THE WOLFE GROUP, L.L.C.
Land Planning, Consulting, & Civil Engineering

2401 W. Main Street, Suite 210
Battle Ground, WA 98604
(360) 687-2699

"VINEYARD VISTA"

Preliminary Technical Information Report

November 2023

11-10-23

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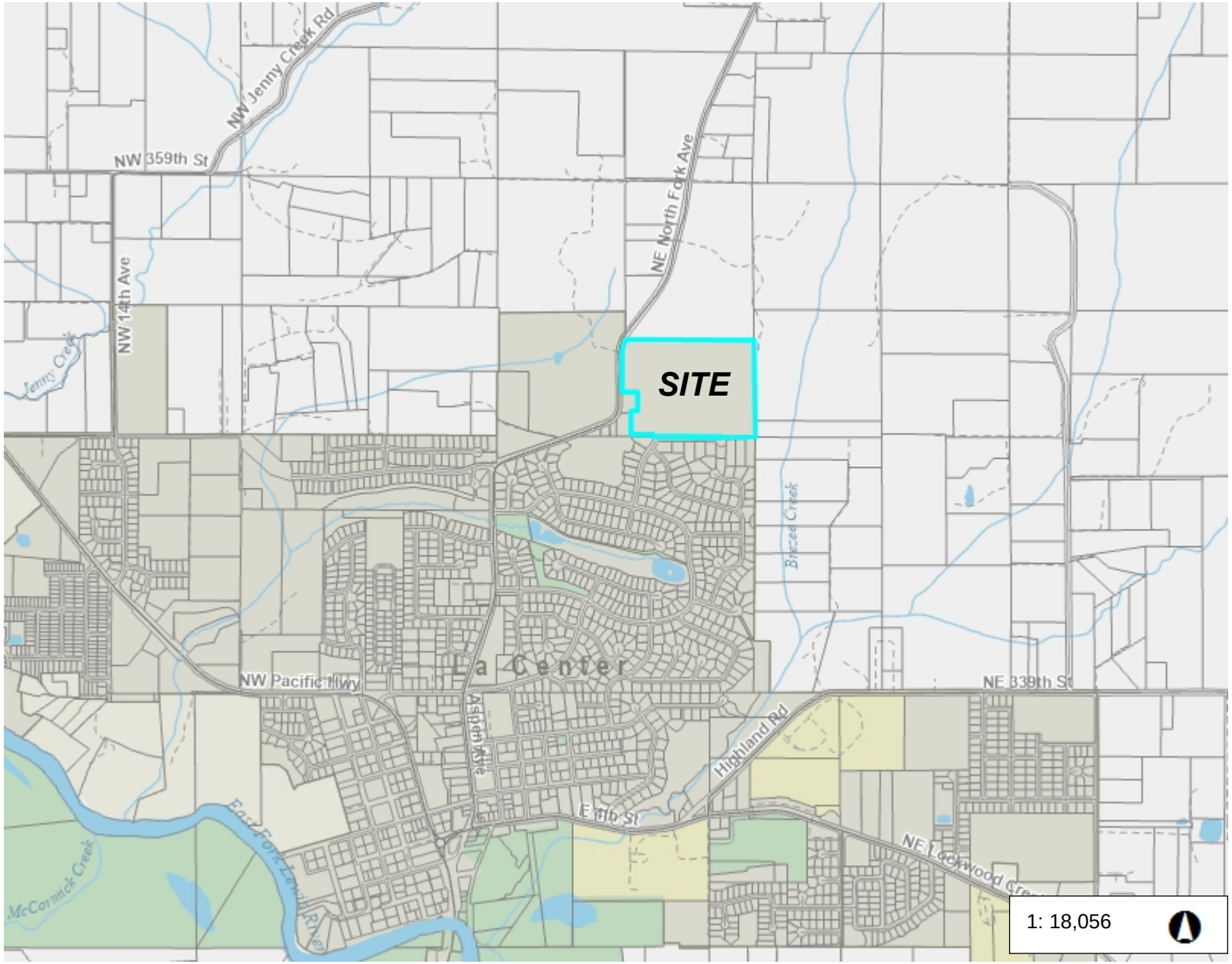
VICINITY MAPS

