0.4': Topsoil/Forest Debris
0.4'-1.5': Subsoil (orange-brown, f/c SAND and SILT, some fine to coarse Gravel, trace (-) Roots, with cobbles)
1.5'-5': Glacial Till (gray-brown, f/c SAND and GRAVEL, some Silt, with cobbles and boulders)
Groundwater Not Encountered
Infiltration Test @ 5 feet below grade

TP-B-2:

0'-0.5': Topsoil/Forest Debris
0.5'-3': Subsoil
3'-8.5': Glacial Till
Groundwater Encountered @ about 7 feet below grade.

TP-B-3:

0'-0.3': Topsoil/Forest Debris
0.3'-2': Subsoil
Groundwater Not Encountered
Infiltration Test @ 2 feet below grade

TP-C-1:

0'-0.4': Topsoil/Forest Debris
0.4'-2.5': Subsoil (orange-brown, SILT and f/c SAND, some fine to coarse Gravel, trace (-) Roots, with cobbles)
2.5'-5': Glacial Till (gray-brown, f/c SAND and SILT, some f/c Gravel, with cobbles and boulders)
Groundwater Not Encountered
Infiltration Test @ 5 feet below grade

TP-C-2:

0'-0.6': Topsoil/Forest Debris
0.6'-3.5': Subsoil
3.5'-8': Glacial Till
Groundwater Encountered @ about 6 feet below grade (4 hour stabilization time).

TP-C-3:

0'-0.8': Topsoil/Forest Debris
0.8'-2': Subsoil
Groundwater Not Encountered
Infiltration Test @ 2 feet below grade

TP-D-1:

0'-0.5': Topsoil/Forest Debris
0.5'-3': Subsoil (orange-brown, f/c SAND and SILT, little fine to coarse Gravel, trace (-) Roots, with cobbles)
3'-5': Glacial Till (gray-brown, f/c SAND, some Silt, some f/c Gravel, with cobbles and boulders)
Groundwater Not Encountered
Infiltration Test @ 5 feet below grade

TP-D-2:

0'-0.8': Topsoil/Forest Debris
0.8'-2.5': Subsoil
2.5'-8': Glacial Till
Groundwater Encountered @ about 7.5 feet below grade.

TP-D-3:

0'-1': Topsoil/Forest Debris
1'-1.7': Subsoil
1.7'-2': Glacial Till
Groundwater Not Encountered
Infiltration Test @ 2 feet below grade

Exhibit 2
Basin Calculation DEP WQV

WATER QUALITY VOLUME CALCULATIONS
FOR
POWER LINES SOLAR
20-1 SHORT HILLS RD, OLD LYME, CT 06371

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

where: WQV = water quality volume (ac-ft)
R = volumetric runoff coefficient = 0.05+0.009(I)
I = percent impervious cover
A = site area in acres

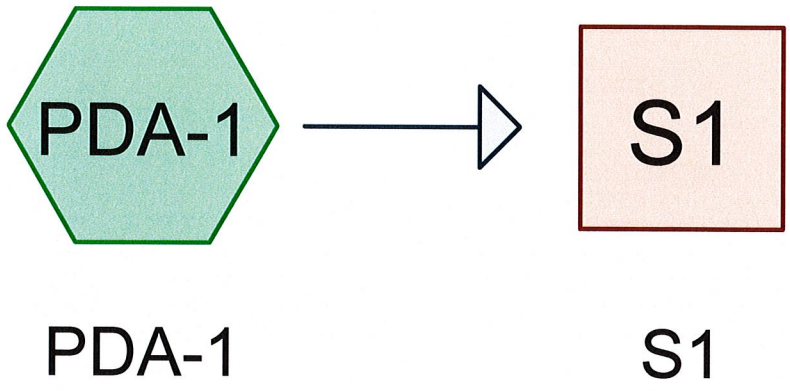
$V=WQV+((P)(A_b)/12)$

V=required basin storage volume (ac-ft)
WQV=Water Quality Volume (ac-ft)
P= design water quality precipitation (in)
A_b=basin surface area (ac)

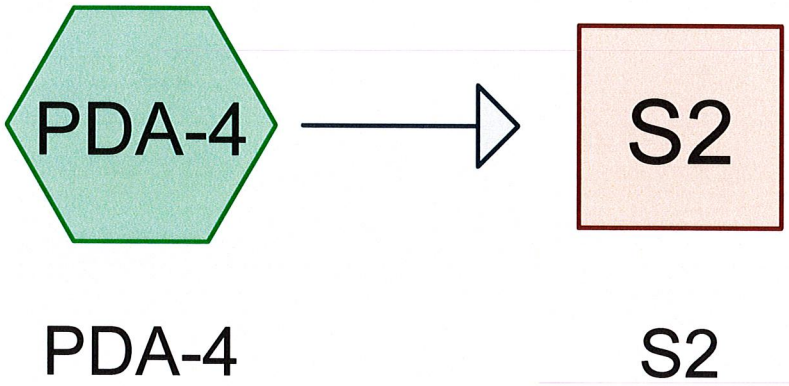
	Area (ac)	Pervious (ac)	Imperv. (ac)	I	R	WQV (ac-ft)	P (in)	Ab (ac)	V (ac-ft)	Total V Req. (cyd)	V Provided (cyd)
Overall Site	12.72	7.91	4.81	38%	0.39	0.41	n/a	n/a	n/a	667.52	
Basin 1	4.04	3.78	0.26	6%	0.11	0.04	1	0.226485	0.06	89.25	690.47
Basin 2	2.47	2.36	0.11	5%	0.09	0.02	1	0.272052	0.04	66.76	835.68
Basin 3	2.94	2.83	0.11	4%	0.08	0.02	1	0.254573	0.04	67.08	779.95
Basin 4	3.37	2.89	0.49	14%	0.18	0.05	1	0.266531	0.07	117.20	818.07

Overal Total V Required = 667.52 cyd
Overal Total V Provided = 3,124.17 cyd

Exhibit 3
Swale Calculations



PDA-1 S1



PDA-4 S2

Subcat Reach Pond Link

Routing Diagram for Old Lyme - Swale - Rev0
Prepared by Microsoft, Printed 12/6/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.737	96	Gravel surface, HSG D (PDA-1, PDA-4)
0.365	71	Meadow, non-grazed, HSG C (PDA-1)
5.756	78	Meadow, non-grazed, HSG D (PDA-1, PDA-4)
0.009	98	Unconnected pavement, HSG D (PDA-4)
0.049	55	Woods, Good, HSG B (PDA-1)
0.499	70	Woods, Good, HSG C (PDA-1, PDA-4)
7.415	**79**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=4.044 ac 0.00% Impervious Runoff Depth=1.39"
Flow Length=497' Tc=85.3 min CN=77 Runoff=2.03 cfs 0.470 af

Subcatchment PDA-4: PDA-4 Runoff Area=3.371 ac 0.27% Impervious Runoff Depth=1.60"
Flow Length=500' Tc=14.8 min CN=80 Runoff=4.74 cfs 0.449 af

Reach S1: S1 Avg. Flow Depth=0.17' Max Vel=4.72 fps Inflow=2.03 cfs 0.470 af
n=0.022 L=44.5' S=0.0674 '/' Capacity=62.42 cfs Outflow=2.03 cfs 0.470 af

Reach S2: S2 Avg. Flow Depth=0.29' Max Vel=5.75 fps Inflow=4.74 cfs 0.449 af
n=0.022 L=62.4' S=0.0561 '/' Capacity=56.94 cfs Outflow=4.74 cfs 0.449 af

Total Runoff Area = 7.415 ac Runoff Volume = 0.918 af Average Runoff Depth = 1.49"
99.88% Pervious = 7.406 ac 0.12% Impervious = 0.009 ac

