CIVIL ENGINEERING
ENVIRONMENTAL
SURVEYING
LANDSCAPE ARCHITECTURE
GEOTECHNICAL

STORMWATER MANAGEMENT REPORT

248 Stickles Pond Road
Block 151 Lot 21
Andover Township
Sussex County, New Jersey

Prepared For:
BHT Properties Group
5081 SW 48th Street, 1023
Davie, Florida 33314

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1. PROJECT DESCRIPTION

1.1 Existing Conditions

The site is identified as 248 Stickles Pond Road and is located in the Township of Andover, County of Sussex, New Jersey. The tax parcel designation is Block 151, Lot 21. This project's overall property is the former Newton Airport. It is bordered by Stickles Pond to the Northeast and the Pequest River to the Northwest along the property lines. The total parcel area is 4,393,962 ft^2 (± 100.87 acres). The existing development features consist of 3 unoccupied buildings, multiple barns, multiple trailers and detached garages, paved driveways and an asphalt runaway. Currently, the site land cover consists of grassland and wooded areas. Field investigation for wetlands discovered the presence of freshwater wetlands on the property. The topographic relief of the property ranges from 588 to 645 feet about MSL. The surface topography fluctuates from moderately flat land along Stickles Pond Road, the southern part of the property, to various steep sections scattered throughout the property. There are no existing stormwater conveyance on the site that collects the generated stormwater runoff. Therefore, the stormwater runoff generated within the site is in its majority contained within the site boundaries and the remaining runoff it discharges toward the adjacent properties and Stickles Pond.

1.2 Proposed Conditions

The project proposes the construction of a ±12,860 square feet construction office building with storage areas designated to store construction equipment and construction materials such as aggregate, stones and other typical construction materials. The surface cover for the storage areas is asphalt millings. Access and parking on the site will include a two-way driveway from Stickles Pond Road and surface paved parking along the frontage of the office building. Amenities proposed for the site include a proposed concrete sidewalk along the front, side, and rear of the proposed building. The total limit of disturbance created by the proposed development is ±61.65 acres (±62% of the total area of the site) and the net increase in impervious coverage is ±43.17 acres. The project is considered a major project in accordance with the NJDEP Phase II Stormwater Regulations, as it will include greater than 1.0 acre of disturbance and creates greater than 1/4 acre of new impervious surface. Stormwater on the proposed site will be controlled with:

- Six above-ground infiltration basins designed to capture, treat and infiltrate the stormwater runoff.

Due to the existing drainage characteristics of the site, the proposed stormwater management systems have been designed to capture, treat and infiltrate the water quality storm event and the 2, 10, and 100-year storm events in order to meet the water quantity peak reduction requirements, water quality requirements, and the ground water requirements specified on N.J.A.C. 7:8-5.4 and N.J.A.C. 7:8-5.5. Therefore, an exception waiver is requested for the use of infiltration as part of the routing for the 2, 10 and 100-year storm events.

1.3 Soil Conditions

Per the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey of Sussex County, the site is underlain by four soil types:

- FaxC - Farmington-Rock Outcrop Complex (0 to 15 percent slopes). The Farmington series consists of shallow, well drained and somewhat excessively drained soils formed in till. They are nearly level to very steep soils on glaciated uplands. It is not on the hydric soils list;

- HdxpAb – Hazen-Paulins Kill Complex (0 to 3 percent slopes); Hazen Hero Fredon soils are present surrounding the Paulins Kill and surrounding floodplains. This general soil unit consists of nearly level to very steep, deep, well drained and poorly drained soils, on river terraces, outwash terraces and kames. It is not on the hydric soils list;

- USFARC – Urban Land-Farmington-Rock Outcrop Complex (0 to 15 percent slopes). Urban Land consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures;

- RnfD – Rock Outcrop – Farmington-Galway Complex (15 to 35 percent slopes). Rock Outcrop consists of steep, well-drained soil. It is not on the hydric soil list.

Farmington-Rock Outcrop (FaxC) comprises 33% of the total disturbed area, Hazen-Paulins Kill (HdxpAb) comprises 59%, Urban Land-Farmington-Rock Outcrop (USFARC) comprises 5% and the remaining 3% of the total disturbed area is comprised by Rock Outcrop – Farmington-Galway (RnfD). Both FaxC, USFARC and RnfD are classified as Hydrologic Soil Group (HSG) 'D', and HdxpAb is classified as Hydrologic Soil Group (HSG) 'A'. A USDA NRCS Web Soil Survey map is included in Appendix A.

In situ soil testing was performed onsite in the location of the proposed stormwater management systems and along the areas with different USDA NRCS soil group classifications to obtain physical data regarding the infiltration rates of the site. The lab data results are included in Appendix H. The results obtained indicate that the site is well-drained within the proposed limit of disturbance. The obtained soil permeability rates were greater than 5.67 inches per hour; therefore, in accordance with NJ Stormwater BMP Manual Appendix E, the soil hydrologic groups can be classified as Hydrologic Soil Group 'A'.

2. METHODOLOGY

2.1 Stormwater Runoff Calculation Methodology

The stormwater quantity runoff analysis has been performed utilizing the Soil Conservation Service (SCS) Technical Release 55 (TR-55) "Urban Hydrology for Small Watersheds," revised June 1986. The site runoff has been calculated for the 2-, 10-, and 100-year storm frequencies in accordance with NJDEP's stormwater regulations for water quantity control (N.J.A.C. 7:8-5.4).

The analysis utilized the New Jersey 24-hour rainfall frequency data per NOAA precipitation frequency estimates with New Jersey region C rainfall distribution. The time of concentration (Tc) calculations were calculated based on the TR-55 methodology. Several potential Tc flow paths were analyzed in order to determine the most appropriate flow path. CN values were calculated for each drainage area. The summary of results and supporting calculations for the existing and proposed stormwater quantity runoff analysis can be found in Appendices B, C and D of this report.

2.2 Stormwater Runoff Quality

The stormwater runoff quality analysis has been performed in accordance with NJDEP's Stormwater Management Regulations (N.J.A.C. 7:8-5.5). This stormwater management plan serves to reduce the post-construction load of Total Suspended Solids (TSS) generated from the water quality design storm by 80 percent, as an annual average. This reduction has been applied to all areas of new development on the site. The water quality design storm consists of 1.25 inches of rain falling in 2 hours with the NJDEP distribution as illustrated in N.J.A.C. 7:8-5.5 "Table 1 - Water Quality Design Storm Distribution" (refer to Appendix H).

Six above-ground infiltration basins to obtain the required 80% TSS removal from the total proposed impervious area (refer to Appendix G).

2.3 Groundwater Recharge

A groundwater recharge analysis has been performed in accordance with NJDEP's Stormwater Management Rules (N.J.A.C. 7:8-5.4). The New Jersey Groundwater Recharge Spreadsheet (NJGRS) Version 2.0 (Updated November 2003) was utilized to determine the groundwater recharge associated with the site. Computations of the pre-development and post-development annual groundwater recharge rates and the annual recharge deficit was prepared based on the New Jersey Geological Survey Report GSR-32" A Method for Evaluating Ground-Water Recharge Areas in New Jersey", which is incorporated into the NJGSR spreadsheet (refer to Appendix G of this report).

2.4 Non-Structural Stormwater Management Strategies

As per N.J.A.C. 7:8-5.3 requirements non-structural stormwater strategies have been incorporated into the design to the maximum extent practicable:

- The impervious surfaces are minimized on the project site to meet current codes and the runoff over the impervious surfaces flow into the proposed stormwater systems.
- The Time of Concentration decrease is minimized to the extent practicable.
- Land disturbance is being minimized to the extent practicable.
- Soil compaction will be minimized and any areas of over compaction will be mediated.
- Low maintenance trees and native grasses are proposed to encourage retention of all plantings.
- The use of natural open channel swales is utilized to convey the stormwater runoff through portions of the site where it is feasible.

2.5 Stormwater Conveyance

The storm sewer hydraulics is based upon the Manning Equation as defined in the "Handbook of Hydraulics," by Brater and King, Sixth Edition. Storm sewer capacity is based on full depth gravity flow. Two stormwater conveyance pipes are proposed to convey the water to each of the two infiltration basins. Refer to Appendix E for calculations.

3. STORMWATER ANALYSIS

3.1 Existing Conditions Stormwater Runoff Quantity

The Pre-Development Drainage Area Plan (Appendix B) illustrates the existing drainage areas on site. The pre-development drainage areas have been delineated only within the proposed limit of disturbance anticipated by the proposed development. The site has been analyzed as nine distinct drainage areas: EDA-A, EDA-B, EDA-C, EDA-D, EDA-E, EDA-F, EDA-G, EDA-H, and EDA-I.

EDA-A is defined as 14.94 acres of site area that drains from the southern section of Stickles Pond Road and the middle-south section of the site toward a low point located east from the common property line with Block 151, Lot 20. The drainage area contains multiple land covers as follows: 8.88 acres of grassland, 4.61 acres of woods, and 1.46 acres of impervious area. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-B is defined as 17.97 acres of site area that drains from the north section of Stickles Pond Road and the middle-north section of the site toward the existing wetlands. The drainage area contains multiple land covers as follows: 12.21 acres of grassland, 3.40 acres of woods, and 2.36 acres of impervious area. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-C is comprised of 4.29 acres of site area that drains from the north section of Stickles Pond Road and east section of the site toward the Stickles pond. The drainage area contains multiple land covers as follows: 2.2 acres of grassland, 0.97 acres of woods, and 1.12 acres of impervious area.

EDA-D is comprised of 3.76 acres of site area that drains from the middle-north west section of the site and west section of the site toward a low point located east from the common property line with Block 151, Lot 20. The drainage area contains multiple land covers as follows: 0.43 acres of grassland, and 3.20 acres of woods. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-E is comprised 4.69 acres of site area that drains from the middle-north west section of the site toward the north section of the site, to a point located along the common property line with Block 151, Lot 22. The drainage area contains 4.69 acres of woods.

EDA-F is comprised 0.97 acres of site area that drains from the west section of the site toward the adjacent property, Block 151, Lot 17. The drainage area contains 0.97 acres of woods.

EDA-G is comprised of 5.08 acres of site area that drains from the northwest section of the site toward the adjacent property, Block 151, Lot 22. The drainage area contains multiple land covers as follows: 2.01 acres of grassland, and 3.06 acres of woods.

EDA-H is comprised of 12.92 acres of site area that drains from the upper north section of the site toward a low point. The drainage area contains multiple land covers as follows: 8.92 acres of grassland and 4.0 acres of woods. Due to the topographic characteristics of the drainage area, the generated stormwater runoff is contained within the site boundaries and it is infiltrated to the ground.

EDA-I is comprised of 1.10 acres of site area that drains from the upper northeast section of the site toward Stickles pond. The drainage area contains 1.10 acres of woods.

The curve numbers (CN) and time of concentration (Tc) for the existing drainage areas have been calculated utilizing the TR-55 method for each drainage. Runoff hydrographs have been calculated for the 2, 10, and 100 years storm.

The pre-development runoff from the drainage areas is listed in the following table:

Drainage Area	2-year Storm	10-year Storm	100-year Storm
EDA-A	4.381 CFS	13.26 CFS	37.09 CFS
EDA-B	4.623 CFS	8.550 CFS	26.18 CFS
EDA-C	5.163 CFS	9.692 CFS	19.47 CFS
EDA-D	5.388 CFS	10.55 CFS	20.91 CFS
EDA-E	6.409 CFS	12.58 CFS	25.00 CFS

EDA-F	1.543 CFS	2.911 CFS	5.610 CFS
EDA-G	2.996 CFS	7.883 CFS	19.07 CFS
EDA-H	0.000 CFS	0.097 CFS	3.352 CFS
EDA-I	0.000 CFS	0.000 CFS	0.064 CFS

Refer to Appendices B through D for a summary of the composite curve numbers (CN), pre-development peak discharge rates for the 2-, 10-, and 100-year storms, and the associated runoff hydrographs.

3.2 Proposed Conditions Stormwater Runoff Quantity

The Post-Development Drainage Area Plan (Appendix B), illustrates the proposed drainage areas for the post-development condition. The post-development drainage areas have been delineated only within the proposed limit of disturbance anticipated by the proposed development. To accommodate the proposed site development, the site has been analyzed as nine distinct drainage areas: PDA-A, PDA-B, PDA-C, PDA-D, PDA-E, PDA-F, PDA-G, PDA-H, and PDA-I.

PDA-A is comprised of 5.13 acres of site area along the lower south section of Stickles Pond Road and the lower south section of the site. PDA A is comprised of the proposed building, paved areas and lawn areas located along the lower south section of the site and the lower south section of the Stickles Pond Road. The stormwater runoff generated from PDA-A is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-A. Since in existing conditions the stormwater runoff generated by EDA-A is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-A. SWM-A has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B is comprised of 25.62 acres of site area along the north section of Stickles Pond Road and the middle-north section of the site. For the purpose of analysis, PDA-B has been divided into three sub-drainage areas: PDA-B1, PDA-B2 and PDA-B3. PDA-B1 is a 20.58 acres site area comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the upper middle-north section of the site and the north section of Stickles Pond Road. The stormwater runoff generated from PDA-B1 is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-B1. Since in the existing conditions the stormwater runoff generated by EDA-B is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed pervious pavement system SWM-B1. SWM-B1 has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B2 is a 4.53 acres site area comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the south section of the site. The stormwater runoff generated from PDA-B2 is captured, treated and infiltrated by the proposed pervious pavement system: SWM-B2. Since in the existing conditions the stormwater runoff generated by EDA-B is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-B2. SWM-B2 has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-B3 is a 0.50 acres site area comprised of lawn areas located along the south section of the site. The stormwater runoff generated from PDA-B3 bypasses the proposed above-ground basins for PDA-B, and it discharges to an existing wetland on site.

PDA-C is a 0.94 acres site area along the upper north section of Stickles Pond Road. It is comprised of lawn areas and the upper north section of the Stickles Pond Road. The stormwater runoff generated from PDA-C bypasses the proposed stormwater management systems and it drains to the existing Stickles pond.

PDA-D is a 12.66 acres site area along the middle-north west section of the site and the lower west section of the site. It is comprised of a portion of the proposed construction equipment and construction material storage area and lawn area. The stormwater runoff generated from PDA-D is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-D. Since in the existing conditions the stormwater runoff generated by EDA-D is contained within the site and its outlet point is through infiltration to the ground, the same approach has been used to define the point of discharge of the proposed above-ground infiltration basin SWM-D. SWM-D has been designed to capture, treat and infiltrate the water quality storm, and the 2,10, and 100-year storms by using a permeability rate of 5 inches per hour. The permeability rate used has been obtained from the results obtained from the in-situ soil testing investigation (refer to Appendix H).

PDA-E is a 0.36 acres site area comprised of lawn area. The stormwater runoff generated by PDA-E bypasses the proposed stormwater management systems and discharges to the adjacent property, Block 151, Lot 22. Since the size of PDA-e has been reduced to produce a stormwater runoff less than or equal to the stormwater runoff produced by EDA-E, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-F is a 0.85 acres site area along the west section of the site. It Is comprised of grass areas and it drains toward the adjacent property, Block 151, Lot 17. Since the size of PDA-F has been reduced to produce a stormwater runoff less than or equal to the stormwater runoff produced by EDA-F, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-G is comprised of 6.39 acres of site area along the northwest section of the site. For the purpose of analysis, PDA-G has been divided into two sub-drainage areas: PDA-G1 and PDA-G2. PDA-G1 is a 5.83 acres site area comprised

of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the northwest section of the site. The stormwater runoff generated by PDA-G1 is captured, treated and infiltrated by the proposed above-ground infiltration basin: SWM-G1. The proposed above-ground infiltration basin has been designed to capture, treat and infiltrate the water quality storm, and the 2, 10, and 100-year storms. PDA-G2 is a 0.30 acres site area comprised of lawn located areas along the northwest section of the site. The stormwater runoff generated by PDA-G2 bypasses the proposed stormwater management systems and it drains to the adjacent property, Block 151, Lot 22. By designing the proposed above-ground infiltration basin to capture, treat and infiltrate the water quality storms, and the 2,10, and 100-year storms, no increase in peak discharge toward Block 151, Lot 22 is expected to occur.

PDA-H is comprised of 13.53 acres of site area along the upper north section of the site. It is comprised of a portion of the proposed construction equipment and construction material storage area and lawn areas located along the upper north section of the site. The stormwater runoff generated by PDA-H is captured, treated and infiltrated by a proposed above-ground infiltration basin: SWM-H. The proposed above-ground infiltration basin SWM-H1 has been designed to capture, treat and infiltrate the water quality storm and the 2, 10 and 100-year storms.

PDA-I is a 0.26 acres of site area located along the upper northeast section of the site. It is comprised of lawn areas and wooded areas. The stormwater runoff generated by PDA-I bypasses the proposed stormwater management systems and it drains to the existing Stickles pond.

The post-development drainage area discharges, and the performance of the stormwater management systems are summarized in the tables below:

Table-2: Post-Development Drainage Areas Peak Discharge Summary			
Drainage Area	2-year Storm	10-year Storm	100-year Storm
PDA-A	0.000 CFS	0.000 CFS	0.000 CFS
PDA-B	0.663 CFS	1.405 CFS	2.951 CFS
PDA-C	2.481 CFS	4.043 CFS	7.016 CFS
PDA-D	0.000 CFS	0.000 CFS	0.000 CFS
PDA-E	0.908 CFS	1.529 CFS	2.691 CFS
PDA-F	0.919 CFS	1.781 CFS	3.503 CFS
PDA-G	0.528 CFS	1.011 CFS	1.969 CFS
PDA-H	0.000 CFS	0.000 CFS	0.000 CFS
PDA-I	0.000 CFS	0.001 CFS	0.064 CFS

Table-3: Stormwater Management System Performance: SWM-A			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	593.28 FT	15,242 CF
10-Yr	0.000 CFS	593.92 FT	23,853 CF
100-Yr	0.000 CFS	595.05 FT	41,143 CF

Table-5: Stormwater Management System Performance: SWM B1-B2			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	599.19 FT, 598.84 FT	97,924 CF
10-Yr	0.000 CFS	599.93 FT, 599.29 FT	163,505 CF
100-Yr	0.000 CFS	601.29 FT, 600.29 FT	302,733 CF

Table-8: Stormwater Management System Performance: SWM-D			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	600.54 FT	68,027 CF
10-Yr	0.000 CFS	601.84 FT	108,547 CF
100-Yr	0.000 CFS	604.11 FT	189,497 CF

Table-10: Stormwater Management System Performance: SWM-G1			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	598.13 FT	29,169 CF
10-Yr	0.000 CFS	599.14 FT	47,342 CF
100-Yr	0.000 CFS	600.64 FT	82,656 CF

Table-11: Stormwater Management System Performance: SWM-H			
Storm	Peak Basin Discharge	Water Surface Elevation	Max. Storage
2-Yr	0.000 CFS	597.36 FT	53,610 CF
10-Yr	0.000 CFS	598.16 FT	89,289 CF
100-Yr	0.000 CFS	599.63 FT	164,586 CF

The proposed Stormwater Management Systems provide the necessary detention time and storage to achieve the reduction factors required by N.J.A.C.7:8. A summary table has been provided below documenting the overall performance of the systems.

Table-12: Pre-Development and Post Development Peak Discharge Runoff Comparison Table

Drainage Areas	Storm	Existing Peak Discharge	Reduction Required	Target Runoff	Proposed Peak Discharge
EDA-A/PDA-A	2-Year	4.381 CFS	50%	2.19 CFS	0.000 CFS
	10-Year	13.26 CFS	75%	9.945 CFS	0.000 CFS
	100-Year	37.09 CFS	80%	29.67 CFS	0.000 CFS
EDA-B/PDA-B	2-Year	4.623 CFS	50%	2.3115 CFS	0.663 CFS
	10-Year	8.537 CFS	75%	6.402 CFS	1.405 CFS
	100-Year	26.07 CFS	80%	20.856 CFS	2.951 CFS
EDA-C/PDA-C	2-Year	5.163 CFS	>=	5.163 CFS	2.481 CFS
	10-Year	9.692 CFS	>=	9.692 CFS	4.043 CFS
	100-Year	19.47 CFS	>=	19.47 CFS	7.016 CFS
EDA-D/PDA-D	2-Year	5.388 CFS	50%	2.694 CFS	0.000 CFS
	10-Year	10.55 CFS	75%	7.912 CFS	0.000 CFS
	100-Year	20.91 CFS	80%	16.728 CFS	0.000 CFS
EDA-E/PDA-E	2-Year	6.409 CFS	>=	6.409 CFS	0.908CFS
	10-Year	12.58 CFS	>=	12.58 CFS	1.529 CFS
	100-Year	25.00 CFS	>=	25.00 CFS	2.691 CFS
EDA-F/PDA-F	2-Year	1.543 CFS	>=	1.543 CFS	0.919 CFS
	10-Year	2.911 CFS	>=	2.911 CFS	1.781 CFS
	100-Year	5.610 CFS	>=	5.610 CFS	3.503 CFS
EDA-G/PDA-G	2-Year	2.996 CFS	50%	1.498 CFS	0.528 CFS
	10-Year	7.883 CFS	75%	5.912 CFS	1.011 CFS

	100-Year	19.07 CFS	80%	15.256 CFS	1.969 CFS
EDA-E/PDA-H	2-Year	0.000 CFS	50%	0.000 CFS	0.000 CFS
	10-Year	0.097 CFS	75%	0.0727 CFS	0.000 CFS
	100-Year	3.352 CFS	80%	2.68 CFS	0.000 CFS
EDA-E/PDA-I	2-Year	0.000 CFS	>=	0.000 CFS	0.000 CFS
	10-Year	0.000 CFS	>=	0.000 CFS	0.001 CFS
	100-Year	0.064 CFS	>=	0.062 CFS	0.064C FS

3.3 Stormwater Runoff Quality

Proposed runoff quality has achieved the required TSS removal, in accordance with NJDEP standards. The water quality storm calculations are contained in Appendix F. Quality treatment has been provided for PDA-A, PDA-B, PDA-D, PDA-G, and PDA-H through the use of six above-ground infiltration basins designed to treat the entire water quality storm volume without overflow. Consequently, the proposed above-ground infiltration basins qualify for an 80% TSS removal rate in accordance with NJDEP Phase II standards.

3.4 Groundwater Recharge

For the groundwater recharge calculations, the soil type chosen to model the site recharge capacity were based: Hazen, Sandy Land, and Urban Land. The web soil survey soil groups Farmington-Rock Outcrop and Rock Outcrop-Farmington-Galway are not in the available list of soils offered by The New Jersey Groundwater Recharge Spreadsheet (NJGRS) Version 2.0 (Updated November 2003). The soil type Sandy Land was chosen base on the results obtained from the on-site in situ soil investigations conducted at the site (refer to Appendix H).

The existing site has a total annual recharge of 3,733,11 C.F. The proposed development creates a groundwater recharge deficit of 2,666,400 C.F. Sic above-ground infiltration basins have been proposed to infiltrate the groundwater recharge deficit. Table-13: Proposed Ground Water Recharge, shows the recharged volume obtained by each proposed stormwater management system.

Table-13: Proposed Groundwater Recharge

SWM Name	Annual BMP Recharge Volume (CF)
SWM-A	383,047 CF
SWM-B1	992,821 CF
SWM-B2	444,829 CF
SWM-D	992,821 CF
SWM-G1	648,709 CF
SWM-H	992,821 CF

Total Proposed Annual Recharge	4,455,048 CF
Net Annual Increase	1,788,648 CF

An annual recharge volume of 4,455,048 C.F. is observed in the post development conditions. A net increase in the annual recharge of 1,788,648 C.F. is observed. The analysis has been performed based upon the approved NJDEP Recharge Spreadsheet and can be found in Appendix G

3.5 Soil Erosion and Sediment Control

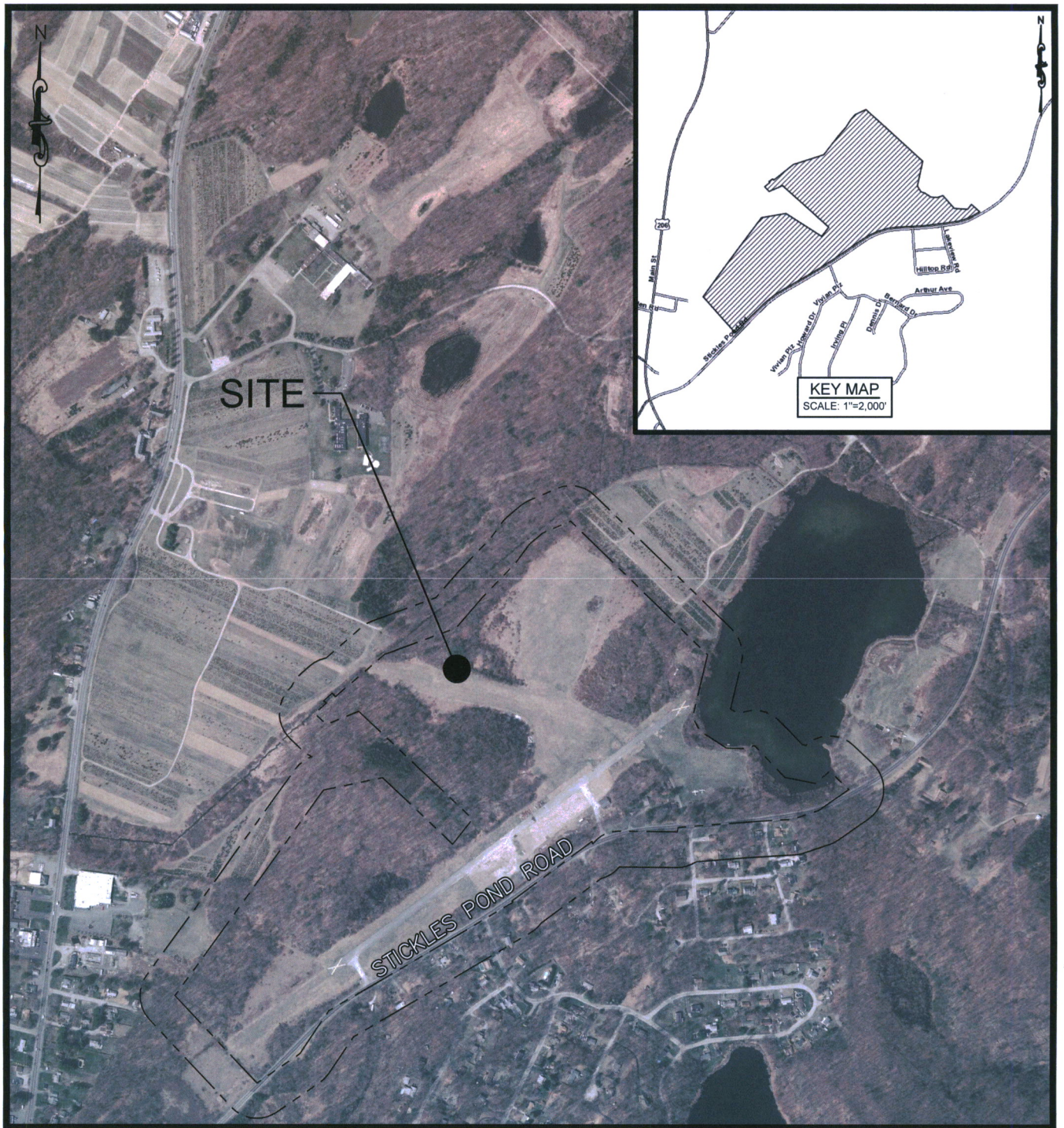
Soil Erosion and Sediment Control measures have been designed for the stormwater management system to ensure that water quality is maintained and that the system can safely and adequately control runoff from the property. Design calculations for the conduit outlet protections for the proposed above-ground infiltration basins can be found in Appendix I

4. CONCLUSIONS

In conclusion, the proposed design includes a proposed stormwater management system for the property that meets all of the quantity, quality and recharge requirements outlined in the Stormwater Management Rules of N.J.A.C. 7:8. A waiver is requested for the use of infiltration in the routing of the 2, 10 and 100-year storm events. There is no existing stormwater conveyance system to which the proposed peak runoff rates can be discharged to.

APPENDIX A –
DRAWING EXHIBITS

E&LP



800 0 800

SCALE 1" = 800 FT

IMAGERY SOURCE: NEW JERSEY GEOGRAPHIC INFORMATION NETWORK

TITLE:

AERIAL MAP

E&LP

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(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

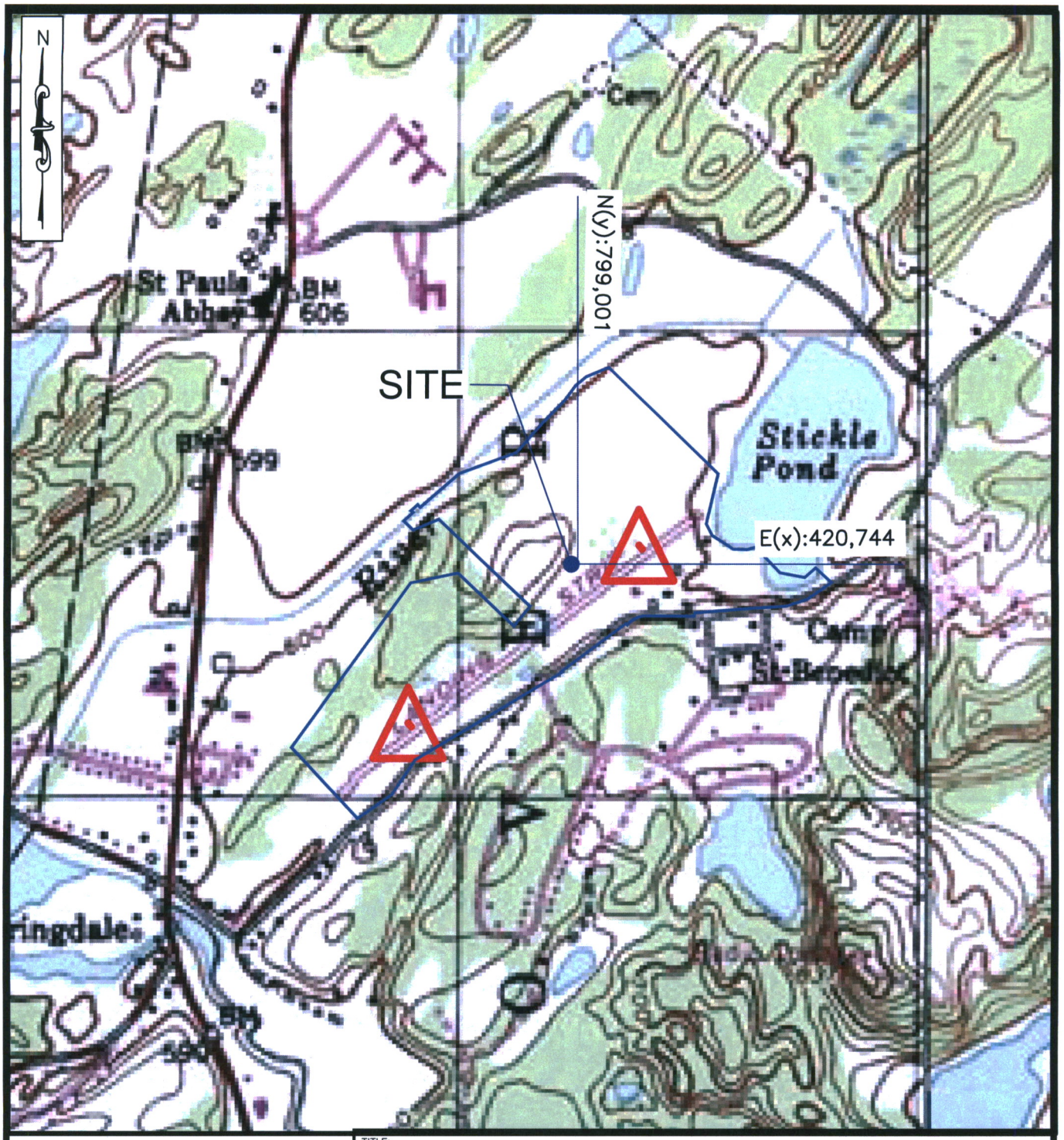
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 01_AERIAL.DWG

FIGURE No.

A1



1000 0 1000

SCALE 1" = 1000 FT

REFERENCES: USGS NEWTON WEST QUAD

TITLE:

USGS MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 02_USGS.DWG

FIGURE No.

A2

600 0 600

SCALE 1" = 600 FT

IMAGERY SOURCE: NEW JERSEY GEOGRAPHIC INFORMATION NETWORK

TITLE:

SOIL MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

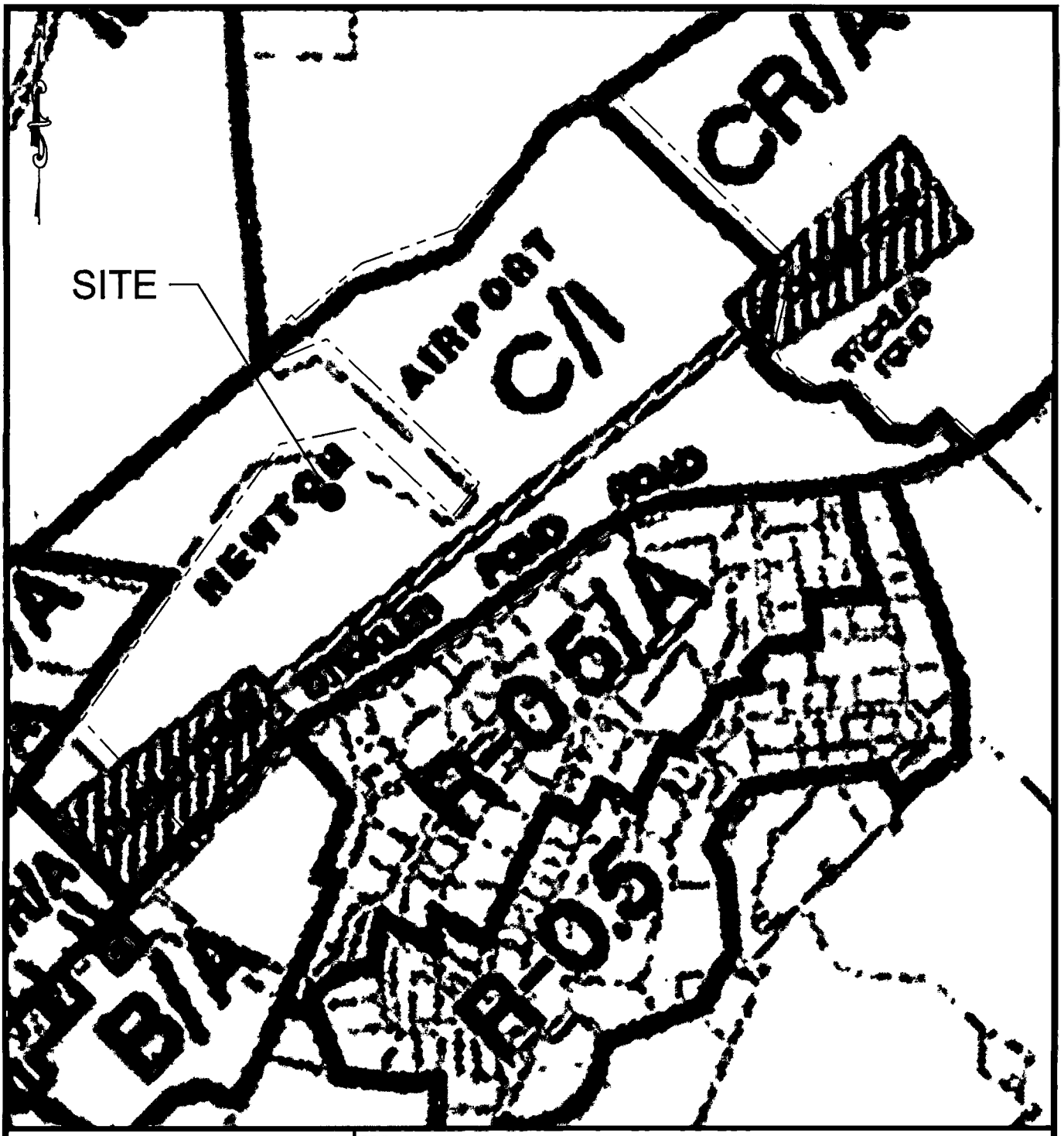
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 03_SOILS.DWG

FIGURE No.

A3



600 0 600

SCALE 1" = 600 FT

IMAGERY SOURCE: ANDOVER TOWNSHIP ZONING MAP

TITLE:

ZONING MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

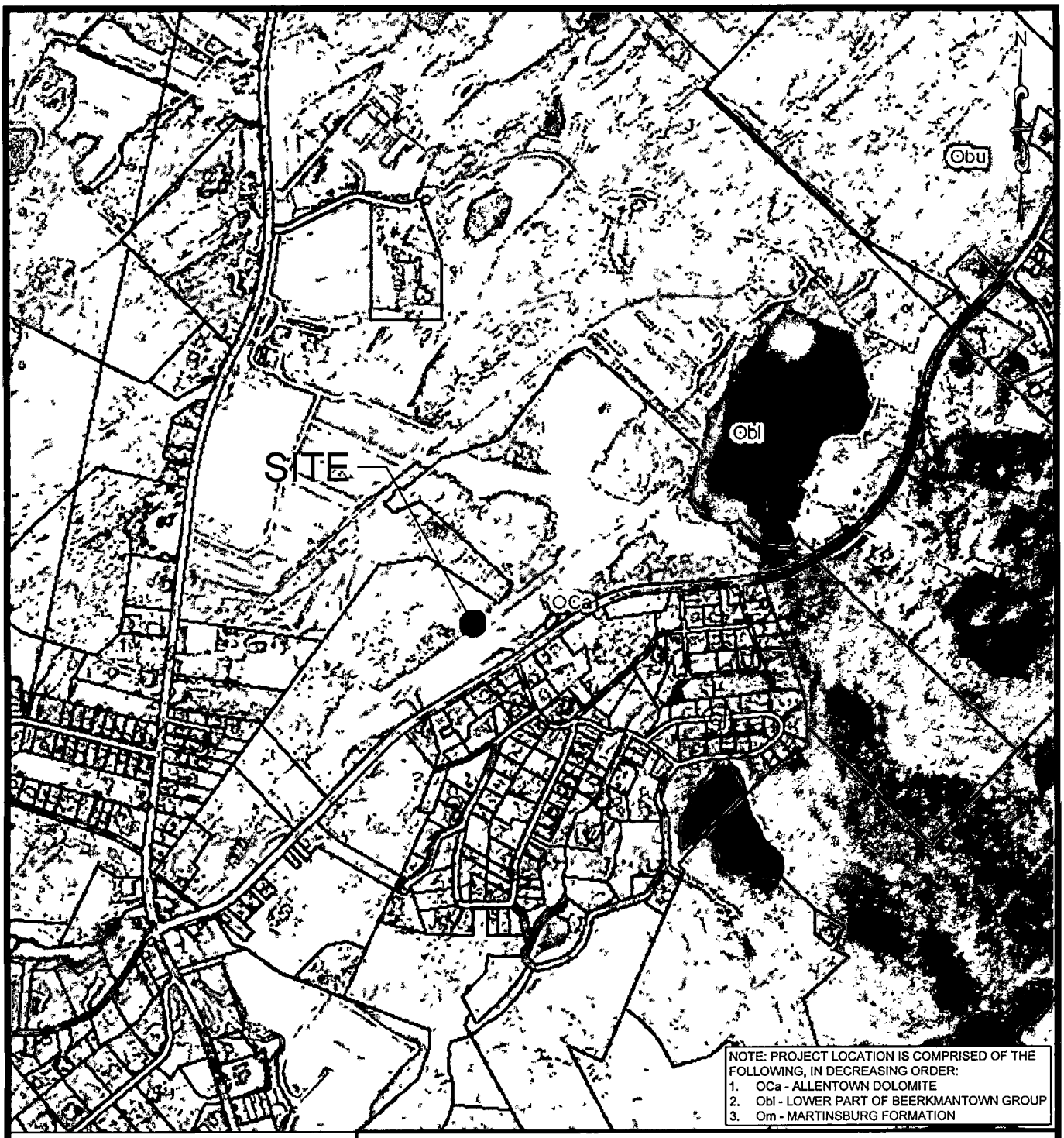
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 04_ZONING.DWG

FIGURE No.

A4



NOTE: PROJECT LOCATION IS COMPRISED OF THE FOLLOWING, IN DECREASING ORDER:
1. OCa - ALLENTOWN DOLOMITE
2. Obl - LOWER PART OF BEERKMANTOWN GROUP
3. Om - MARTINSBURG FORMATION

1000 0 1000

SCALE 1" = 1000 FT

REFERENCES: NJ GEOWEB

TITLE:

GEOLOGIC MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

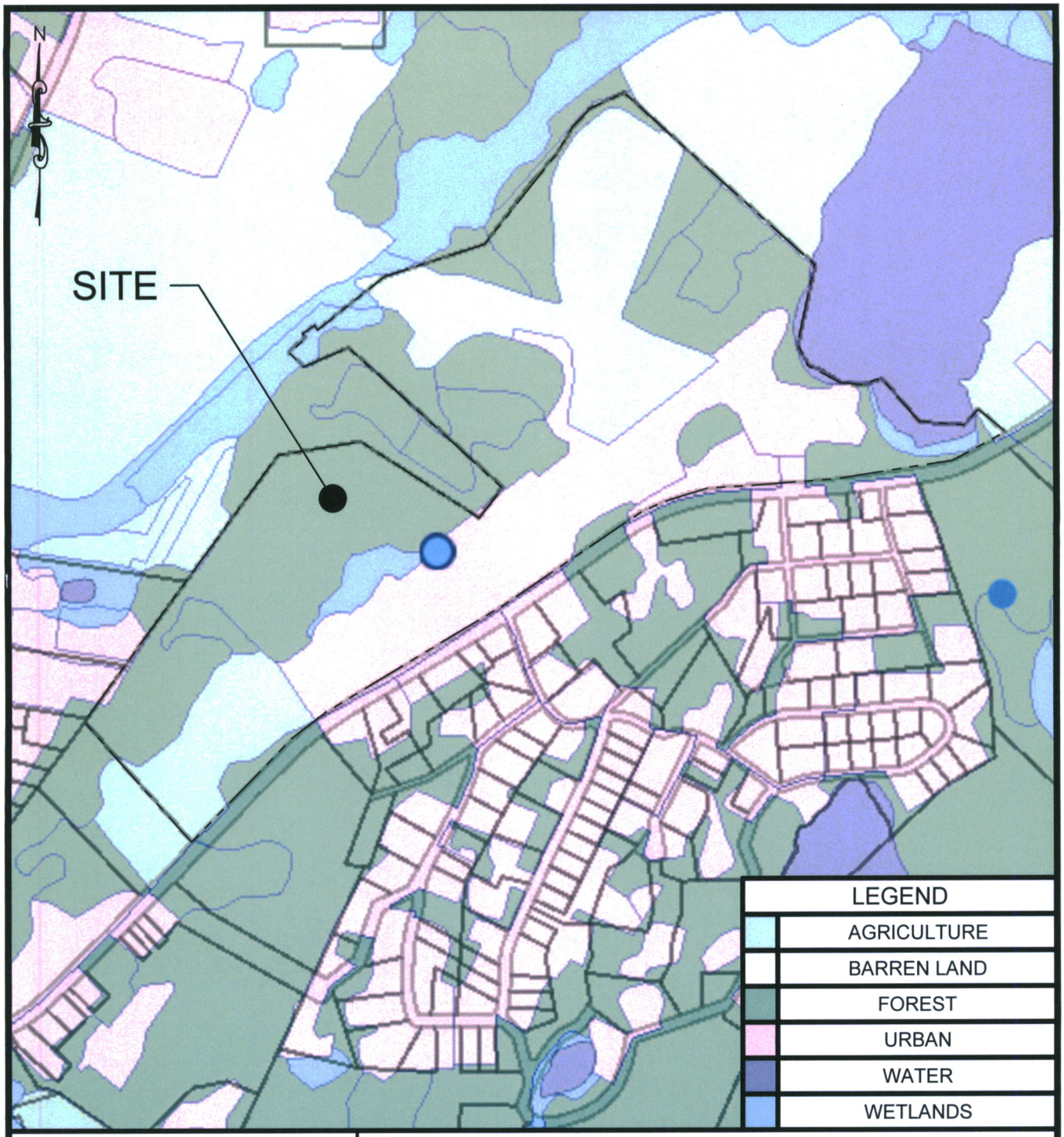
DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 0119134 GEOLOGY.DWG

FIGURE No.