Vicinity Map
Soils Map
1955 Aerial Photo

VICINITY MAP



Legend

- Taxlots

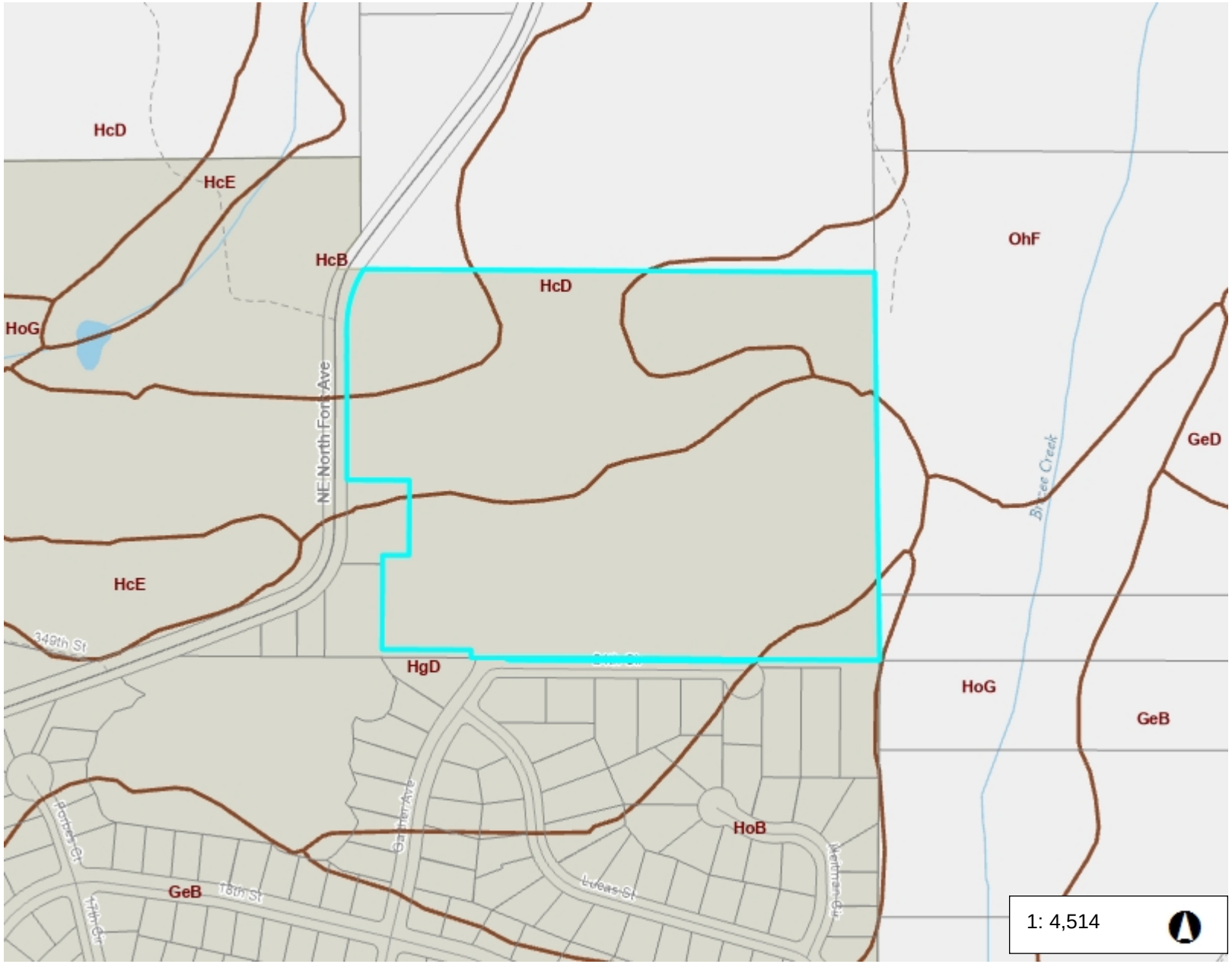
Notes:

1: 18,056

3,009.3 0 1,504.67 3,009.3 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

Soils Map



Legend

- Taxlots
- Soil Type

Notes:

752.3 0 376.17 752.3 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

1955 Aerial Photo

Legend

- Taxlots

Notes:

752.3 0 376.17 752.3 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

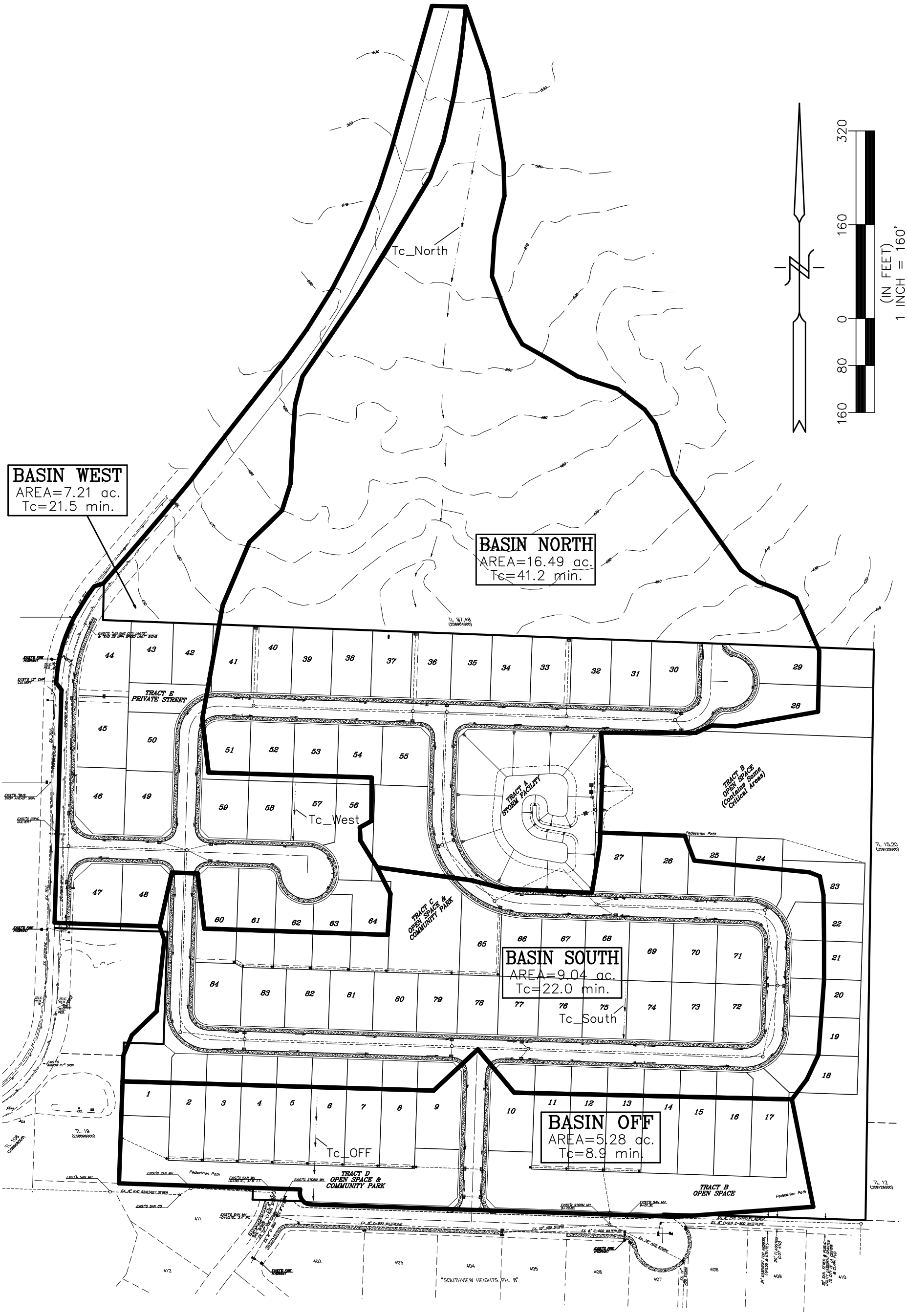
DEVELOPMENT PLAN

Drainage Basins

Flow Routes

"VINEYARD VISTA"