Summary for Subcatchment PDA-1: PDA-1

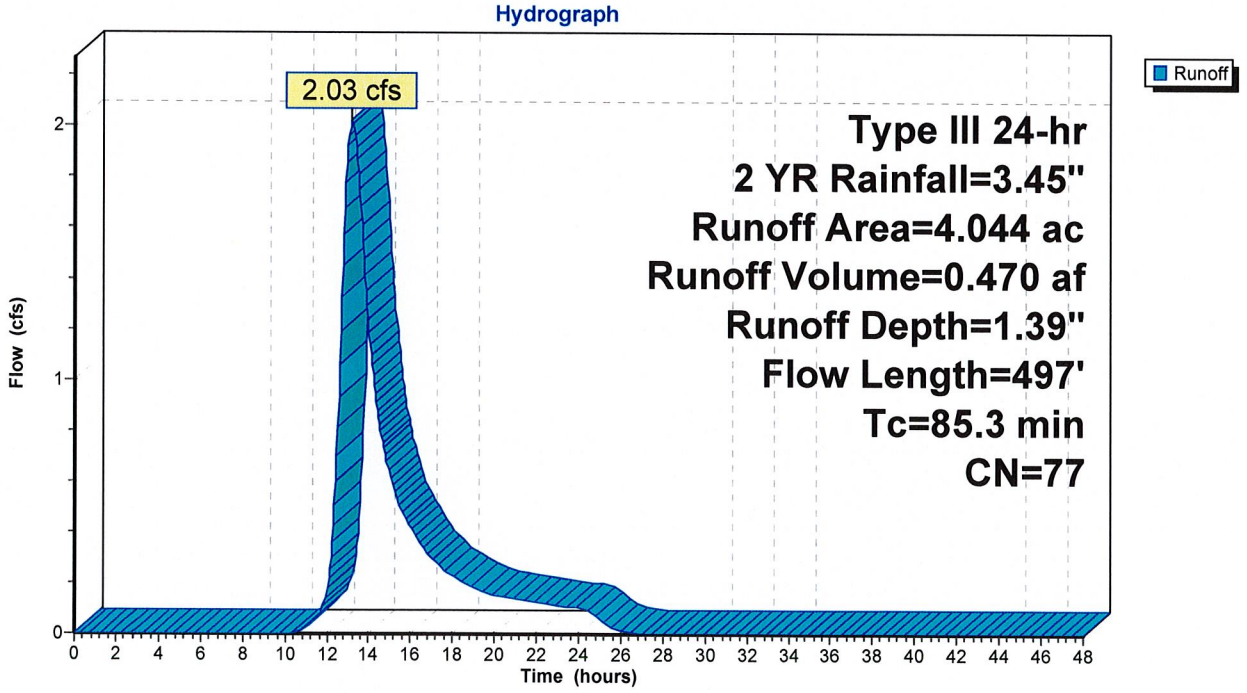
Runoff = 2.03 cfs @ 13.19 hrs, Volume= 0.470 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (ac)	CN	Description
0.049	55	Woods, Good, HSG B
0.365	71	Meadow, non-grazed, HSG C
0.411	70	Woods, Good, HSG C
2.958	78	Meadow, non-grazed, HSG D
0.261	96	Gravel surface, HSG D
4.044	77	Weighted Average
4.044		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
80.2	100	0.0001	0.02		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
4.3	306	0.0283	1.18		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.8	91	0.0740	1.90		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
85.3	497	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-4: PDA-4

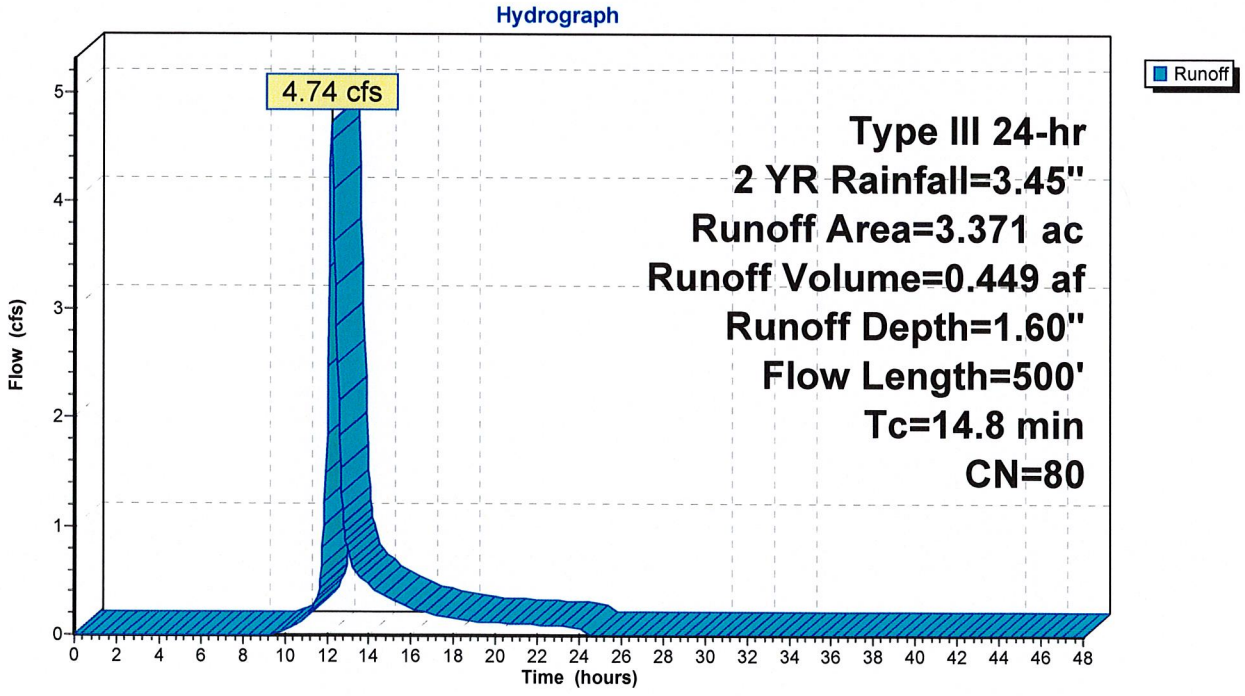
Runoff = 4.74 cfs @ 12.21 hrs, Volume= 0.449 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (ac)	CN	Description
0.088	70	Woods, Good, HSG C
2.798	78	Meadow, non-grazed, HSG D
0.476	96	Gravel surface, HSG D
0.009	98	Unconnected pavement, HSG D
3.371	80	Weighted Average
3.362		99.73% Pervious Area
0.009		0.27% Impervious Area
0.009		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0173	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
2.4	175	0.0296	1.20		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	225	0.0590	1.70		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
14.8	500	Total			

Subcatchment PDA-4: PDA-4



Summary for Reach S1: S1

Inflow Area = 4.044 ac, 0.00% Impervious, Inflow Depth = 1.39" for 2 YR event
Inflow = 2.03 cfs @ 13.19 hrs, Volume= 0.470 af
Outflow = 2.03 cfs @ 13.19 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min

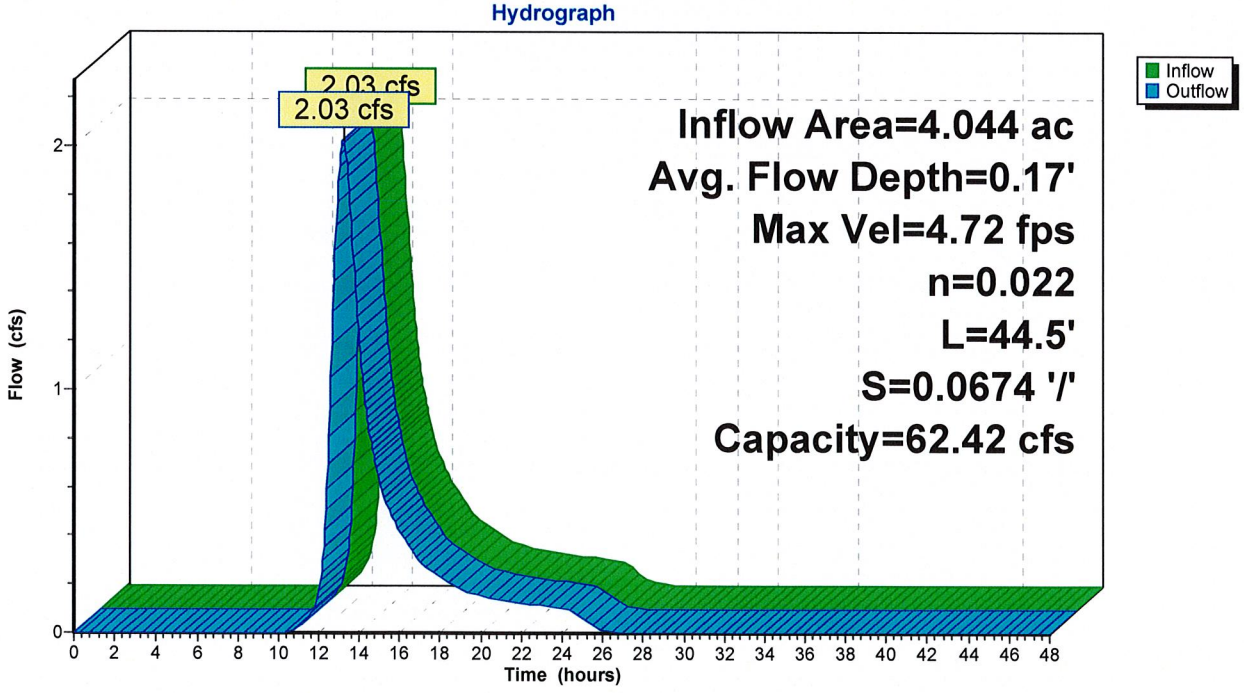
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.72 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 0.4 min