A5



600 0 600

SCALE 1" = 600 FT

IMAGERY SOURCE: ANDOVER TOWNSHIP ZONING MAP

TITLE:

LAND USE MAP

E&LP

140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500

A PROFESSIONAL ASSOCIATION

LOCATION:

BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: 06_LAND USE.DWG

FIGURE No.

A6

NOAA Atlas 14, Volume 2, Version 3
Location name: Andover Twp, New Jersey, USA*
Latitude: 41.026°, Longitude: -74.7583°
Elevation: 602.81 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.327 (0.295-0.365)	0.391 (0.352-0.435)	0.468 (0.420-0.520)	0.527 (0.472-0.586)	0.605 (0.538-0.671)	0.667 (0.590-0.740)	0.730 (0.640-0.810)	0.798 (0.693-0.887)	0.896 (0.769-1.00)	0.973 (0.825-1.09)
10-min	0.514 (0.463-0.573)	0.616 (0.554-0.685)	0.737 (0.661-0.819)	0.825 (0.739-0.917)	0.942 (0.838-1.05)	1.03 (0.914-1.15)	1.13 (0.989-1.25)	1.22 (1.06-1.36)	1.36 (1.17-1.52)	1.47 (1.24-1.65)
15-min	0.637 (0.573-0.710)	0.763 (0.687-0.850)	0.916 (0.822-1.02)	1.03 (0.922-1.14)	1.18 (1.05-1.31)	1.29 (1.14-1.43)	1.41 (1.24-1.57)	1.53 (1.33-1.70)	1.70 (1.46-1.91)	1.84 (1.56-2.07)
30-min	0.856 (0.771-0.955)	1.04 (0.933-1.15)	1.28 (1.15-1.42)	1.46 (1.31-1.62)	1.70 (1.51-1.89)	1.89 (1.67-2.10)	2.09 (1.84-2.32)	2.30 (2.00-2.56)	2.61 (2.24-2.92)	2.86 (2.42-3.21)
60-min	1.06 (0.951-1.18)	1.29 (1.16-1.43)	1.62 (1.45-1.80)	1.88 (1.68-2.08)	2.23 (1.99-2.48)	2.53 (2.23-2.80)	2.84 (2.49-3.15)	3.18 (2.76-3.54)	3.67 (3.15-4.11)	4.09 (3.47-4.59)
2-hr	1.29 (1.16-1.42)	1.56 (1.42-1.73)	1.98 (1.78-2.19)	2.31 (2.07-2.55)	2.79 (2.49-3.07)	3.19 (2.83-3.52)	3.64 (3.20-4.01)	4.13 (3.60-4.57)	4.87 (4.18-5.41)	5.50 (4.66-6.14)
3-hr	1.44 (1.31-1.60)	1.74 (1.58-1.93)	2.19 (1.98-2.43)	2.55 (2.30-2.82)	3.07 (2.75-3.39)	3.51 (3.12-3.88)	3.99 (3.51-4.41)	4.51 (3.94-5.01)	5.31 (4.56-5.91)	5.98 (5.08-6.70)
6-hr	1.87 (1.70-2.06)	2.25 (2.05-2.48)	2.80 (2.55-3.09)	3.26 (2.96-3.59)	3.94 (3.55-4.33)	4.54 (4.05-4.99)	5.20 (4.59-5.72)	5.94 (5.18-6.54)	7.06 (6.05-7.81)	8.05 (6.80-8.93)
12-hr	2.33 (2.11-2.59)	2.81 (2.55-3.13)	3.52 (3.18-3.91)	4.13 (3.72-4.57)	5.05 (4.50-5.57)	5.86 (5.17-6.45)	6.77 (5.91-7.46)	7.80 (6.73-8.62)	9.40 (7.95-10.4)	10.8 (8.98-12.0)
24-hr	2.69 (2.50-2.93)	3.24 (3.01-3.52)	4.05 (3.75-4.39)	4.72 (4.36-5.11)	5.72 (5.25-6.18)	6.57 (6.00-7.09)	7.51 (6.81-8.09)	8.54 (7.69-9.19)	10.1 (8.96-10.8)	11.4 (10.0-12.2)
2-day	3.17 (2.95-3.43)	3.82 (3.55-4.13)	4.77 (4.43-5.15)	5.56 (5.14-5.99)	6.69 (6.16-7.20)	7.65 (7.01-8.23)	8.70 (7.92-9.34)	9.83 (8.89-10.6)	11.5 (10.3-12.3)	12.9 (11.4-13.8)
3-day	3.33 (3.10-3.58)	4.00 (3.73-4.32)	4.99 (4.64-5.37)	5.80 (5.38-6.24)	6.97 (6.44-7.48)	7.97 (7.32-8.53)	9.04 (8.25-9.67)	10.2 (9.24-10.9)	11.9 (10.7-12.7)	13.3 (11.8-14.2)
4-day	3.48 (3.25-3.74)	4.18 (3.91-4.50)	5.21 (4.85-5.59)	6.05 (5.62-6.48)	7.26 (6.71-7.76)	8.28 (7.62-8.84)	9.38 (8.58-10.0)	10.6 (9.60-11.3)	12.3 (11.1-13.1)	13.7 (12.3-14.7)
7-day	4.10 (3.84-4.41)	4.91 (4.59-5.27)	6.04 (5.65-6.48)	6.99 (6.51-7.49)	8.36 (7.75-8.93)	9.50 (8.78-10.1)	10.7 (9.86-11.5)	12.1 (11.0-12.9)	14.0 (12.7-15.0)	15.7 (14.0-16.7)
10-day	4.73 (4.44-5.05)	5.65 (5.30-6.03)	6.86 (6.43-7.32)	7.85 (7.34-8.37)	9.24 (8.62-9.85)	10.4 (9.65-11.1)	11.6 (10.7-12.3)	12.9 (11.8-13.7)	14.7 (13.4-15.7)	16.2 (14.7-17.3)
20-day	6.35 (5.98-6.74)	7.53 (7.09-7.99)	8.94 (8.42-9.49)	10.1 (9.47-10.7)	11.6 (10.9-12.3)	12.9 (12.0-13.6)	14.1 (13.2-15.0)	15.5 (14.4-16.4)	17.3 (15.9-18.3)	18.7 (17.2-19.9)
30-day	7.94 (7.51-8.40)	9.36 (8.85-9.89)	10.9 (10.3-11.5)	12.1 (11.4-12.8)	13.7 (12.9-14.4)	14.9 (14.0-15.8)	16.2 (15.2-17.1)	17.5 (16.3-18.4)	19.1 (17.8-20.2)	20.4 (18.9-21.6)
45-day	10.1 (9.62-10.7)	11.9 (11.3-12.5)	13.6 (12.9-14.3)	14.9 (14.2-15.7)	16.6 (15.8-17.5)	17.9 (17.0-18.9)	19.2 (18.2-20.2)	20.4 (19.3-21.5)	22.0 (20.7-23.2)	23.2 (21.8-24.5)
60-day	12.2 (11.5-12.8)	14.2 (13.5-15.0)	16.2 (15.4-17.0)	17.7 (16.8-18.6)	19.5 (18.6-20.6)	21.0 (19.9-22.1)	22.3 (21.1-23.5)	23.7 (22.4-24.9)	25.3 (23.9-26.7)	26.6 (25.0-28.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

TITLE: NOAA ATLAS 14 - POINT PRECIPITATION FREQUENCY ESTIMATES

E&LP
140 WEST MAIN STREET, HIGH BRIDGE, NJ 08829
(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500
A PROFESSIONAL ASSOCIATION

LOCATION:
BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: NOAA FREQUENCY.DWG

FIGURE No. A7

IMAGERY SOURCE: NOAA ATLAS 14, VOLUME 2, VERSION 3 FOR ANDOVER TOWNSHIP.

Figure 5-9: NJ Locations of Regions C and D

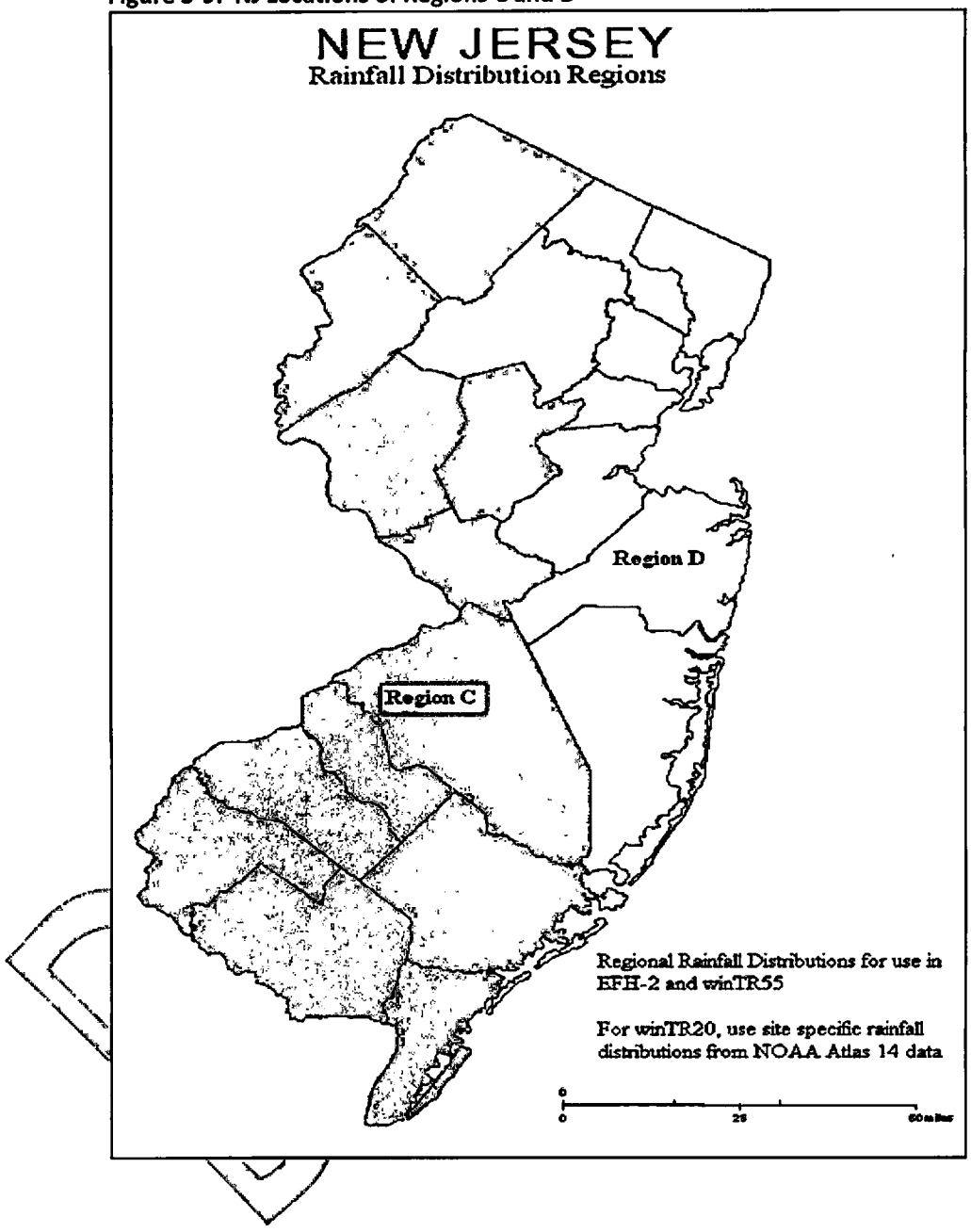


TABLE 7.1

TYPICAL RUNOFF COEFFICIENTS (C VALUES) FOR 100 YEAR FREQUENCY STORM

TABLE 7.1

TYPICAL RUNOFF COEFFICIENTS (C VALUES) FOR 100 YEAR FREQUENCY STORM

Land Use Description		Hydrologic Soil Group A	B	C	D
Cultivated land:					
without conservation treatment		0.49	0.67	0.81	0.88
with conservation treatment		0.27	0.43	0.61	0.67
Pasture or range land:					
poor condition		0.38	0.63	0.78	0.84
good condition		NA	0.25	0.51	0.65
Meadow: good condition		NA	NA	0.44	0.61
Wood or forest land:					
thin stand, poor cover, no mulch		NA	NA	0.59	0.79
good cover		NA	NA	0.45	0.59
Open spaces, lawns, parks, golf courses, cemeteries:					
good condition, grass cover on 75% or more of area		NA	0.25	0.51	0.65
fair condition, grass cover on 50–75% of area		NA	0.45	0.63	0.74
Commercial and business areas (85% impervious)		0.84	0.90	0.93	0.96
Industrial districts (72% impervious)		0.67	0.81	0.88	0.92
Residential:					
Average lot size	Average impervious				
⅛ acre	65%	0.59	0.76	0.86	0.90
¼ acre	38%	0.25	0.55	0.70	0.80
⅓ acre	30%	NA	0.49	0.67	0.78
½ acre	25%	NA	0.45	0.65	0.76
1 acre	20%	NA	0.41	0.63	0.74
Paved parking lots, roofs, driveways, etc.		0.99	0.99	0.99	0.99
Streets and roads:					
paved with curbs and storm sewers		0.99	0.99	0.99	0.99
gravel		0.57	0.76	0.84	0.88
dirt		0.49	0.69	0.80	0.84

Note: NA denotes information is not available; design engineers should rely on another authoritative source.
Source: New Jersey Department of Environmental Protection, Technical Manual for Land Use Regulation Program, Bureaus of Inland and Coastal Regulations, Stream Encroachment Permits (Trenton, New Jersey: Department of Environmental Protection, Revised September 1995) p. 12.

IMAGERY SOURCE: NOAA ATLAS 14, VOLUME 2, VERSION 3 FOR ANDOVER TOWNSHIP.

TITLE: NJRSIS TABLE 7.1: TYPICAL RUNOFF COEFFICIENTS

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(908) 238-0544 FAX: (908)238-9572
C.O.A. #: 24GA28021500
A PROFESSIONAL ASSOCIATION

LOCATION:
BLOCK 151, LOT 21
248 STICKLES POND ROAD
TOWNSHIP OF ANDOVER,
SUSSEX COUNTY, NJ

DATE: 10/22/2019

PROJECT NO.: 0119134

FILENAME: RUNOFF COEFFICIENTS.DWG

FIGURE No. A8

APPENDIX B –
PRE AND POST DEVELOPMENT DRAINAGE AREA MAPS

APPENDIX C –
CURVE NUMBER WORKSHEETS

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA A - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	332,648	7.64	297.82
Grassland (D)	80	59,725	1.37	109.69
Wood (A)	30	19,124	0.44	13.17
Wood (D)	77	181,596	4.17	321.00
Totals =			13.62	741.69

Composite Cn = $\frac{741.69}{13.62}$ = 54.47

USE Cn = 54

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA A - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	63,746	1.46	143.41

Totals = 1.46 143.41

Composite Cn = $\frac{143.41}{1.46}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA B - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	492,568	11.31	441.00
Grassland (D)	80	44,048	1.01	80.90
Wood (A)	30	37,480	0.86	25.81
Wood (D)	77	110,833	2.54	195.92
Totals =			15.72	743.63

Composite Cn = $\frac{743.63}{15.72}$ = 47.29

USE Cn = 47

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA B - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	102,727	2.36	231.11

Totals = 2.36 231.11

Composite Cn = $\frac{231.11}{2.36}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA C - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	46,284	1.06	41.44
Grassland (D)	80	49,557	1.14	91.01
Wood (A)	30	3,296	0.08	2.27
Wood (D)	77	38,897	0.89	68.76
Totals =			3.17	203.48

Composite Cn = $\frac{203.48}{3.17}$ = 64.21

USE Cn = 64

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA C - Pre-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	48,787	1.12	109.76

Totals = 1.12 109.76

Composite Cn = $\frac{109.76}{1.12}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA D - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (D)	80	18,911	0.43	34.73
Wood (D)	77	144,703	3.32	255.79
Totals =			3.76	290.52

Composite Cn = $\frac{290.52}{3.76}$ = 77.35

USE Cn = 77

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA E - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (D)	77	204,296	4.69	361.13
Totals =			4.69	361.13

Composite Cn = $\frac{361.13}{4.69}$ = 77.00

USE Cn = 77.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA F - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (D)	77	42,253	0.97	74.69
Totals =			0.97	74.69

Composite Cn = $\frac{74.69}{0.97}$ = 77.00

USE Cn = 77.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA G - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	56,368	1.29	50.47
Grassland (D)	80	31,324	0.72	57.53
Wood (A)	30	11,763	0.27	8.10
Wood (D)	77	121,640	2.79	215.02
Totals =			5.08	331.12

Composite Cn = $\frac{331.12}{5.08}$ = 65.24

USE Cn = 65

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA H - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Grassland (A)	39	388,727	8.92	348.03
Wood (A)	30	174,178	4.00	119.96
Totals =			12.92	467.99

Composite Cn = $\frac{467.99}{12.92}$ = 36.22

USE Cn = 36

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

EDA I - Pre-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Wood (A)	30	48,079	1.10	33.11
Totals =			1.10	33.11

Composite Cn = $\frac{33.11}{1.10}$ = 30.00

USE Cn = 30

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA A - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	41,124	0.94	64.20
Lawn (D)	89	47,331	1.09	96.71
Totals =			2.03	160.90

Composite Cn = $\frac{160.90}{2.03}$ = 79.24

USE Cn = 79

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA A - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	135,036	3.10	303.80

Totals = 3.10 303.80

Composite Cn = 303.80 / 3.10 = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	189,095	4.34	295.19
Lawn (D)	89	106,611	2.45	217.82
Totals =			6.79	513.01

Composite Cn = $\frac{513.01}{6.79}$ = 75.57

USE Cn = 76

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	600,692	13.79	1351.42
Totals =			13.79	1351.42

Composite Cn = $\frac{1351.42}{13.79}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B2 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	35,955	0.83	56.13
Totals =			0.83	56.13

Composite Cn = $\frac{56.13}{0.83}$ = 68.00

USE Cn = 68

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B2 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	156,816	3.60	352.80

Totals = 3.60 352.80

Composite Cn = $\frac{352.80}{3.60}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA B3 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	16,494	0.38	25.75
Lawn (D)	89	5,294	0.12	10.82
Totals =			0.50	36.57

Composite Cn = $\frac{36.57}{0.50}$ = 73.10

USE Cn = 73

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA C - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	9,494	0.22	14.82
Lawn (D)	89	14,999	0.34	30.64
Totals =			0.56	45.46

Composite Cn = $\frac{45.46}{0.56}$ = 80.86

USE Cn = 81

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA-C - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	16,397	0.38	36.89

Totals =	0.38	36.89

Composite Cn = $\frac{36.89}{0.38}$ = 98.00

USE Cn = 98.0

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA D - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	9,585	0.22	14.96
Lawn (D	89	24,052	0.55	49.14
Totals =			0.77	64.10

Composite Cn = $\frac{64.10}{0.77}$ = 83.02

USE Cn = 83

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA D - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	517,928	11.89	1165.22

Totals =	11.89	1165.22

Composite Cn = $\frac{1165.22}{11.89}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA E1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (D)	86	15,682	0.36	30.96
Totals =			0.36	30.96

Composite Cn = $\frac{30.96}{0.36}$ = 86.00

USE Cn = 86

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA F - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Meadow (D)	78	37,026	0.85	66.30
Totals =			0.85	66.30

Composite Cn = $\frac{66.30}{0.85}$ = 78.00

USE Cn = 78

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	42,430	0.97	66.24
Lawn (D)	89	7,214	0.17	14.74
Totals =			1.14	80.98

Composite Cn = $\frac{80.98}{1.14}$ = 71.05

USE Cn = 71

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Impervious	98	228,690	5.25	514.50

Totals =	5.25	514.50

Composite Cn = $\frac{514.50}{5.25}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA G2 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Meadow (D)	78	13268.9	0.30	23.76
Totals =			0.30	23.76

Composite Cn = $\frac{23.76}{0.30}$ = 78.00

USE Cn = 78

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA H1 - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	149,194	3.43	232.90
Totals =			3.43	232.90

Composite Cn = $\frac{232.90}{3.43}$ = 68.00

USE Cn = 68

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA H1 - Post-Developed (Impervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
*Impervious	98	439,956	10.10	989.80
Totals =			10.10	989.80

Composite Cn = $\frac{989.80}{10.10}$ = 98.00

USE Cn = 98

248 Stickles Pond Road
Andover Township
Sussex County, NJ

By: EAJ
Date: 23-Oct-19
Chk'd: CN
Revised: 1-Nov-20

PDA I - Post-Developed (Pervious)

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Cover Description	Cn	Area (sf)	Area (acres)	Product of CN x Area
Lawn (A)	68	1,307	0.03	2.04
Wood (A)	30	10200.26	0.23	7.02
Totals =			0.26	9.06

Composite Cn = $\frac{9.06}{0.26}$ = 34.32

USE Cn = 34

APPENDIX D -

HYDROLOGIC ANALYSIS AND RUNOFF QUANTITY CALCULATIONS

E&LP

Hydraflow Table of Contents

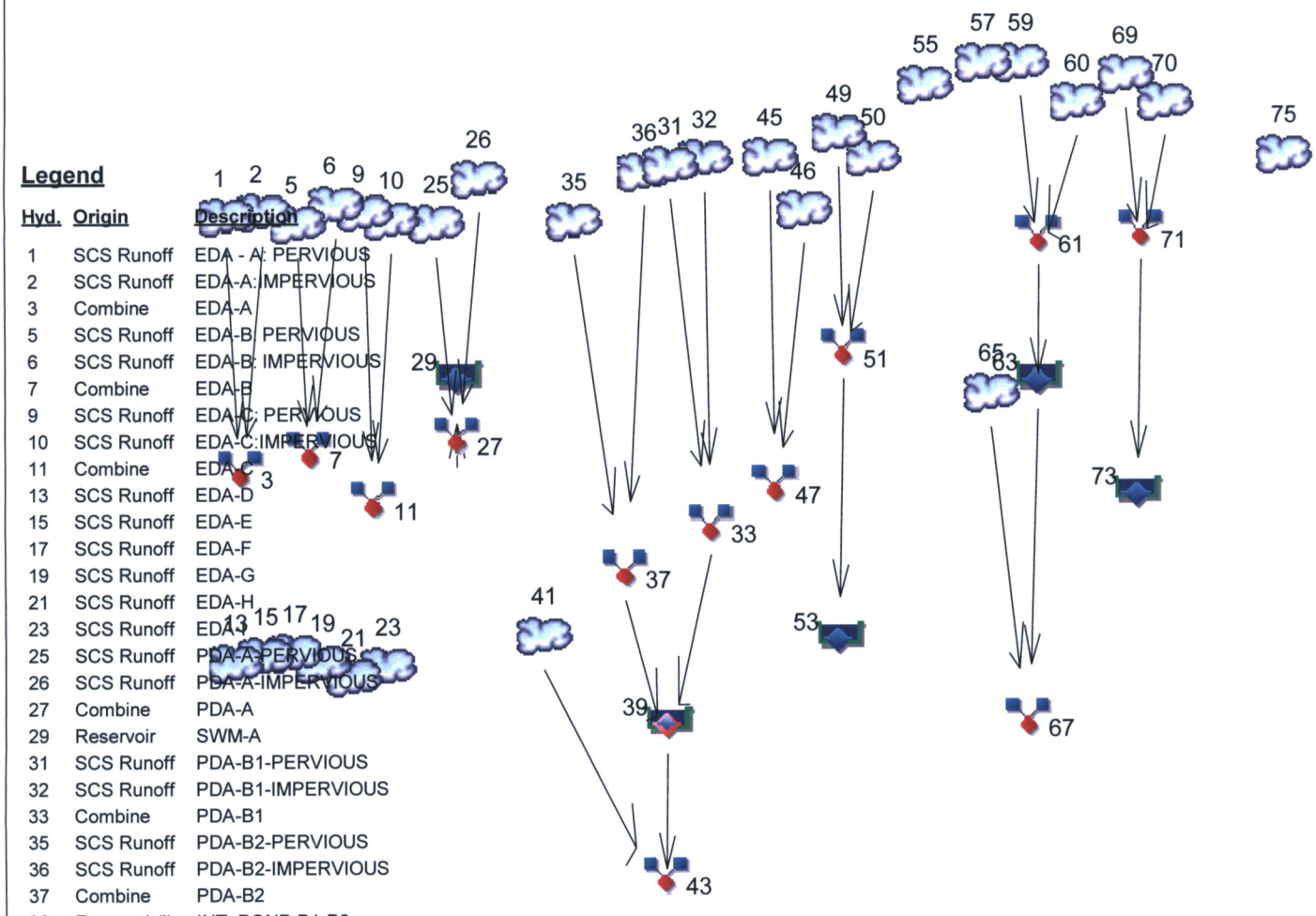
Hydrologic Calculations.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 2 / 2020

10 - Year

100 - Year

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EDA - A: PERVIOUS
2	SCS Runoff	EDA-A: IMPERVIOUS
3	Combine	EDA-A
5	SCS Runoff	EDA-B: PERVIOUS
6	SCS Runoff	EDA-B: IMPERVIOUS
7	Combine	EDA-B
9	SCS Runoff	EDA-C: PERVIOUS
10	SCS Runoff	EDA-C:IMPERVIOUS
11	Combine	EDA-C
13	SCS Runoff	EDA-D
15	SCS Runoff	EDA-E
17	SCS Runoff	EDA-F
19	SCS Runoff	EDA-G
21	SCS Runoff	EDA-H
23	SCS Runoff	EDA-I
25	SCS Runoff	PDA-A-PERVIOUS
26	SCS Runoff	PDA-A-IMPERVIOUS
27	Combine	PDA-A
29	Reservoir	SWM-A
31	SCS Runoff	PDA-B1-PERVIOUS
32	SCS Runoff	PDA-B1-IMPERVIOUS
33	Combine	PDA-B1
35	SCS Runoff	PDA-B2-PERVIOUS
36	SCS Runoff	PDA-B2-IMPERVIOUS
37	Combine	PDA-B2
39	Reservoir(i)	INT. POND B1-B2
41	SCS Runoff	PDA-B3
43	Combine	PDA-B
45	SCS Runoff	PDA-C-PERVIOUS
46	SCS Runoff	PDA-C-IMPERVIOUS
47	Combine	PDA-C
49	SCS Runoff	PDA-D-PERVIOUS
50	SCS Runoff	PDA-D-IMPERVIOUS
51	Combine	PDA-D
53	Reservoir	SWM-D
55	SCS Runoff	PDA-E
57	SCS Runoff	PDA-F
59	SCS Runoff	PDA-G1-PERVIOUS
60	SCS Runoff	PDA-G1-IMPERVIOUS
61	Combine	PDA-G1
63	Reservoir	SWM-G1
65	SCS Runoff	PDA-G2
67	Combine	PDA-G
69	SCS Runoff	PDA-H-PERVIOUS
70	SCS Runoff	PDA-H-IMPERVIOUS
71	Combine	PDA-H
73	Reservoir	SWM-H
75	SCS Runoff	PDA-I

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	1.078	-----	-----	7.491	-----	-----	27.91	EDA - A: PERVIOUS
2	SCS Runoff	-----	-----	3.447	-----	-----	5.067	-----	-----	8.078	EDA-A:IMPERVIOUS
3	Combine	1, 2	-----	4.075	-----	-----	12.50	-----	-----	35.98	EDA-A
5	SCS Runoff	-----	-----	0.157	-----	-----	2.561	-----	-----	15.76	EDA-B: PERVIOUS
6	SCS Runoff	-----	-----	4.623	-----	-----	6.797	-----	-----	10.84	EDA-B: IMPERVIOUS
7	Combine	5, 6	-----	4.623	-----	-----	8.550	-----	-----	26.18	EDA-B
9	SCS Runoff	-----	-----	1.529	-----	-----	4.412	-----	-----	11.16	EDA-C: PERVIOUS
10	SCS Runoff	-----	-----	4.090	-----	-----	6.007	-----	-----	9.571	EDA-C:IMPERVIOUS
11	Combine	9, 10	-----	5.163	-----	-----	9.692	-----	-----	19.47	EDA-C
13	SCS Runoff	-----	-----	5.388	-----	-----	10.55	-----	-----	20.91	EDA-D
15	SCS Runoff	-----	-----	6.409	-----	-----	12.58	-----	-----	25.00	EDA-E
17	SCS Runoff	-----	-----	1.543	-----	-----	2.911	-----	-----	5.610	EDA-F
19	SCS Runoff	-----	-----	2.996	-----	-----	7.883	-----	-----	19.07	EDA-G
21	SCS Runoff	-----	-----	0.000	-----	-----	0.097	-----	-----	3.352	EDA-H
23	SCS Runoff	-----	-----	0.000	-----	-----	0.000	-----	-----	0.064	EDA-I
25	SCS Runoff	-----	-----	0.000	-----	-----	0.000	-----	-----	0.000	PDA-A-PERVIOUS
26	SCS Runoff	-----	-----	10.93	-----	-----	16.05	-----	-----	25.58	PDA-A-IMPERVIOUS
27	Combine	25, 26	-----	10.93	-----	-----	16.05	-----	-----	25.58	PDA-A
29	Reservoir	27	-----	0.000	-----	-----	0.000	-----	-----	0.000	SWM-A
31	SCS Runoff	-----	-----	10.75	-----	-----	21.35	-----	-----	42.81	PDA-B1-PERVIOUS
32	SCS Runoff	-----	-----	48.62	-----	-----	71.41	-----	-----	113.78	PDA-B1-IMPERVIOUS
33	Combine	31, 32	-----	59.36	-----	-----	92.76	-----	-----	156.59	PDA-B1
35	SCS Runoff	-----	-----	0.779	-----	-----	1.878	-----	-----	4.313	PDA-B2-PERVIOUS
36	SCS Runoff	-----	-----	12.69	-----	-----	18.64	-----	-----	29.70	PDA-B2-IMPERVIOUS
37	Combine	35, 36	-----	13.46	-----	-----	20.52	-----	-----	34.02	PDA-B2
39	Reservoir(i)	33, 37	-----	0.000	-----	-----	0.000	-----	-----	0.000	INT. POND B1-B2
41	SCS Runoff	-----	-----	0.663	-----	-----	1.405	-----	-----	2.951	PDA-B3

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
43	Combine	39, 41,	------	0.663	------	------	1.405	------	------	2.951	PDA-B
45	SCS Runoff	-----	------	1.142	------	------	2.075	------	------	3.881	PDA-C-PERVIOUS
46	SCS Runoff	-----	------	1.340	------	------	1.968	------	------	3.135	PDA-C-IMPERVIOUS
47	Combine	45, 46	------	2.481	------	------	4.043	------	------	7.016	PDA-C
49	SCS Runoff	-----	------	1.717	------	------	3.023	------	------	5.512	PDA-D-PERVIOUS
50	SCS Runoff	-----	------	41.92	------	------	61.57	------	------	98.10	PDA-D-IMPERVIOUS
51	Combine	49, 50	------	43.64	------	------	64.59	------	------	103.61	PDA-D
53	Reservoir	51	------	0.000	------	------	0.000	------	------	0.000	SWM-D
55	SCS Runoff	-----	------	0.908	------	------	1.529	------	------	2.691	PDA-E
57	SCS Runoff	-----	------	1.497	------	------	2.864	------	------	5.578	PDA-F
59	SCS Runoff	-----	------	1.328	------	------	2.951	------	------	6.411	PDA-G1-PERVIOUS
60	SCS Runoff	-----	------	18.51	------	------	27.19	------	------	43.32	PDA-G1-IMPERVIOUS
61	Combine	59, 60	------	19.84	------	------	30.14	------	------	49.73	PDA-G1
63	Reservoir	61	------	0.000	------	------	0.000	------	------	0.000	SWM-G1
65	SCS Runoff	-----	------	0.528	------	------	1.011	------	------	1.969	PDA-G2
67	Combine	63, 65,	------	0.528	------	------	1.011	------	------	1.969	PDA-G
69	SCS Runoff	-----	------	3.219	------	------	7.759	------	------	17.82	PDA-H-PERVIOUS
70	SCS Runoff	-----	------	35.61	------	------	52.30	------	------	83.33	PDA-H-IMPERVIOUS
71	Combine	69, 70	------	38.80	------	------	60.06	------	------	101.15	PDA-H
73	Reservoir	71	------	0.000	------	------	0.000	------	------	0.000	SWM-H
75	SCS Runoff	-----	------	0.000	------	------	0.001	------	------	0.064	PDA-I

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.078	1	749	11,468	-----	-----	-----	EDA - A: PERVIOUS
2	SCS Runoff	3.447	1	734	15,938	-----	-----	-----	EDA-A:IMPERVIOUS
3	Combine	4.075	1	736	27,407	1, 2	-----	-----	EDA-A
5	SCS Runoff	0.157	1	815	4,542	-----	-----	-----	EDA-B: PERVIOUS
6	SCS Runoff	4.623	1	741	25,763	-----	-----	-----	EDA-B: IMPERVIOUS
7	Combine	4.623	1	741	30,305	5, 6	-----	-----	EDA-B
9	SCS Runoff	1.529	1	733	6,546	-----	-----	-----	EDA-C: PERVIOUS
10	SCS Runoff	4.090	1	727	13,059	-----	-----	-----	EDA-C:IMPERVIOUS
11	Combine	5.163	1	728	19,605	9, 10	-----	-----	EDA-C
13	SCS Runoff	5.388	1	729	16,931	-----	-----	-----	EDA-D
15	SCS Runoff	6.409	1	730	21,496	-----	-----	-----	EDA-E
17	SCS Runoff	1.543	1	729	4,813	-----	-----	-----	EDA-F
19	SCS Runoff	2.996	1	732	12,041	-----	-----	-----	EDA-G
21	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	EDA-H
23	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	EDA-I
25	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	PDA-A-PERVIOUS
26	SCS Runoff	10.93	1	727	34,899	-----	-----	-----	PDA-A-IMPERVIOUS
27	Combine	10.93	1	727	34,899	25, 26	-----	-----	PDA-A
29	Reservoir	0.000	1	711	0	27	593.28	15,242	SWM-A
31	SCS Runoff	10.75	1	727	29,991	-----	-----	-----	PDA-B1-PERVIOUS
32	SCS Runoff	48.62	1	727	155,245	-----	-----	-----	PDA-B1-IMPERVIOUS
33	Combine	59.36	1	727	185,236	31, 32	-----	-----	PDA-B1
35	SCS Runoff	0.779	1	728	2,344	-----	-----	-----	PDA-B2-PERVIOUS
36	SCS Runoff	12.69	1	727	40,528	-----	-----	-----	PDA-B2-IMPERVIOUS
37	Combine	13.46	1	727	42,872	35, 36	-----	-----	PDA-B2
39	Reservoir(i)	0.000	1	798	0	33, 37	599.19	97,442	INT. POND B1-B2
41	SCS Runoff	0.663	1	727	1,888	-----	-----	-----	PDA-B3

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

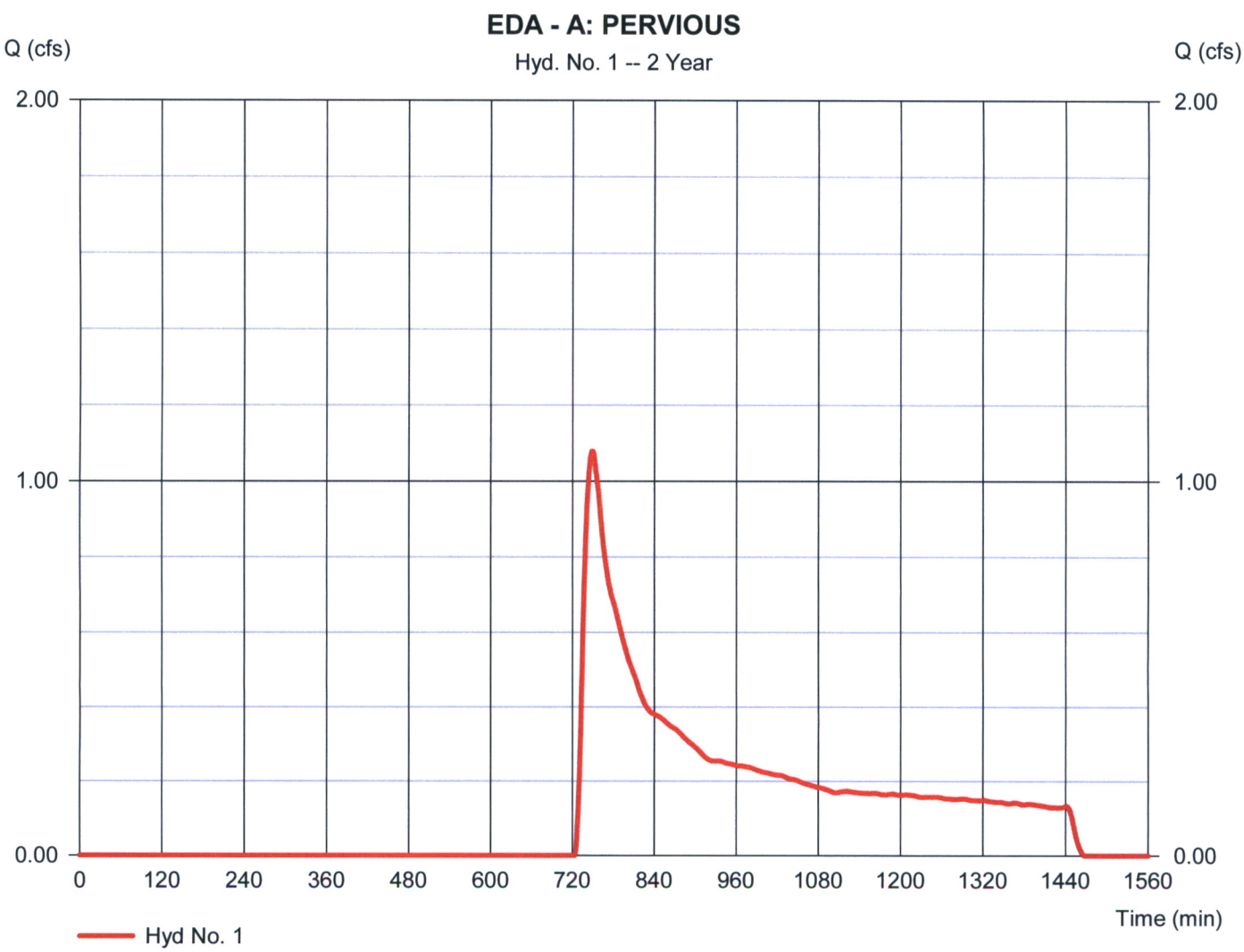
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
43	Combine	0.663	1	727	1,888	39, 41,	-----	-----	PDA-B
45	SCS Runoff	1.142	1	727	3,146	-----	-----	-----	PDA-C-PERVIOUS
46	SCS Runoff	1.340	1	727	4,278	-----	-----	-----	PDA-C-IMPERVIOUS
47	Combine	2.481	1	727	7,424	45, 46	-----	-----	PDA-C
49	SCS Runoff	1.717	1	727	4,733	-----	-----	-----	PDA-D-PERVIOUS
50	SCS Runoff	41.92	1	727	133,855	-----	-----	-----	PDA-D-IMPERVIOUS
51	Combine	43.64	1	727	138,588	49, 50	-----	-----	PDA-D
53	Reservoir	0.000	1	677	0	51	600.54	68,027	SWM-D
55	SCS Runoff	0.908	1	727	2,520	-----	-----	-----	PDA-E
57	SCS Runoff	1.497	1	727	4,145	-----	-----	-----	PDA-F
59	SCS Runoff	1.328	1	728	3,850	-----	-----	-----	PDA-G1-PERVIOUS
60	SCS Runoff	18.51	1	727	59,103	-----	-----	-----	PDA-G1-IMPERVIOUS
61	Combine	19.84	1	727	62,954	59, 60	-----	-----	PDA-G1
63	Reservoir	0.000	1	687	0	61	598.13	29,169	SWM-G1
65	SCS Runoff	0.528	1	727	1,463	-----	-----	-----	PDA-G2
67	Combine	0.528	1	727	1,463	63, 65,	-----	-----	PDA-G
69	SCS Runoff	3.219	1	728	9,687	-----	-----	-----	PDA-H-PERVIOUS
70	SCS Runoff	35.61	1	727	113,704	-----	-----	-----	PDA-H-IMPERVIOUS
71	Combine	38.80	1	727	123,391	69, 70	-----	-----	PDA-H
73	Reservoir	0.000	1	909	0	71	597.36	53,610	SWM-H
75	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	PDA-I

Hydrograph Report

Hyd. No. 1

EDA - A: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.078 cfs
Storm frequency	= 2 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 11,468 cuft
Drainage area	= 13.620 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.70 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484A_C_1 min.cds	Storm frequency	= 2 yrs



TR55 Tc Worksheet

Hyd. No. 1

EDA - A: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 16.00		0.00		0.00		
Travel Time (min)	**= 9.29**	**+**	**0.00**	**+**	**0.00**	**=**	**9.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		274.00		479.00		
Watercourse slope (%)	= 0.00		4.20		0.50		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.31		1.14		
Travel Time (min)	**= 0.00**	**+**	**1.38**	**+**	**7.00**	**=**	**8.38**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