DEVELOPED DRAINAGE BASINS



SECTION A - PROJECT OVERVIEW

The project site consists of approximately 29.5 gross acres and lies along the eastern side of N.E. North Fork Avenue and north of N.E. 24th Circle. Approximately 24.5 acres is proposed for development. It is bordered on the west and south by N.E. North Fork Avenue and N.E. 24th Circle respectively. The existing "Southview Heights Phase 8" residential development project is served by N.E. 24th Circle and also lies south of the project site. Large undeveloped parcels lie north and east of the project site. The present land cover of the property is a combination of second growth forest and brush and a large portion of remnant vineyard. Approximately half of the property is in a forested state while half is covered by the remnants of the former vineyard. No structures other than a small existing shed are on the project site. Approximately 35% of the property drains in a southerly manner toward "N.E. 24th Circle and "Southview Heights Phase 8". The stormwater design of the "Southview Heights" project accounted for the stormwater runoff from this existing tributary area entering the stormwater system for that project. Therefore, the conveyance elements as well as the stormwater treatment and detention facilities have been designed to accommodate this existing runoff from the "Vineyard Vista" project. Approximately 15% of the property drains westward toward N.E. North Fork Avenue and drains through an existing culvert that conveys this runoff to the west side of N.E. North Fork Avenue. The remainder of the property drains in an easterly manner toward Brezee Creek. In fact, a very well defined drainage ravine exits the property site near the northeast corner of the site

An onsite wetpond and stormwater detention facility is proposed to treat and detain the stormwater runoff from the majority of the project site. The proposed stormwater facility is preliminarily located at the north central portion of the proposed development. This facility will contain both a wetpond and a live detention pond that will release stormwater to the aforementioned drainage ravine. The stormwater facility has been preliminarily designed to release stormwater flowrates that do not exceed the existing flowrates from the site draining eastward toward Brezee Creek.

Approximately 5.3 acres of the project site will continue draining southward to existing N.E. 24th circle and the "Southview Heights Phase 8" development. This is a reduction of the area draining in this direction by approximately 50%. Because of the area reduction and the fact that very little impervious area will be added in this region as a result of the proposed development, the stormwater flowrates from this southwardly draining area will not exceed those that presently exist. Therefore, no stormwater detention is needed for this runoff. As mentioned previously, this southward draining runoff entering the "Southview Heights" project has been accounted for in the design of the stormwater facilities for that project.

SECTION B – APPROVAL CONDITIONS SUMMARY

Not applicable for this preliminary report as no conditions are issued at this time.

SECTION C – DOWNSTREAM ANALYSIS

A downstream analysis is to be prepared during the final design phase of the project.

SECTION D – QUANTITY CONTROL ANALYSIS & DESIGN

In computing the runoff volume and discharges from the site, the Santa Barbara Urban Hydrograph computer program used by the King County Public Works Dept. was utilized. In using this program, some assumptions had to be made regarding the particular runoff curve numbers to use. Because the predominant hydrological soil group present at the site is group "C", pervious curve numbers of 82 (vineyard) and 81 (forest) have been determined to exist on the site. A pervious curve number of 86 has been used to represent the lawns, landscaped areas, and other open areas after development. A curve number of 98 is used for the impervious surfaces which consist of the streets, sidewalks, driveways, and roofs. These curve numbers were obtained from Table III-1.3 of the Stormwater Management Manual for the Puget Sound Basin. The amounts of pervious and impervious acreage existing and predicted for the site are shown in
Tables 1 & 2.

TABLE 1:

EXISTING AREA QUANTITIES (acres)							
Drainage Basin:	Total Area:	Streets & Sidewalks:	Driveways:	Roofs:	Contrib. Impervious Area: (Roofs incl.):	Contrib. Impervious Area: (no Roofs):	Contrib. Pervious Area:
Basin A	17.90	0.00	0.00	0.00	0.00	0.00	17.90
Basin B	2.57	0.00	0.00	0.00	0.00	0.00	2.57
Basin C	10.34	0.01	0.00	0.04	0.05	0.01	10.29
Basin D	7.56	0.41	0.08	0.03	0.52	0.49	7.04
TOTALS:	38.37			**TOTALS:**	0.00	0.50	37.80

TABLE 2:

DEVELOPED AREA QUANTITIES (acres)							
Drainage Basin:	Total Area:	Streets & Sidewalks:	Driveways:	Roofs:	Contrib. Impervious Area: (Roofs incl.):	Contrib. Impervious Area: (no Roofs):	Contrib. Pervious Area:
Basin North	16.49	1.31	0.31	2.27	3.89	1.62	12.60
Basin South	9.04	2.26	0.61	3.54	6.41	2.87	2.63
Basin West	7.21	1.23	0.25	1.45	2.93	1.48	4.28
Basin OFF	5.28	0.27	0.00	0.00	0.27	0.27	5.01
TOTALS:	38.02			**TOTALS:**	13.50	6.24	24.52
Basin North Roof Area consists of 0.50 ac. for pond surface							
Each Roof Area assumed to be 3,500 SF							
Each Driveway Area assumed to be 600 SF							