Peak Storage= 19 cf @ 13.19 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 62.42 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 44.5' Slope= 0.0674 '/'
Inlet Invert= 214.00', Outlet Invert= 211.00'

‡

Reach S1: S1



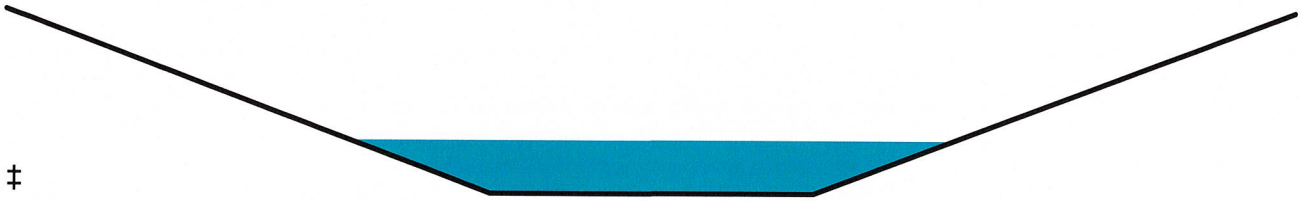
Summary for Reach S2: S2

Inflow Area = 3.371 ac, 0.27% Impervious, Inflow Depth = 1.60" for 2 YR event
Inflow = 4.74 cfs @ 12.21 hrs, Volume= 0.449 af
Outflow = 4.74 cfs @ 12.21 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.75 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 0.5 min

Peak Storage= 51 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 56.94 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 62.4' Slope= 0.0561 '/'
Inlet Invert= 214.50', Outlet Invert= 211.00'



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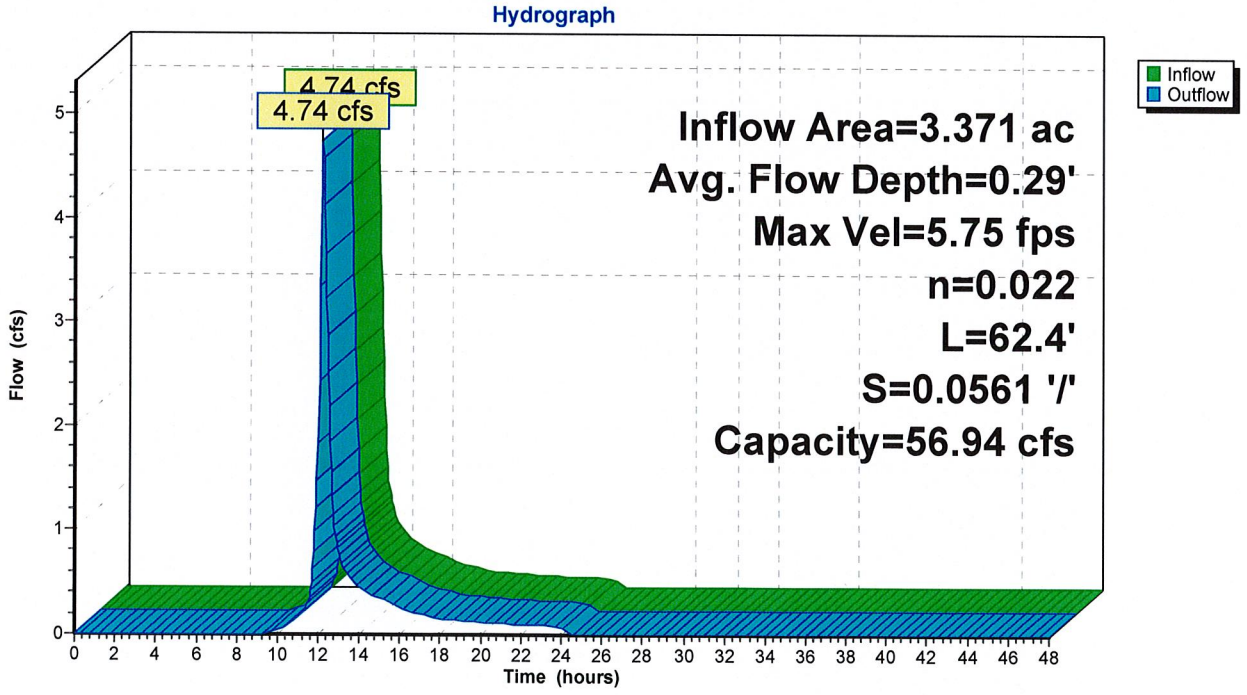
Reach S2: S2



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=4.044 ac 0.00% Impervious Runoff Depth=3.72"
Flow Length=497' Tc=85.3 min CN=77 Runoff=5.57 cfs 1.252 af

Subcatchment PDA-4: PDA-4 Runoff Area=3.371 ac 0.27% Impervious Runoff Depth=4.03"
Flow Length=500' Tc=14.8 min CN=80 Runoff=12.01 cfs 1.131 af

Reach S1: S1 Avg. Flow Depth=0.30' Max Vel=6.44 fps Inflow=5.57 cfs 1.252 af
n=0.022 L=44.5' S=0.0674 '/' Capacity=62.42 cfs Outflow=5.57 cfs 1.252 af

Reach S2: S2 Avg. Flow Depth=0.47' Max Vel=7.51 fps Inflow=12.01 cfs 1.131 af
n=0.022 L=62.4' S=0.0561 '/' Capacity=56.94 cfs Outflow=12.01 cfs 1.131 af

Total Runoff Area = 7.415 ac Runoff Volume = 2.383 af Average Runoff Depth = 3.86"
99.88% Pervious = 7.406 ac 0.12% Impervious = 0.009 ac

Summary for Subcatchment PDA-1: PDA-1

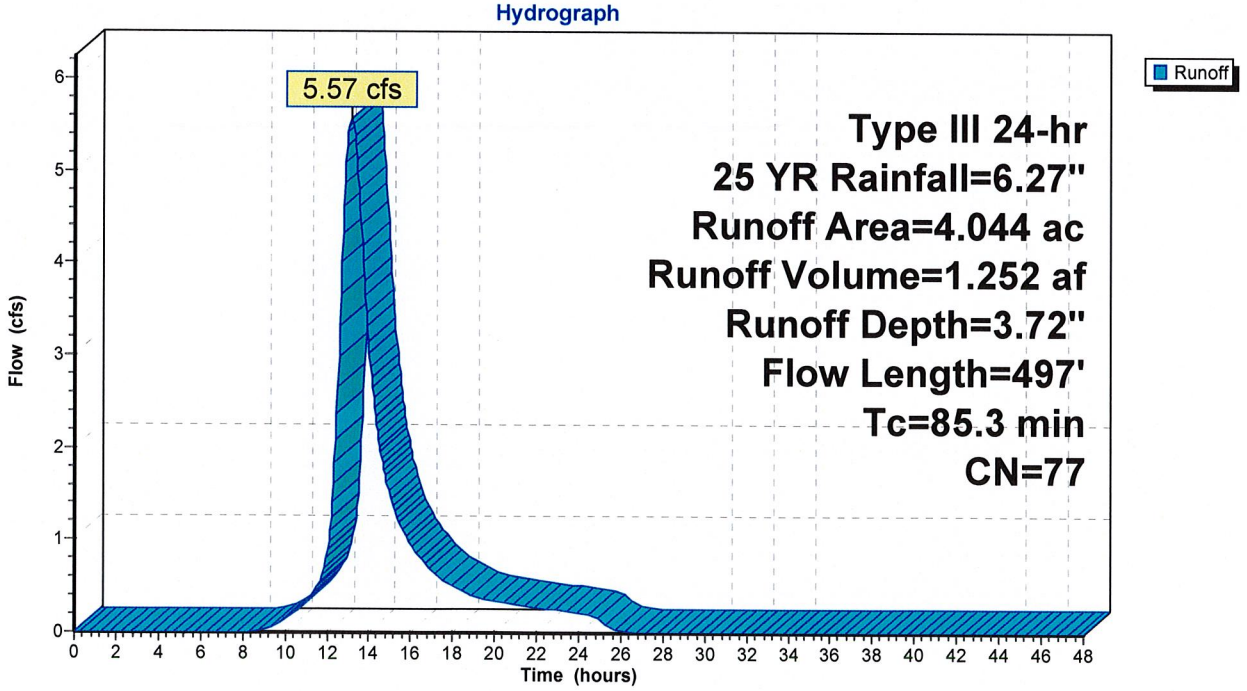
Runoff = 5.57 cfs @ 13.15 hrs, Volume= 1.252 af, Depth= 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.27"