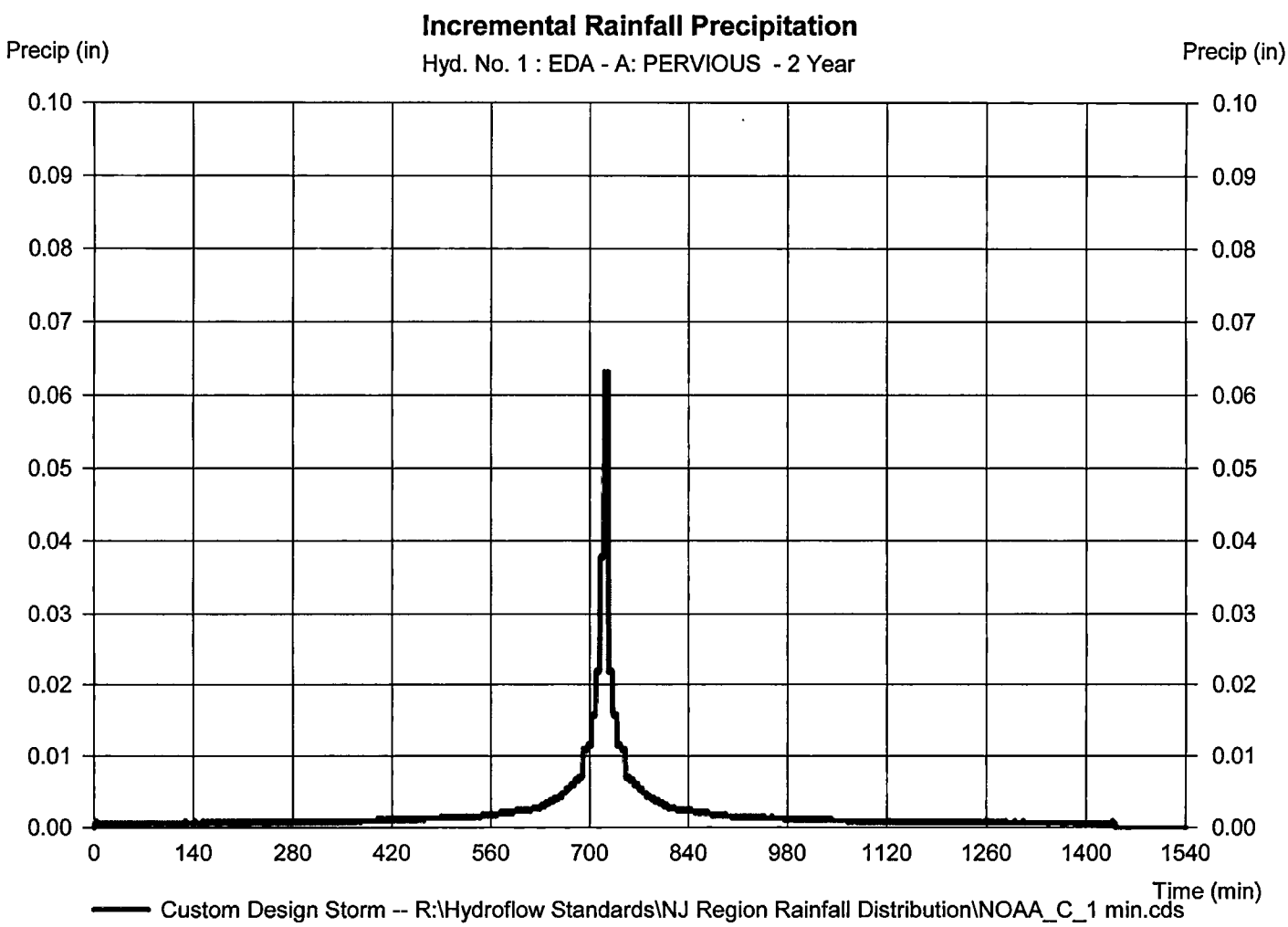
Total Travel Time, Tc ..... **17.70 min**

Precipitation Report

Hyd. No. 1

EDA - A: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

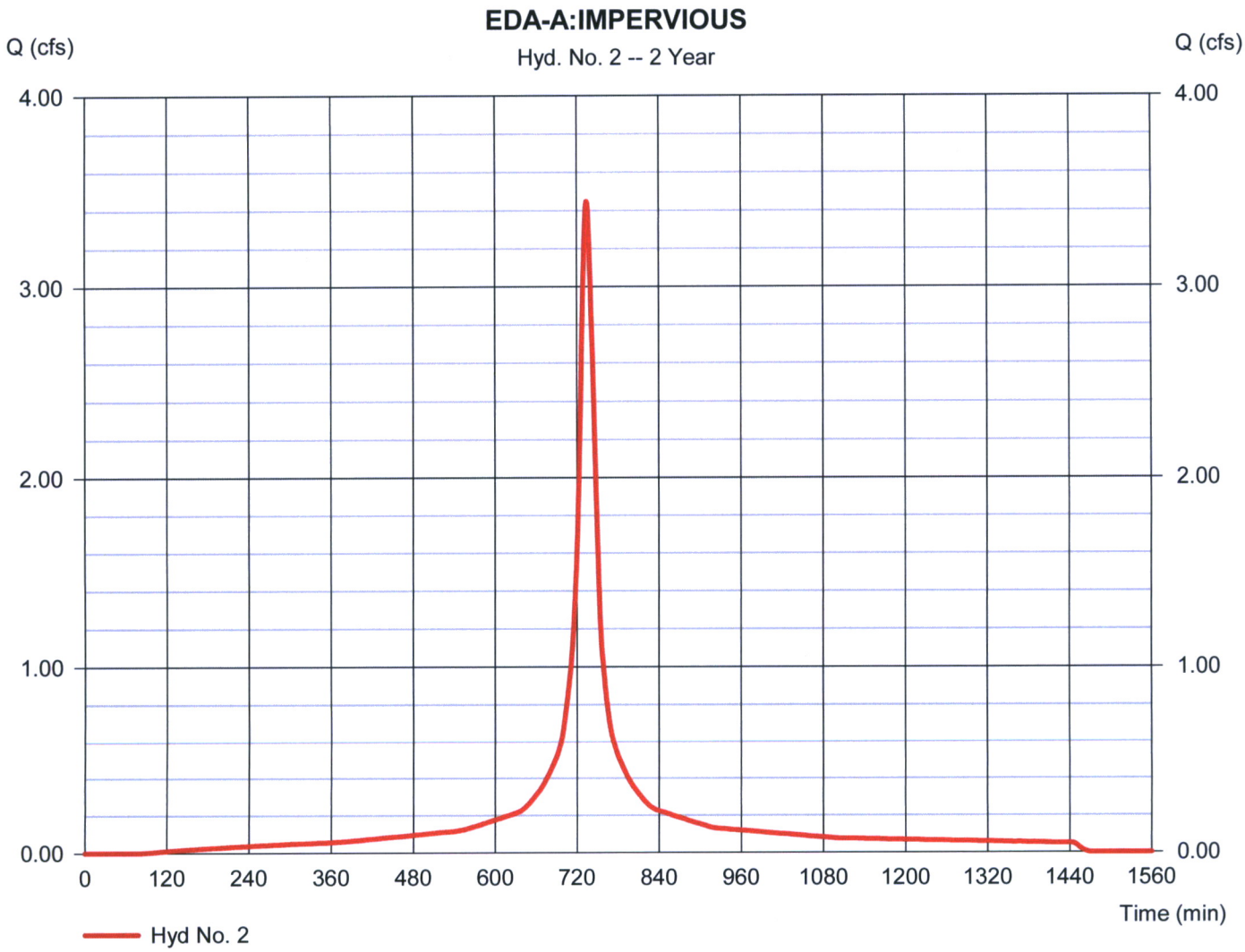


Hydrograph Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.447 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 15,938 cuft
Drainage area	= 1.460 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.60 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Distribution	



TR55 Tc Worksheet

Hyd. No. 2

EDA-A:IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.40		0.00		0.00		
Travel Time (min)	**= 2.29**	**+**	**0.00**	**+**	**0.00**	**=**	**2.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		509.00		600.00		
Watercourse slope (%)	= 0.00		0.20		0.60		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		1.25		
Travel Time (min)	**= 0.00**	**+**	**9.33**	**+**	**8.00**	**=**	**17.33**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

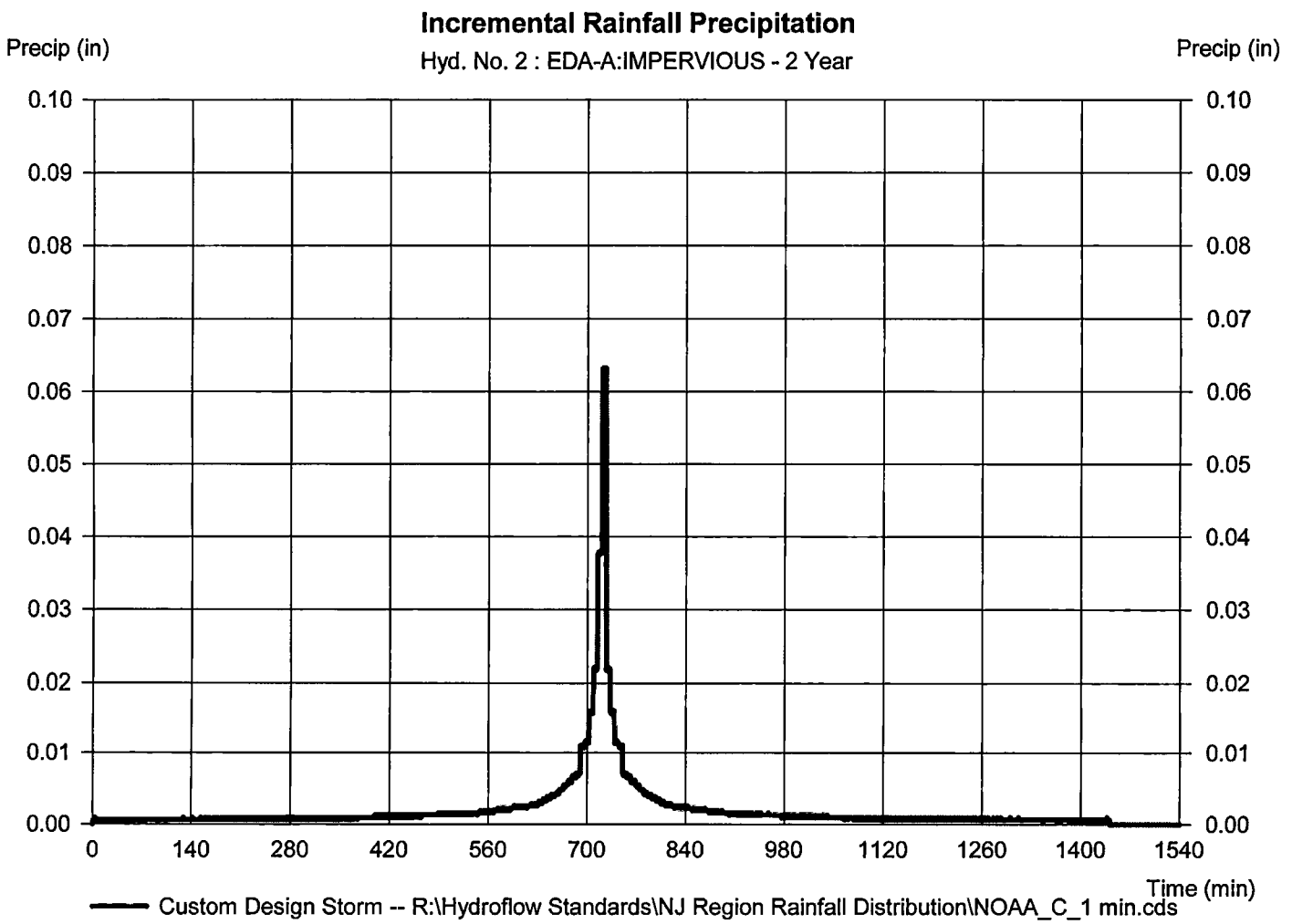
Total Travel Time, Tc ..... **19.60 min**

Precipitation Report

Hyd. No. 2

EDA-A:IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

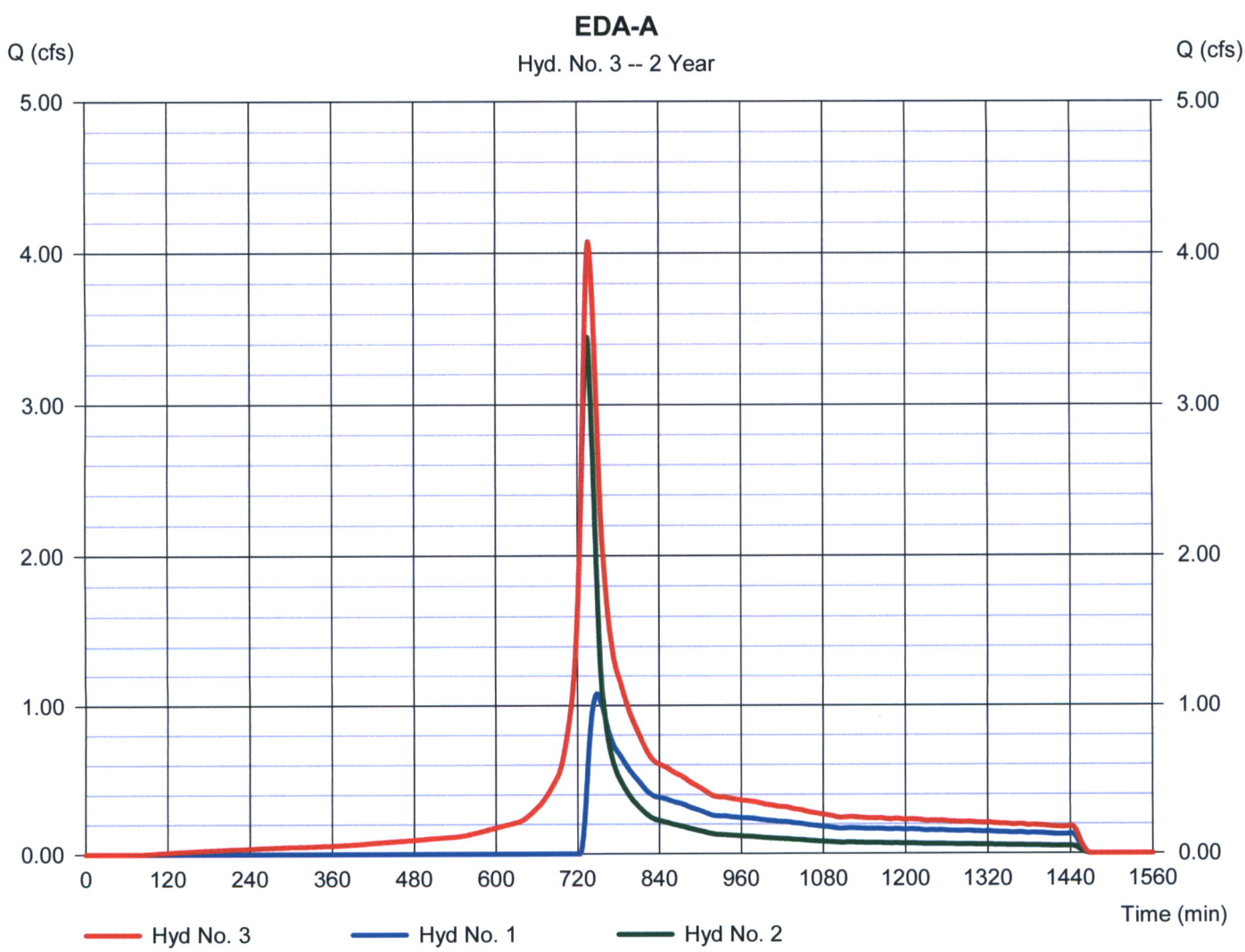


Hydrograph Report

Hyd. No. 3

EDA-A

Hydrograph type	= Combine	Peak discharge	= 4.075 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 27,407 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 15.080 ac

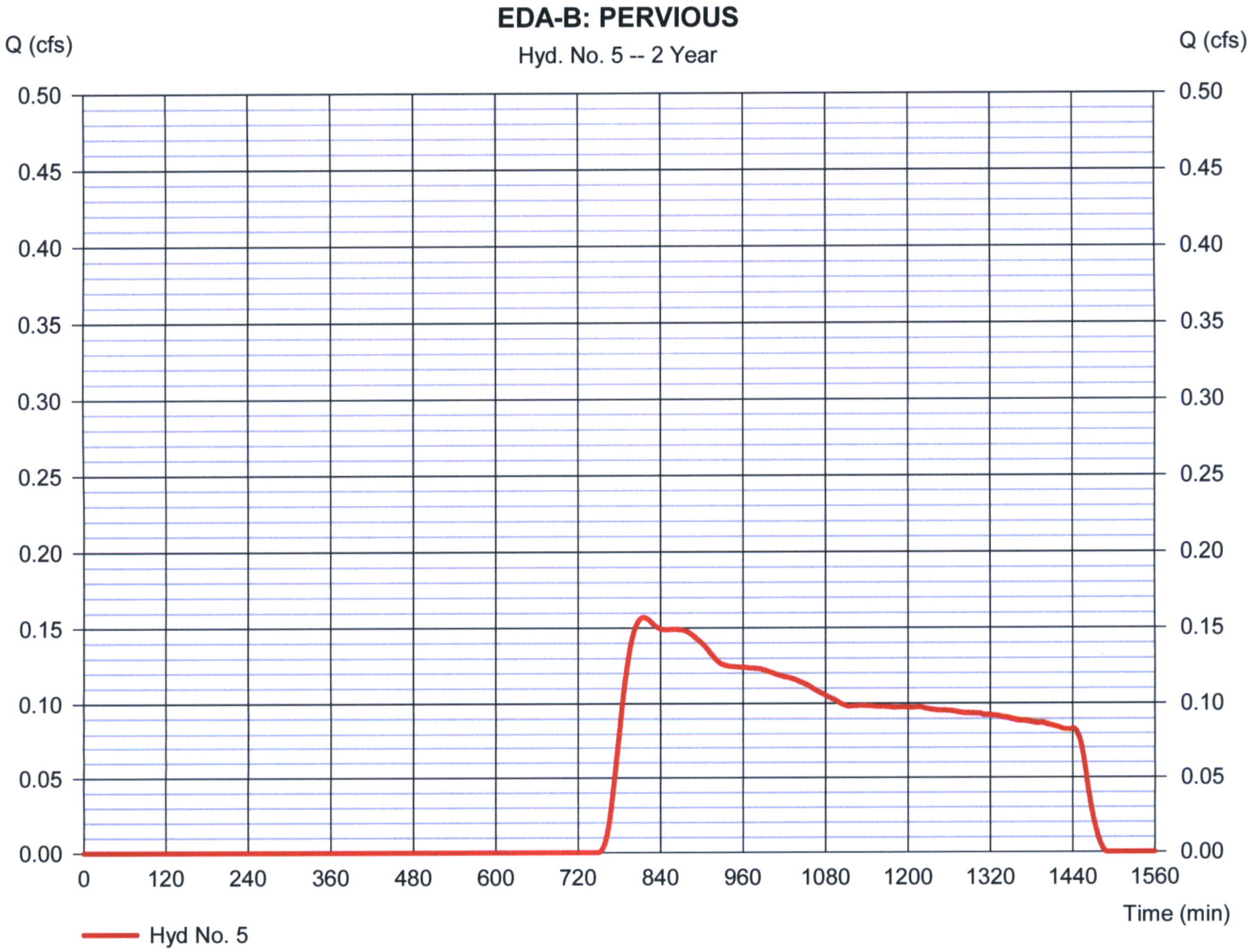


Hydrograph Report

Hyd. No. 5

EDA-B: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.157 cfs
Storm frequency	= 2 yrs	Time to peak	= 815 min
Time interval	= 1 min	Hyd. volume	= 4,542 cuft
Drainage area	= 15.720 ac	Curve number	= 47
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 31.40 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hyd. No. 5

EDA-B: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 7.30		0.00		0.00		
Travel Time (min)	**= 12.71**	**+**	**0.00**	**+**	**0.00**	**=**	**12.71**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		704.00		818.00		
Watercourse slope (%)	= 0.00		4.90		0.30		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		3.57		0.88		
Travel Time (min)	**= 0.00**	**+**	**3.29**	**+**	**15.43**	**=**	**18.71**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

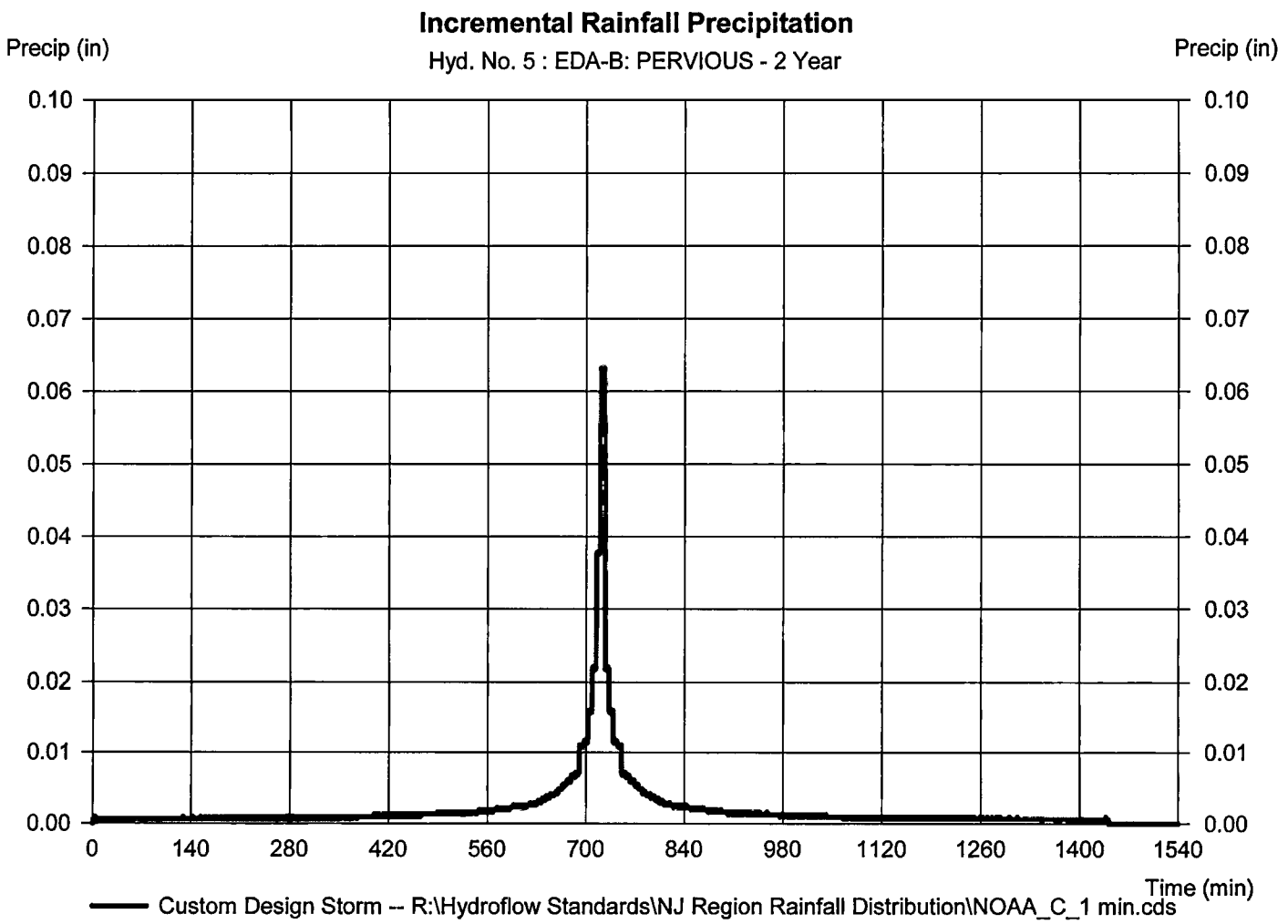
Total Travel Time, Tc ..... **31.40 min**

Precipitation Report

Hyd. No. 5

EDA-B: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

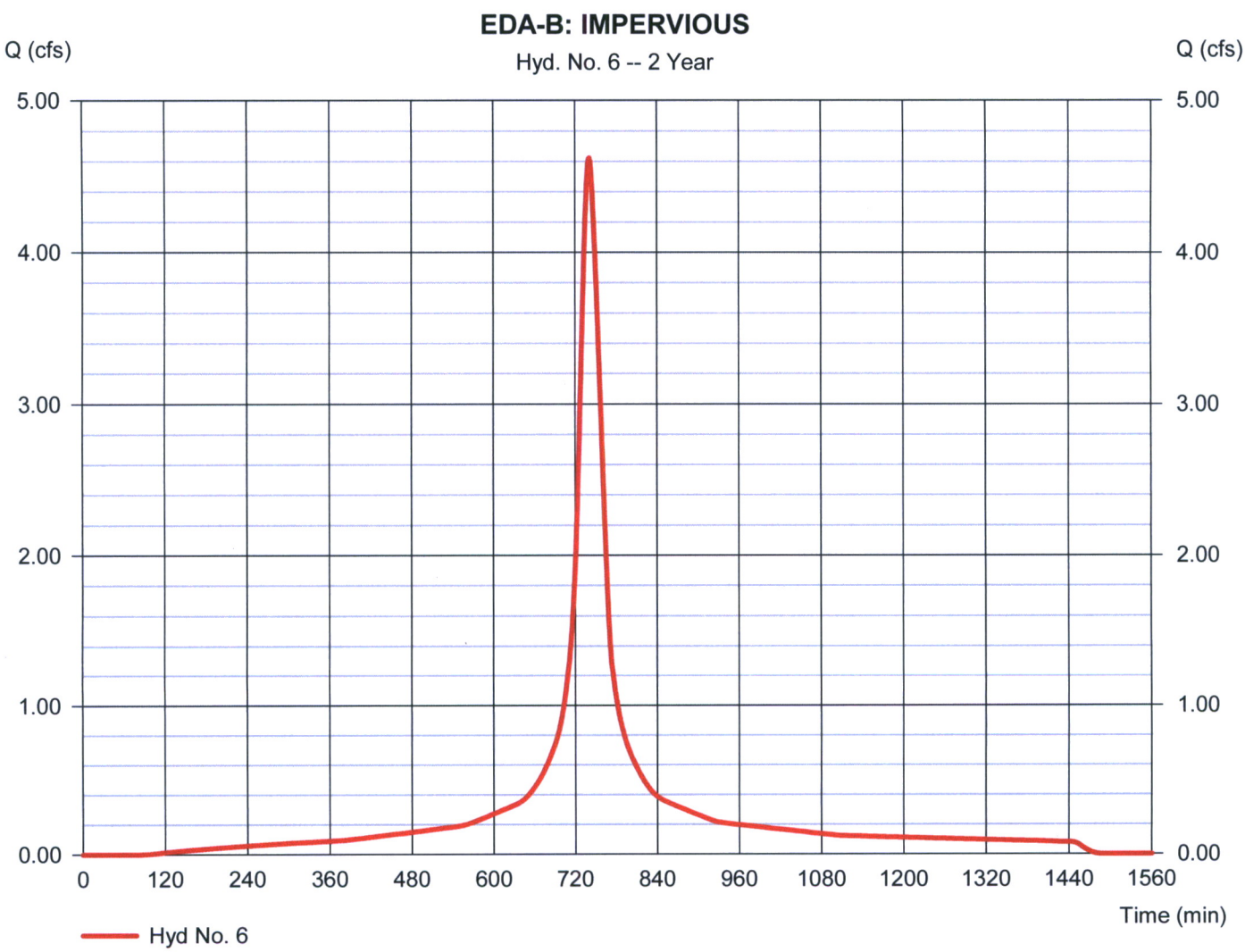


Hydrograph Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 4.623 cfs
Storm frequency	= 2 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 25,763 cuft
Drainage area	= 2.360 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 29.70 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hyd. No. 6

EDA-B: IMPERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 0.10		0.00		0.00		
Travel Time (min)	**= 3.99**	**+**	**0.00**	**+**	**0.00**	**=**	**3.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		1303.00		98.00		
Watercourse slope (%)	= 0.00		0.20		0.30		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.91		0.88		
Travel Time (min)	**= 0.00**	**+**	**23.89**	**+**	**1.85**	**=**	**25.74**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

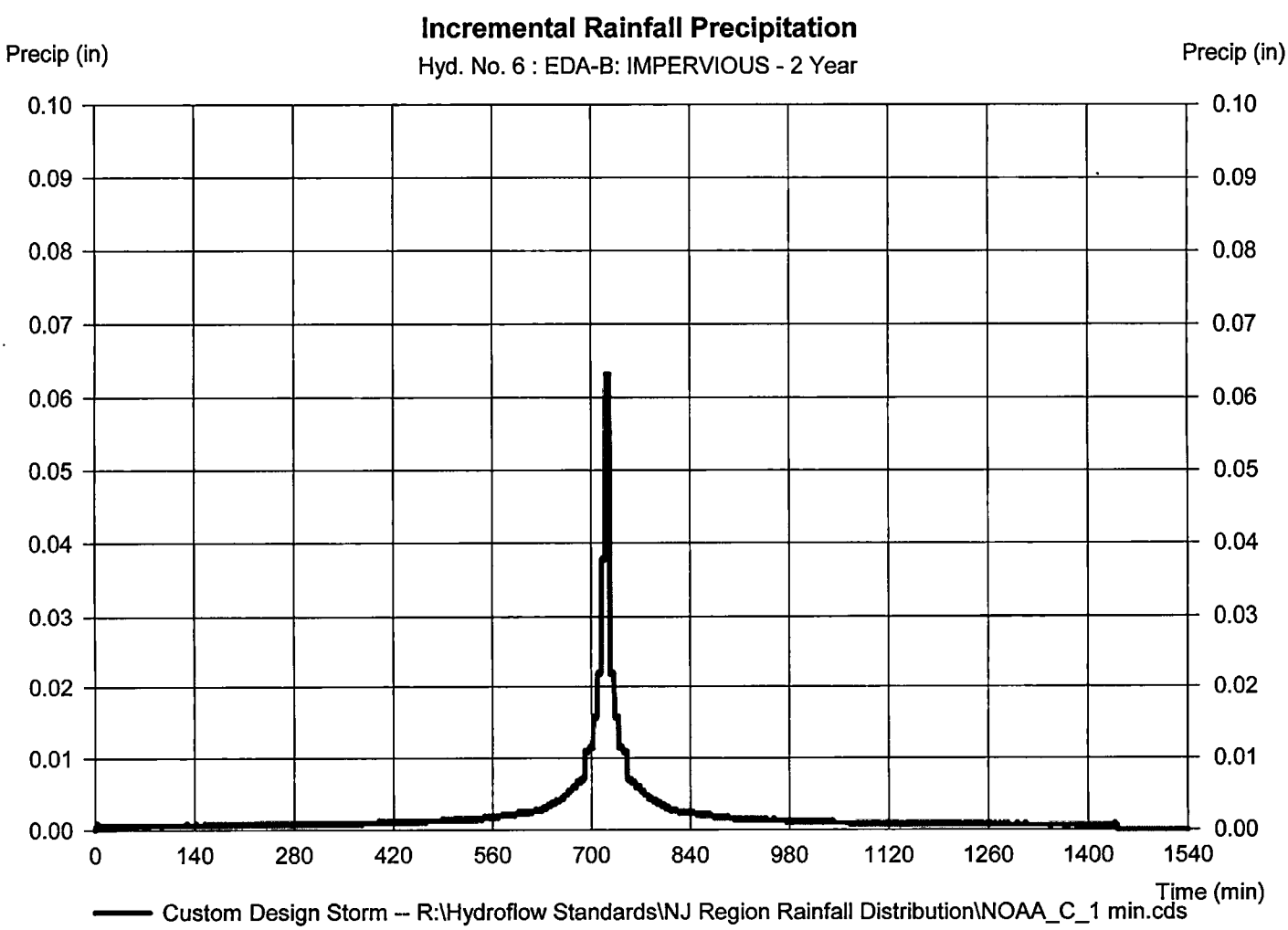
Total Travel Time, Tc ..... **29.70 min**

Precipitation Report

Hyd. No. 6

EDA-B: IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

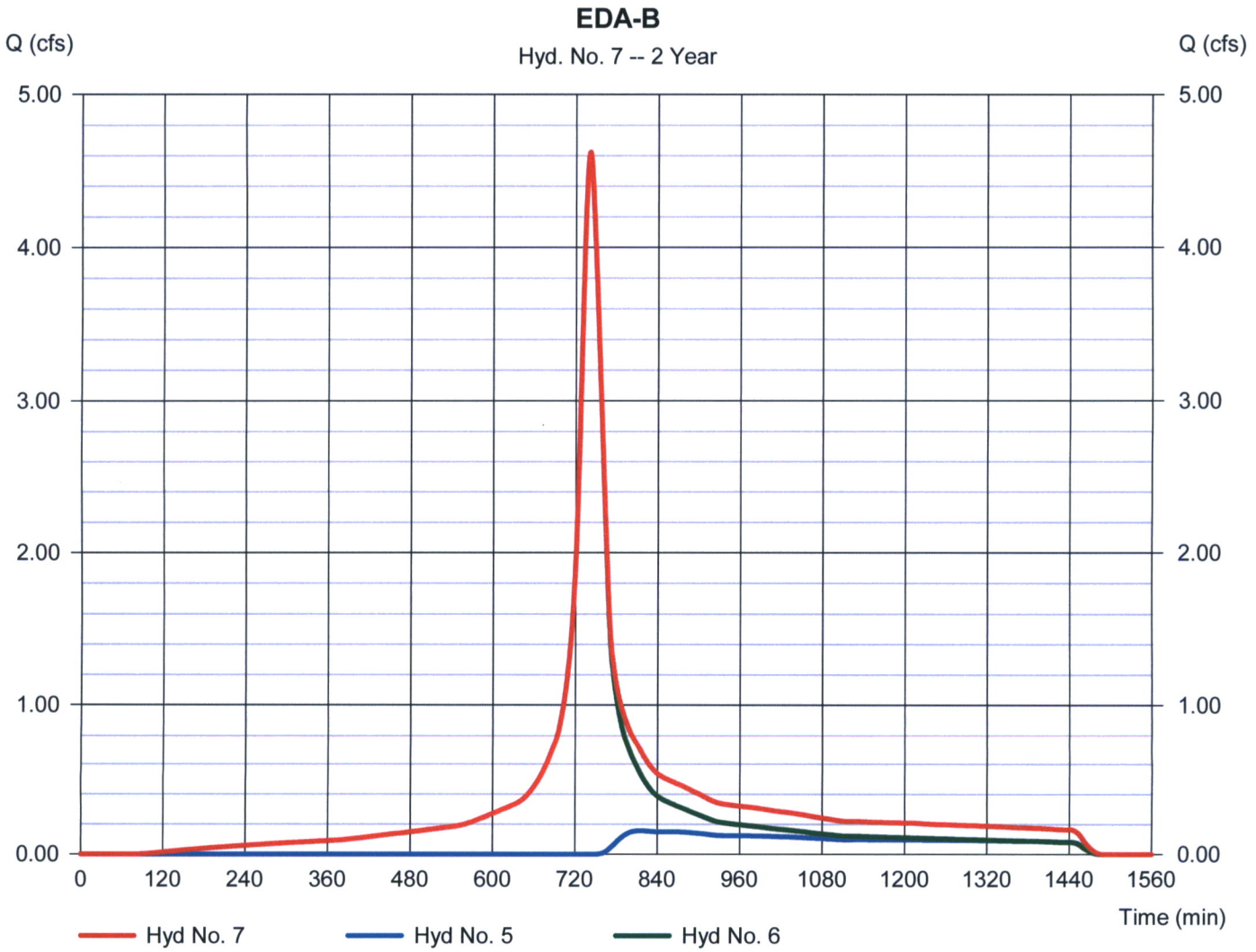


Hydrograph Report

Hyd. No. 7

EDA-B

Hydrograph type	= Combine	Peak discharge	= 4.623 cfs
Storm frequency	= 2 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 30,305 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 18.080 ac

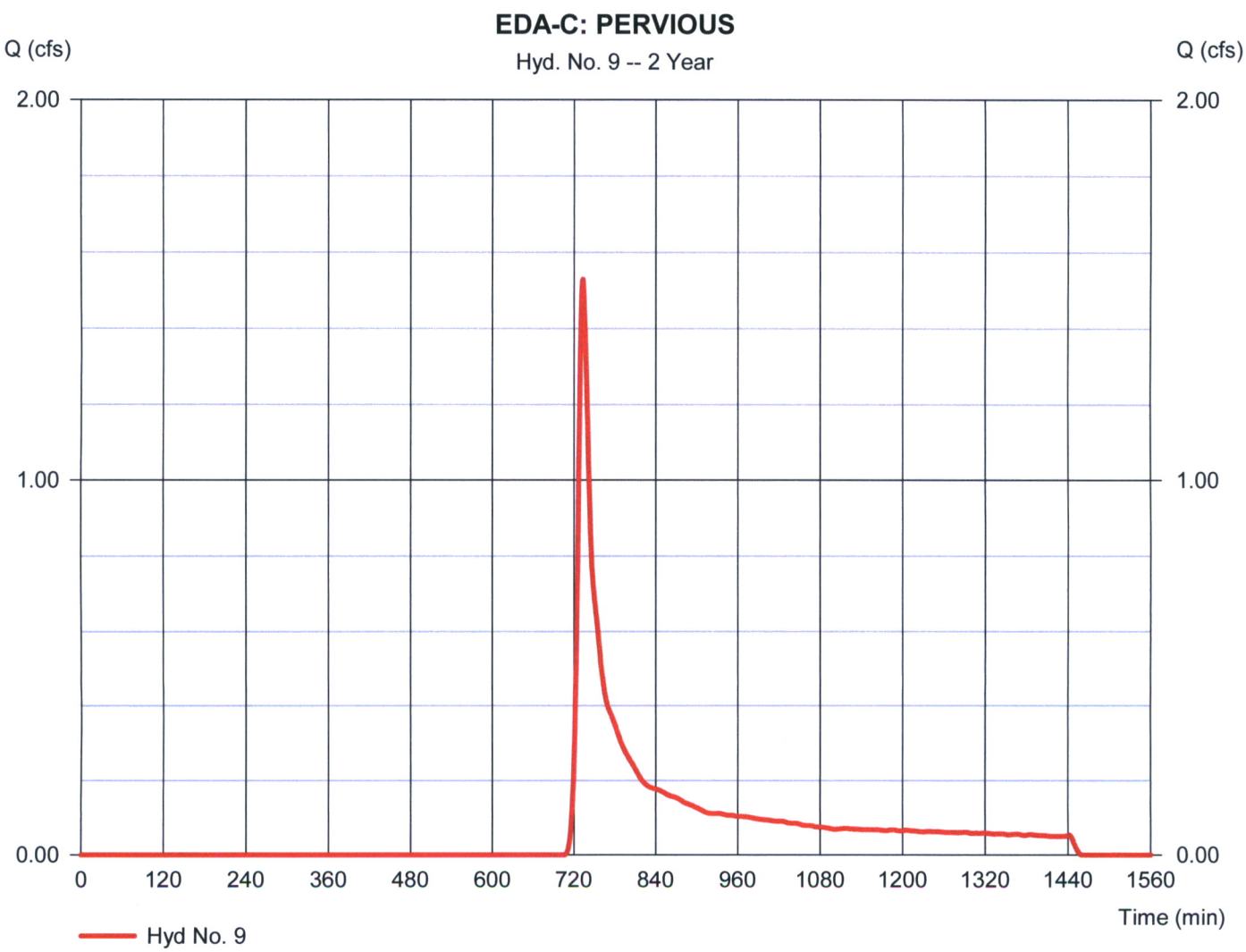


Hydrograph Report

Hyd. No. 9

EDA-C: PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.529 cfs
Storm frequency	= 2 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 6,546 cuft
Drainage area	= 3.170 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.70 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hyd. No. 9

EDA-C: PERVIOUS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.10		0.00		0.00		
Travel Time (min)	**= 10.39**	**+**	**0.00**	**+**	**0.00**	**=**	**10.39**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		73.00		265.00		
Watercourse slope (%)	= 0.00		12.00		1.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.59		2.10		
Travel Time (min)	**= 0.00**	**+**	**0.22**	**+**	**2.10**	**=**	**2.32**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

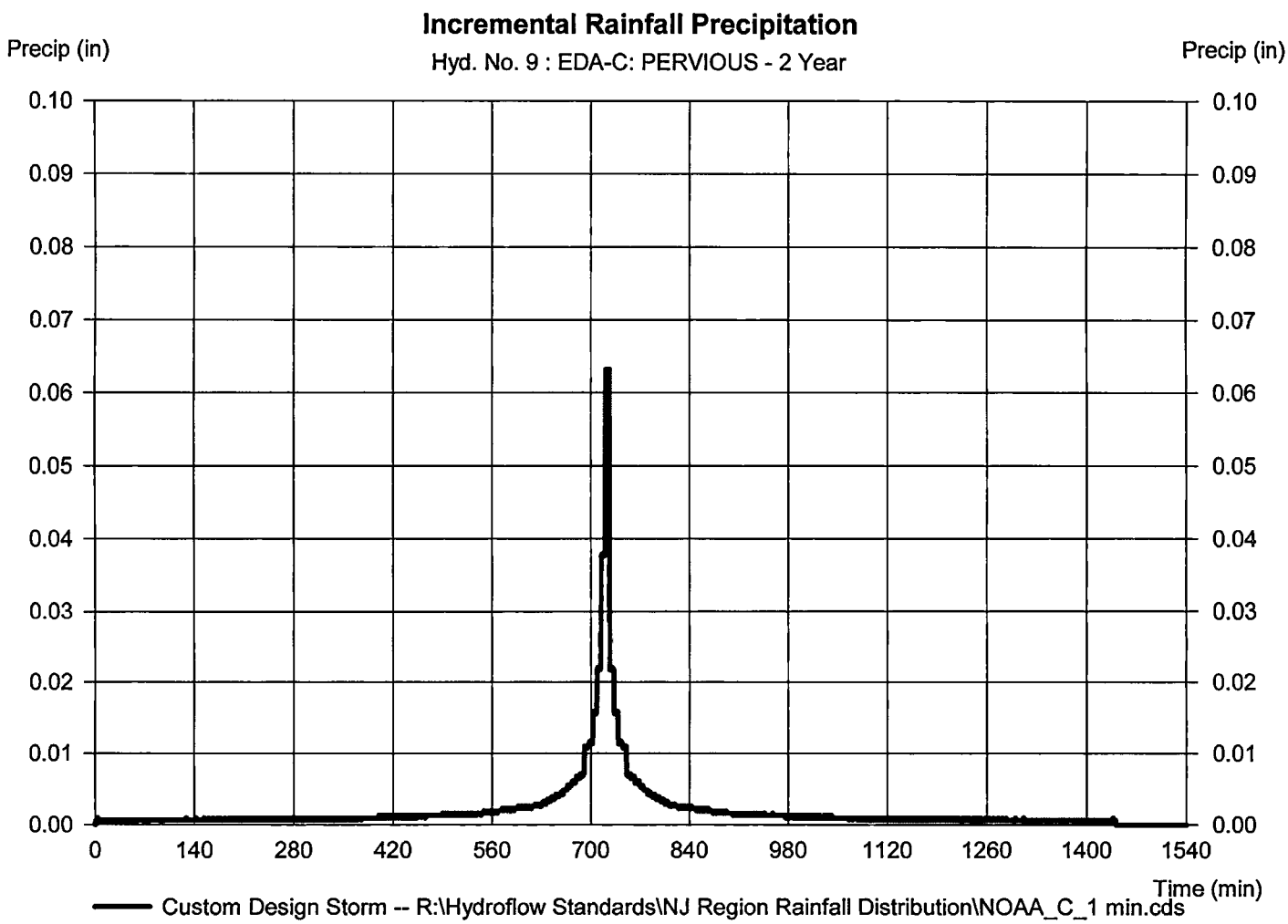
Total Travel Time, Tc ..... **12.70 min**