The actual computer modeled runoff calculations are presented in appendix I. In **Tables 3 & 4**, the predicted and existing peak discharges from the project are tabulated by basin. The values presented in these tables have been obtained with the Santa Barbara Urban Hydrograph computer program by inputting those values listed in **Tables 1 & 2**.

TABLE 3: Developed Runoff Volumes/Discharge

DEVELOPED RUNOFF VOLUMES/DISCHARGE										
	66% 2-Yr, 24-hr. (6 month storm)		**2 yr., 24 hr. Storm**		**10 yr., 24 hr. Storm**		**25 yr., 24 hr. Storm**		**100 yr., 24 hr. Storm**	
Drainage Basin	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):
Basin North	1.28	37,600	3.01	77,100	5.05	121,400	6.27	147,300	8.80	200,900
Basin South	2.11	37,300	3.68	64,400	5.30	92,500	6.21	108,300	8.04	140,200
Basin West	1.09	21,400	2.20	40,400	3.42	61,000	4.12	72,800	5.57	97,100
Basin OFF	0.62	11,500	1.57	24,800	2.64	39,600	3.26	48,200	4.53	65,900
TOTALS:	5.10	107,800	10.46	206,700	16.41	314,500	19.86	376,600	26.94	504,100

TABLE 4: Existing Runoff Volumes/Discharge

	EXISTING RUNOFF VOLUMES/DISCHARGE							
	2-Yr, 24-hr. Storm		10 yr., 24 hr. Storm		25 yr., 24 hr. Storm		100 yr., 24 hr. Storm	
Drainage Basin	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):
Basin A	1.95	60,800	3.92	105,000	5.13	131,200	7.68	186,600
Basin B	0.28	8,700	0.55	15,060	0.72	18,860	1.09	26,800
Basin C	1.60	36,300	3.13	62,200	4.06	77,700	6.03	109,800
Basin D	1.23	28,000	2.30	48,050	2.95	59,500	4.31	83,400
TOTALS:	5.06	133,800	9.90	230,310	12.86	287,260	19.11	406,600

The detention facility proposed for the development consists of a proposed surface pond that will "stack" live storage volume above the permanent wet pool volume. The hydrographs for the various design storms for the site have been added together and routed through the proposed facility (see Appendix II). The results are shown in **Table 5**. The values shown in **Table 5** represent our final design values after the volume correction factor has been applied. The volume correction factor is based on the sites developed impervious cover and is calculated in Appendix II for the detention facility.

TABLE 5: PROPOSED DETENTION FACILITY PERFORMANCE

Storm Event:	Release Rate:	Allowable Release Rate:	Peak Storage:	Peak Stage:	% of allowable release rate:
2 yr., 24 hr.	1.94 cfs	2.23 cfs	65,700 ft^3	403.95'	87%
10 yr., 24 hr.	3.54 cfs	4.47 cfs	99,390 ft^3	405.55'	79%
25 yr., 24 hr.	4.31 cfs	5.85 cfs	114,980 ft^3	406.23'	74%
100 yr., 24 hr.	6.57 cfs	8.77 cfs	143,740 ft^3	407.41'	75%

Beginning stage elevation=400.00'

The stormwater facility locations and elevations are readily seen on the preliminary stormwater plan. All detailed information regarding the outlet structure and construction of the facility will be presented on the final engineering drawings.

SECTION E – CONVEYANCE SYSTEMS ANALYSIS & DESIGN

The stormwater conveyance system proposed for the project consists primarily of a series of inlets and storm piping that delivers the site stormwater runoff to the stormwater management facility.

The capacity of each pipe will be analyzed during final design using Manning's Equation for pipe flow with a Manning's roughness coefficient of 0.012. Pipe sizes are expected to range from 8" to 18" in diameter.