Area (ac)	CN	Description
0.049	55	Woods, Good, HSG B
0.365	71	Meadow, non-grazed, HSG C
0.411	70	Woods, Good, HSG C
2.958	78	Meadow, non-grazed, HSG D
0.261	96	Gravel surface, HSG D
4.044	77	Weighted Average
4.044		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
80.2	100	0.0001	0.02		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
4.3	306	0.0283	1.18		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.8	91	0.0740	1.90		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
85.3	497	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-4: PDA-4

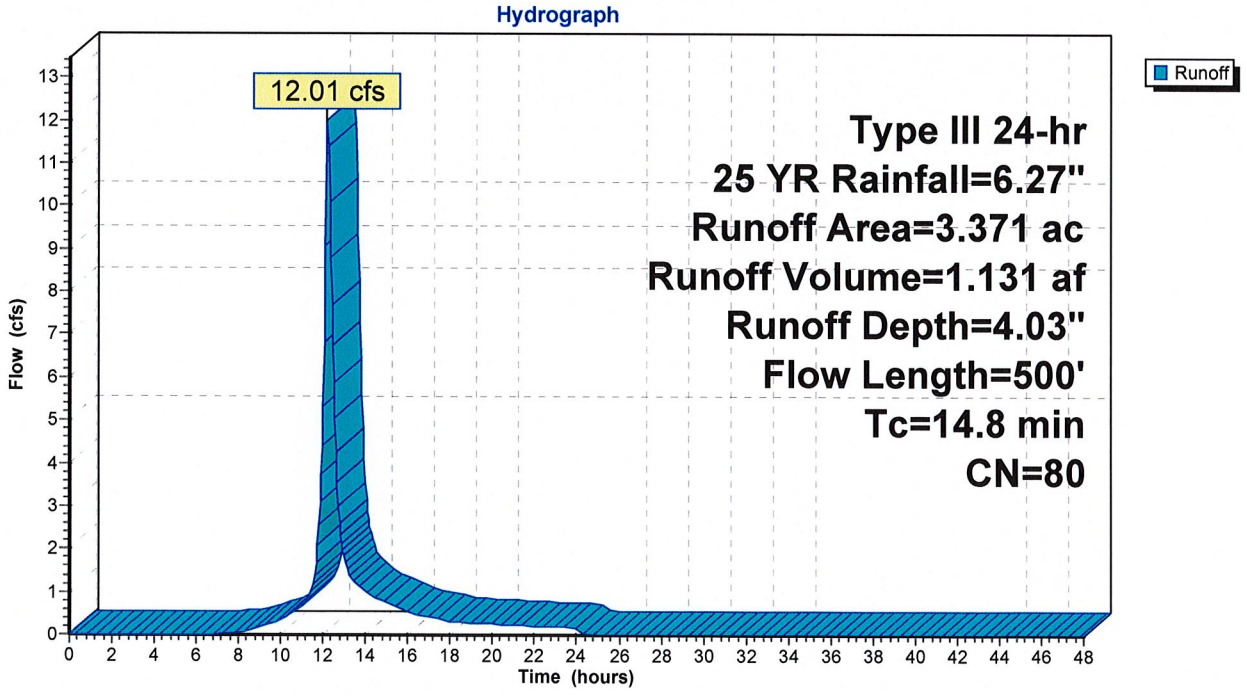
Runoff = 12.01 cfs @ 12.20 hrs, Volume= 1.131 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.27"

Area (ac)	CN	Description
0.088	70	Woods, Good, HSG C
2.798	78	Meadow, non-grazed, HSG D
0.476	96	Gravel surface, HSG D
0.009	98	Unconnected pavement, HSG D
3.371	80	Weighted Average
3.362		99.73% Pervious Area
0.009		0.27% Impervious Area
0.009		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0173	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
2.4	175	0.0296	1.20		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	225	0.0590	1.70		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
14.8	500	Total			

Subcatchment PDA-4: PDA-4



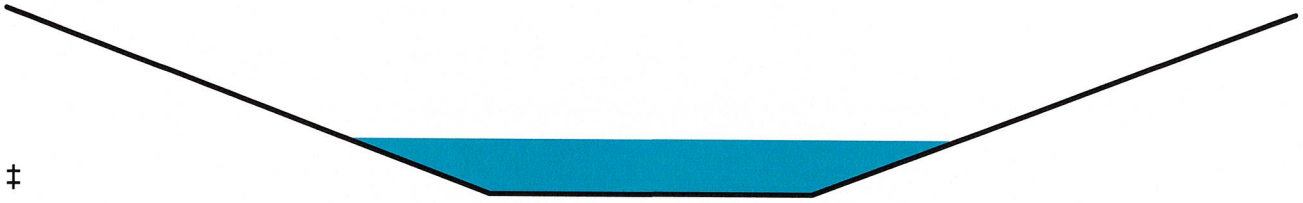
Summary for Reach S1: S1

Inflow Area = 4.044 ac, 0.00% Impervious, Inflow Depth = 3.72" for 25 YR event
Inflow = 5.57 cfs @ 13.15 hrs, Volume= 1.252 af
Outflow = 5.57 cfs @ 13.15 hrs, Volume= 1.252 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.44 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.3 min

Peak Storage= 38 cf @ 13.15 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 62.42 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 44.5' Slope= 0.0674 '/'
Inlet Invert= 214.00', Outlet Invert= 211.00'



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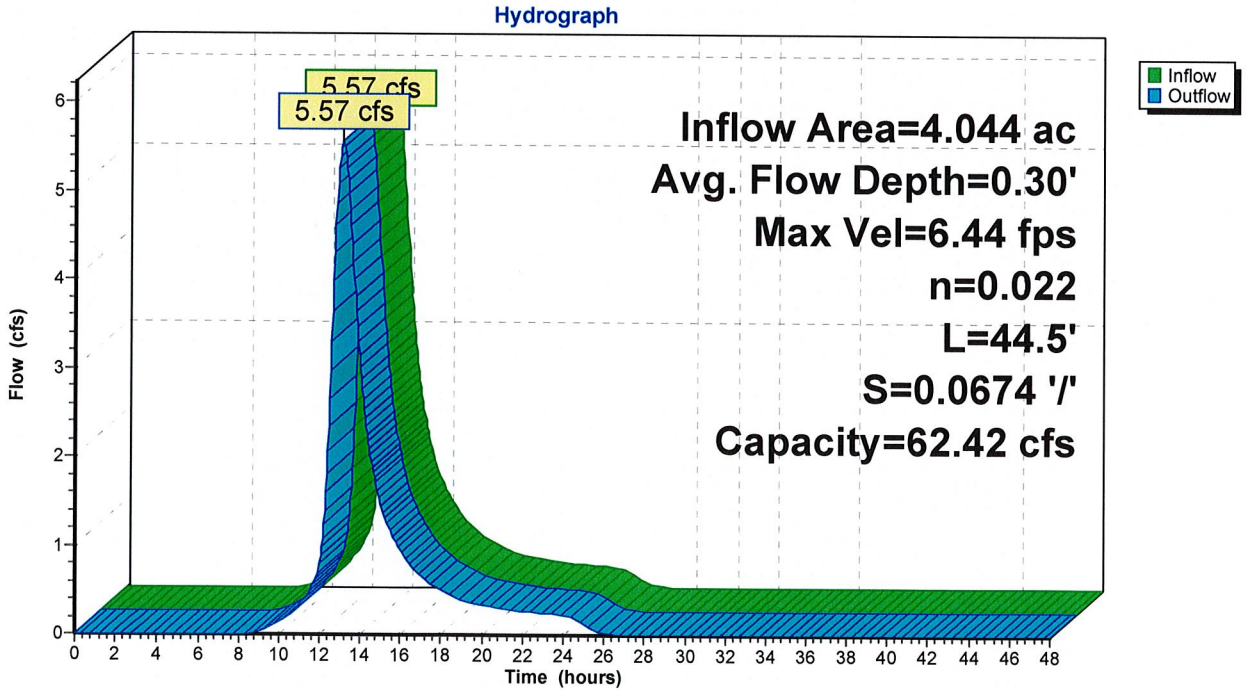
Reach S1: S1