Precipitation Report

Hyd. No. 9

EDA-C: PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

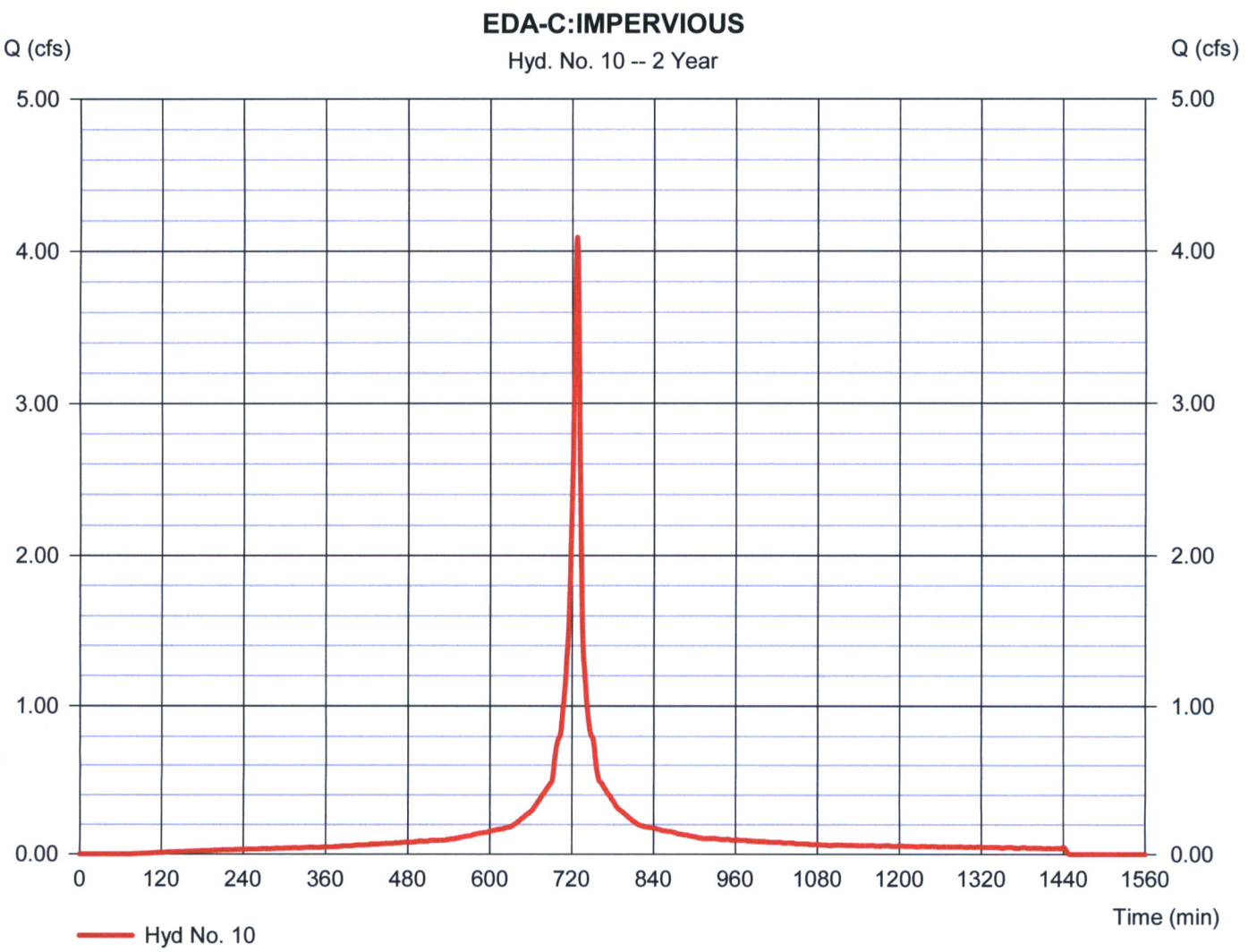


Hydrograph Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 4.090 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 13,059 cuft
Drainage area	= 1.160 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm frequency	= 2 yrs

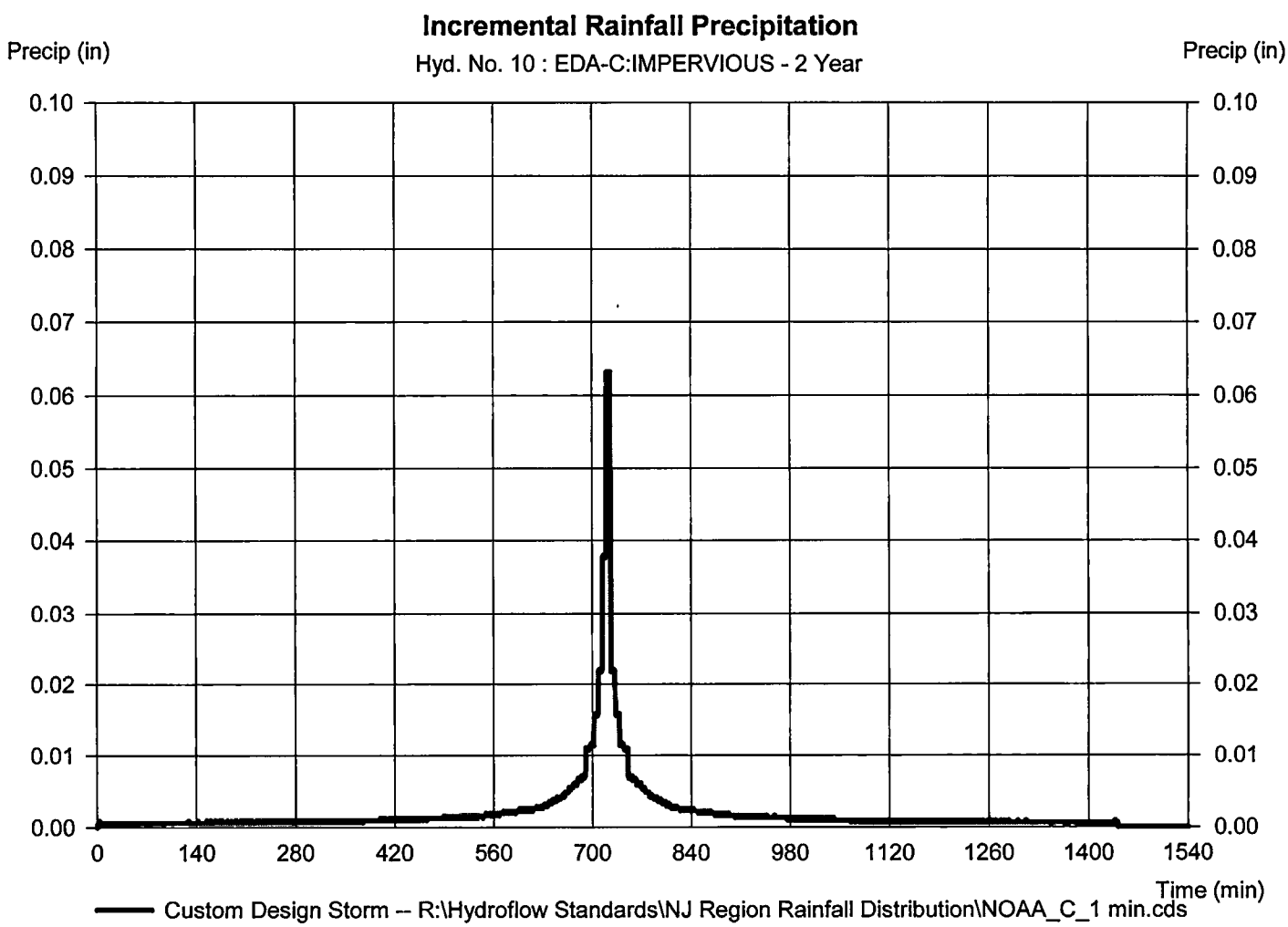


Precipitation Report

Hyd. No. 10

EDA-C:IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

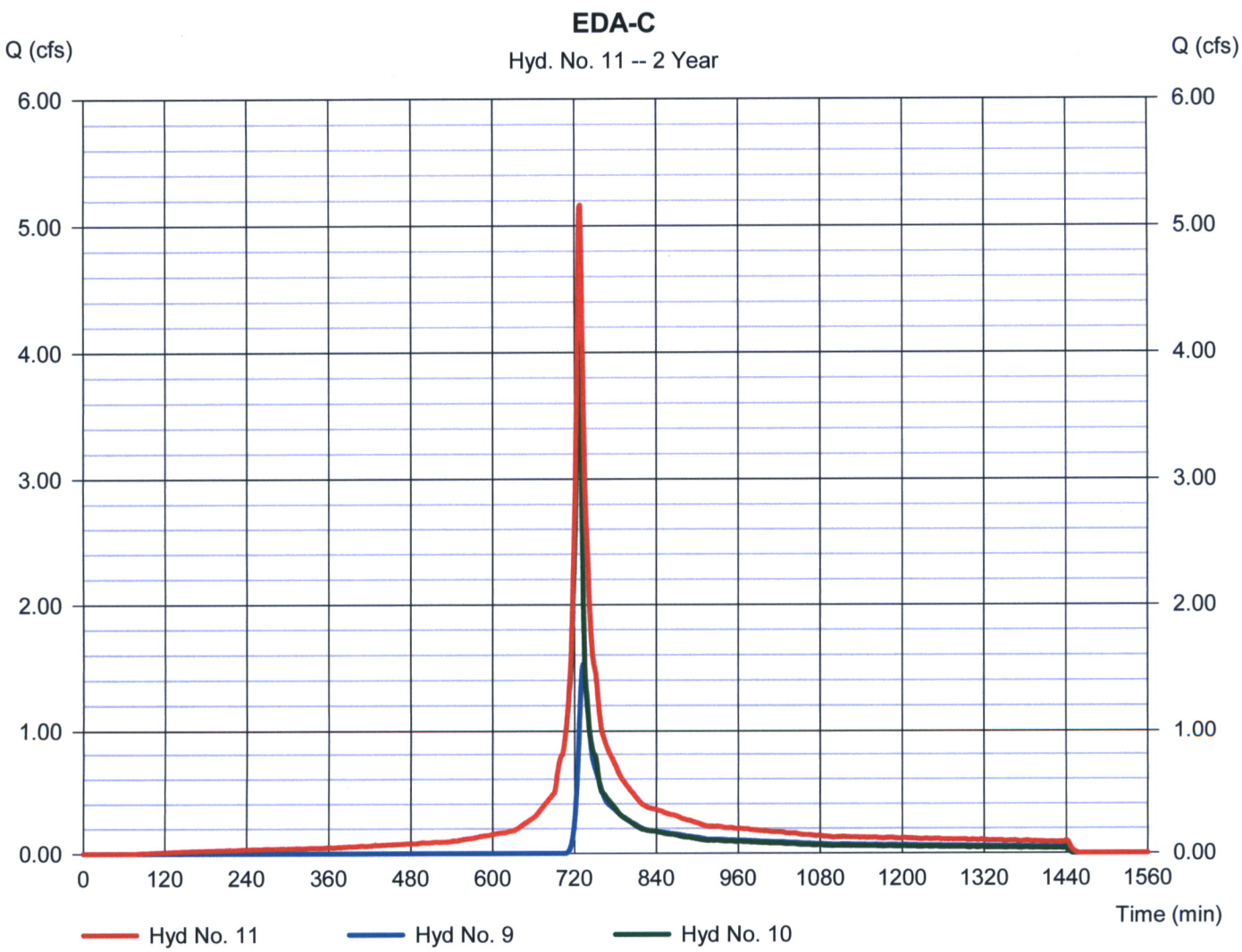


Hydrograph Report

Hyd. No. 11

EDA-C

Hydrograph type	= Combine	Peak discharge	= 5.163 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 19,605 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 4.330 ac

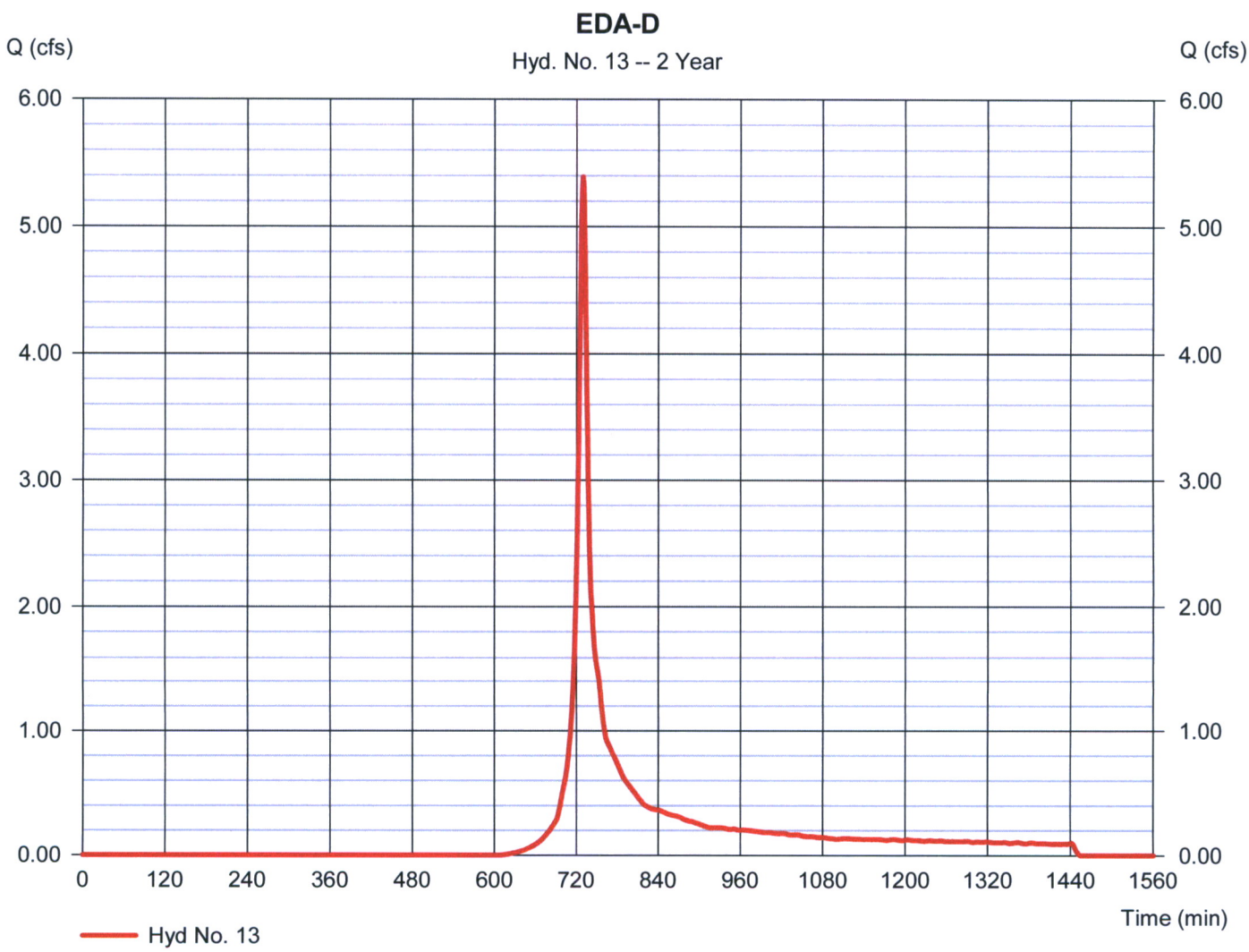


Hydrograph Report

Hyd. No. 13

EDA-D

Hydrograph type	= SCS Runoff	Peak discharge	= 5.388 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 16,931 cuft
Drainage area	= 3.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 13

EDA-D

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.000		0.000		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 21.20		0.00		0.00		
Travel Time (min)	**= 8.30**	**+**	**0.00**	**+**	**0.00**	**=**	**8.30**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		288.00		0.00		
Watercourse slope (%)	= 0.00		3.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		2.79		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.72**	**+**	**0.00**	**=**	**1.72**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

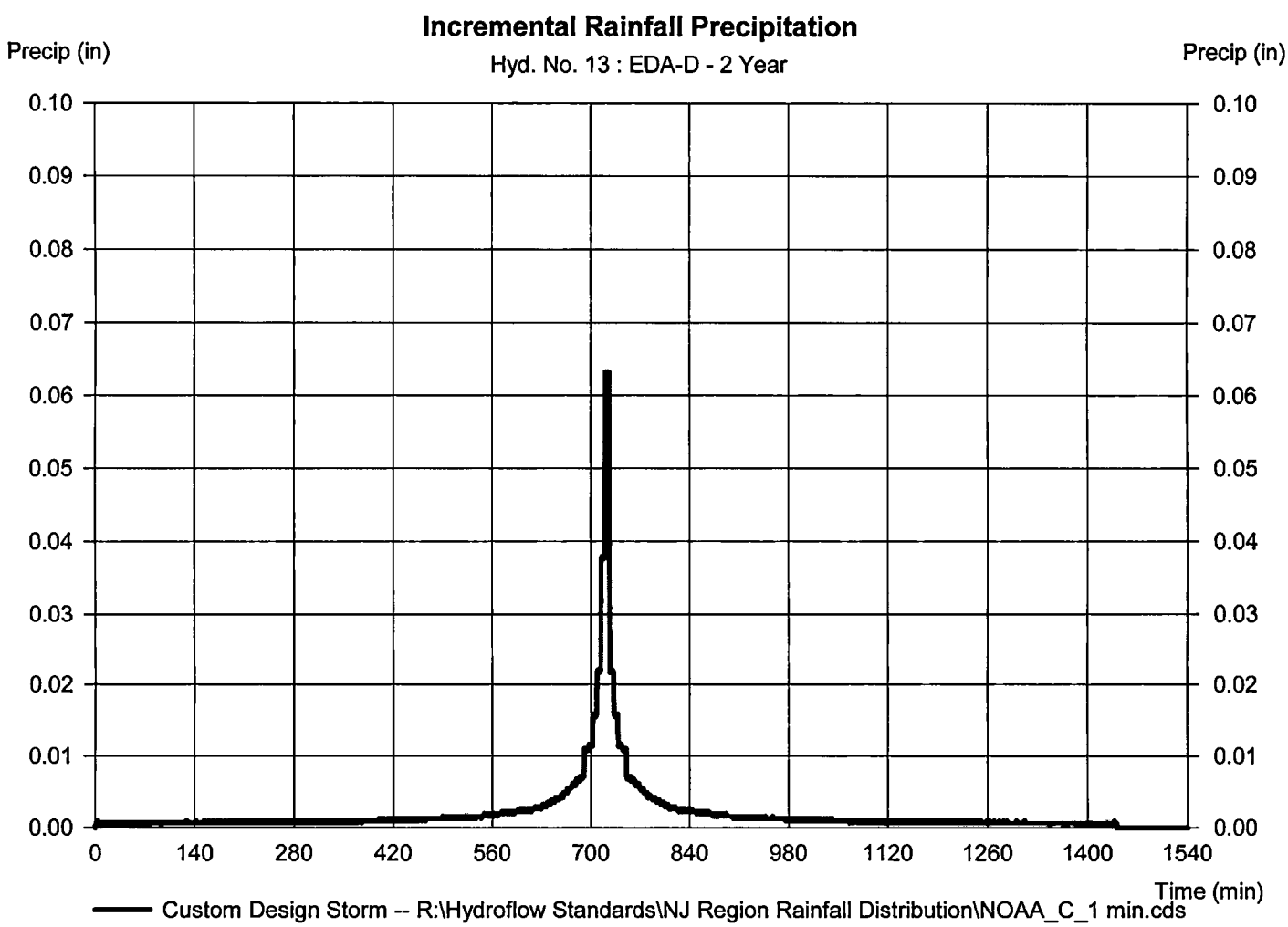
Total Travel Time, Tc ..... **10.00 min**

Precipitation Report

Hyd. No. 13

EDA-D

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

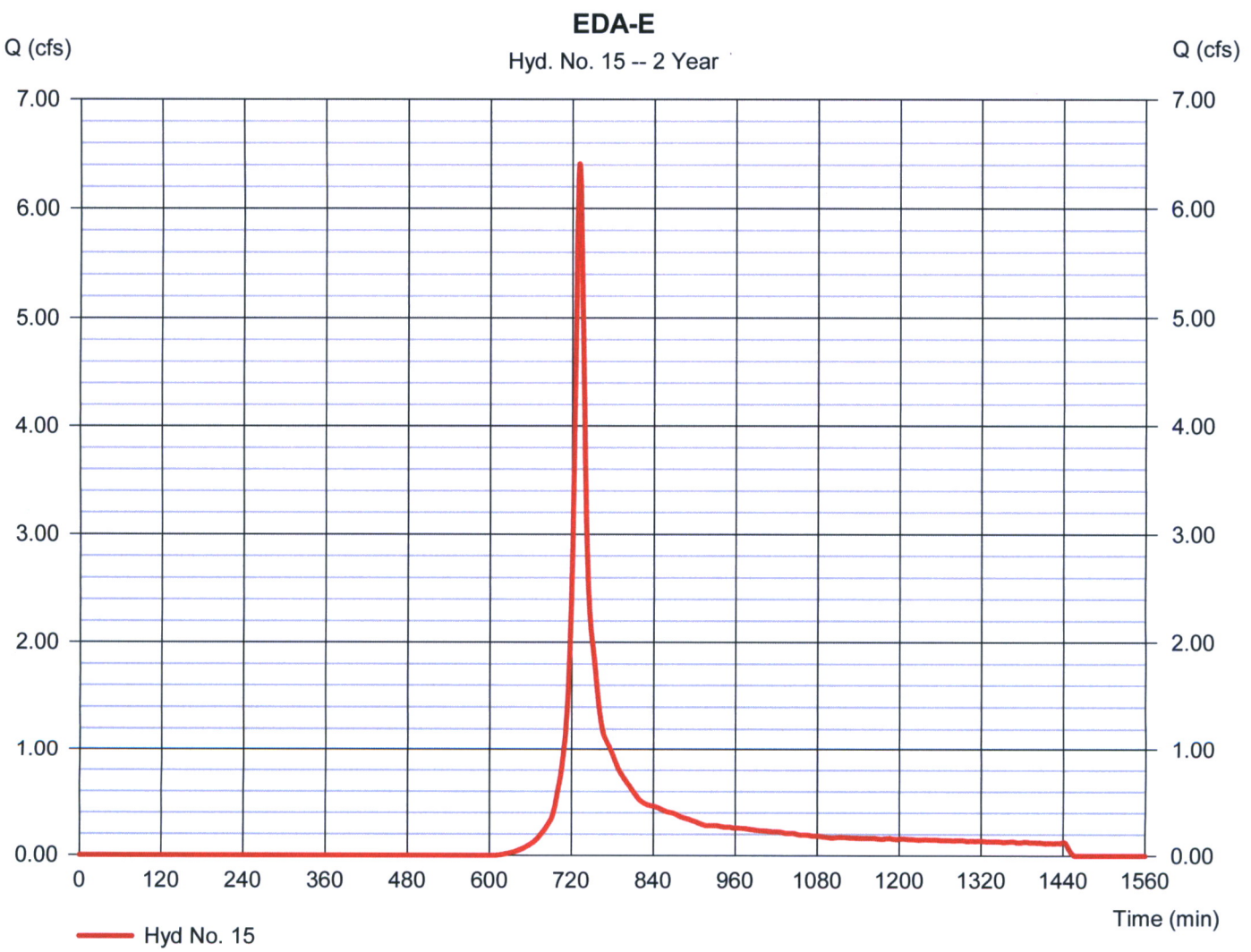


Hydrograph Report

Hyd. No. 15

EDA-E

Hydrograph type	= SCS Runoff	Peak discharge	= 6.409 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 21,496 cuft
Drainage area	= 4.690 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.40 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 15

EDA-E

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.40		0.00		0.00		
Travel Time (min)	**= 10.29**	**+**	**0.00**	**+**	**0.00**	**=**	**10.29**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		257.00		0.00		
Watercourse slope (%)	= 0.00		5.30		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		3.71		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.15**	**+**	**0.00**	**=**	**1.15**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

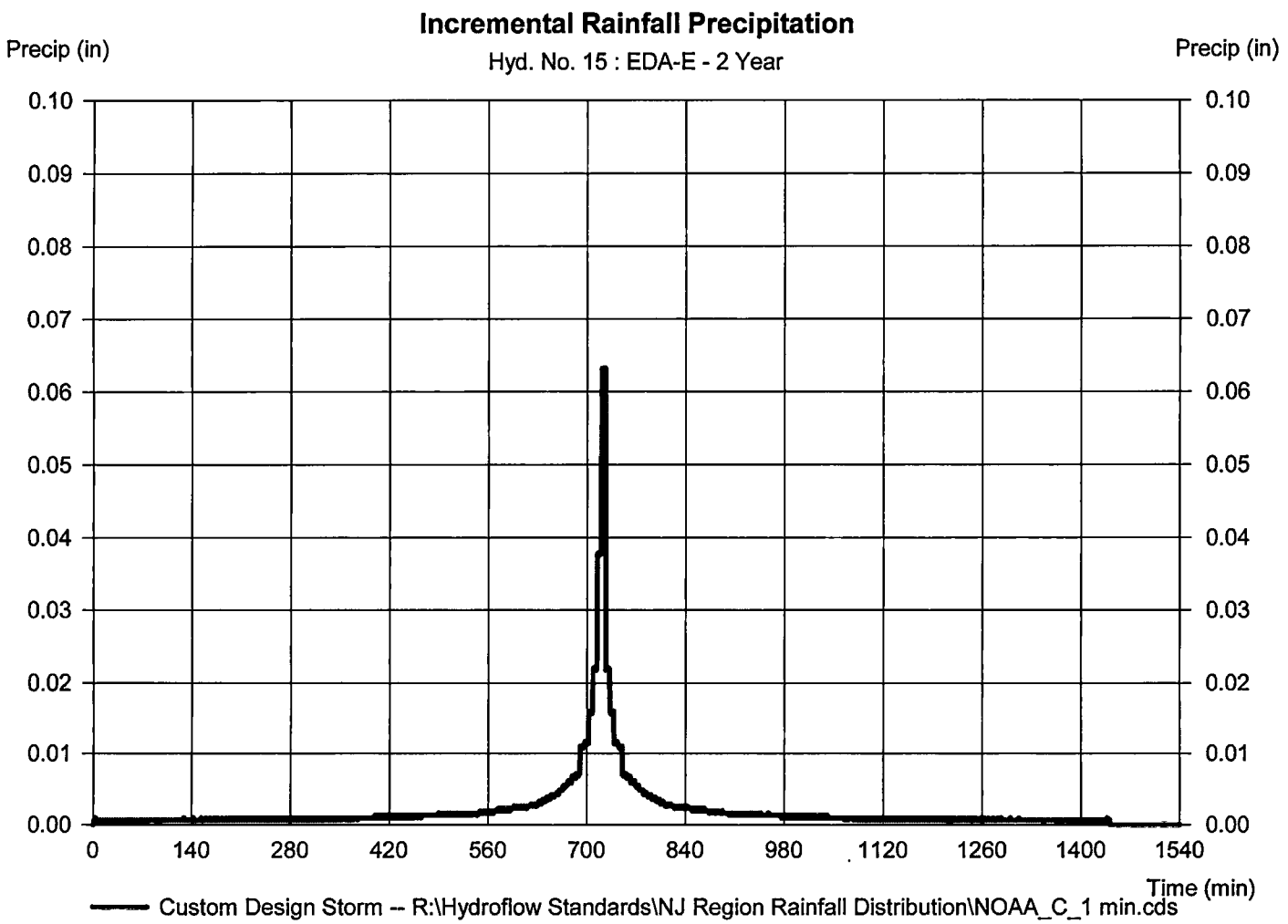
Total Travel Time, Tc ..... **11.40 min**

Precipitation Report

Hyd. No. 15

EDA-E

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

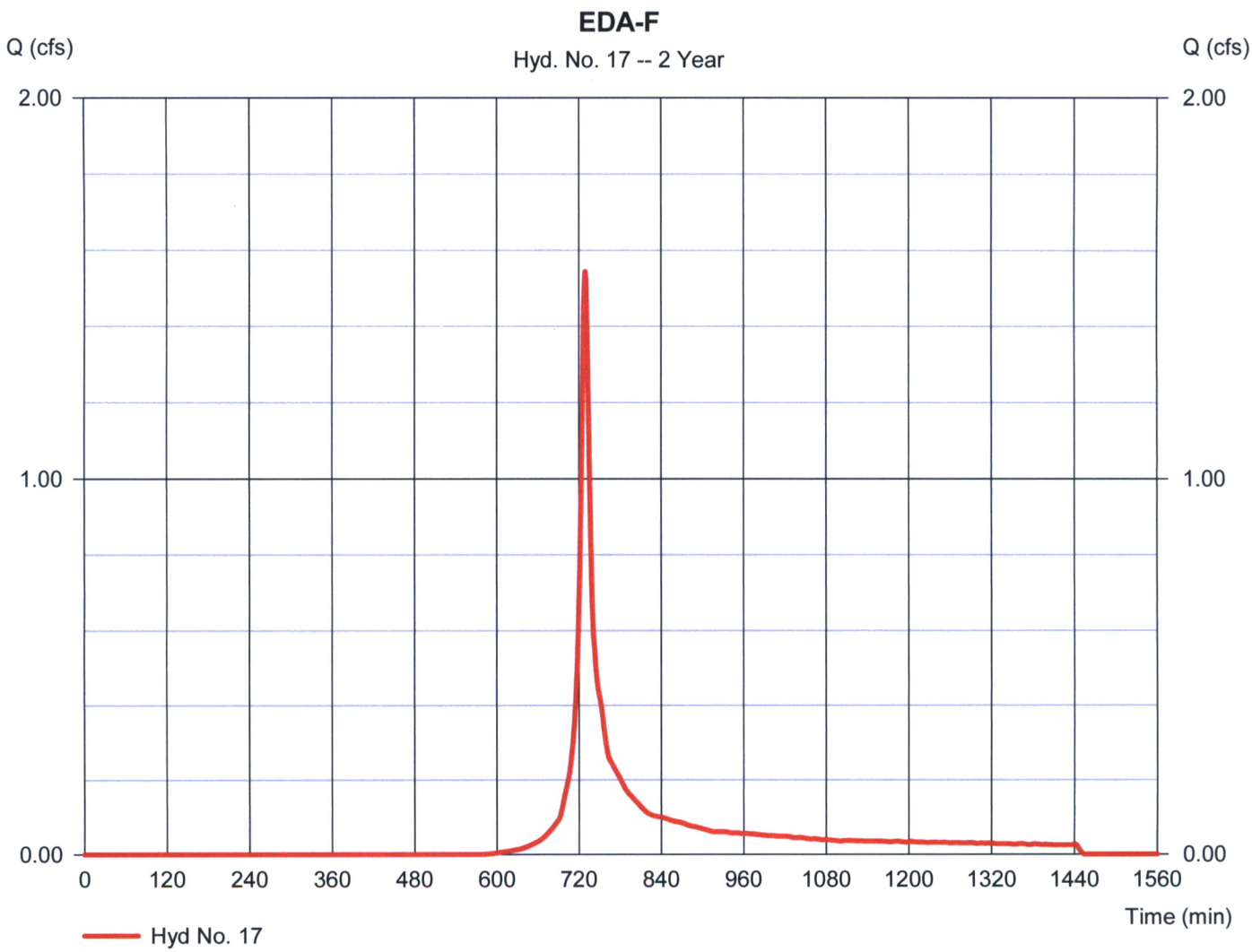


Hydrograph Report

Hyd. No. 17

EDA-F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.543 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,813 cuft
Drainage area	= 0.970 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Distribution	



TR55 Tc Worksheet

Hyd. No. 17

EDA-F

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.240		0.011		
Flow length (ft)	= 40.0		35.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 16.30		3.50		0.00		
Travel Time (min)	**= 4.43**	**+**	**4.90**	**+**	**0.00**	**=**	**9.33**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		62.00		0.00		
Watercourse slope (%)	= 0.00		1.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		1.61		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.64**	**+**	**0.00**	**=**	**0.64**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

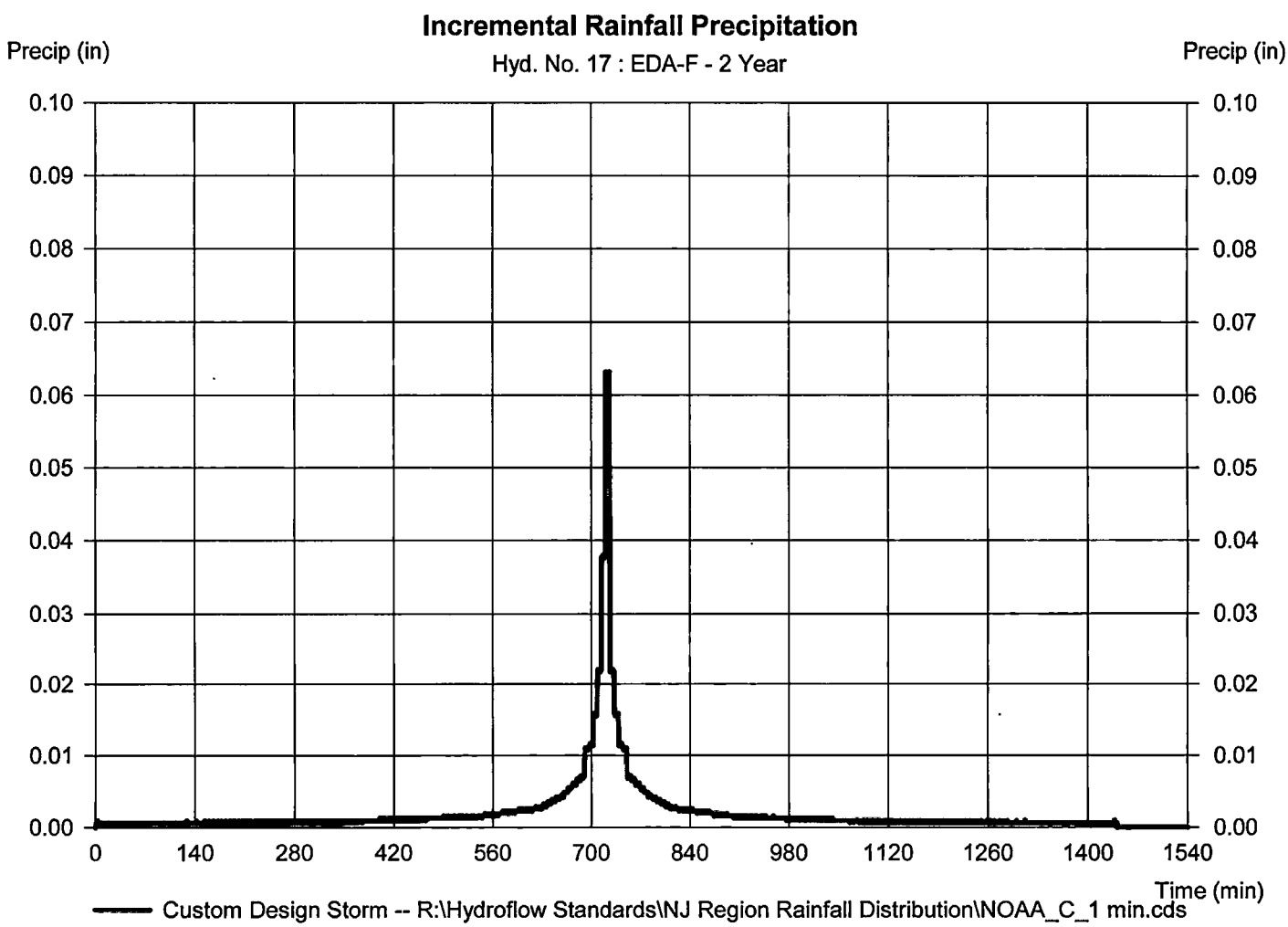
Total Travel Time, Tc ..... 10.00 min

Precipitation Report

Hyd. No. 17

EDA-F

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

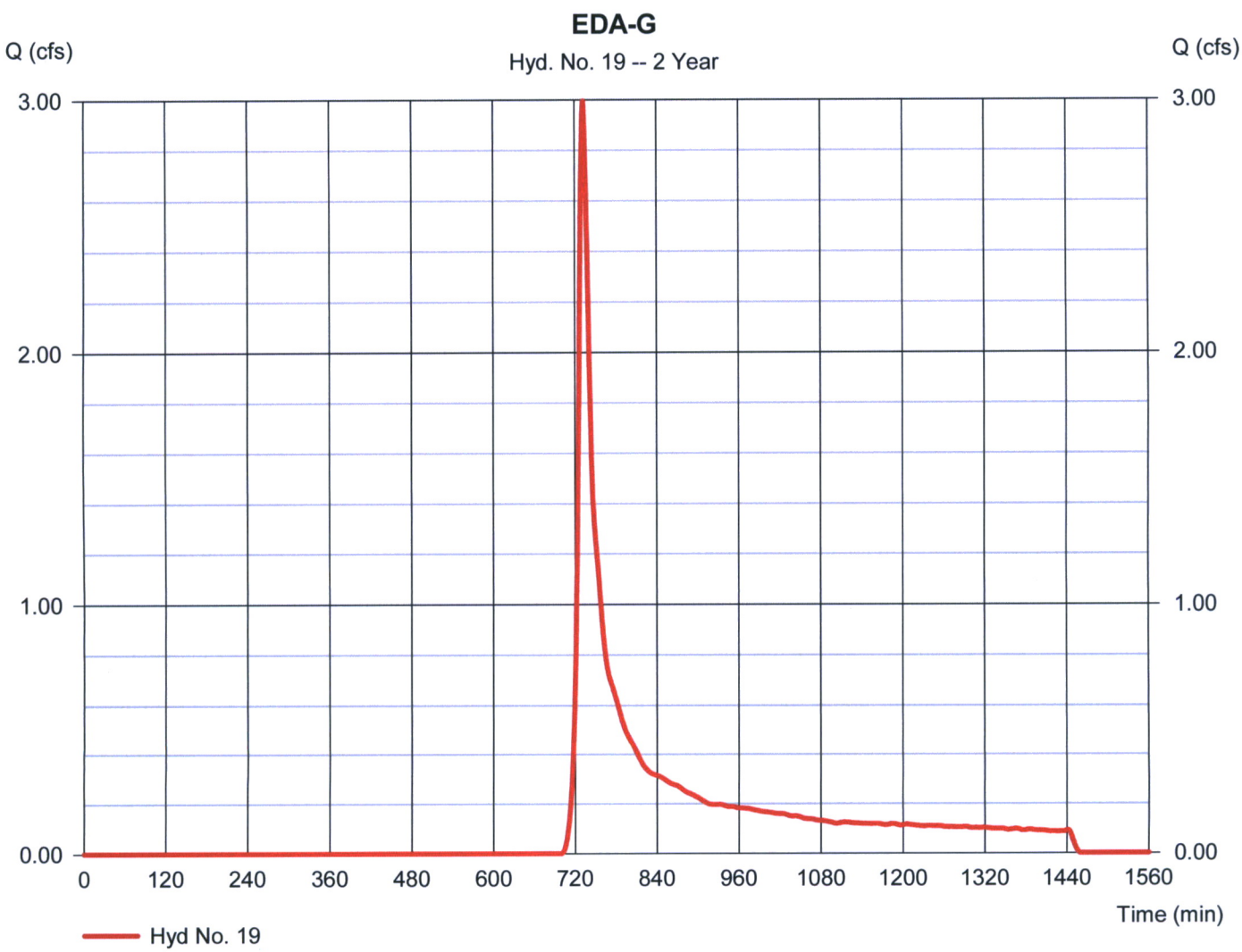


Hydrograph Report

Hyd. No. 19

EDA-G

Hydrograph type	= SCS Runoff	Peak discharge	= 2.996 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 12,041 cuft
Drainage area	= 5.080 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.60 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 19

EDA-G

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 10.50		0.00		0.00		
Travel Time (min)	**= 10.99**	**+**	**0.00**	**+**	**0.00**	**=**	**10.99**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		159.00		276.00		
Watercourse slope (%)	= 0.00		12.20		6.70		
Surface description	= Paved		Unpaved		Unpaved		
Average velocity (ft/s)	=0.00		5.64		4.18		
Travel Time (min)	**= 0.00**	**+**	**0.47**	**+**	**1.10**	**=**	**1.57**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