Summary for Reach S2: S2

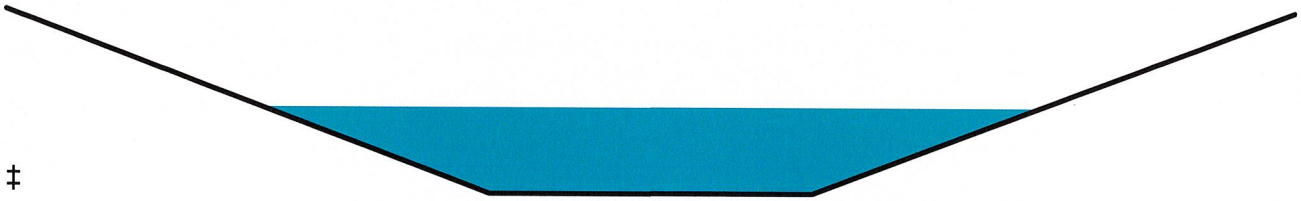
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 3.371 ac, 0.27% Impervious, Inflow Depth = 4.03" for 25 YR event
Inflow = 12.01 cfs @ 12.20 hrs, Volume= 1.131 af
Outflow = 12.01 cfs @ 12.21 hrs, Volume= 1.131 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.51 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.56 fps, Avg. Travel Time= 0.4 min

Peak Storage= 100 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 56.94 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 62.4' Slope= 0.0561 '/'
Inlet Invert= 214.50', Outlet Invert= 211.00'



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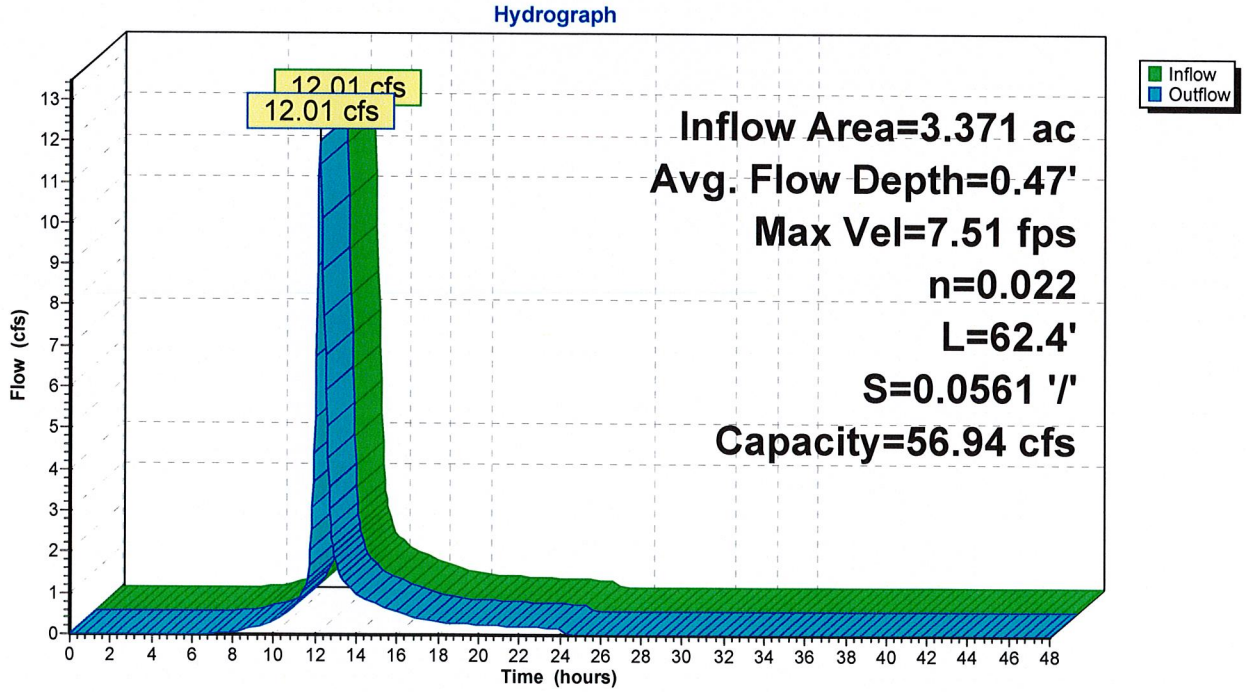
Reach S2: S2



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=4.044 ac 0.00% Impervious Runoff Depth=4.43"
Flow Length=497' Tc=85.3 min CN=77 Runoff=6.63 cfs 1.492 af

Subcatchment PDA-4: PDA-4 Runoff Area=3.371 ac 0.27% Impervious Runoff Depth=4.76"
Flow Length=500' Tc=14.8 min CN=80 Runoff=14.14 cfs 1.337 af

Reach S1: S1 Avg. Flow Depth=0.33' Max Vel=6.78 fps Inflow=6.63 cfs 1.492 af
n=0.022 L=44.5' S=0.0674 '/' Capacity=62.42 cfs Outflow=6.63 cfs 1.492 af

Reach S2: S2 Avg. Flow Depth=0.51' Max Vel=7.86 fps Inflow=14.14 cfs 1.337 af
n=0.022 L=62.4' S=0.0561 '/' Capacity=56.94 cfs Outflow=14.14 cfs 1.337 af

Total Runoff Area = 7.415 ac Runoff Volume = 2.829 af Average Runoff Depth = 4.58"
99.88% Pervious = 7.406 ac 0.12% Impervious = 0.009 ac

Summary for Subcatchment PDA-1: PDA-1

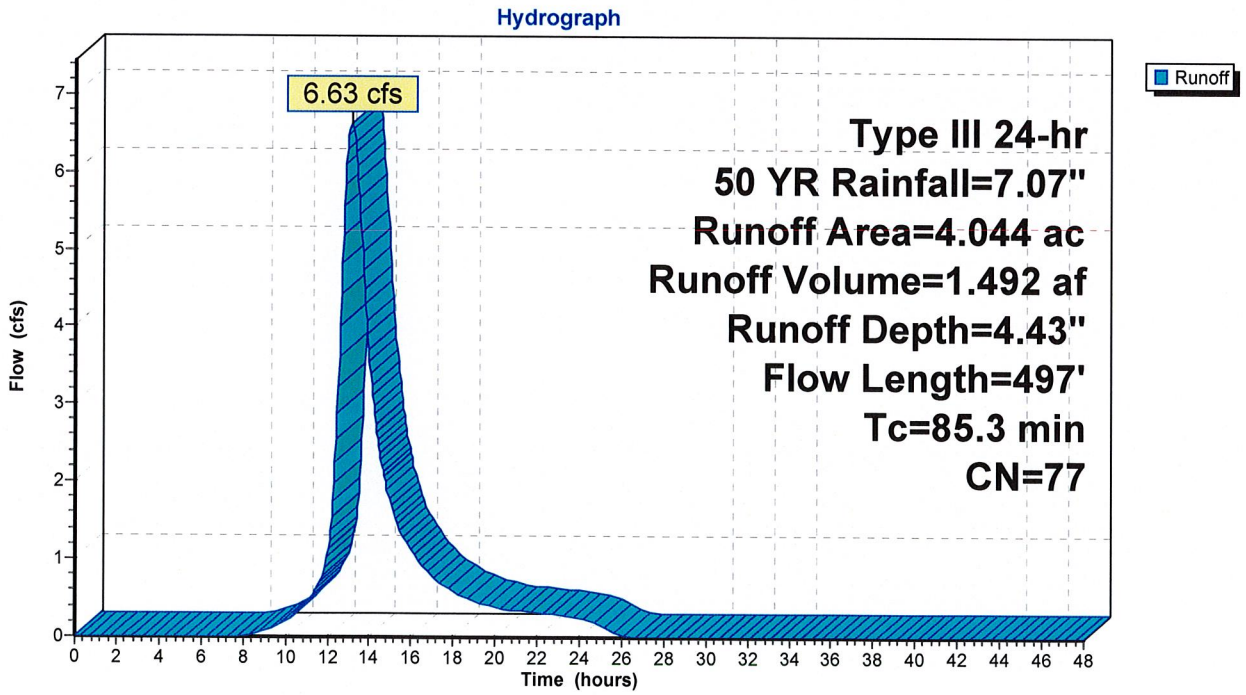
Runoff = 6.63 cfs @ 13.14 hrs, Volume= 1.492 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.07"

Area (ac)	CN	Description
0.049	55	Woods, Good, HSG B
0.365	71	Meadow, non-grazed, HSG C
0.411	70	Woods, Good, HSG C
2.958	78	Meadow, non-grazed, HSG D
0.261	96	Gravel surface, HSG D
4.044	77	Weighted Average
4.044		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
80.2	100	0.0001	0.02		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
4.3	306	0.0283	1.18		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.8	91	0.0740	1.90		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
85.3	497	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-4: PDA-4