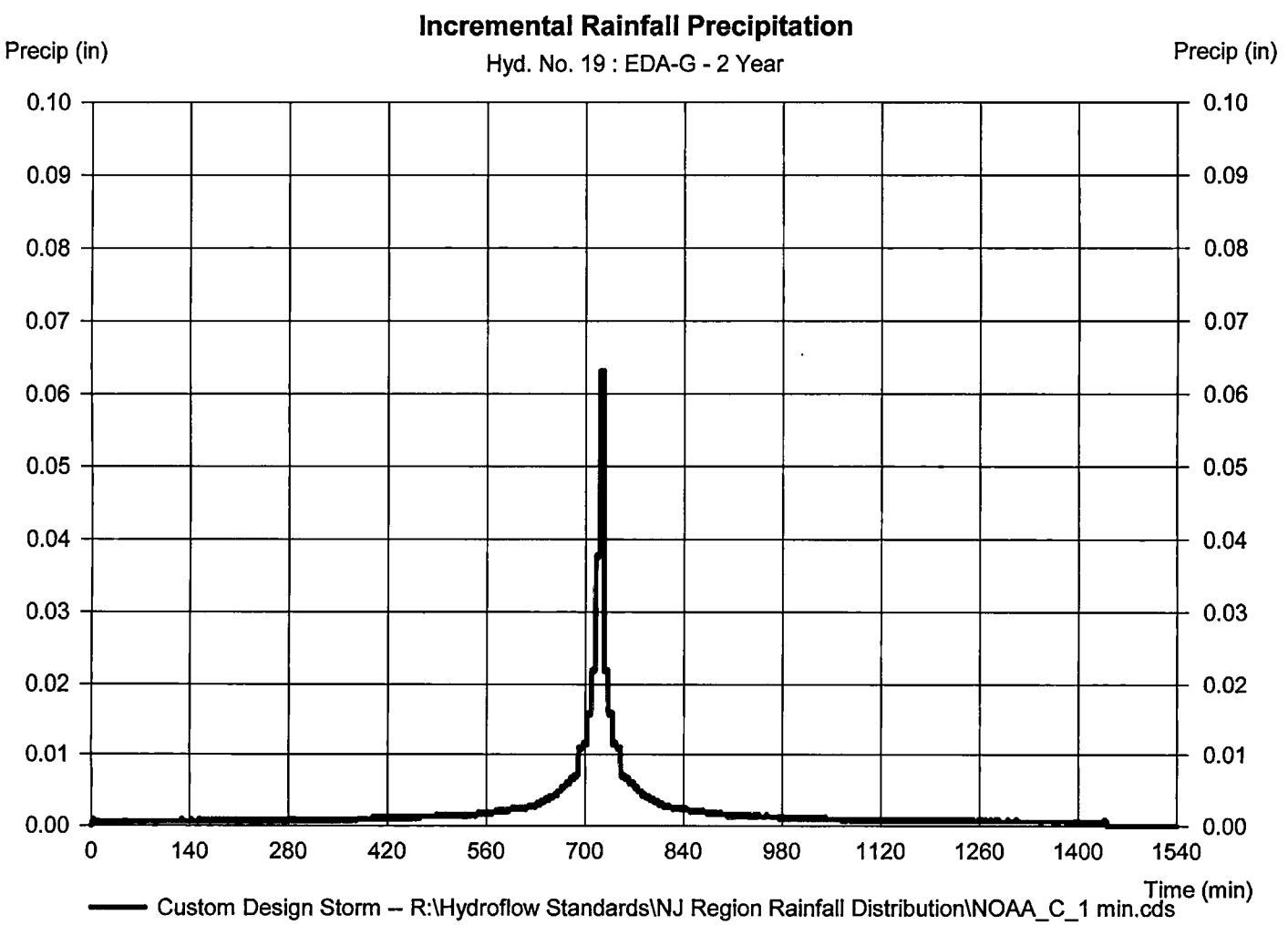
Total Travel Time, Tc ..... **12.60 min**

Precipitation Report

Hyd. No. 19

EDA-G

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

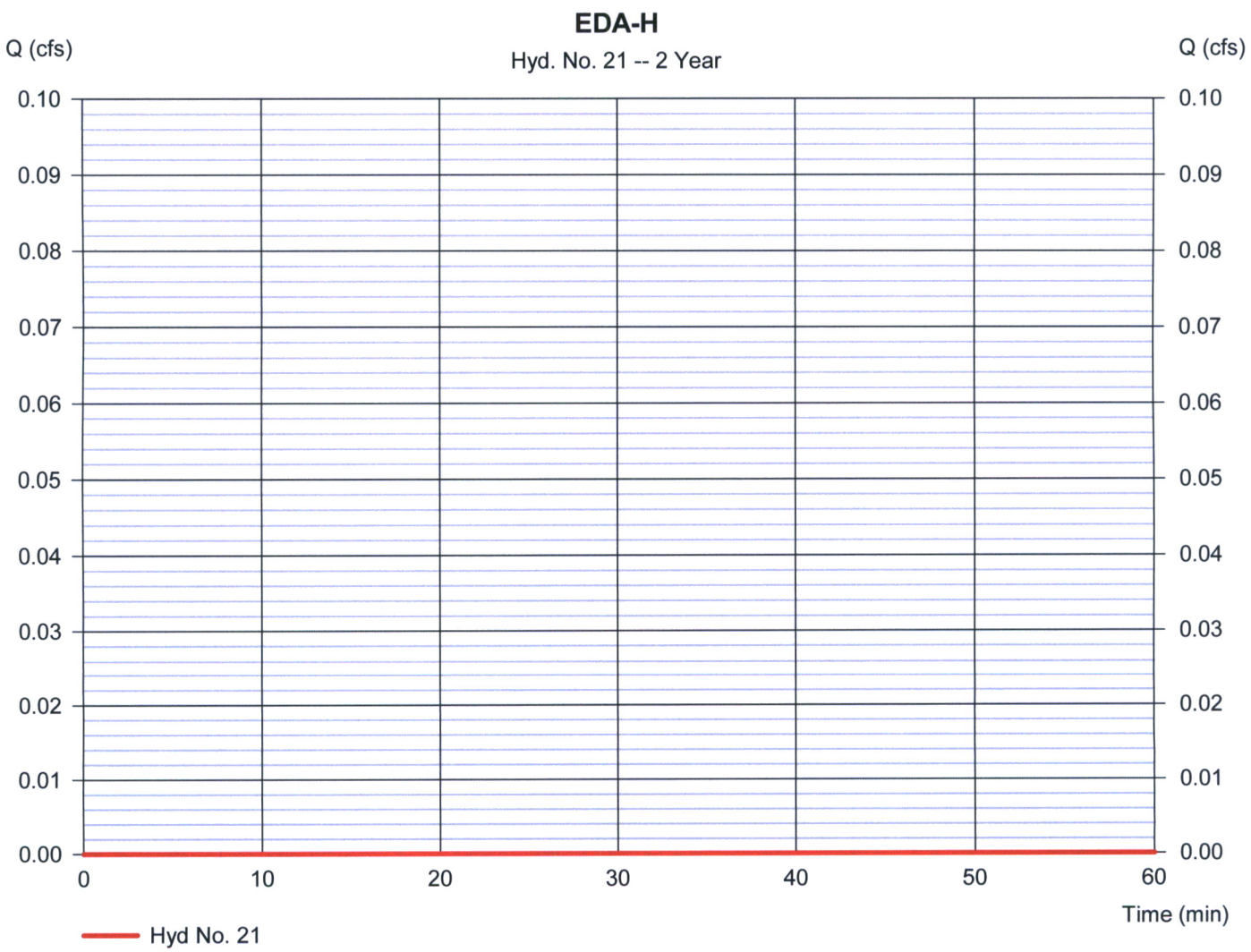


Hydrograph Report

Hyd. No. 21

EDA-H

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 12.920 ac	Curve number	= 36
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.50 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Storm Rainfall Distribution\484AA_C_1 min.cds		



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 21

EDA-H

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.150		0.011		
Flow length (ft)	= 32.0		68.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 3.00		0.10		0.00		
Travel Time (min)	**= 7.29**	**+**	**23.71**	**+**	**0.00**	**=**	**31.00**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		452.00		
Watercourse slope (%)	= 0.00		0.00		3.40		
Surface description	= Paved		Paved		Unpaved		
Average velocity (ft/s)	=0.00		0.00		2.98		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**2.53**	**=**	**2.53**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

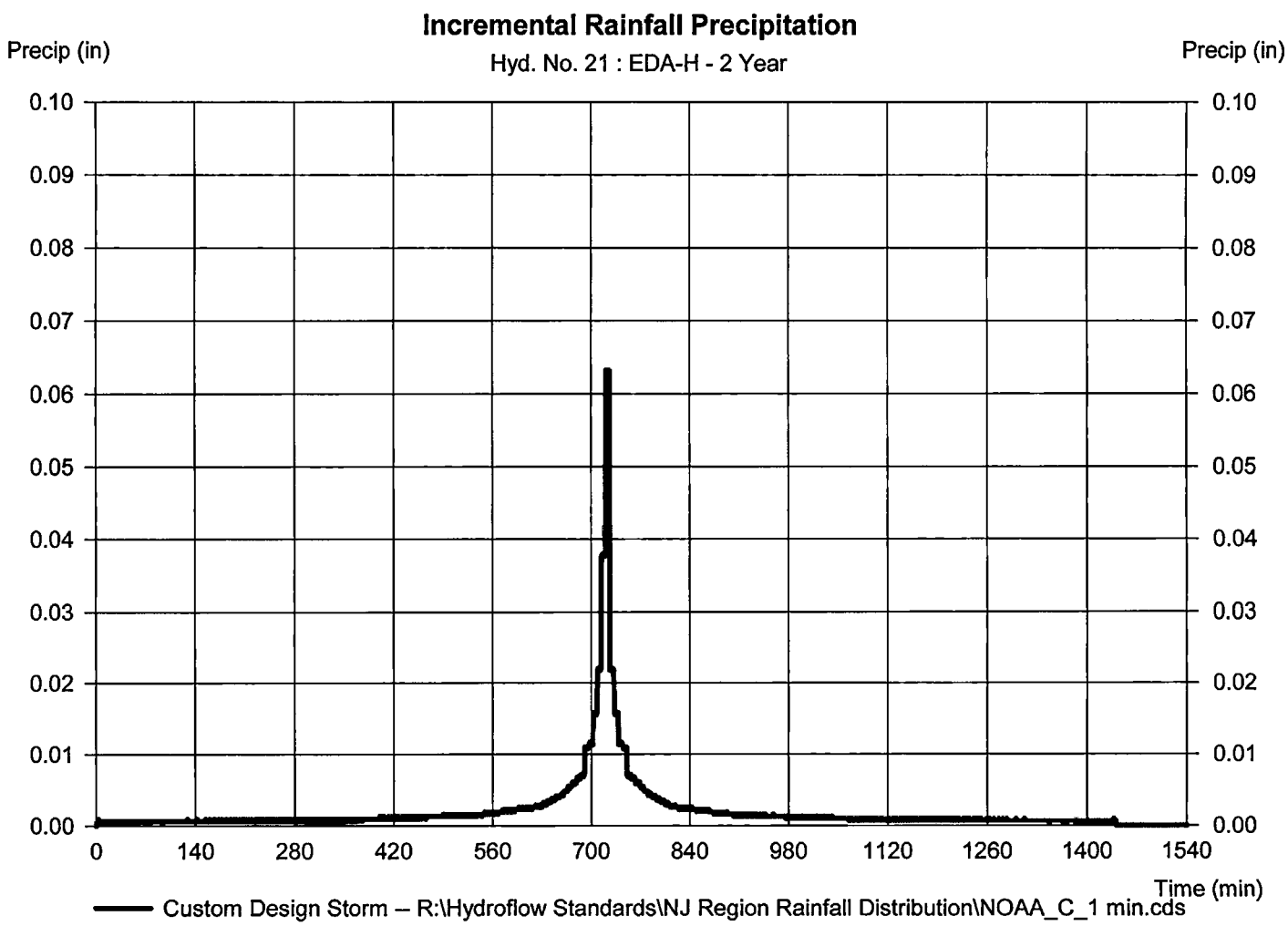
Total Travel Time, Tc ..... **33.50 min**

Precipitation Report

Hyd. No. 21

EDA-H

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

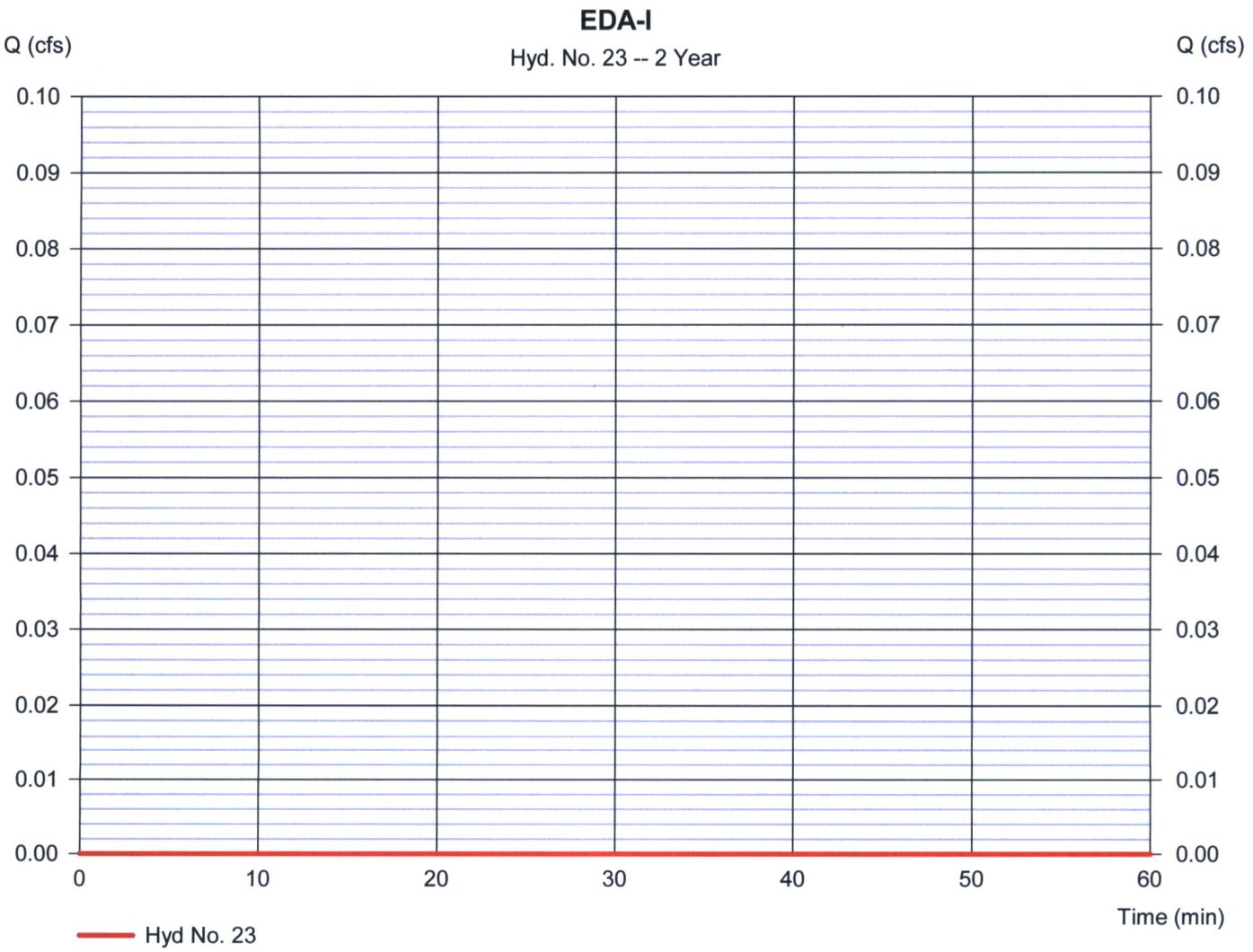


Hydrograph Report

Hyd. No. 23

EDA-I

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 1.100 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 22.10 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\484A_C_1 min.cds	Storm Distribution	



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 23

EDA-I

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 1.90		0.00		0.00		
Travel Time (min)	**= 21.78**	**+**	**0.00**	**+**	**0.00**	**=**	**21.78**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		97.00		0.00		
Watercourse slope (%)	= 0.00		13.80		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		5.99		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.27**	**+**	**0.00**	**=**	**0.27**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

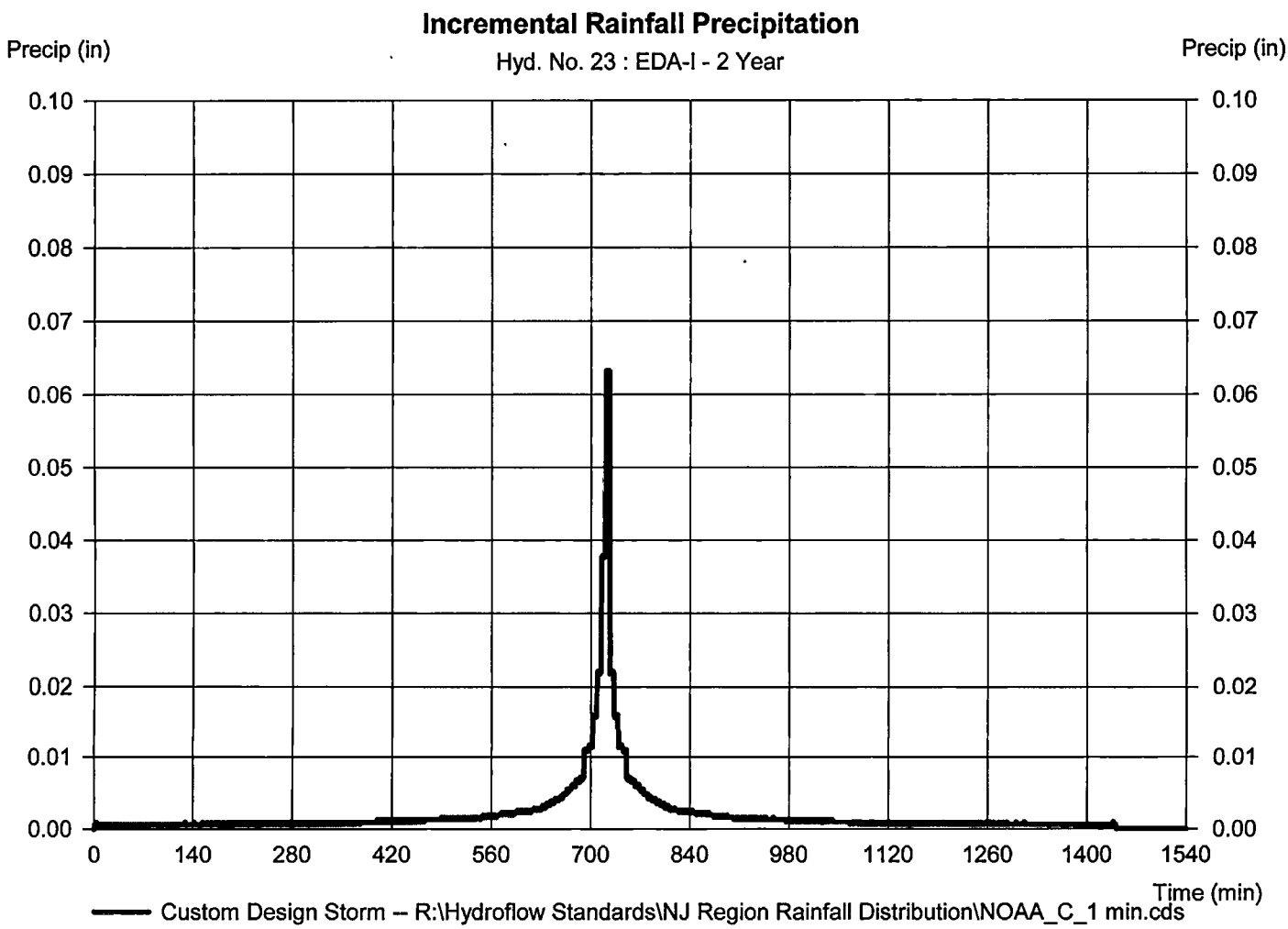
Total Travel Time, Tc ..... **22.10 min**

Precipitation Report

Hyd. No. 23

EDA-I

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

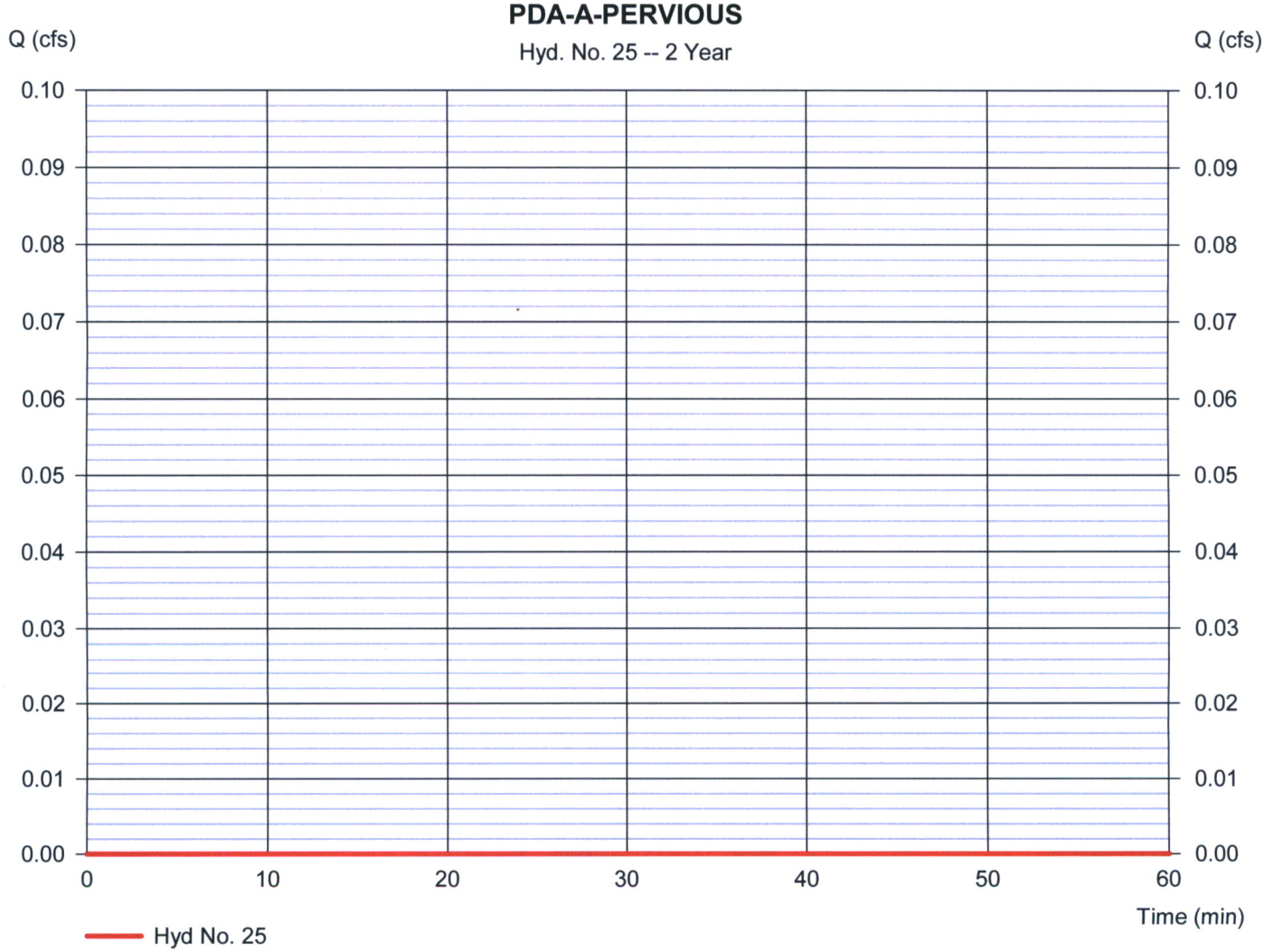


Hydrograph Report

Hyd. No. 25

PDA-A-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 2.030 ac	Curve number	= 9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Storm Rainfall Distribution\484A_C_1 min.cds		

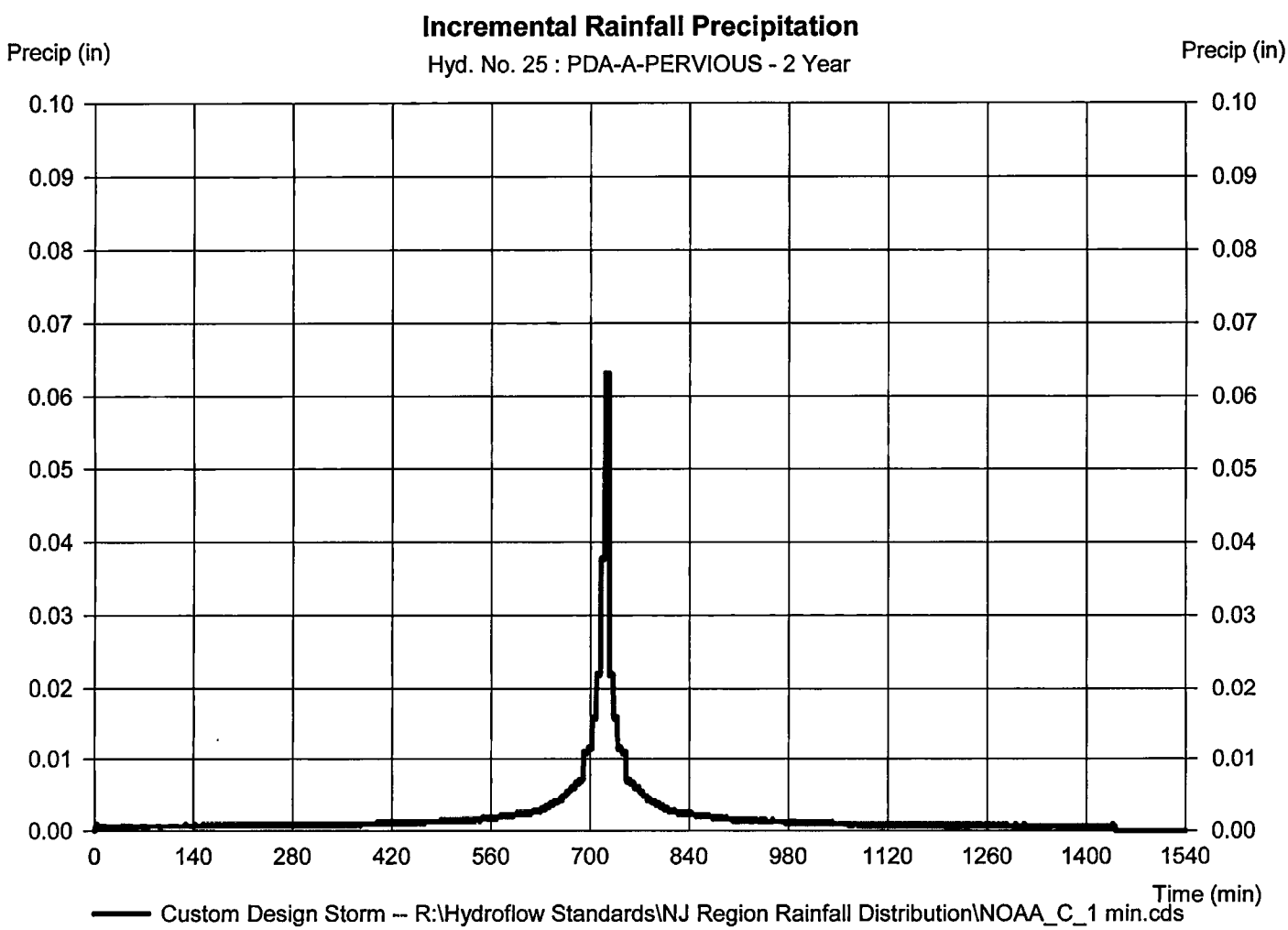


Precipitation Report

Hyd. No. 25

PDA-A-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

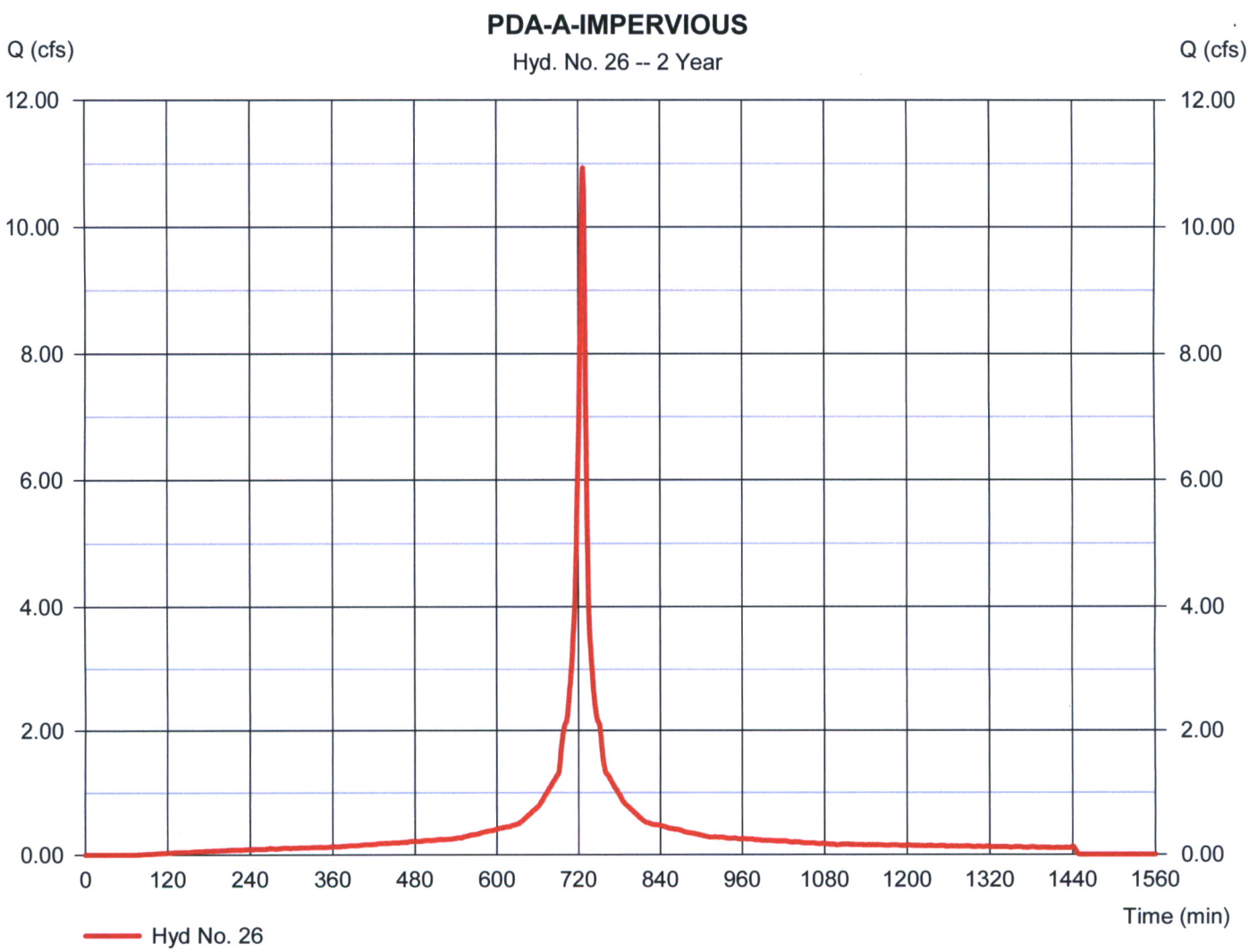


Hydrograph Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 10.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 34,899 cuft
Drainage area	= 3.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Re[illegible] Distribution=\484A_C_1 min.cds		

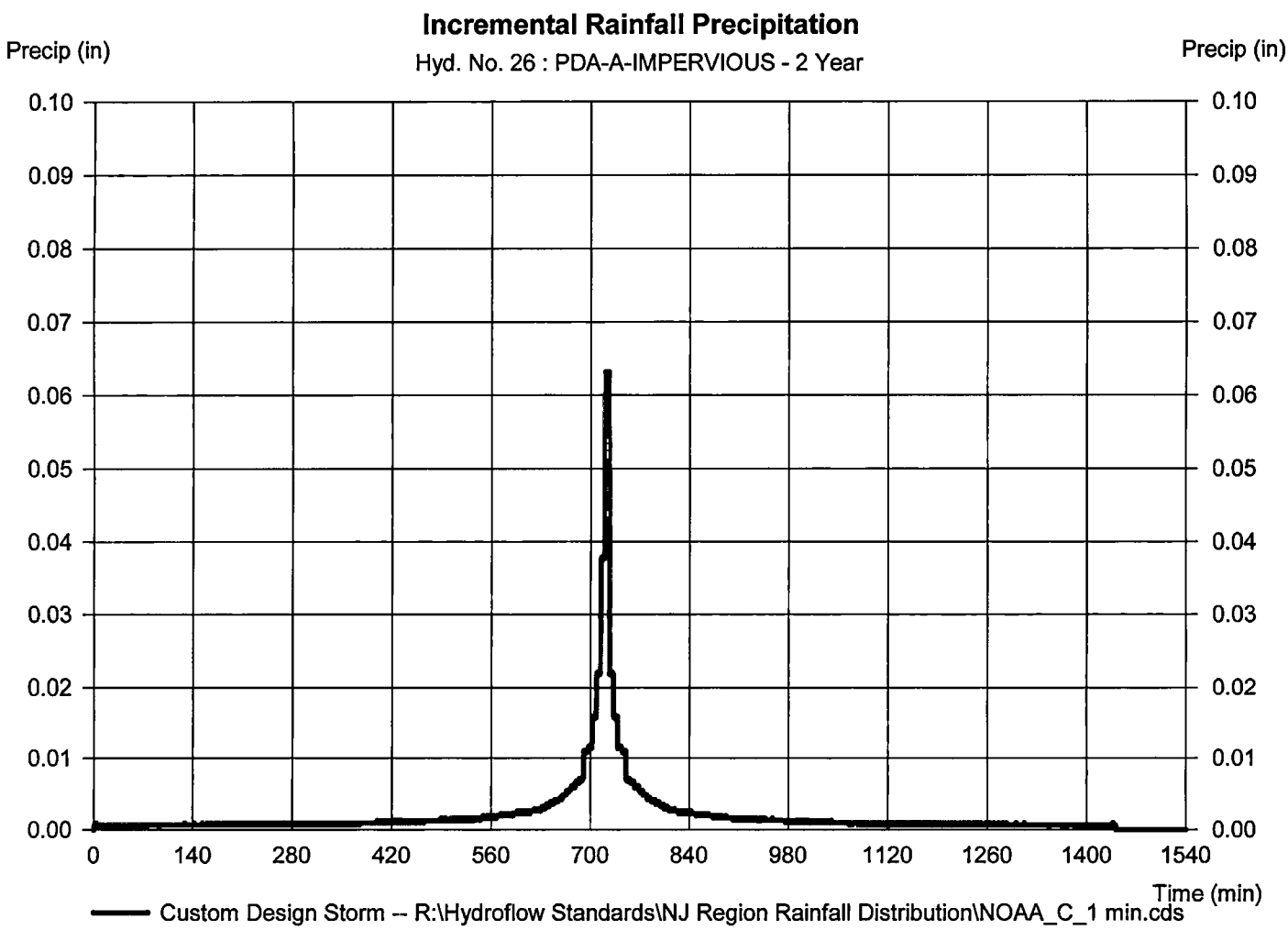


Precipitation Report

Hyd. No. 26

PDA-A-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

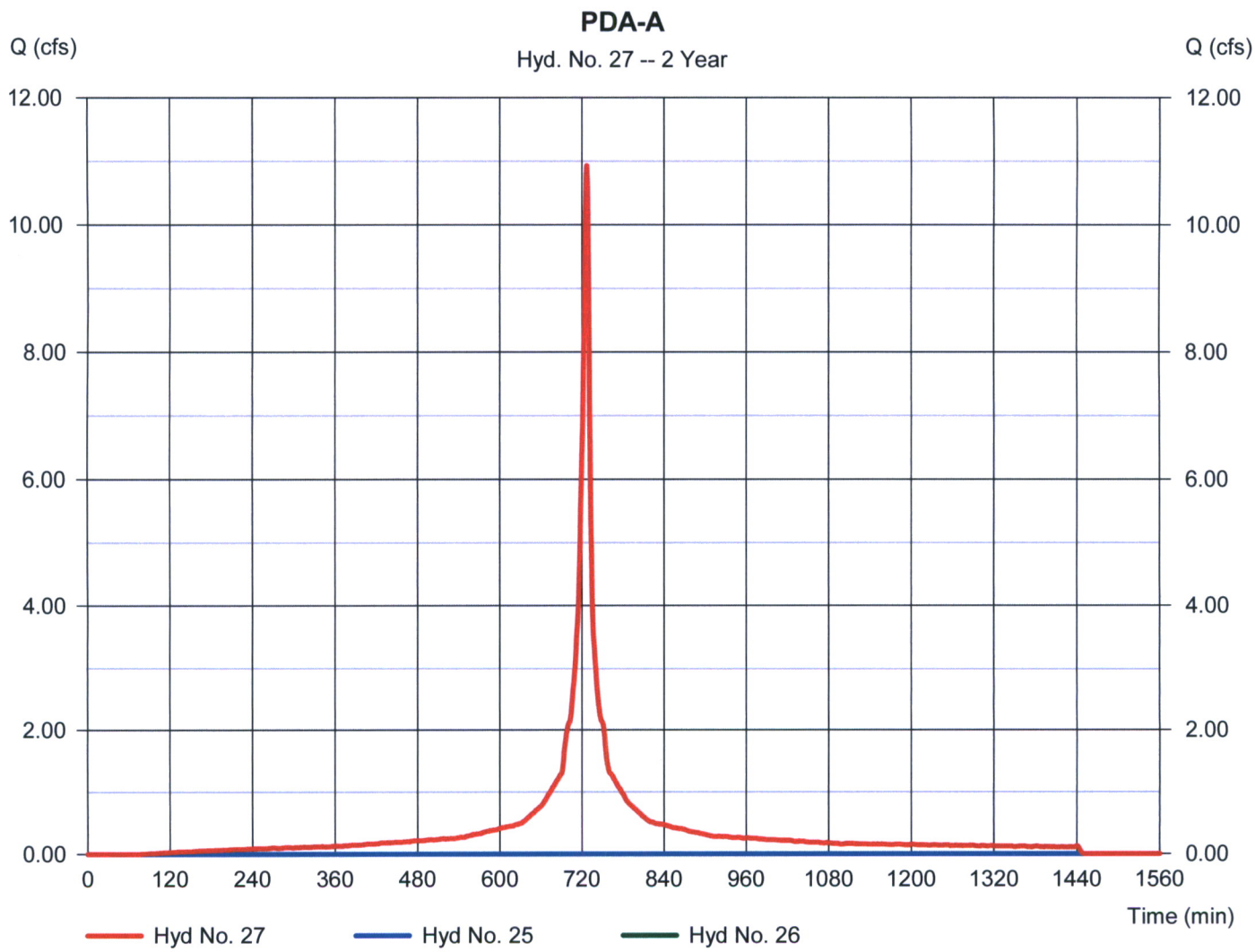


Hydrograph Report

Hyd. No. 27

PDA-A

Hydrograph type	= Combine	Peak discharge	= 10.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 34,899 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 5.130 ac



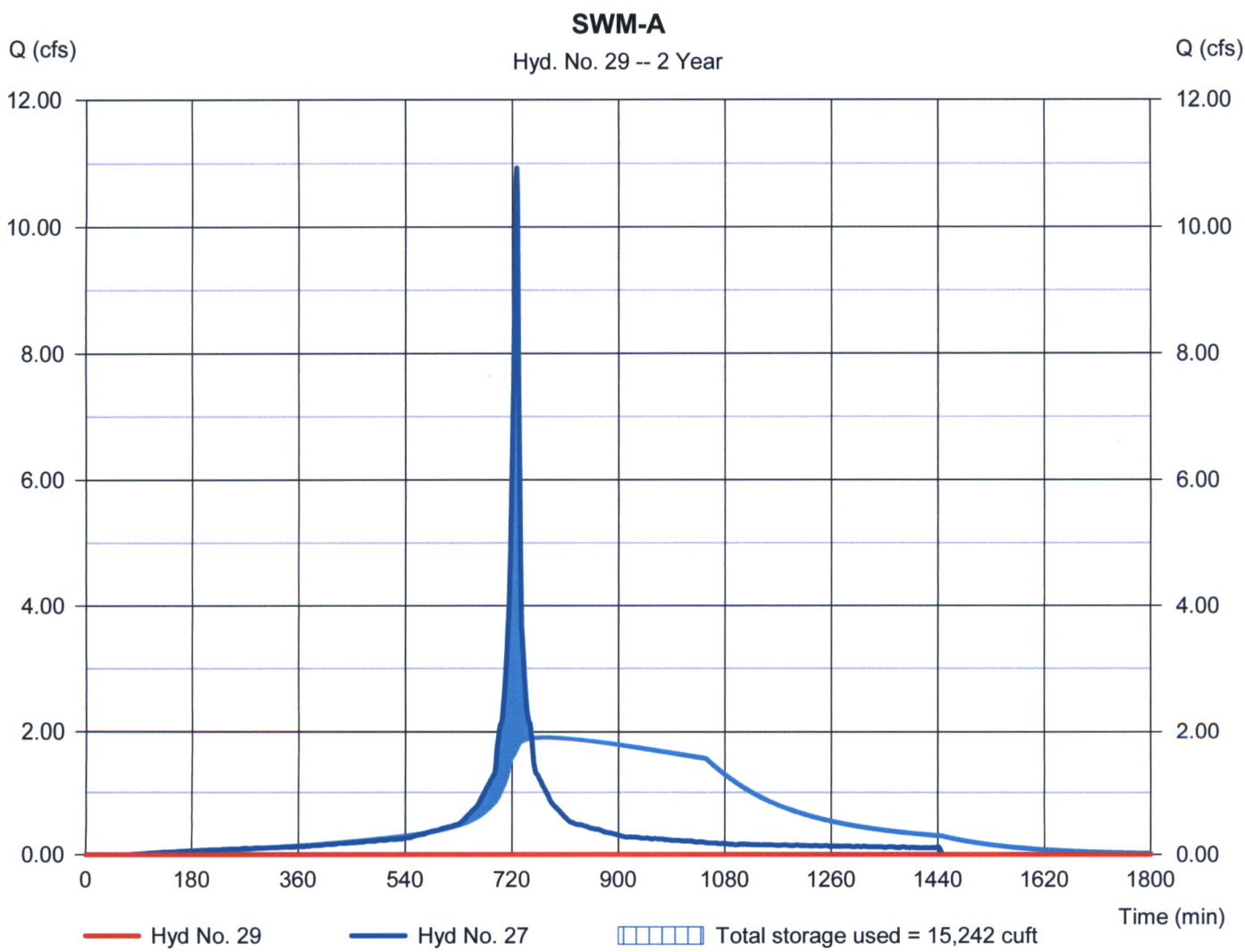
Hydrograph Report

Hyd. No. 29

SWM-A

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 711 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 27 - PDA-A	Max. Elevation	= 593.28 ft
Reservoir name	= SWM-A	Max. Storage	= 15,242 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Pond No. 1 - SWM-A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 592.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	592.00	10,637	0	0
1.00	593.00	12,473	11,542	11,542
2.00	594.00	14,370	13,409	24,951
3.00	595.00	16,330	15,338	40,289
4.00	596.00	18,354	17,330	57,619
5.00	597.00	20,441	19,386	77,006

Culvert / Orifice Structures

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

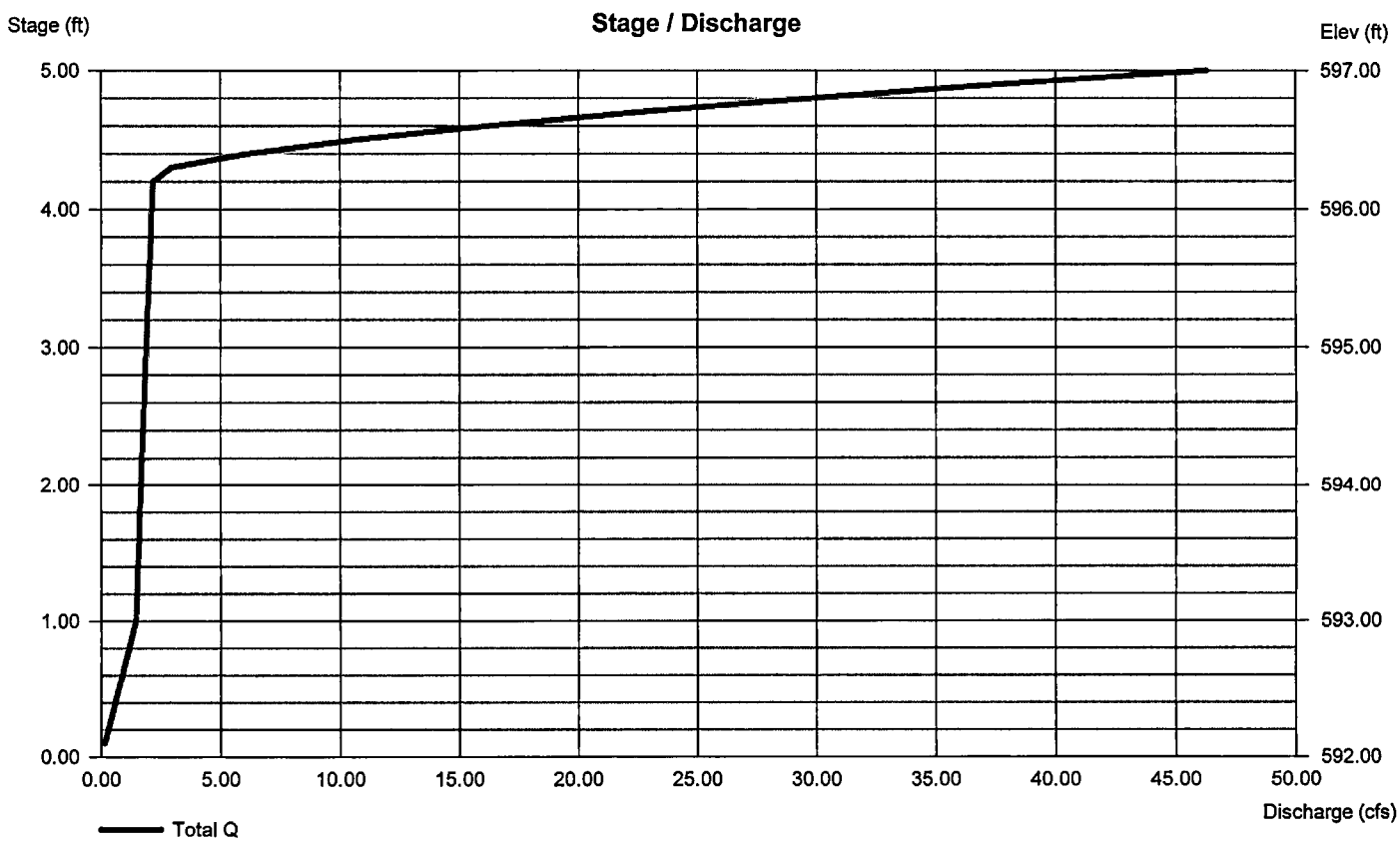
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 26.00	0.00	0.00	0.00
Crest El. (ft)	= 596.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

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

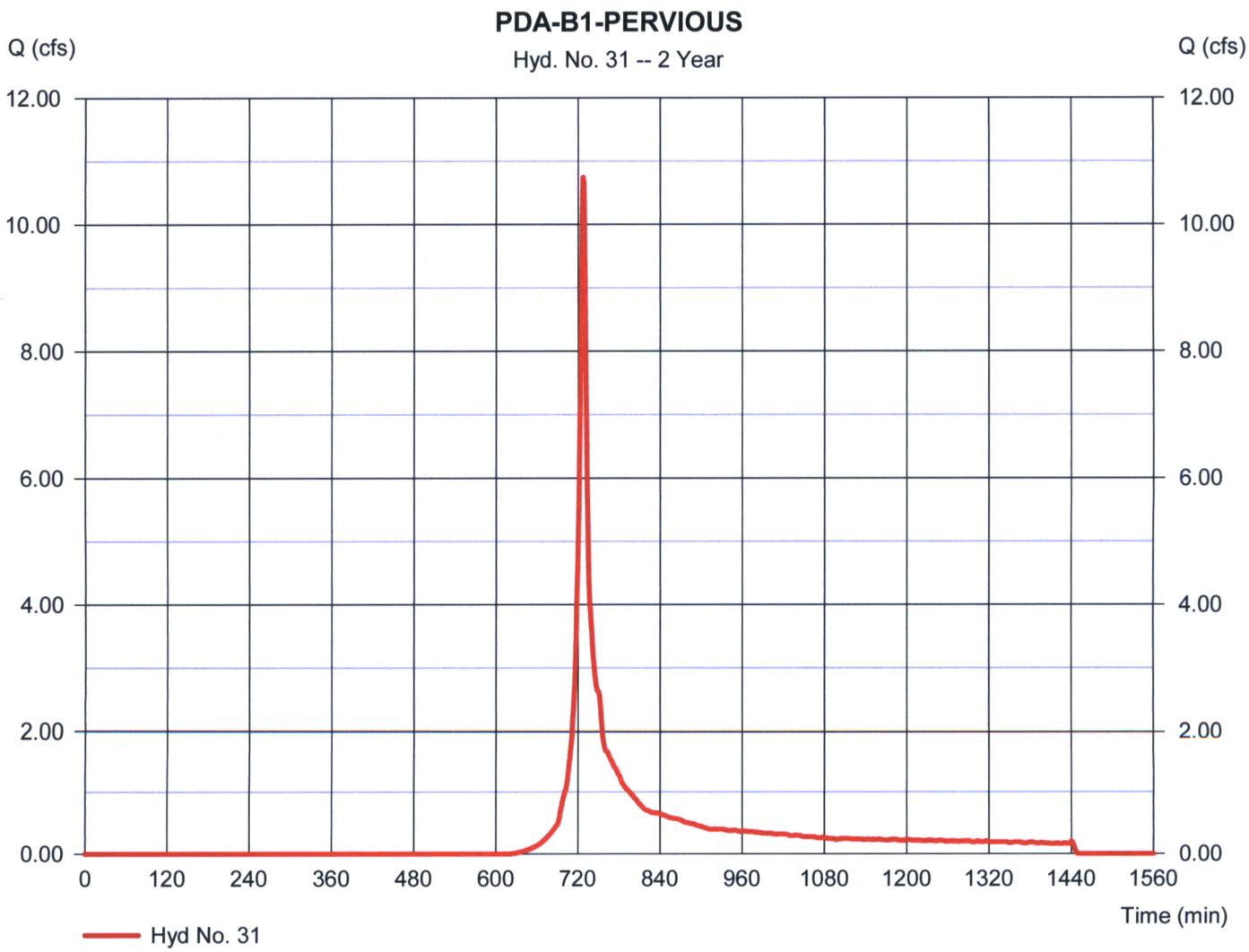


Hydrograph Report

Hyd. No. 31

PDA-B1-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 10.75 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 29,991 cuft
Drainage area	= 6.790 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Re[illegible] Distribution\484AA_C_1 min.cds		

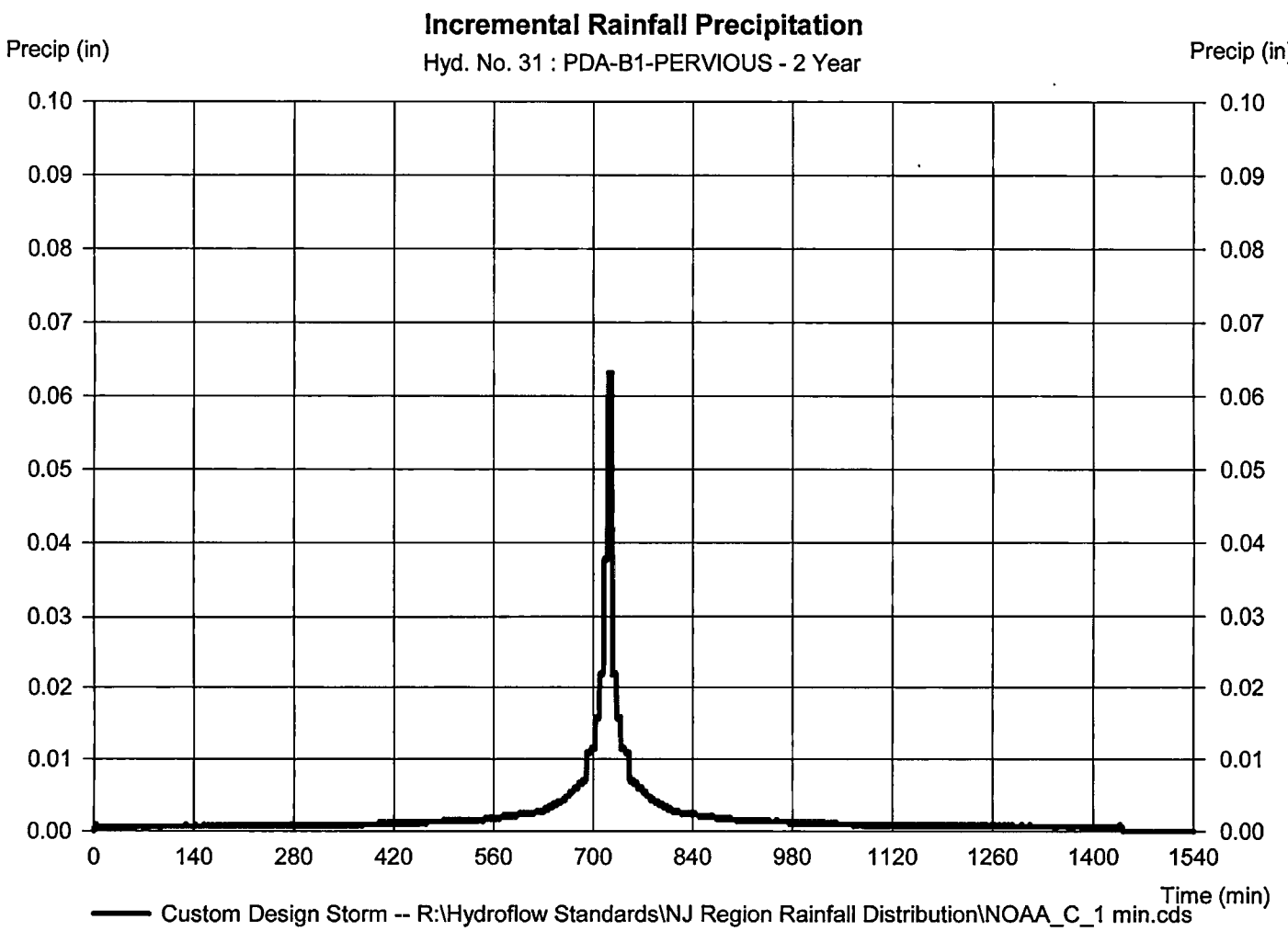


Precipitation Report

Hyd. No. 31

PDA-B1-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

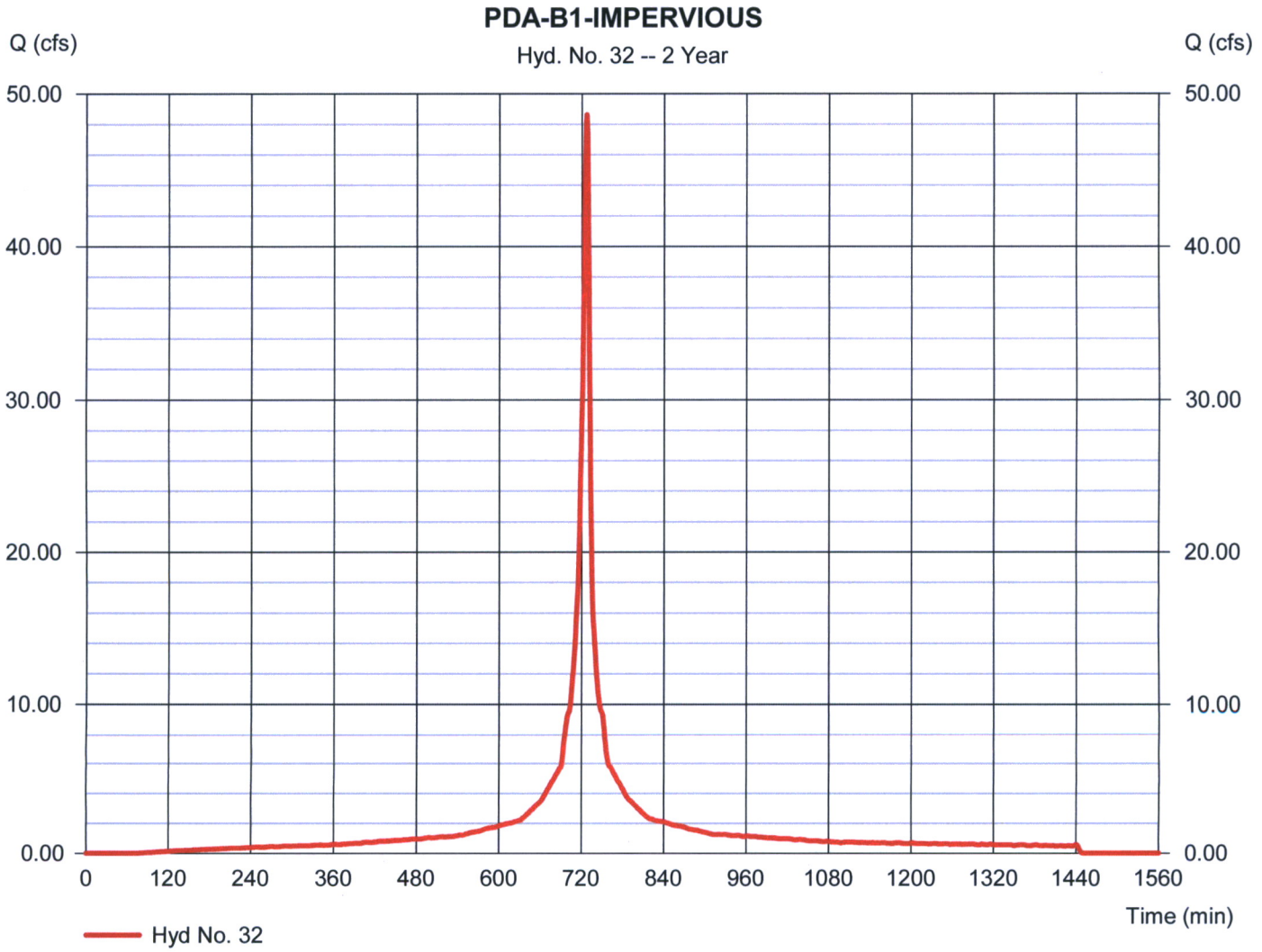


Hydrograph Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 48.62 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 155,245 cuft
Drainage area	= 13.790 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region 4 Rainfall Distribution\NOAA_C_1 min.cds	Storm frequency	= 2 yrs

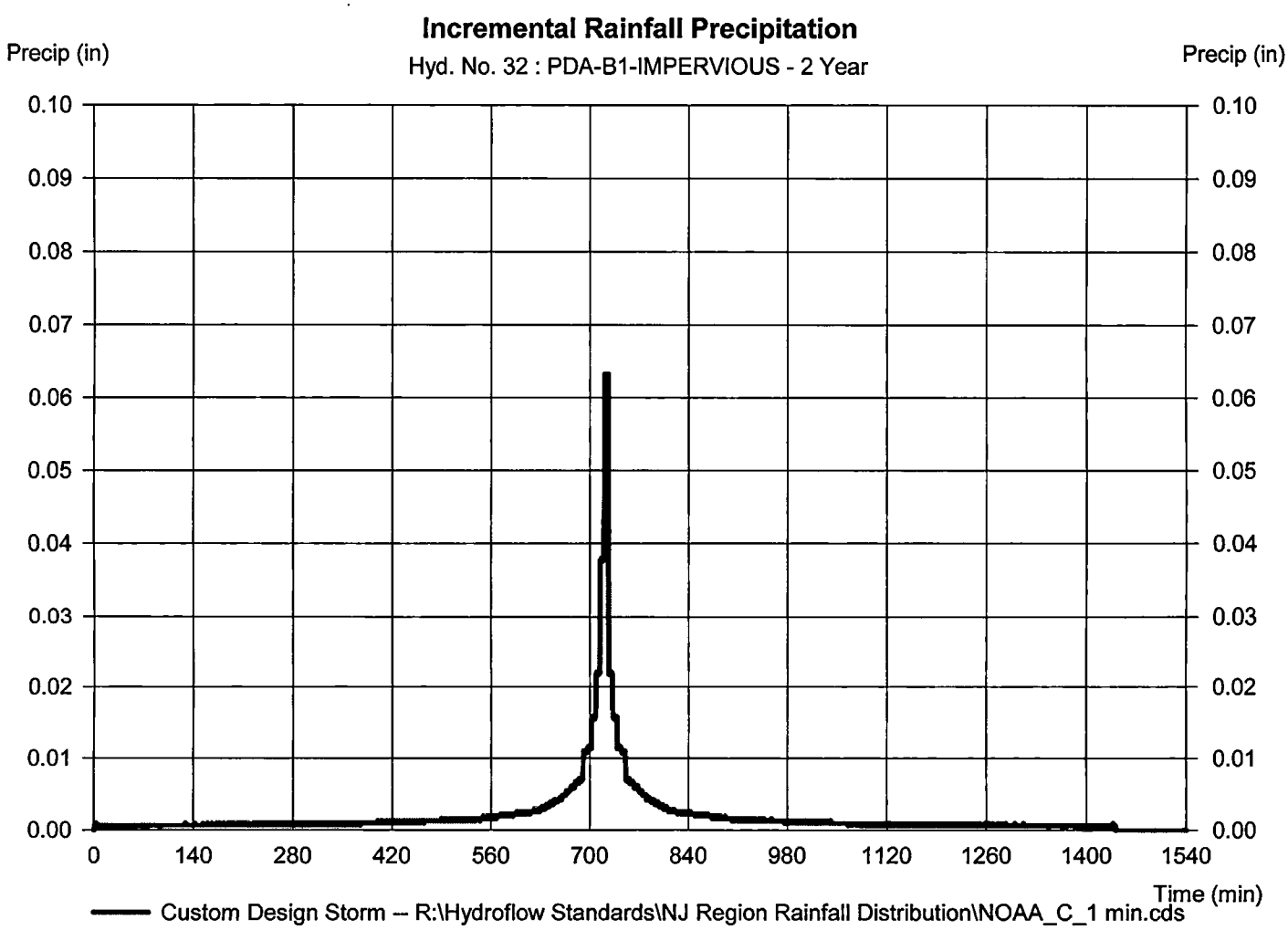


Precipitation Report

Hyd. No. 32

PDA-B1-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

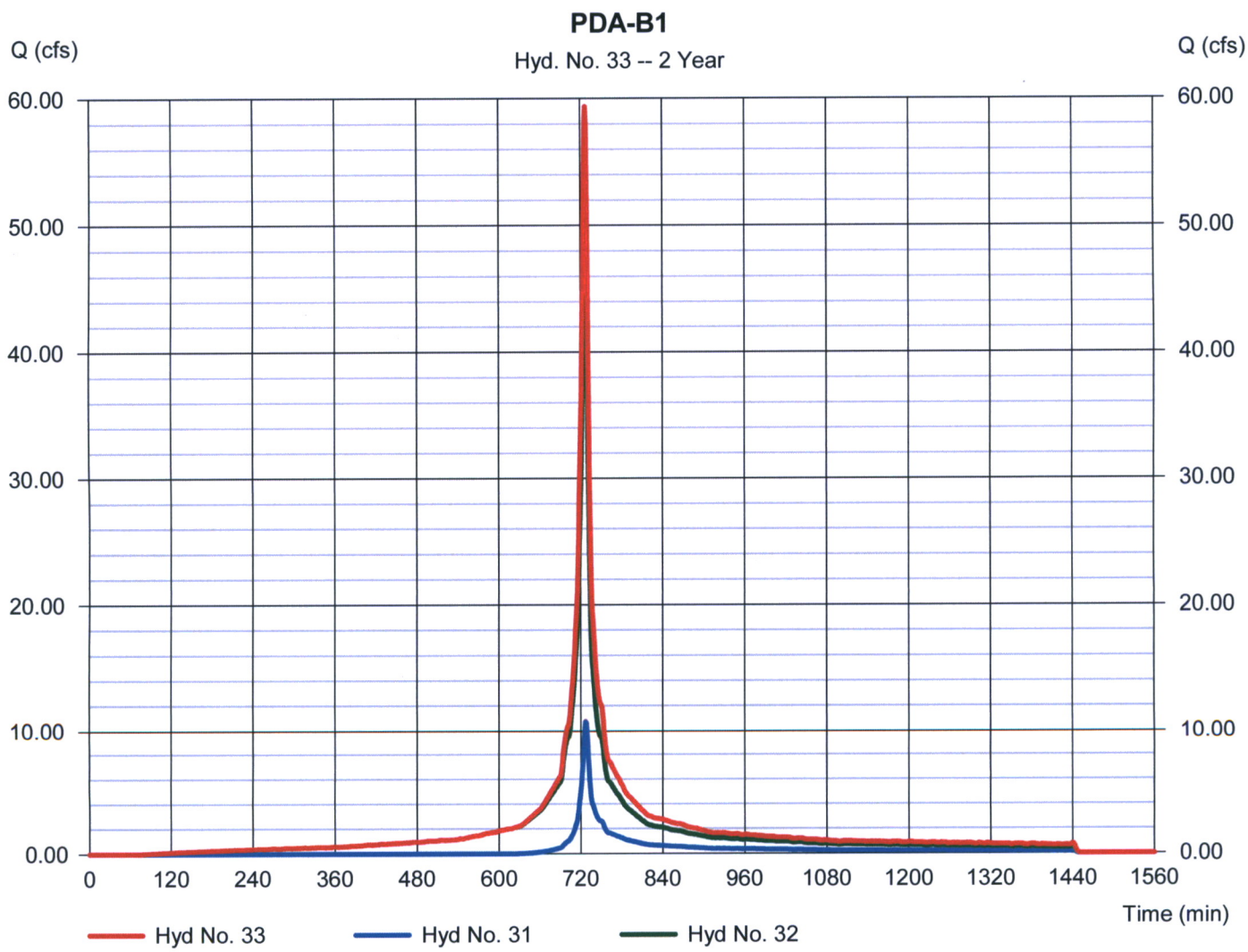


Hydrograph Report

Hyd. No. 33

PDA-B1

Hydrograph type	= Combine	Peak discharge	= 59.36 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 185,236 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 20.580 ac

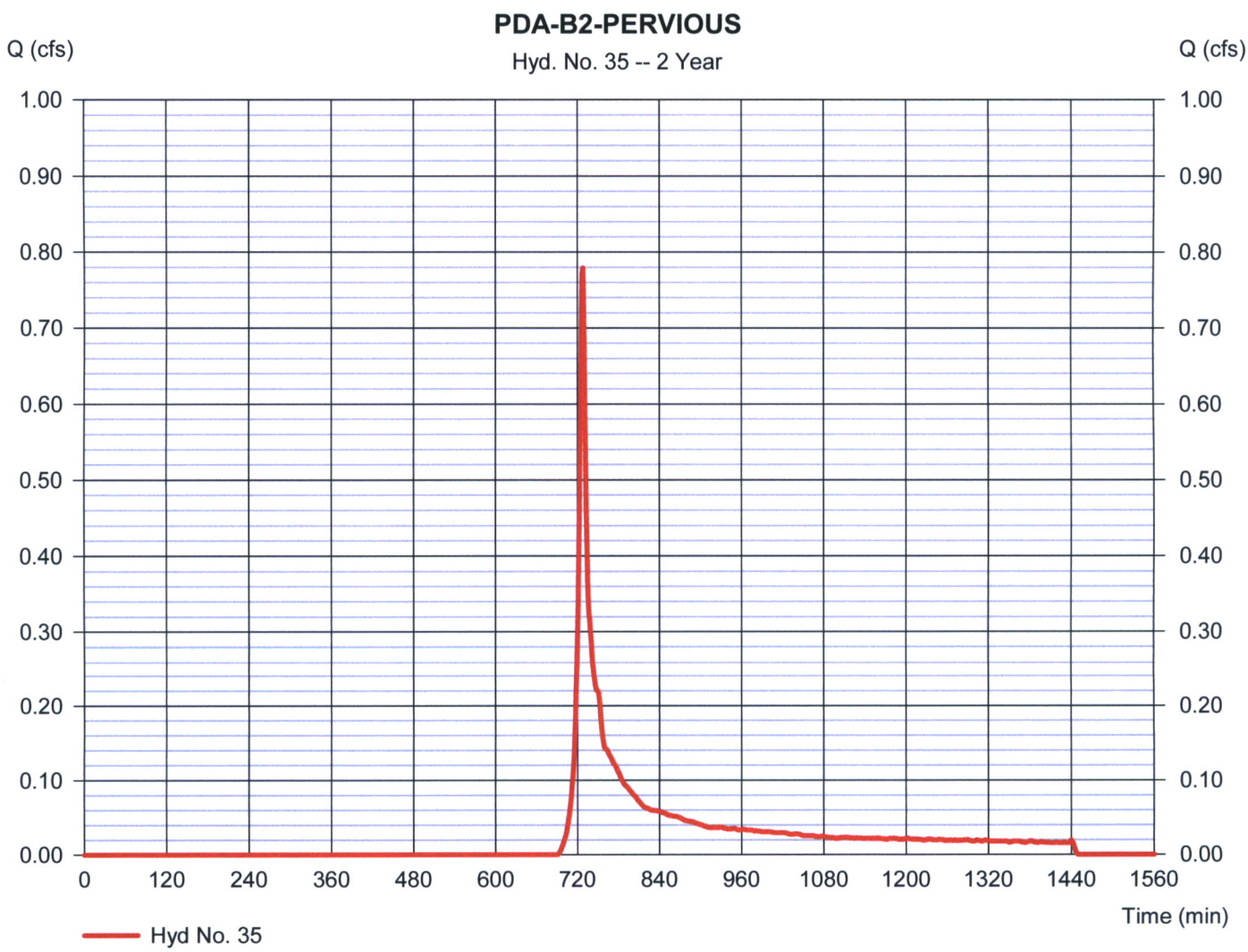


Hydrograph Report

Hyd. No. 35

PDA-B2-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.779 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 2,344 cuft
Drainage area	= 0.830 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Re[illegible] Distribution\484AA_C_1 min.cds		

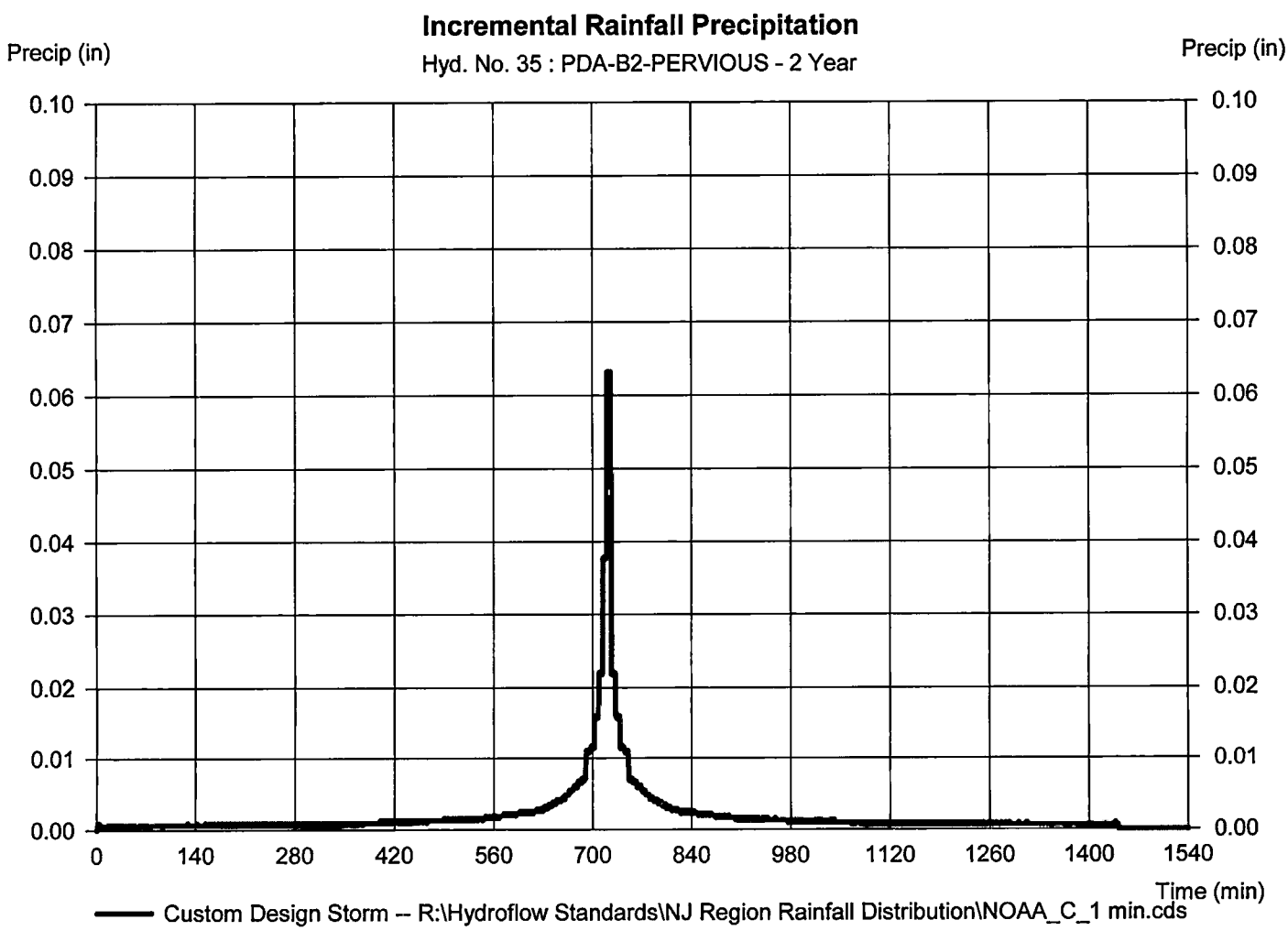


Precipitation Report

Hyd. No. 35

PDA-B2-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

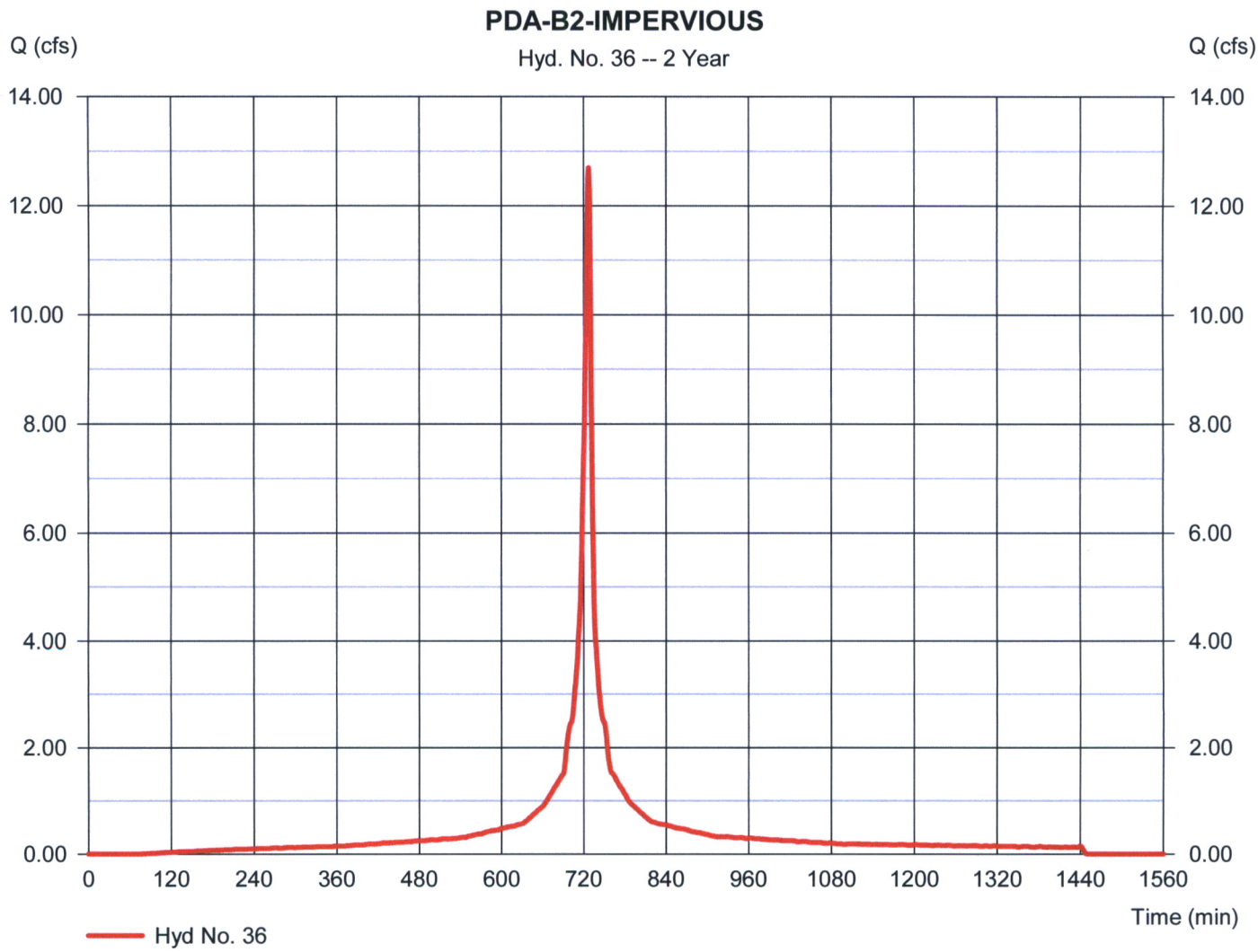


Hydrograph Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 12.69 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 40,528 cuft
Drainage area	= 3.600 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall	Storm Distribution	= NJAA_C_1 min.cds

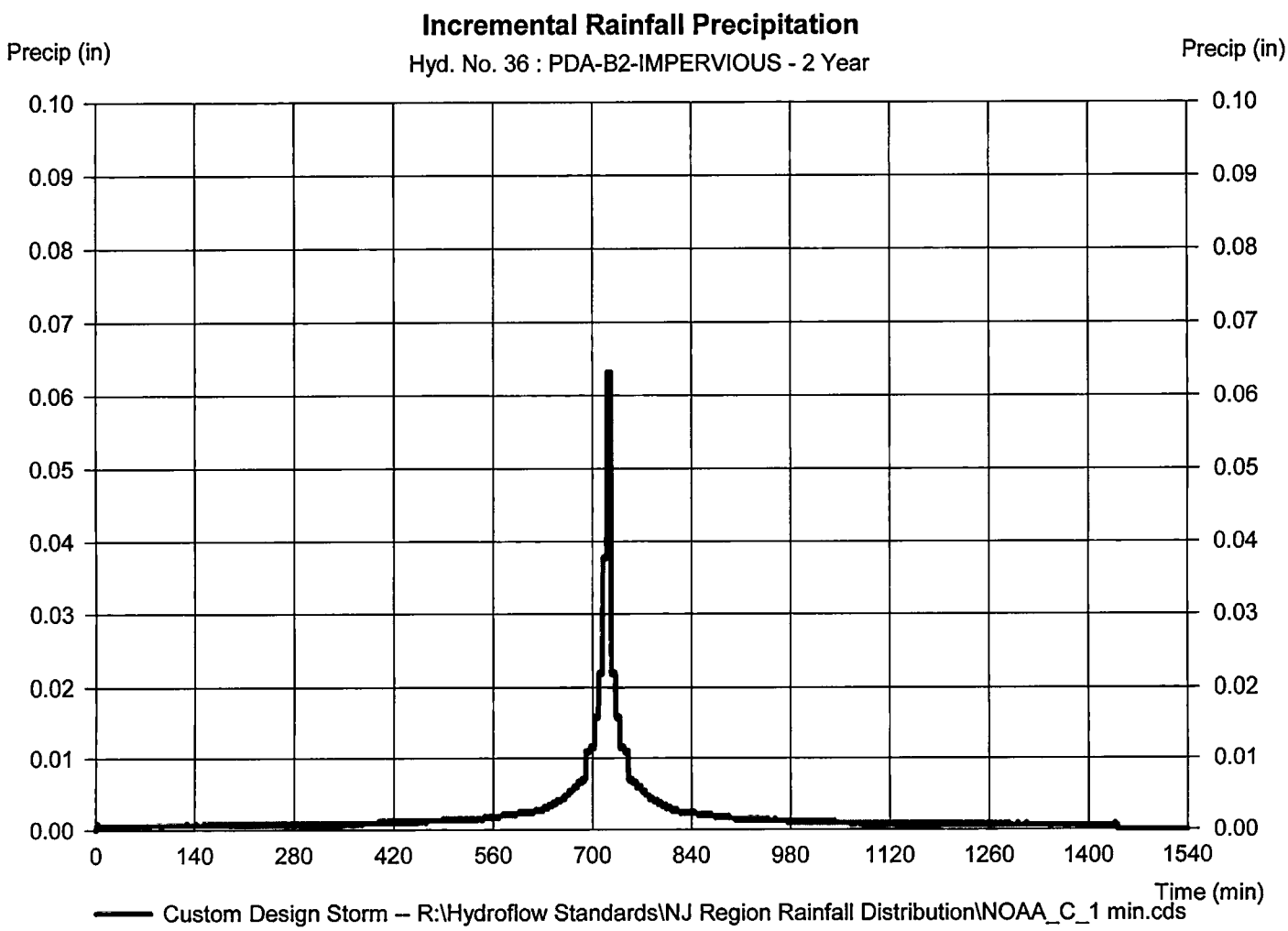


Precipitation Report

Hyd. No. 36

PDA-B2-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

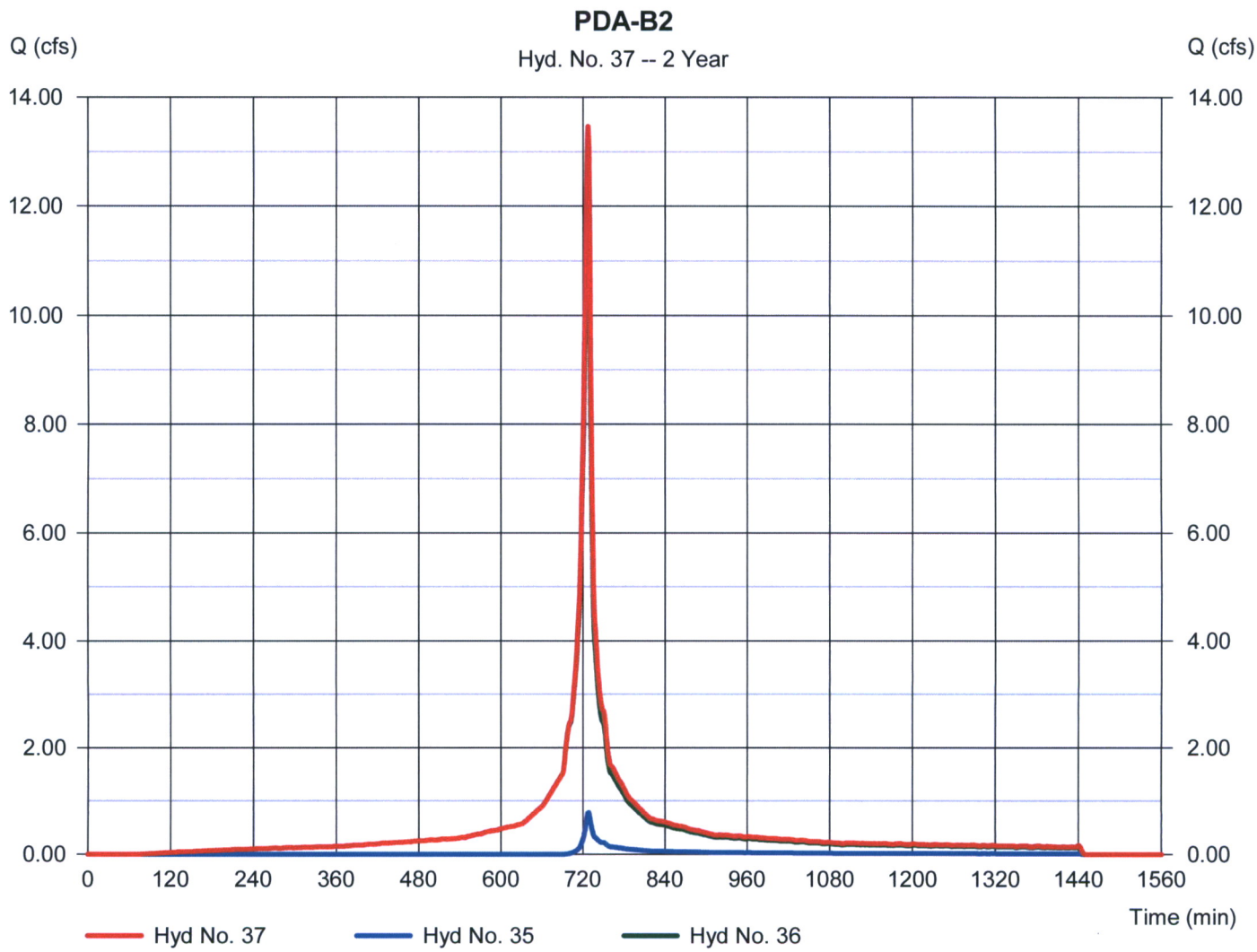


Hydrograph Report

Hyd. No. 37

PDA-B2

Hydrograph type	= Combine	Peak discharge	= 13.46 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 42,872 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 4.430 ac