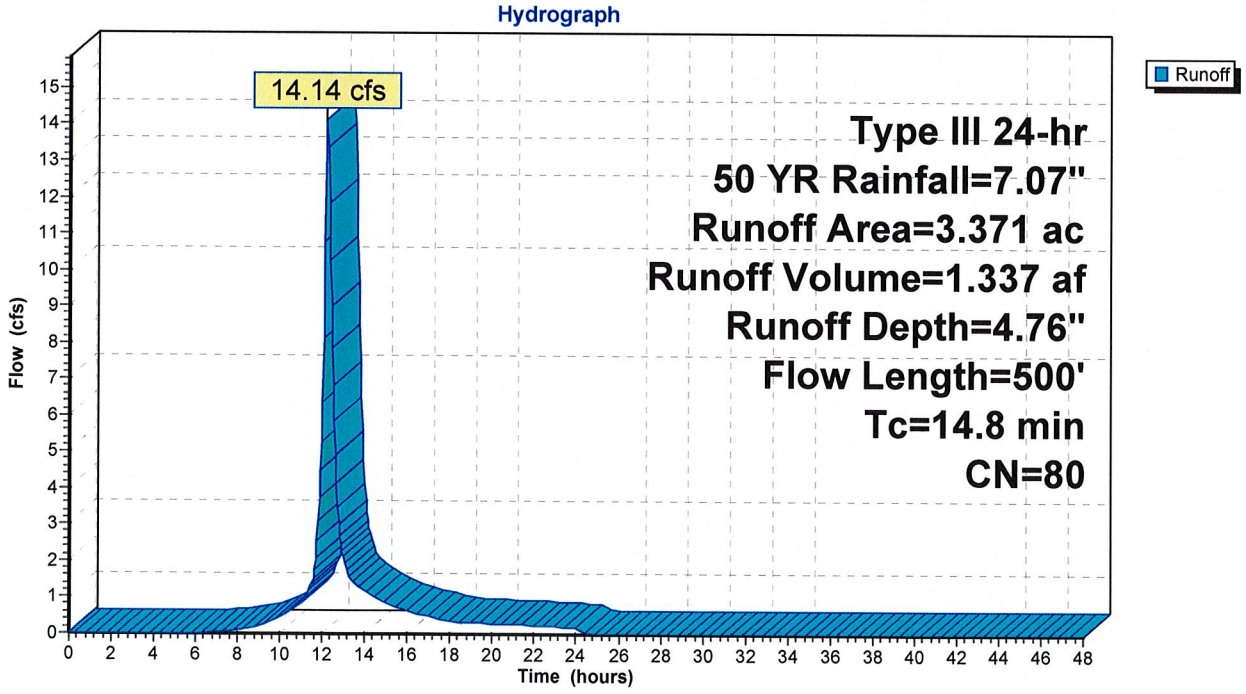
Runoff = 14.14 cfs @ 12.20 hrs, Volume= 1.337 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.07"

Area (ac)	CN	Description
0.088	70	Woods, Good, HSG C
2.798	78	Meadow, non-grazed, HSG D
0.476	96	Gravel surface, HSG D
0.009	98	Unconnected pavement, HSG D
3.371	80	Weighted Average
3.362		99.73% Pervious Area
0.009		0.27% Impervious Area
0.009		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0173	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
2.4	175	0.0296	1.20		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	225	0.0590	1.70		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
14.8	500	Total			

Subcatchment PDA-4: PDA-4



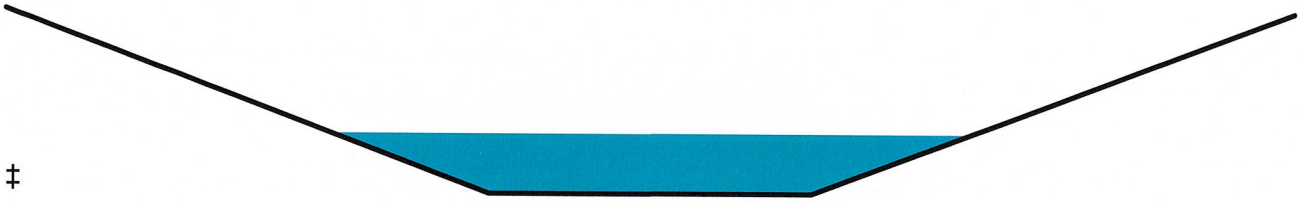
Summary for Reach S1: S1

Inflow Area = 4.044 ac, 0.00% Impervious, Inflow Depth = 4.43" for 50 YR event
Inflow = 6.63 cfs @ 13.14 hrs, Volume= 1.492 af
Outflow = 6.63 cfs @ 13.15 hrs, Volume= 1.492 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.78 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.73 fps, Avg. Travel Time= 0.3 min

Peak Storage= 44 cf @ 13.15 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 62.42 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 44.5' Slope= 0.0674 '/'
Inlet Invert= 214.00', Outlet Invert= 211.00'



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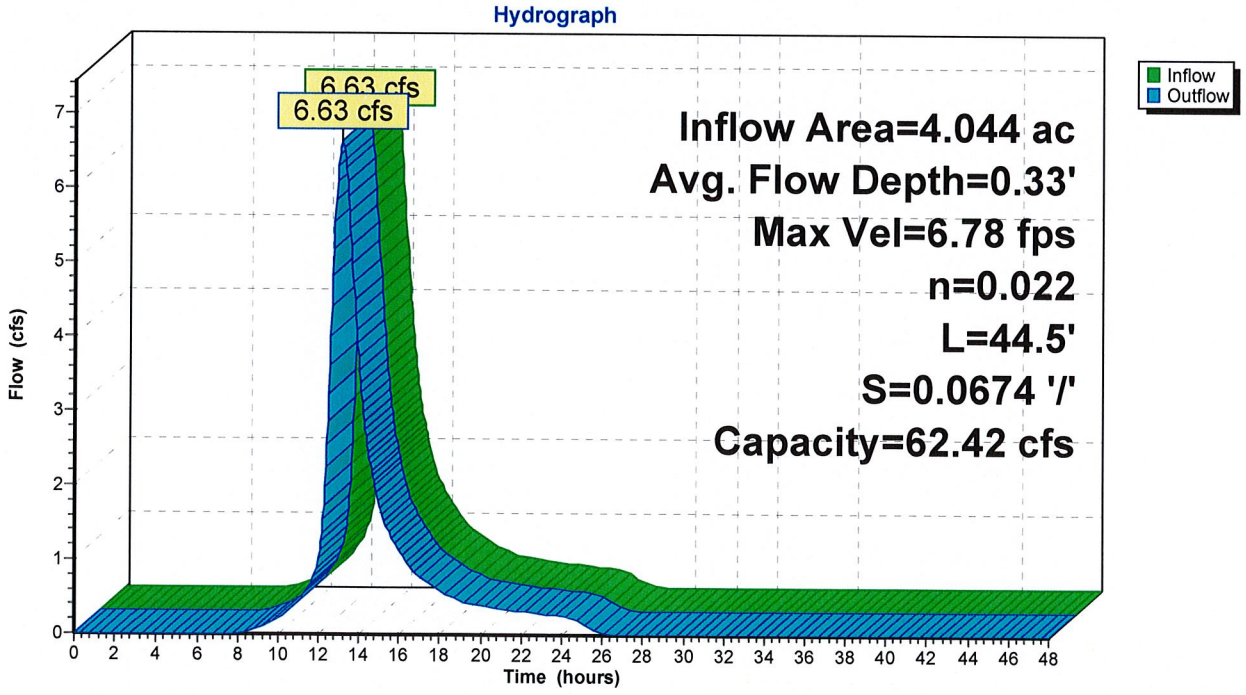
Reach S1: S1



Summary for Reach S2: S2

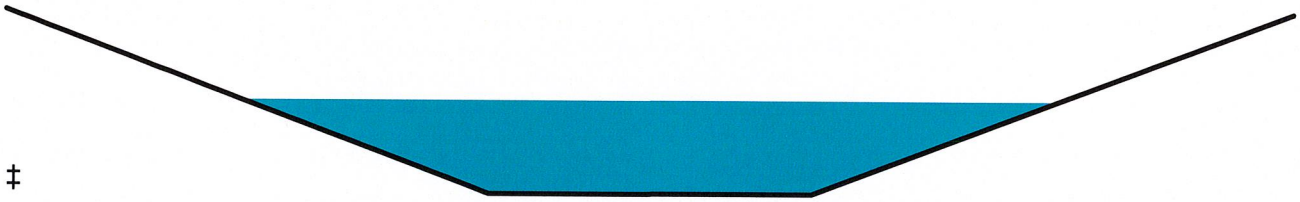
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 3.371 ac, 0.27% Impervious, Inflow Depth = 4.76" for 50 YR event
Inflow = 14.14 cfs @ 12.20 hrs, Volume= 1.337 af
Outflow = 14.14 cfs @ 12.20 hrs, Volume= 1.337 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.86 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.67 fps, Avg. Travel Time= 0.4 min

Peak Storage= 112 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 56.94 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 62.4' Slope= 0.0561 '/'
Inlet Invert= 214.50', Outlet Invert= 211.00'



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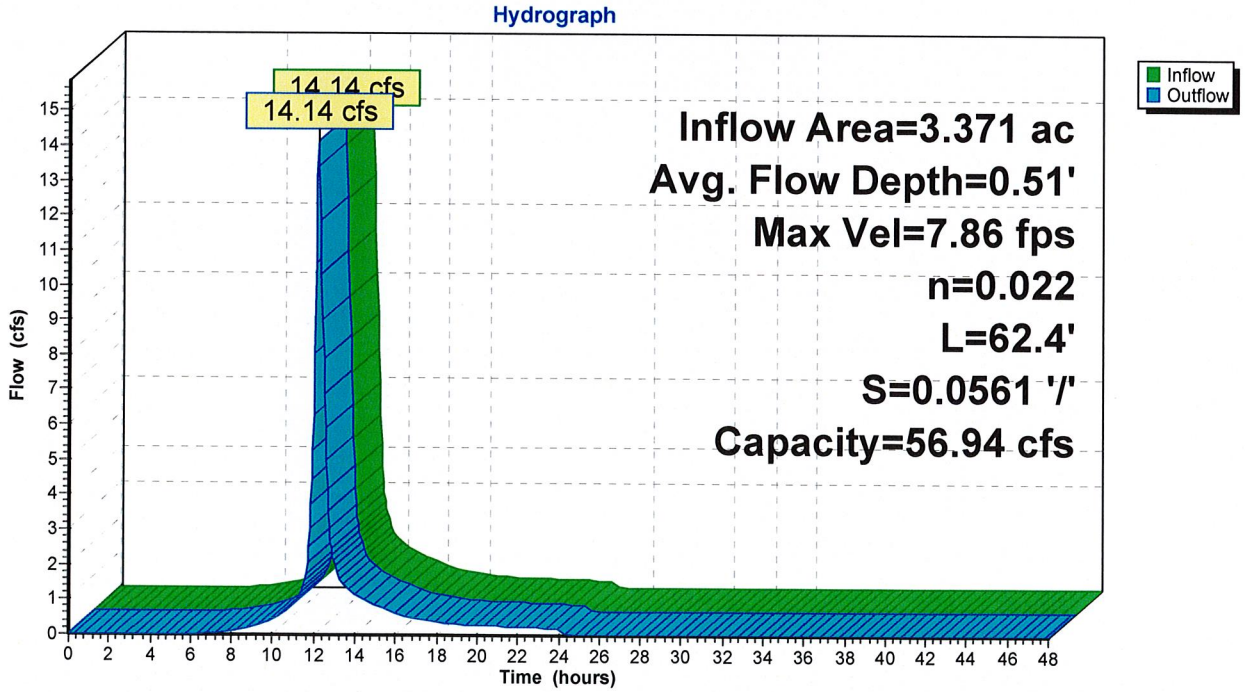
Reach S2: S2



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=4.044 ac 0.00% Impervious Runoff Depth=5.21"
Flow Length=497' Tc=85.3 min CN=77 Runoff=7.79 cfs 1.756 af

Subcatchment PDA-4: PDA-4 Runoff Area=3.371 ac 0.27% Impervious Runoff Depth=5.56"
Flow Length=500' Tc=14.8 min CN=80 Runoff=16.43 cfs 1.562 af

Reach S1: S1 Avg. Flow Depth=0.36' Max Vel=7.10 fps Inflow=7.79 cfs 1.756 af
n=0.022 L=44.5' S=0.0674 '/' Capacity=62.42 cfs Outflow=7.79 cfs 1.756 af

Reach S2: S2 Avg. Flow Depth=0.55' Max Vel=8.19 fps Inflow=16.43 cfs 1.562 af
n=0.022 L=62.4' S=0.0561 '/' Capacity=56.94 cfs Outflow=16.44 cfs 1.562 af

Total Runoff Area = 7.415 ac Runoff Volume = 3.318 af Average Runoff Depth = 5.37"
99.88% Pervious = 7.406 ac 0.12% Impervious = 0.009 ac

Summary for Subcatchment PDA-1: PDA-1

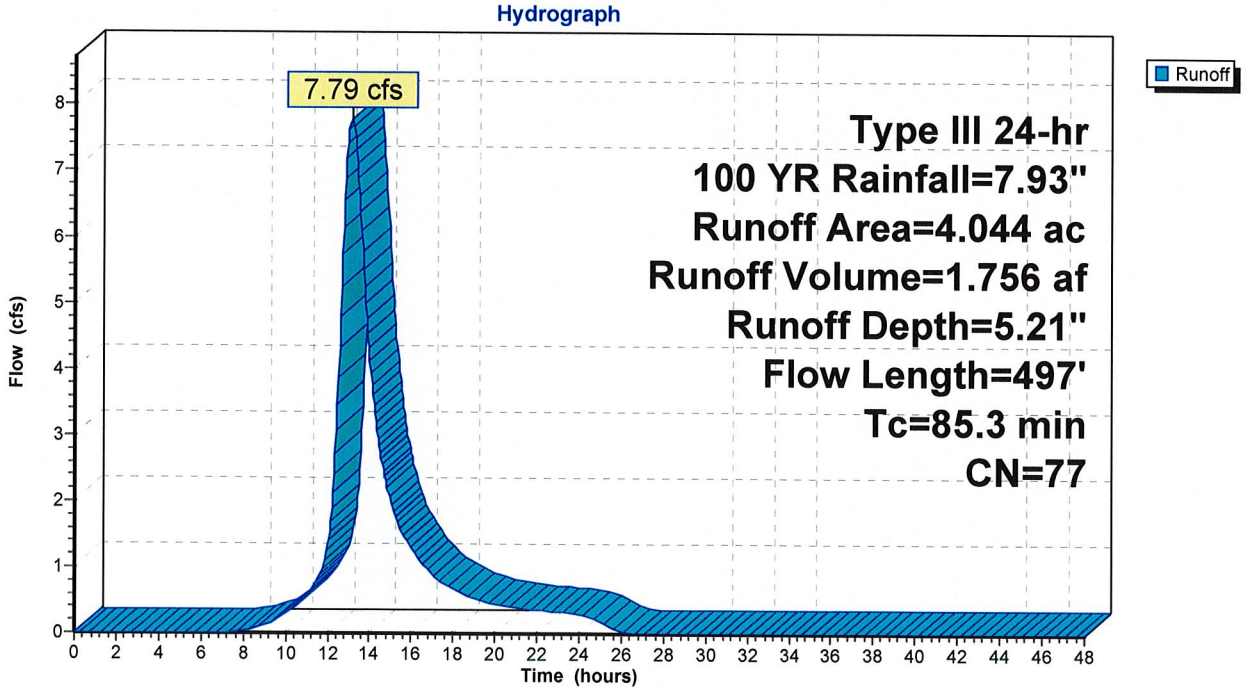
Runoff = 7.79 cfs @ 13.14 hrs, Volume= 1.756 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Description
0.049	55	Woods, Good, HSG B
0.365	71	Meadow, non-grazed, HSG C
0.411	70	Woods, Good, HSG C
2.958	78	Meadow, non-grazed, HSG D
0.261	96	Gravel surface, HSG D
4.044	77	Weighted Average
4.044		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
80.2	100	0.0001	0.02		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
4.3	306	0.0283	1.18		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.8	91	0.0740	1.90		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
85.3	497	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-4: PDA-4