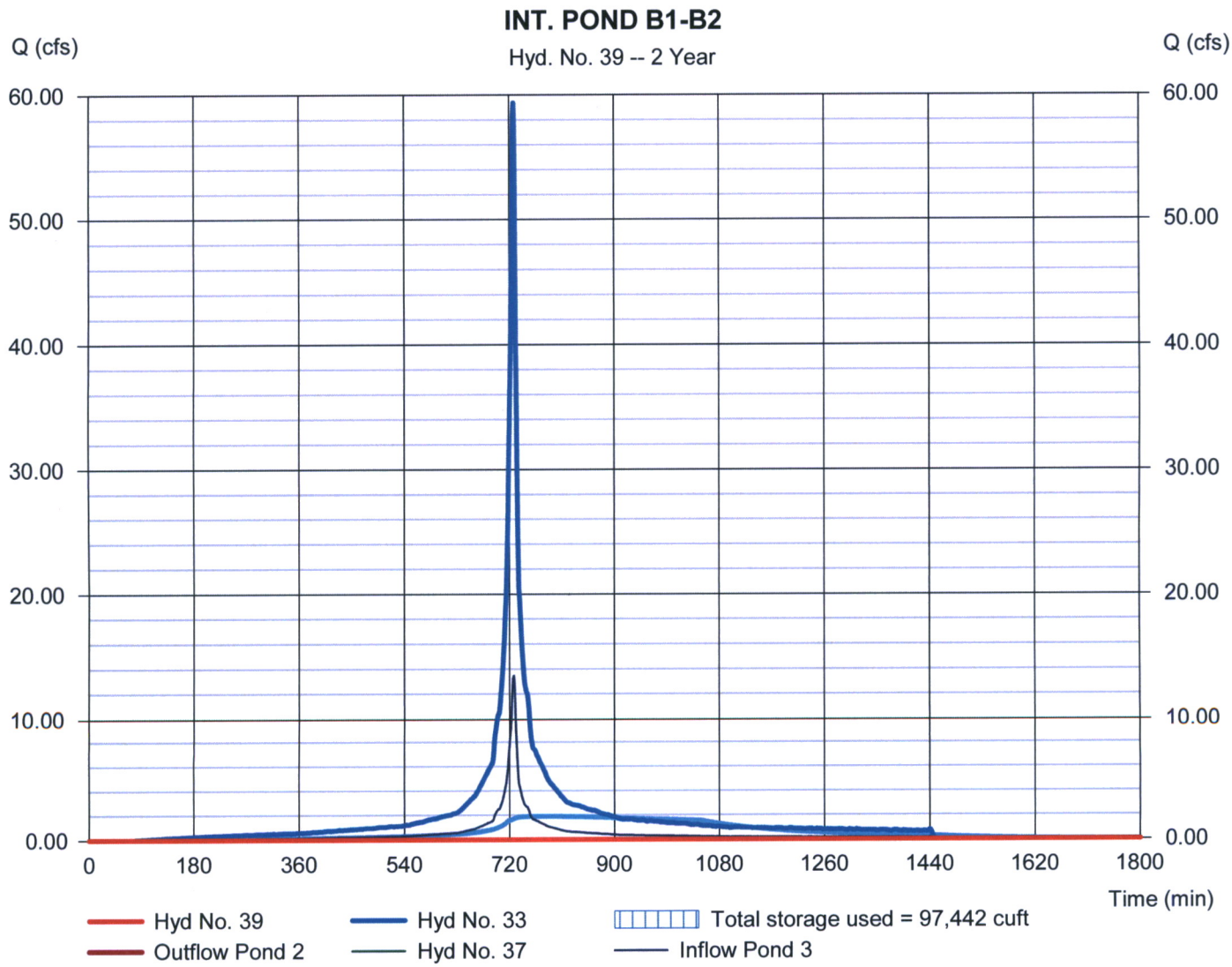
Hydrograph Report

Hyd. No. 39

INT. POND B1-B2

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 798 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Upper Pond	= SWM-B1	Lower Pond	= SWM-B2
Inflow hyd.	= 33 - PDA-B1	Other Inflow hyd.	= 37 - PDA-B2
Max. Elevation	= 599.19 ft	Max. Elevation	= 598.82 ft
Max. Storage	= 79,308 cuft	Max. Storage	= 18,134 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Pond No. 2 - SWM-B1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	61,258	0	0
1.00	599.00	69,679	65,417	65,417
2.00	600.00	78,515	74,046	139,463
3.00	601.00	87,768	83,090	222,553
4.00	602.00	97,511	92,588	315,140

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 598.00	0.00	0.00	0.00
Length (ft)	= 164.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 601.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

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

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Pond No. 3 - SWM-B2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	21,184	0	0
1.00	599.00	23,256	22,210	22,210
2.00	600.00	25,384	24,310	46,520
3.00	601.00	27,569	26,466	72,986
4.00	602.00	29,810	28,679	101,665

Culvert / Orifice Structures

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

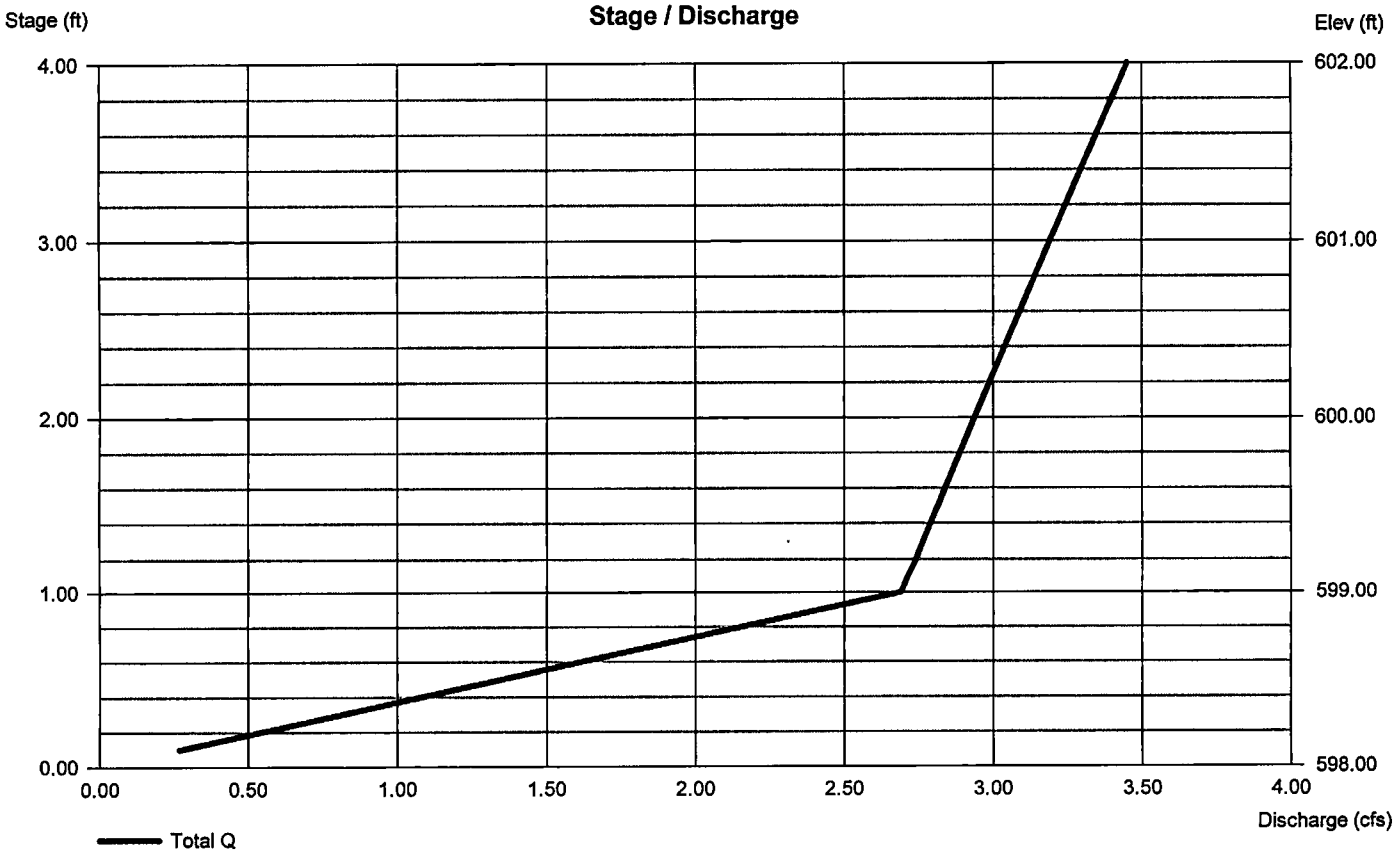
Weir Structures

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

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

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

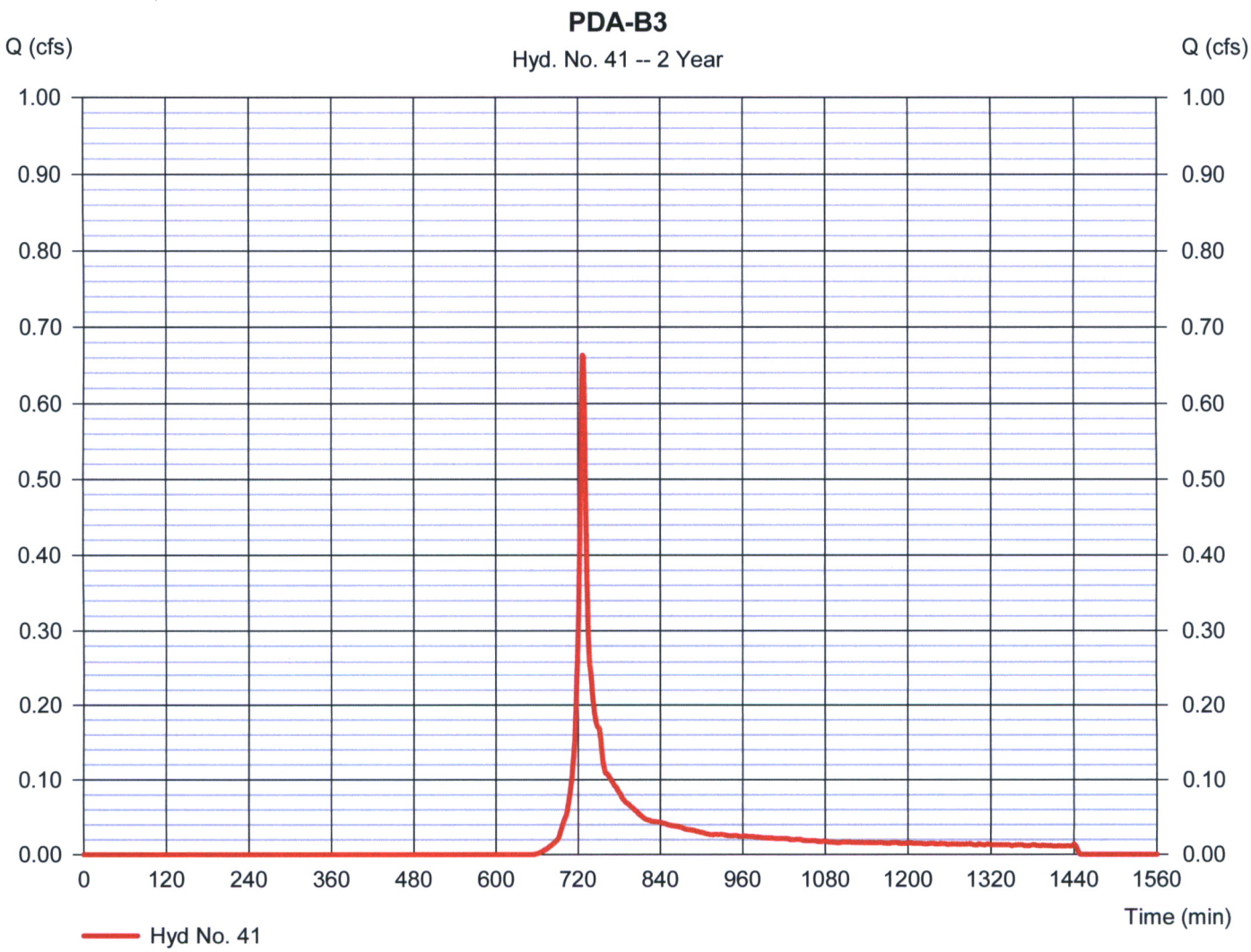


Hydrograph Report

Hyd. No. 41

PDA-B3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.663 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,888 cuft
Drainage area	= 0.500 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall	Storm Distribution	= 484AA_C_1 min.cds

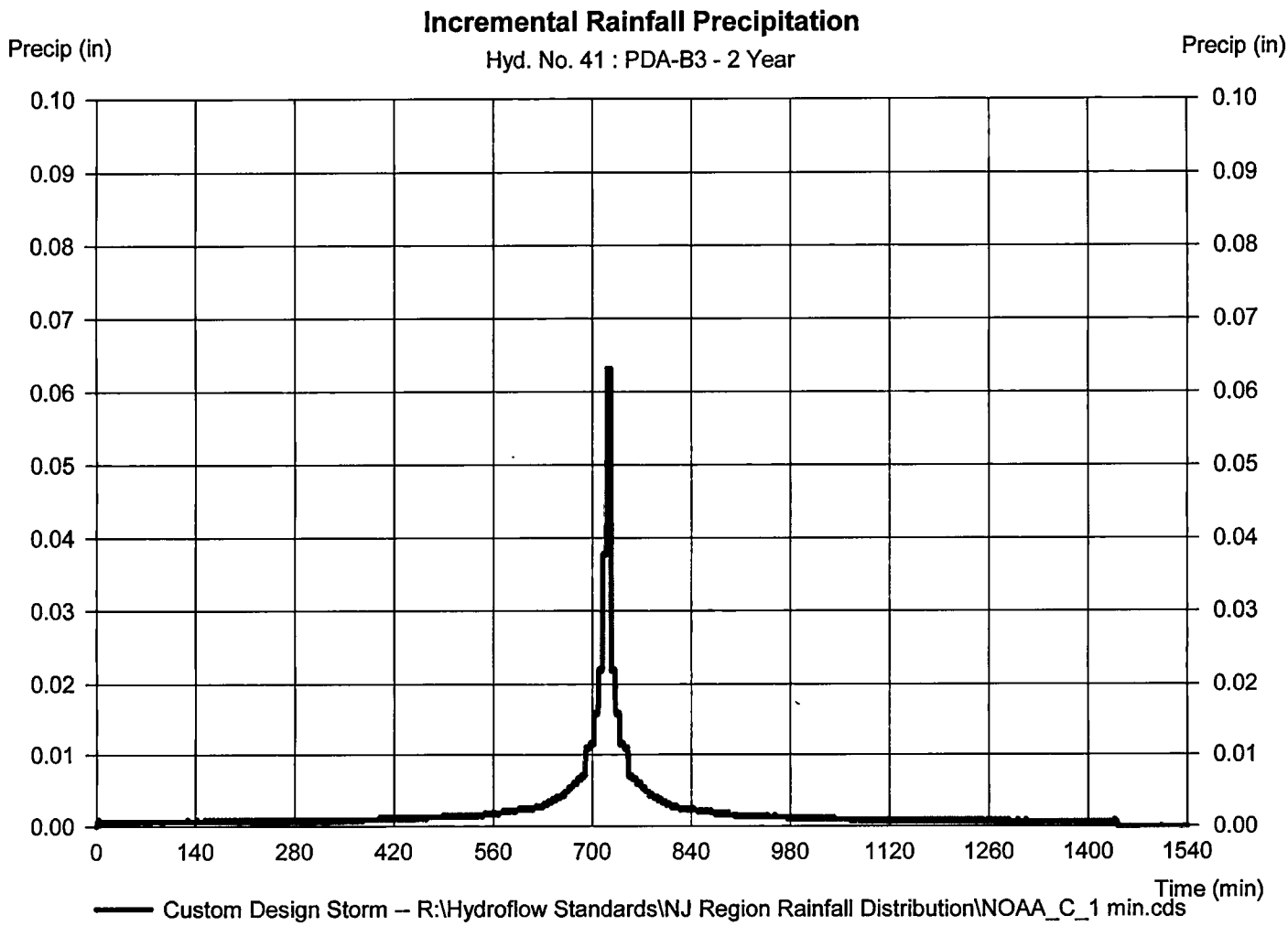


Precipitation Report

Hyd. No. 41

PDA-B3

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

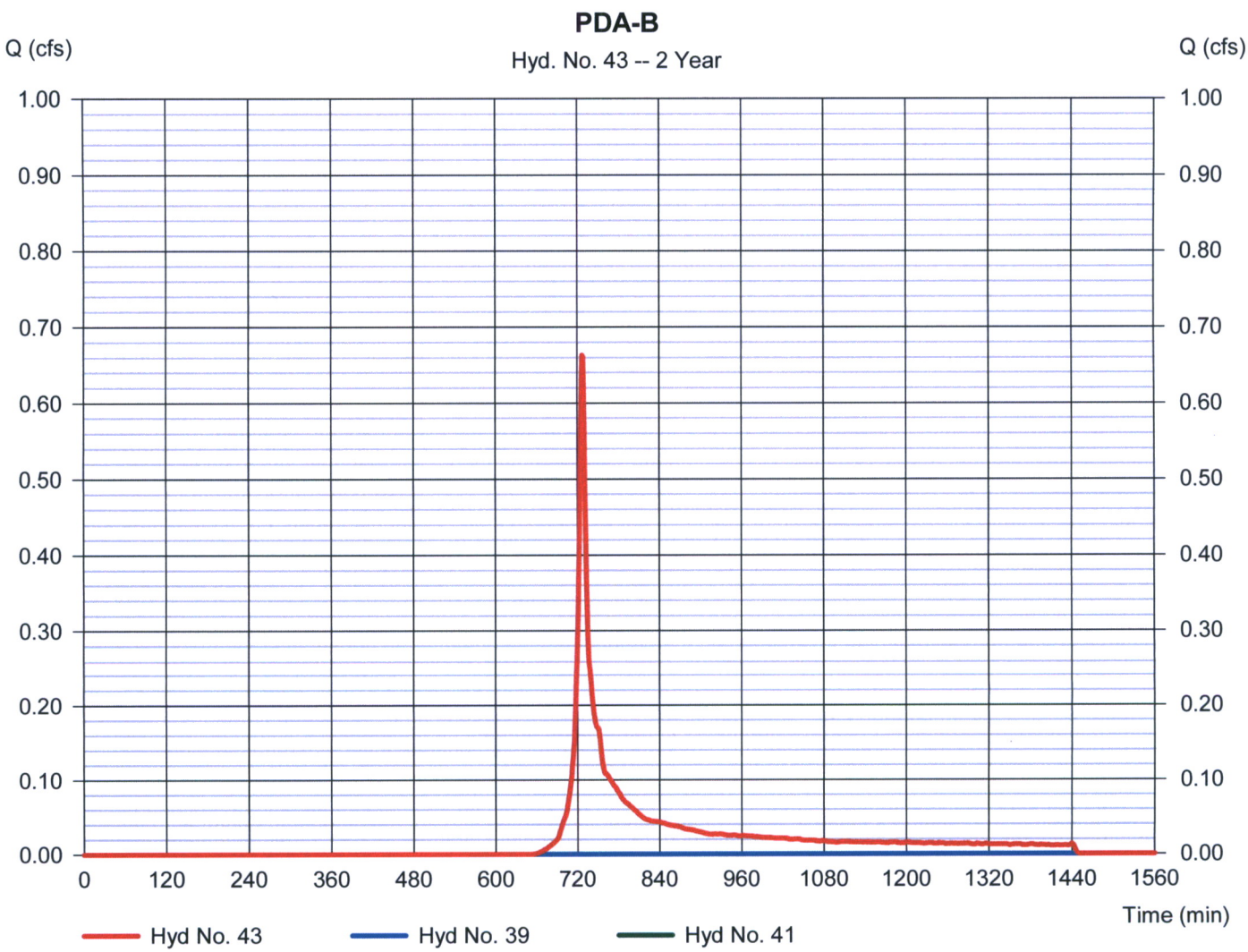


Hydrograph Report

Hyd. No. 43

PDA-B

Hydrograph type	= Combine	Peak discharge	= 0.663 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,888 cuft
Inflow hyds.	= 39, 41	Contrib. drain. area	= 0.500 ac

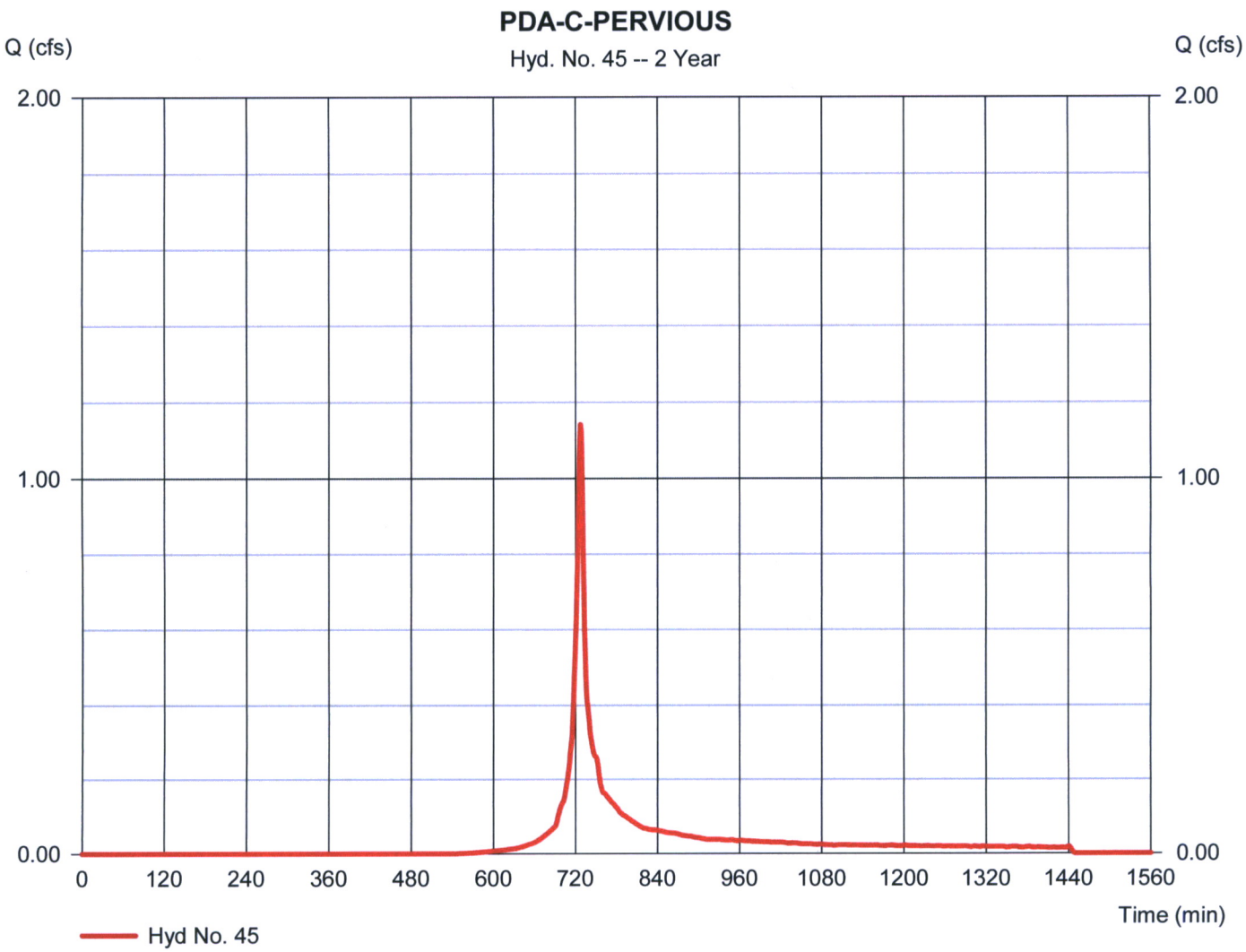


Hydrograph Report

Hyd. No. 45

PDA-C-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.142 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 3,146 cuft
Drainage area	= 0.560 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Rainfall	

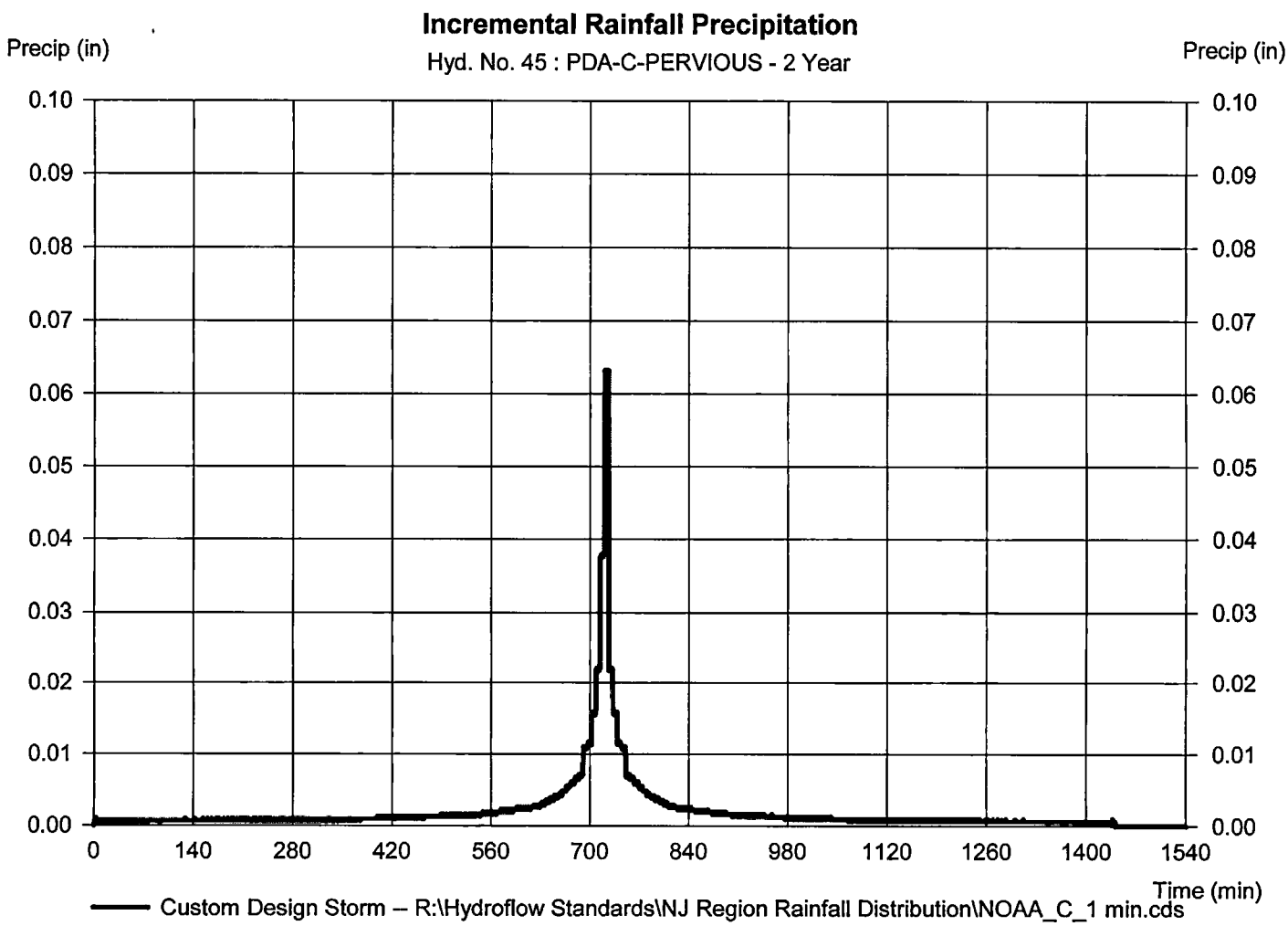


Precipitation Report

Hyd. No. 45

PDA-C-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

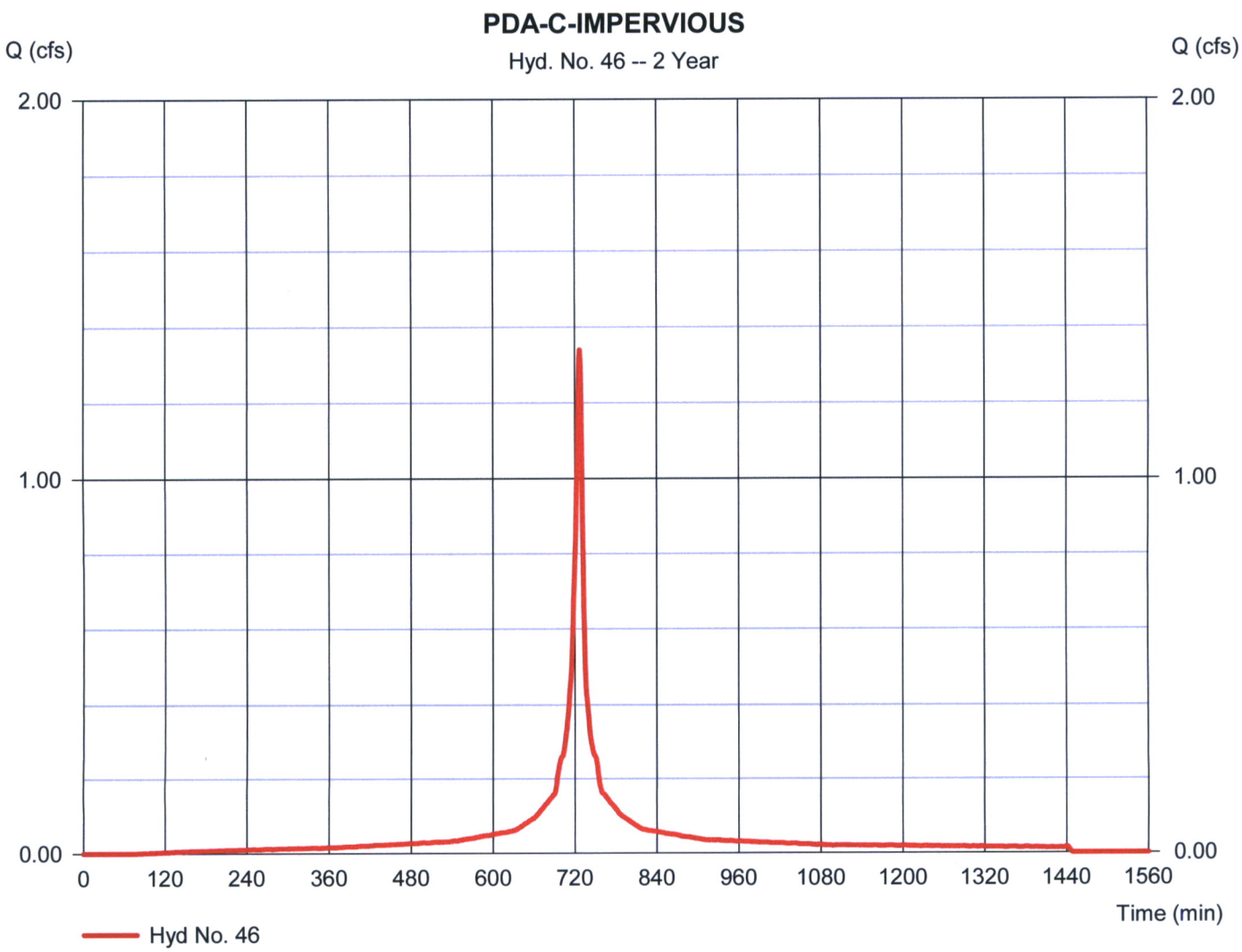


Hydrograph Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.340 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,278 cuft
Drainage area	= 0.380 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.50 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	

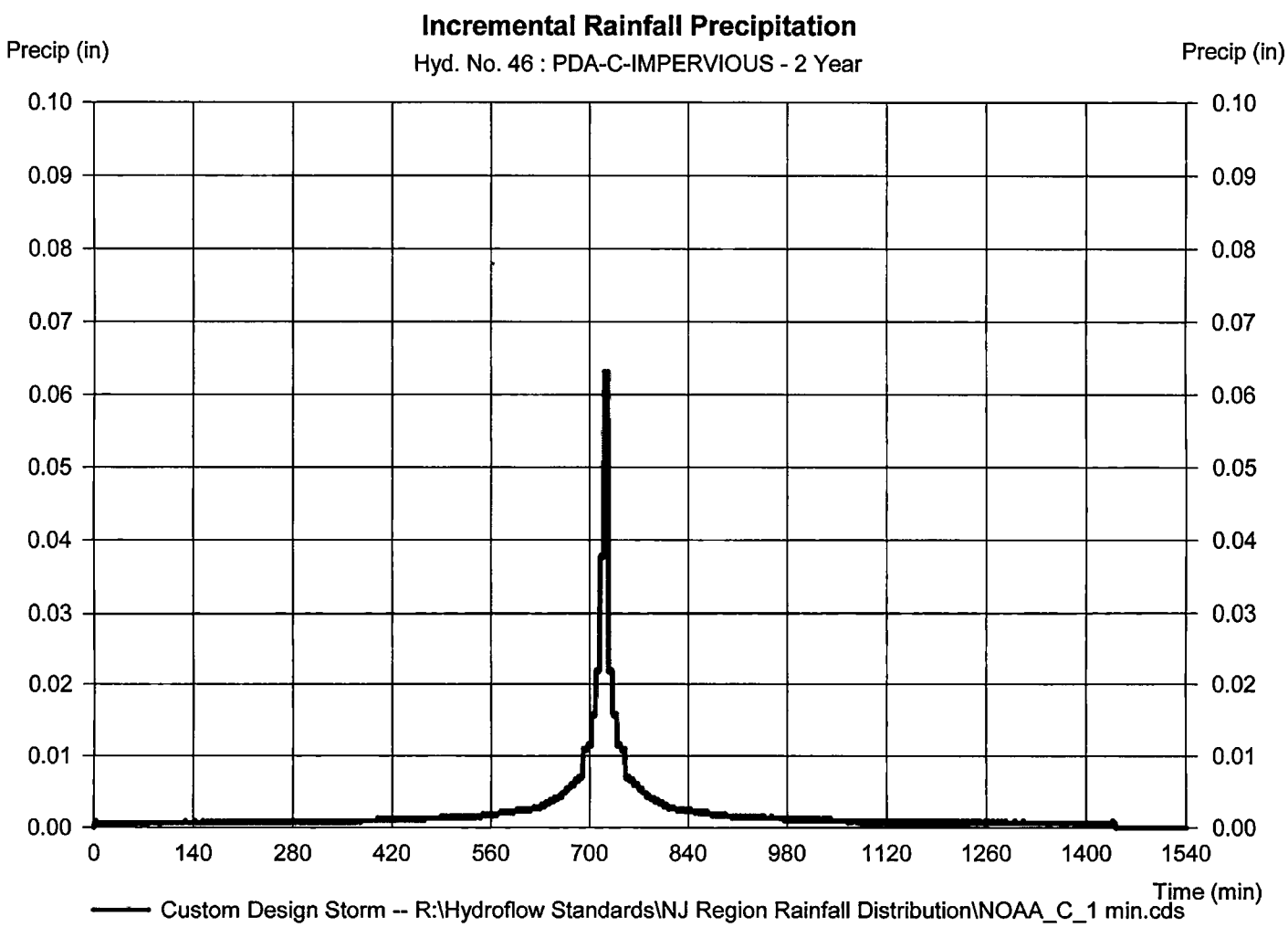


Precipitation Report

Hyd. No. 46

PDA-C-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

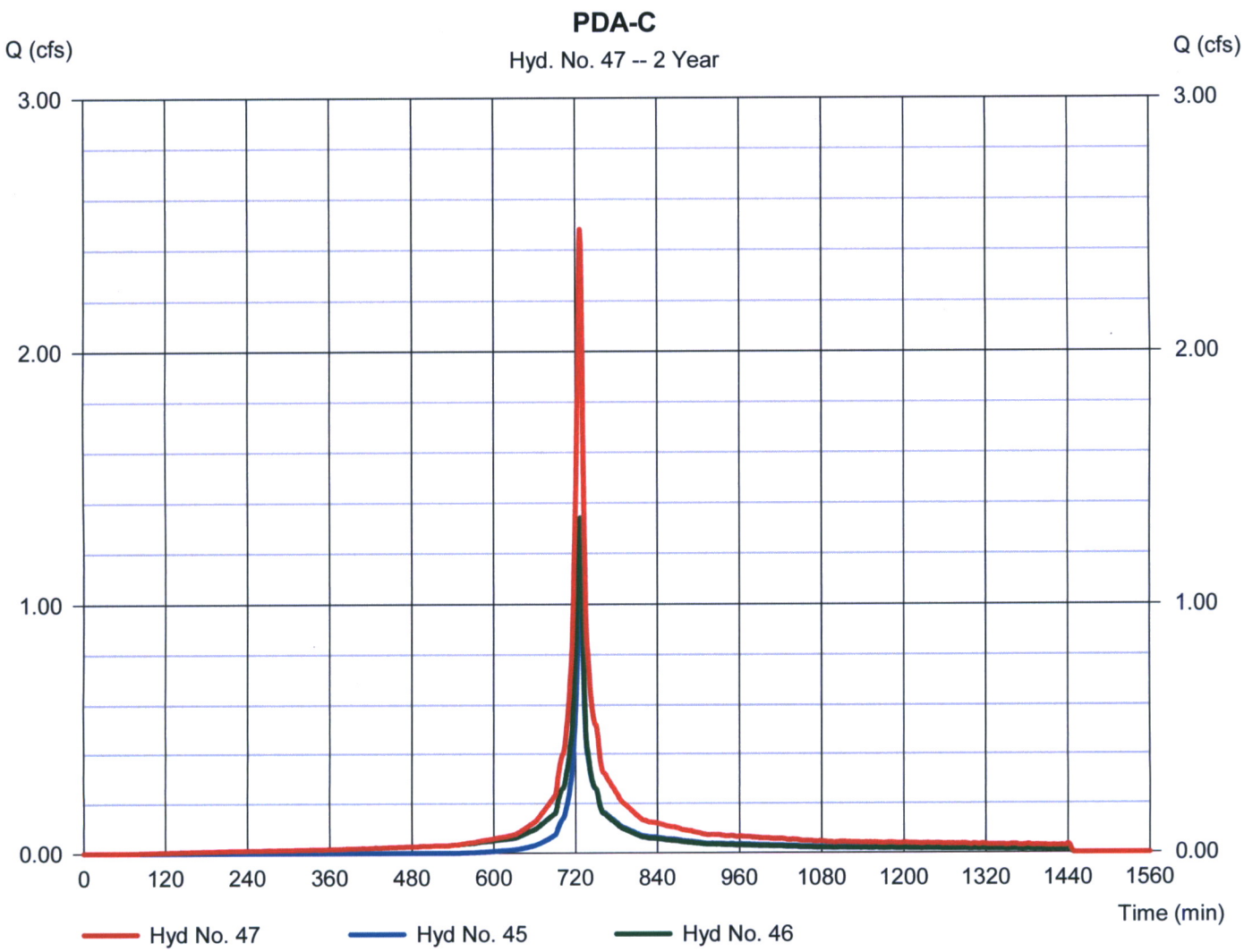


Hydrograph Report

Hyd. No. 47

PDA-C

Hydrograph type	= Combine	Peak discharge	= 2.481 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 7,424 cuft
Inflow hyds.	= 45, 46	Contrib. drain. area	= 0.940 ac

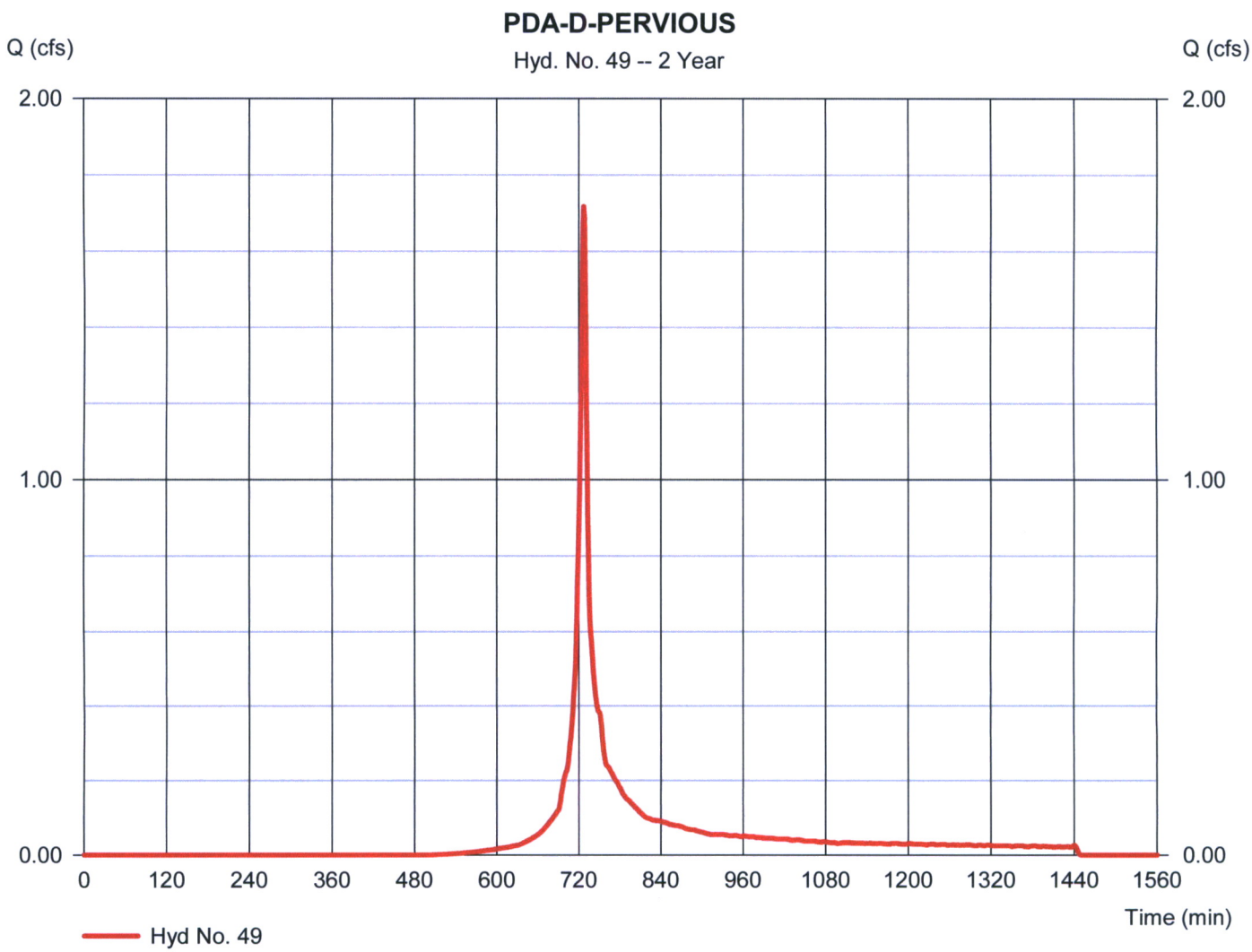


Hydrograph Report

Hyd. No. 49

PDA-D-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.717 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,733 cuft
Drainage area	= 0.770 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	

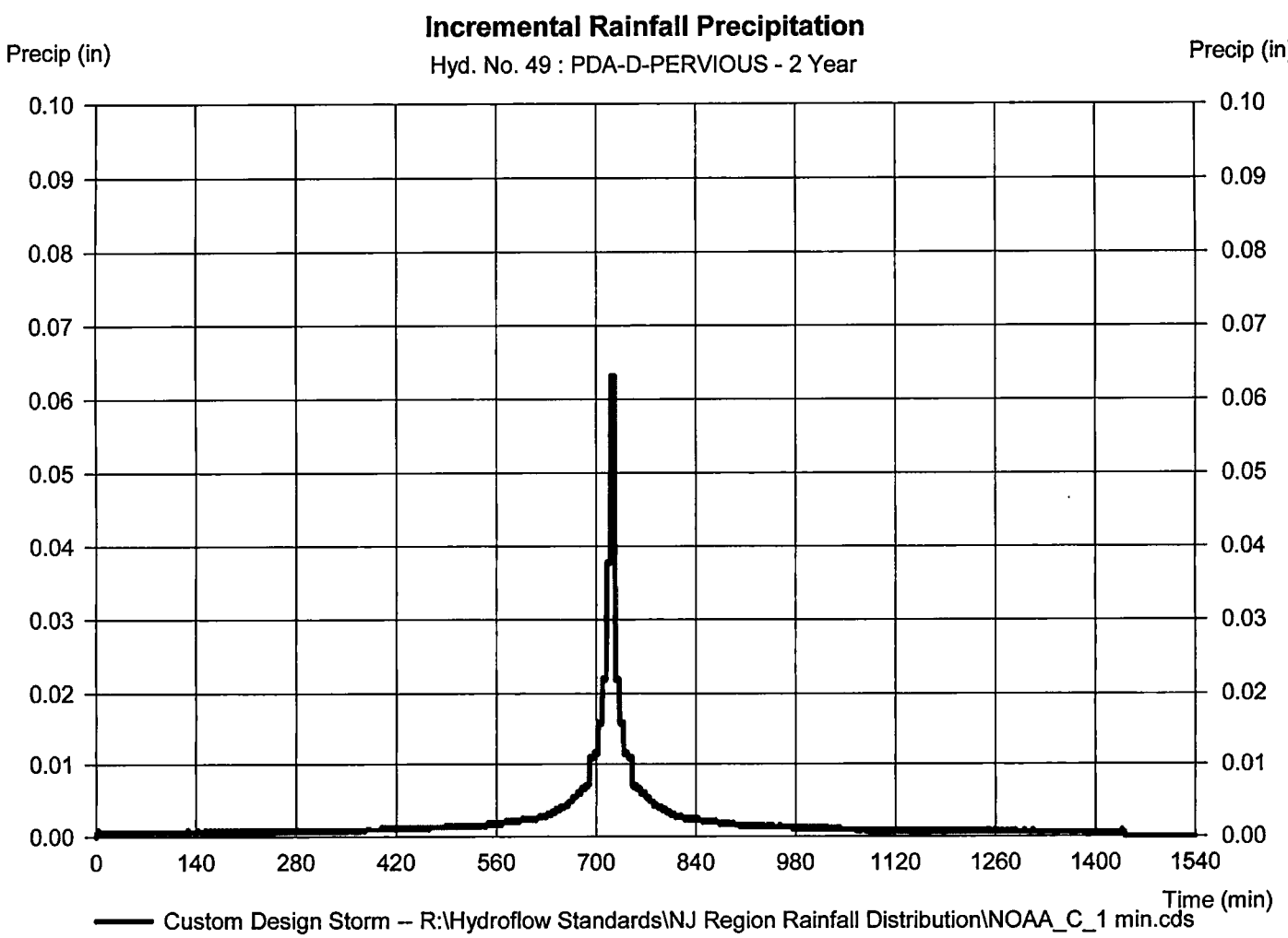


Precipitation Report

Hyd. No. 49

PDA-D-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

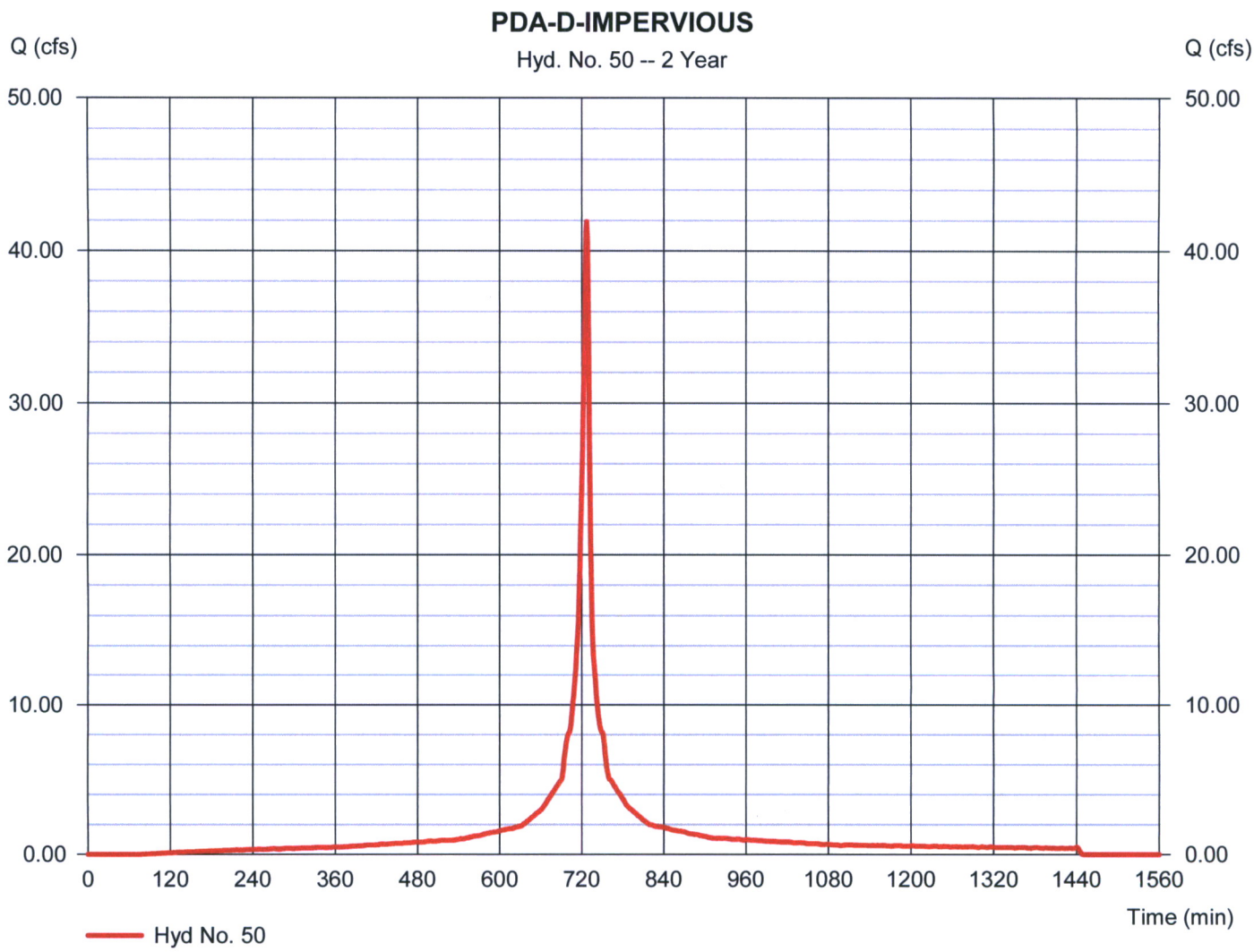


Hydrograph Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 41.92 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 133,855 cuft
Drainage area	= 11.890 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484AA_C_1 min.cds	Storm Distribution	

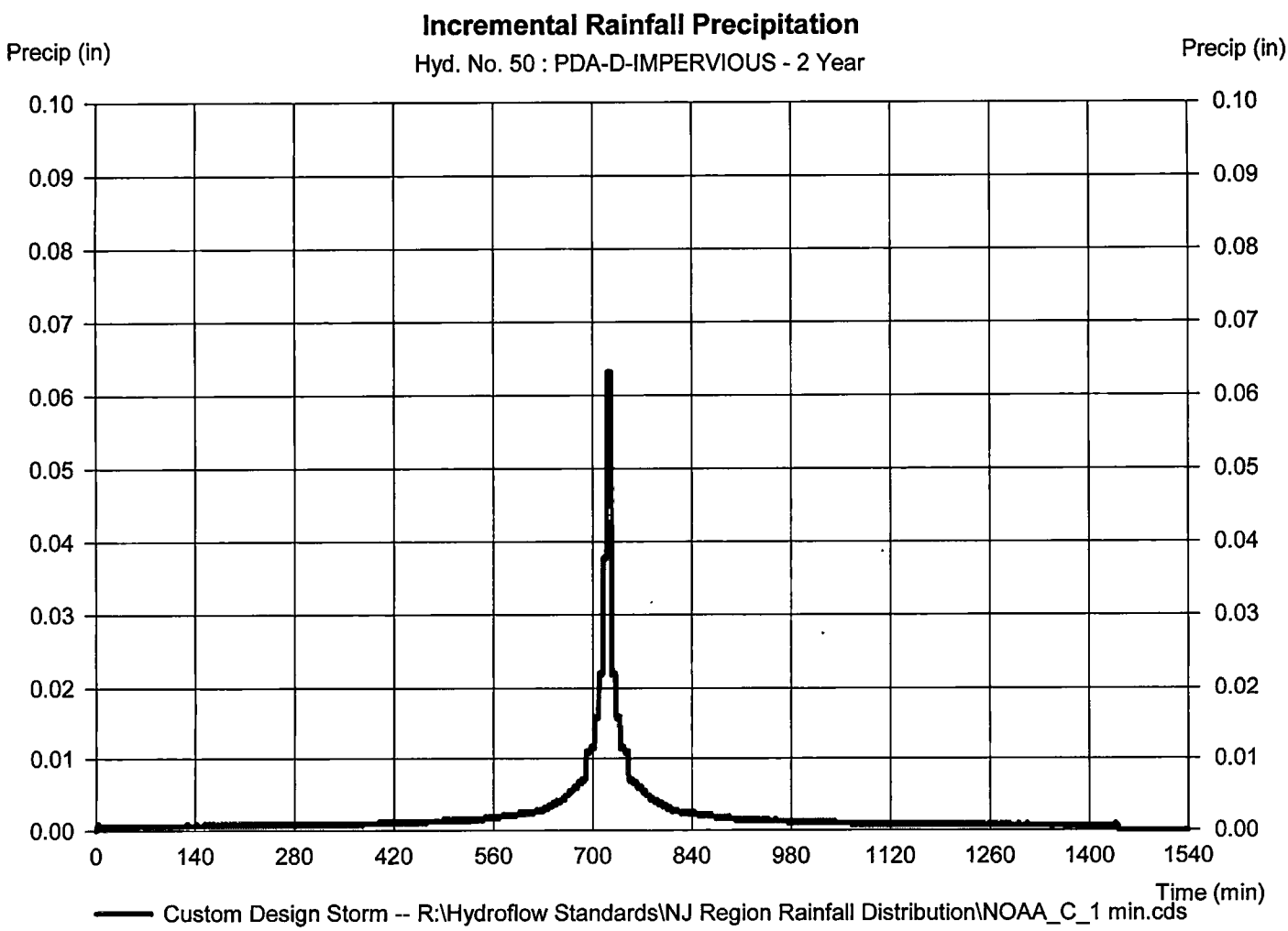


Precipitation Report

Hyd. No. 50

PDA-D-IMPERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

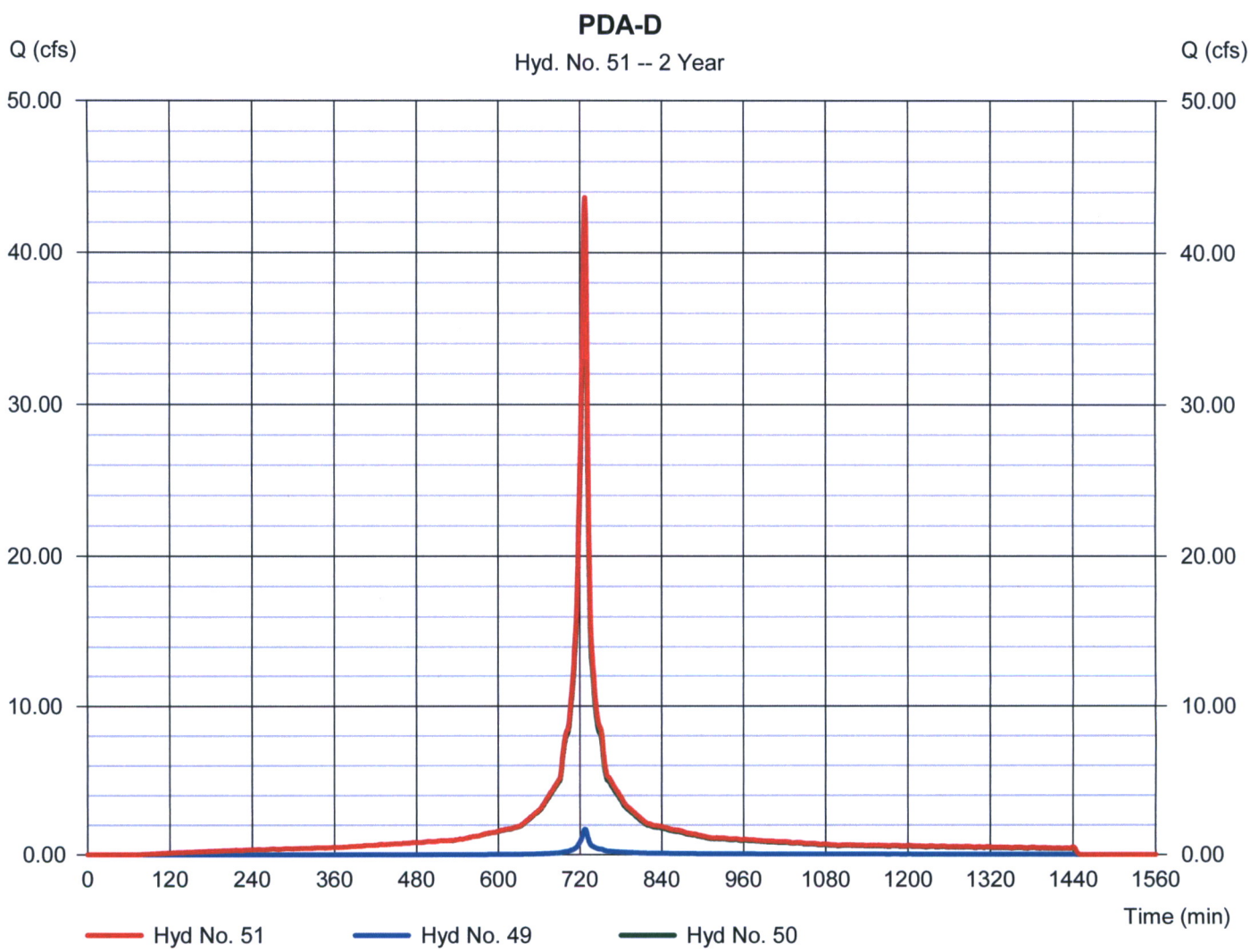


Hydrograph Report

Hyd. No. 51

PDA-D

Hydrograph type	= Combine	Peak discharge	= 43.64 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 138,588 cuft
Inflow hyds.	= 49, 50	Contrib. drain. area	= 12.660 ac



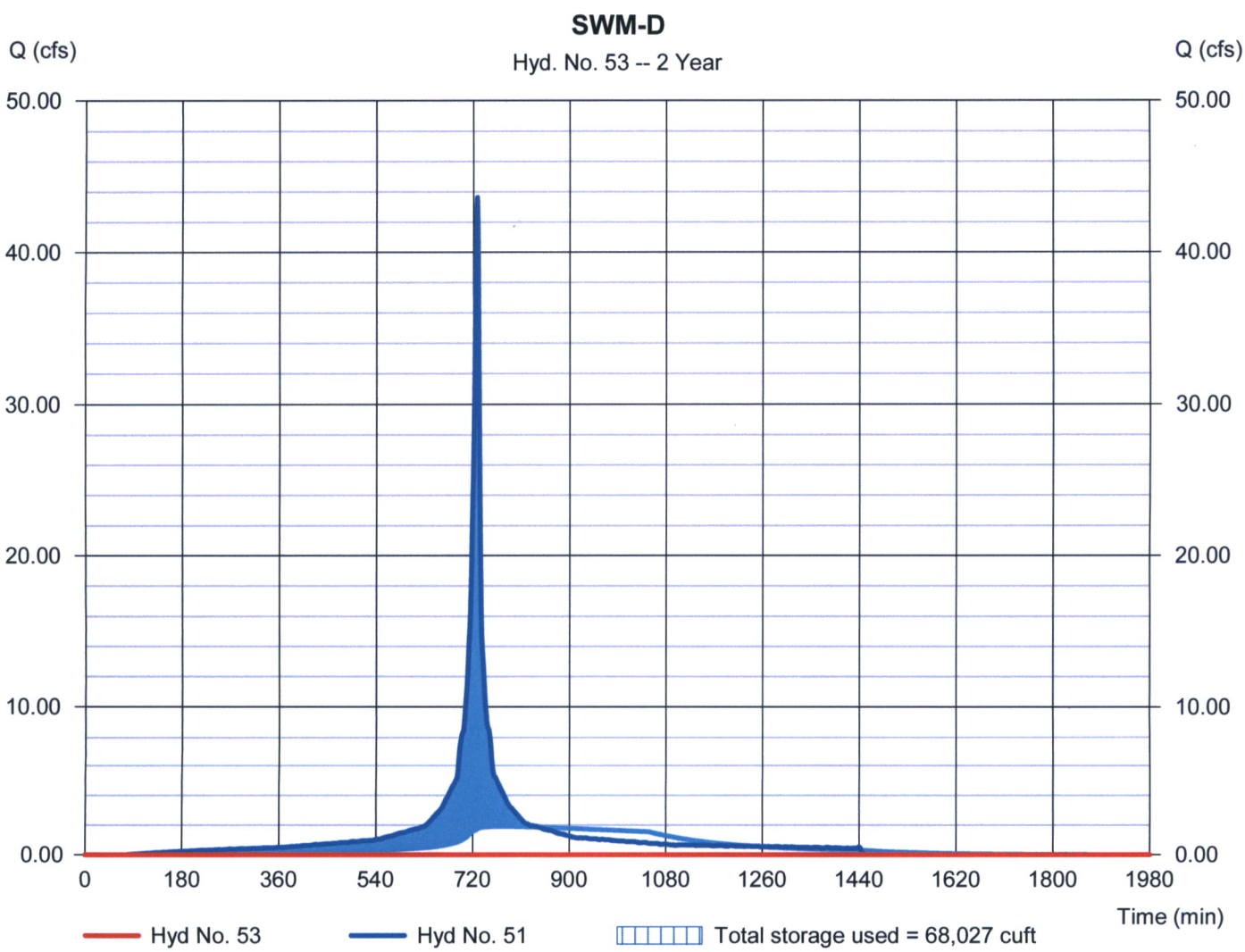
Hydrograph Report

Hyd. No. 53

SWM-D

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 677 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 51 - PDA-D	Max. Elevation	= 600.54 ft
Reservoir name	= SWM-D	Max. Storage	= 68,027 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Pond No. 4 - SWM-D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 598.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	598.00	23,768	0	0
1.00	599.00	26,054	24,900	24,900
2.00	600.00	28,387	27,209	52,109
3.00	601.00	30,767	29,566	81,675
4.00	602.00	33,193	31,969	113,644
5.00	603.00	35,667	34,419	148,064
6.00	604.00	38,187	36,916	184,980
7.00	605.00	40,754	39,460	224,439

Culvert / Orifice Structures

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

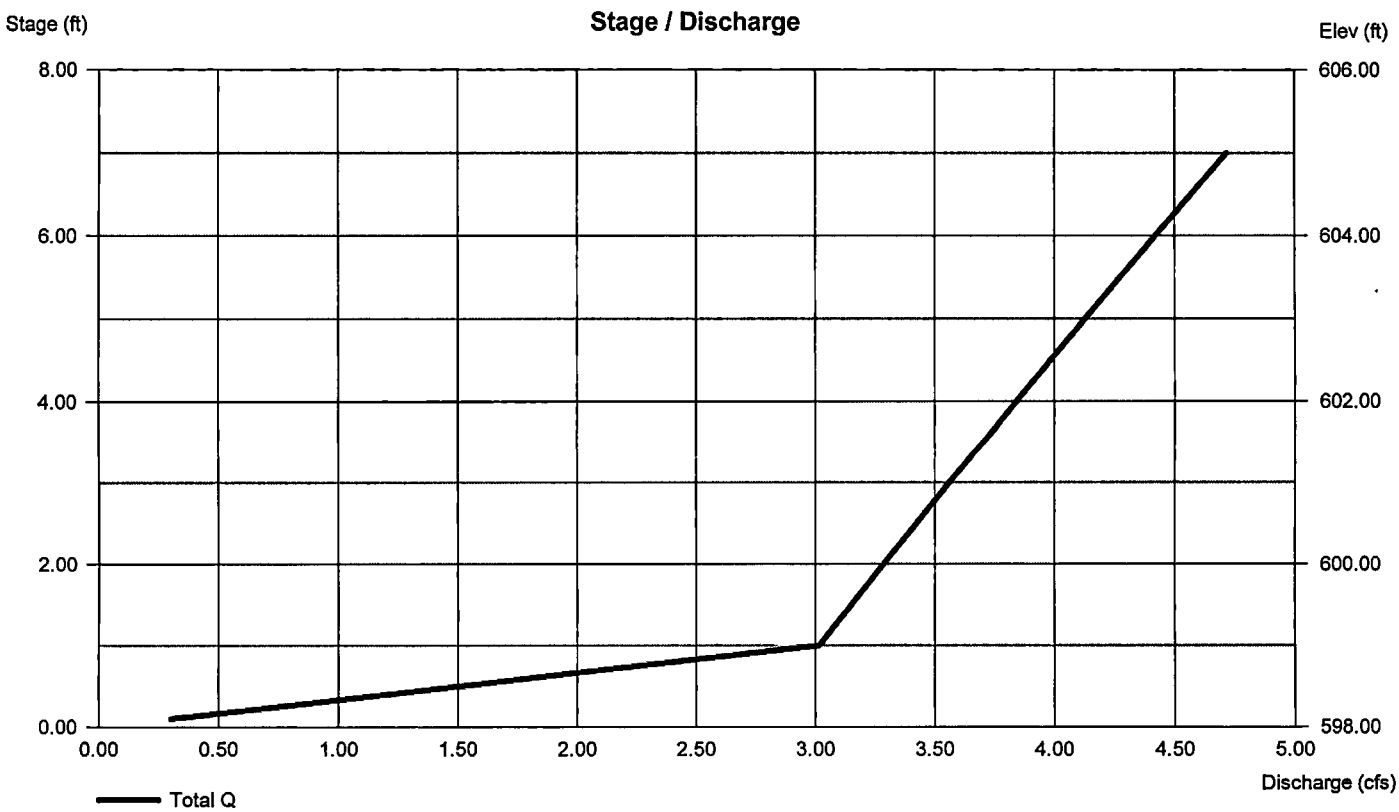
Weir Structures

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

Exfil.(in/hr) = 5.000 (by Contour)

TW Elev. (ft) = 0.00

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

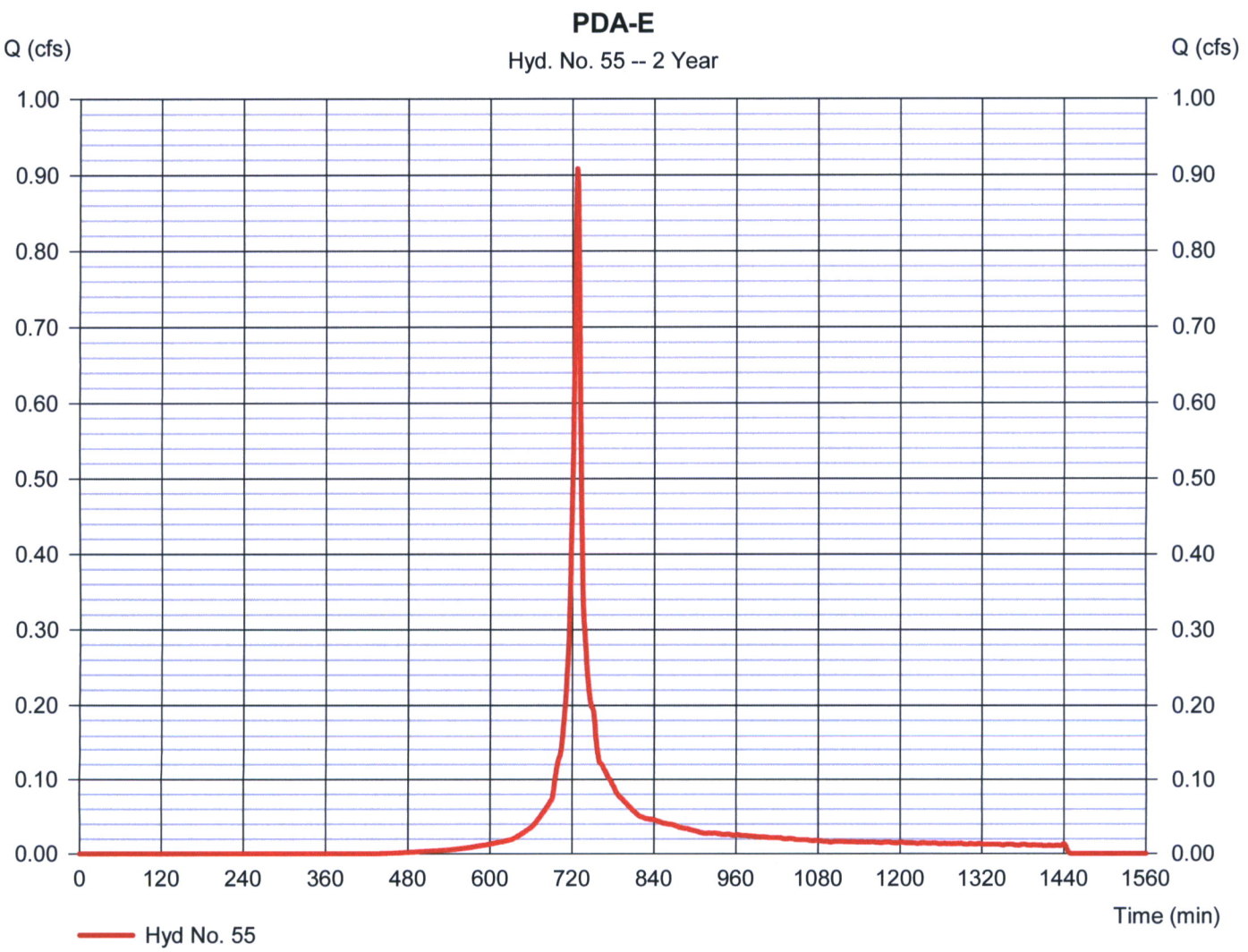


Hydrograph Report

Hyd. No. 55

PDA-E

Hydrograph type	= SCS Runoff	Peak discharge	= 0.908 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,520 cuft
Drainage area	= 0.360 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	

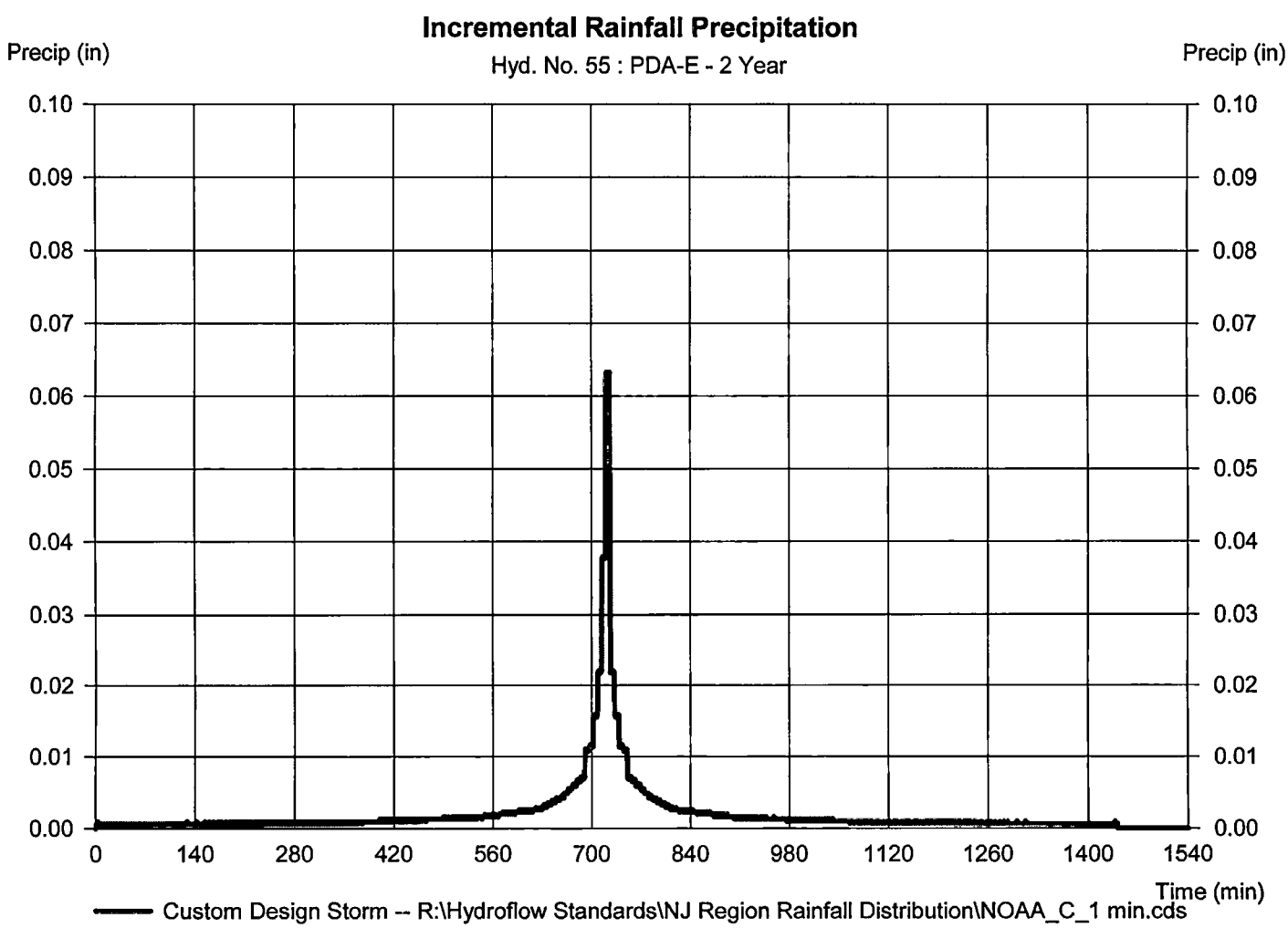


Precipitation Report

Hyd. No. 55

PDA-E

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

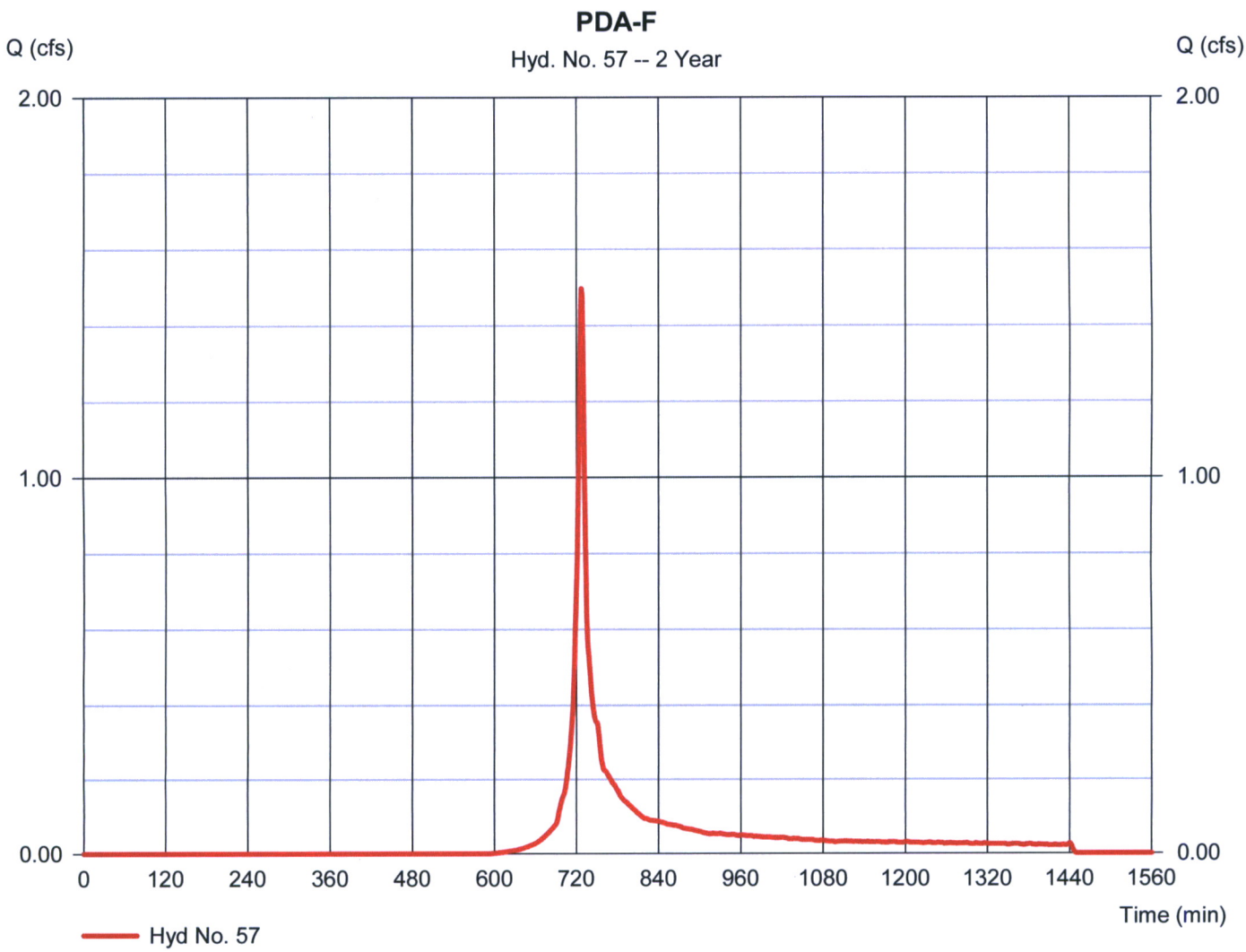


Hydrograph Report

Hyd. No. 57

PDA-F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.497 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,145 cuft
Drainage area	= 0.850 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\NJAA_C_1 min.cds	Storm Rainfall	



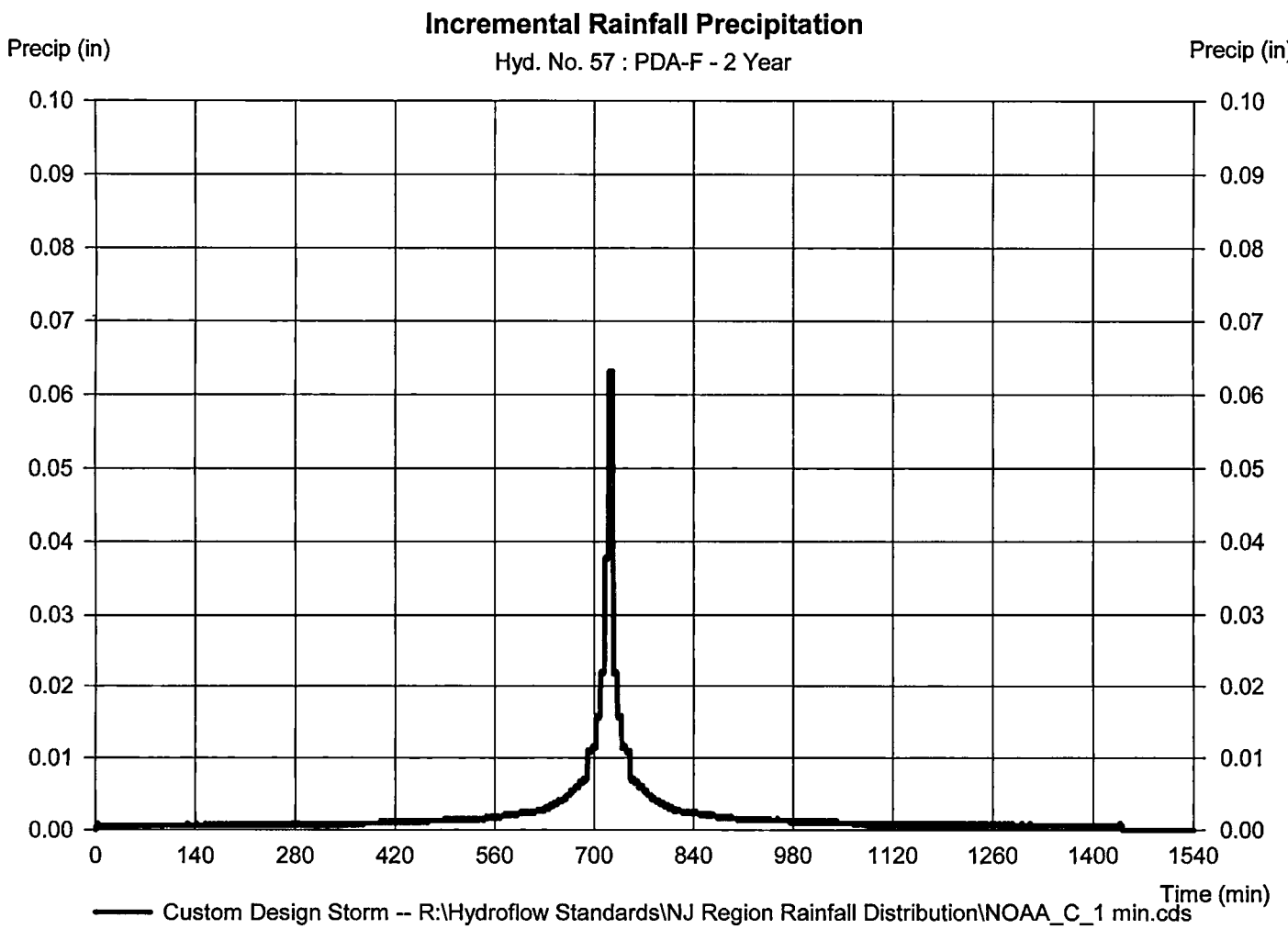
Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 2 / 2020

Hyd. No. 57

PDA-F

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds		

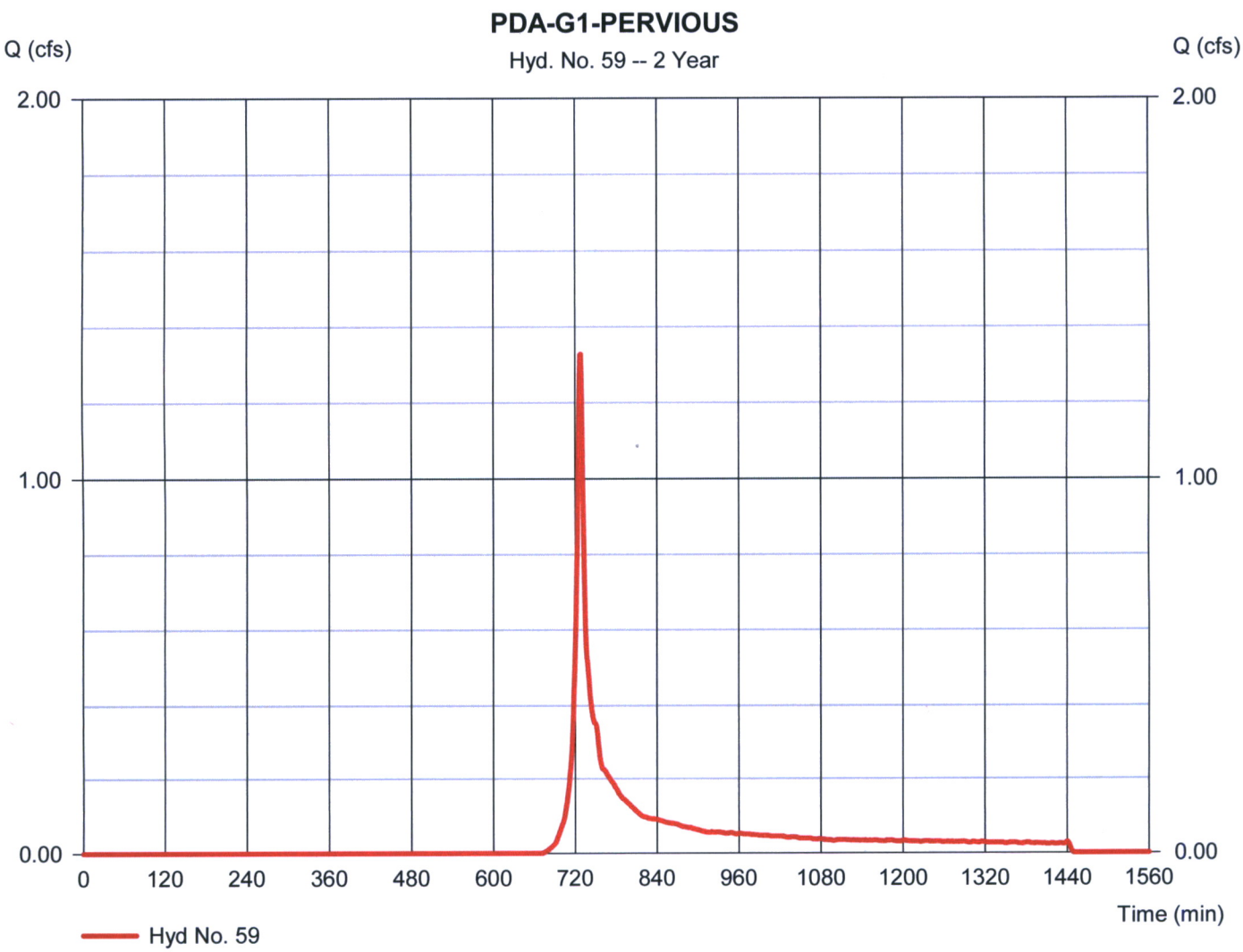


Hydrograph Report

Hyd. No. 59

PDA-G1-PERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.328 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 3,850 cuft
Drainage area	= 1.140 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.24 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Regional Rainfall Distribution\484A_C_1 min.cds	Storm Rainfall	



Precipitation Report

Hyd. No. 59

PDA-G1-PERVIOUS

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.2400 in	Distribution	= Custom
Storm duration	= R:\Hydroflow Standards\NJ Region Rainfall Distribution\NOAA_C_1 min.cds