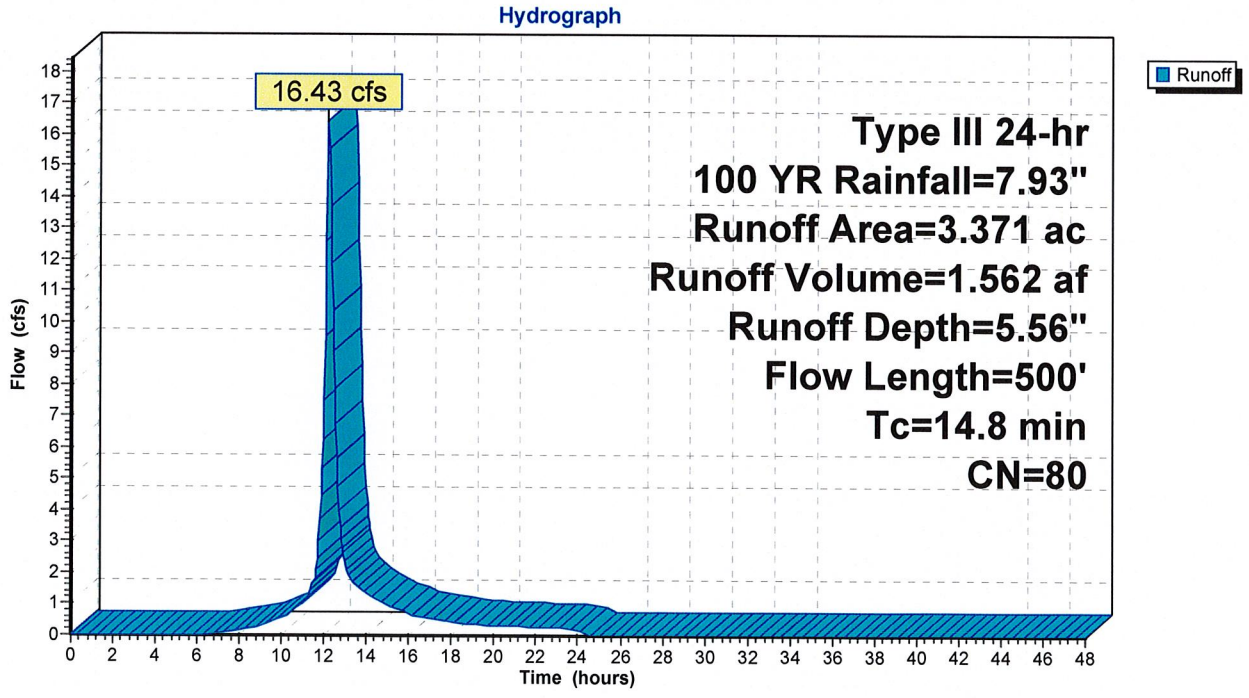
Runoff = 16.43 cfs @ 12.20 hrs, Volume= 1.562 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Description
0.088	70	Woods, Good, HSG C
2.798	78	Meadow, non-grazed, HSG D
0.476	96	Gravel surface, HSG D
0.009	98	Unconnected pavement, HSG D
3.371	80	Weighted Average
3.362		99.73% Pervious Area
0.009		0.27% Impervious Area
0.009		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0173	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.31"
2.4	175	0.0296	1.20		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	225	0.0590	1.70		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
14.8	500	Total			

Subcatchment PDA-4: PDA-4



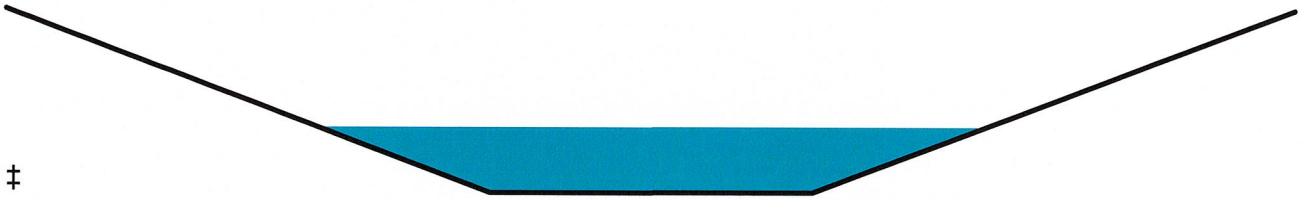
Summary for Reach S1: S1

Inflow Area = 4.044 ac, 0.00% Impervious, Inflow Depth = 5.21" for 100 YR event
Inflow = 7.79 cfs @ 13.14 hrs, Volume= 1.756 af
Outflow = 7.79 cfs @ 13.14 hrs, Volume= 1.756 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.10 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.85 fps, Avg. Travel Time= 0.3 min

Peak Storage= 49 cf @ 13.14 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 62.42 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 44.5' Slope= 0.0674 '/'
Inlet Invert= 214.00', Outlet Invert= 211.00'



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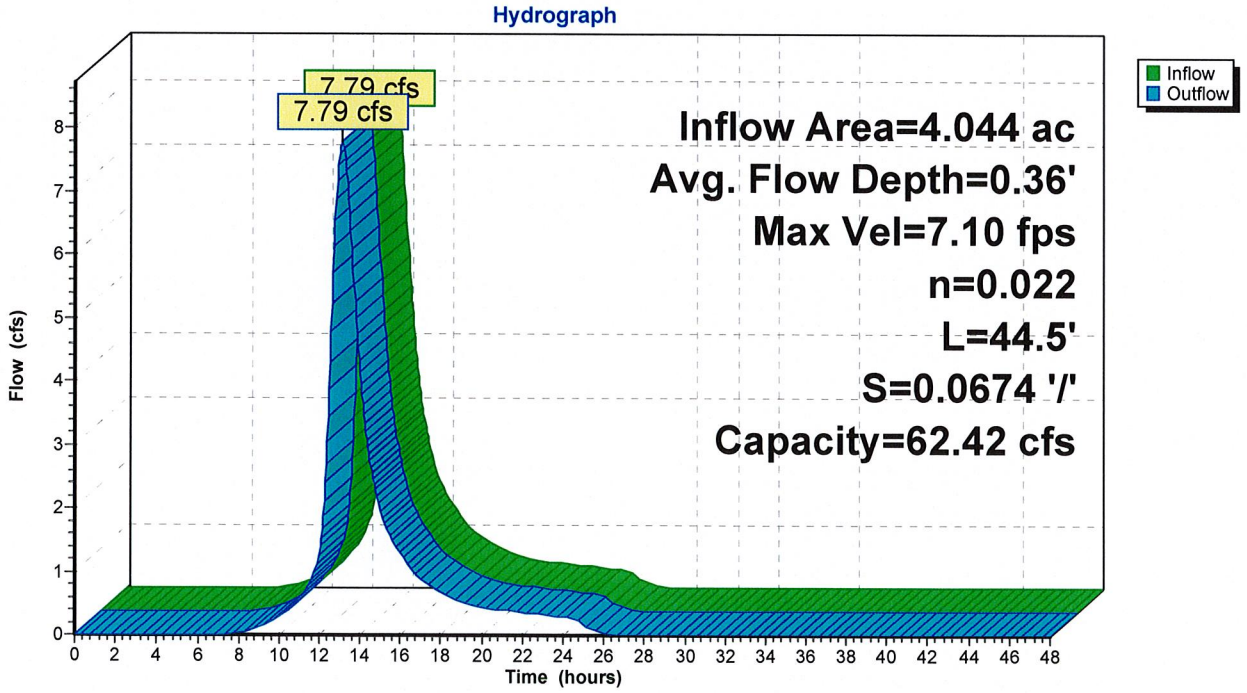
Reach S1: S1



Summary for Reach S2: S2

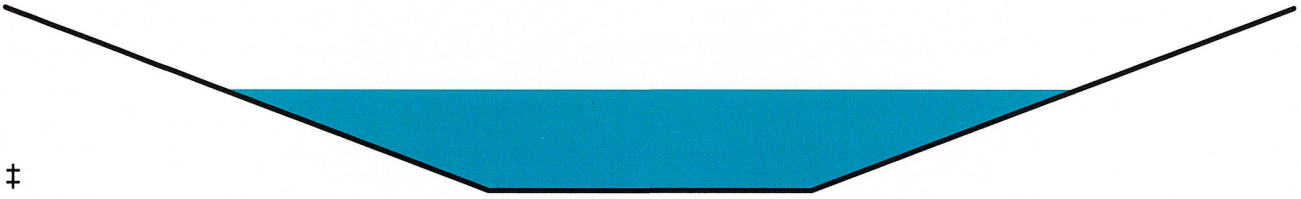
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 3.371 ac, 0.27% Impervious, Inflow Depth = 5.56" for 100 YR event
Inflow = 16.43 cfs @ 12.20 hrs, Volume= 1.562 af
Outflow = 16.44 cfs @ 12.20 hrs, Volume= 1.562 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.19 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.78 fps, Avg. Travel Time= 0.4 min

Peak Storage= 125 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 56.94 cfs

2.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 62.4' Slope= 0.0561 '/'
Inlet Invert= 214.50', Outlet Invert= 211.00'



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Reach S2: S2