SECTION F – WATER QUALITY DESIGN

A wetpond is proposed to treat the contributing runoff from the site. The proposed wetpond will serve drainage basins North, South, & West and is located at the north central portion of the project site. The 6-month, 24-hr. storm runoff volume that will be stored in this wetpond is approximately 96,000 cubic feet. This is the volume of developed runoff from drainage basins North, South, & West during the 6-month, 24-hr storm event.

As can be seen, the treatment requirements of the City of La Center Stormwater Ordinance have been met for all runoff entering the proposed wetpond.

SECTION G- SOILS EVALUATION

The Soil Conservation Service maps the majority of soil on the site as Hesson clay loam (HcB, HcD, HgD) of hydrological soil group "C". The northeast corner of the property is mapped to contain Olequa silty clay loam (OhF) also of hydrological soil group "C". There is a very small area at the southeast corner of the property mapped as Hillsboro silt loam (HoB) of hydrologic group "B". Due to the silty characteristics of all of the onsite soils, infiltration is not being proposed for this site. A geotechnical site investigation has been performed by True North Geotechnical Services. Their report will be provided to the City of La Center.

SECTION H - SPECIAL REPORTS AND STUDIES

A Geotechnical Site Investigation has been performed by True North Geotechnical Services.

SECTION I - OTHER PERMITS

An NPDES Permit from the Washington State Department of Ecology is required for this project and shall be obtained prior to construction. In conjunction with the NPDES permit, a Stormwater Pollution Prevention Plan (SWPPP) will also be prepared.

SECTION J – GROUNDWATER MONITORING

Not applicable

SECTION K – MAINTENANCE & OPERATIONS MANUAL

A homeowner's association (HOA) is to be established by the applicant or owner that shall specify that the stormwater facilities must be maintained regularly by the Homeowner's Association in order to provide for the long-term function of said facilities.

Primary maintenance items associated with the stormwater facilities consist of, but are not limited to, the following:

Cleaning of debris/litter that may accumulate in or around stormwater facilities.
Inspection of outfall structure (orifice/riser) to prevent plugging or clogging.
Inspection of inlets, pipes, outfalls to prevent plugging or clogging.
Inspection of fences encompassing stormwater facilities to insure effectiveness.

SECTION L - TECHNICAL APPENDIX

Appendix I
Runoff Calculations
Existing Conditions Basin Map
Developed Conditions Basin Map

Appendix II
Detention Calculations

Appendix III
Water Quality Calculations

Appendix I

Runoff Calculations

Existing Conditions Basin Map

Developed Conditions Basin Map

Developed Condition

DEVELOPED RUNOFF VOLUMES/DISCHARGE

	66% 2-Yr, 24-hr. (6 month storm)		2 yr., 24 hr. Storm		10 yr., 24 hr. Storm		25 yr., 24 hr. Storm		100 yr., 24 hr. Storm	
Drainage Basin	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):
Basin North	1.28	37,600	3.01	77,100	5.05	121,400	6.27	147,300	8.80	200,900
Basin South	2.11	37,300	3.68	64,400	5.30	92,500	6.21	108,300	8.04	140,200
Basin West	1.09	21,400	2.20	40,400	3.42	61,000	4.12	72,800	5.57	97,100
Basin OFF	0.62	11,500	1.57	24,800	2.64	39,600	3.26	48,200	4.53	65,900
TOTALS:	5.10	107,800	10.46	206,700	16.41	314,500	19.86	376,600	26.94	504,100

DEVELOPED AREA QUANTITIES (acres)

Drainage Basin:	Total Area:	Streets & Sidewalks:	Driveways:	Roofs:	Contrib. Impervious Area: (Roofs incl.):	Contrib. Impervious Area: (no Roofs):	Contrib. Pervious Area:	
Basin North	16.49	1.31	0.31	2.27	3.89	1.62	12.60	Comp. Perv. CN=82 (9.
Basin South	9.04	2.26	0.61	3.54	6.41	2.87	2.63	Perv. CN=86
Basin West	7.21	1.23	0.25	1.45	2.93	1.48	4.28	Comp. Perv. CN=83 (2.
Basin OFF	5.28	0.27	0.00	0.00	0.27	0.27	5.01	Perv. CN=86
TOTALS:	38.02			**TOTALS:**	13.50	6.24	24.52	

Basin North Roof Area consists of 0.50 ac. for pond surface

Each Roof Area assumed to be 3,500 SF

Each Driveway Area assumed to be 600 SF

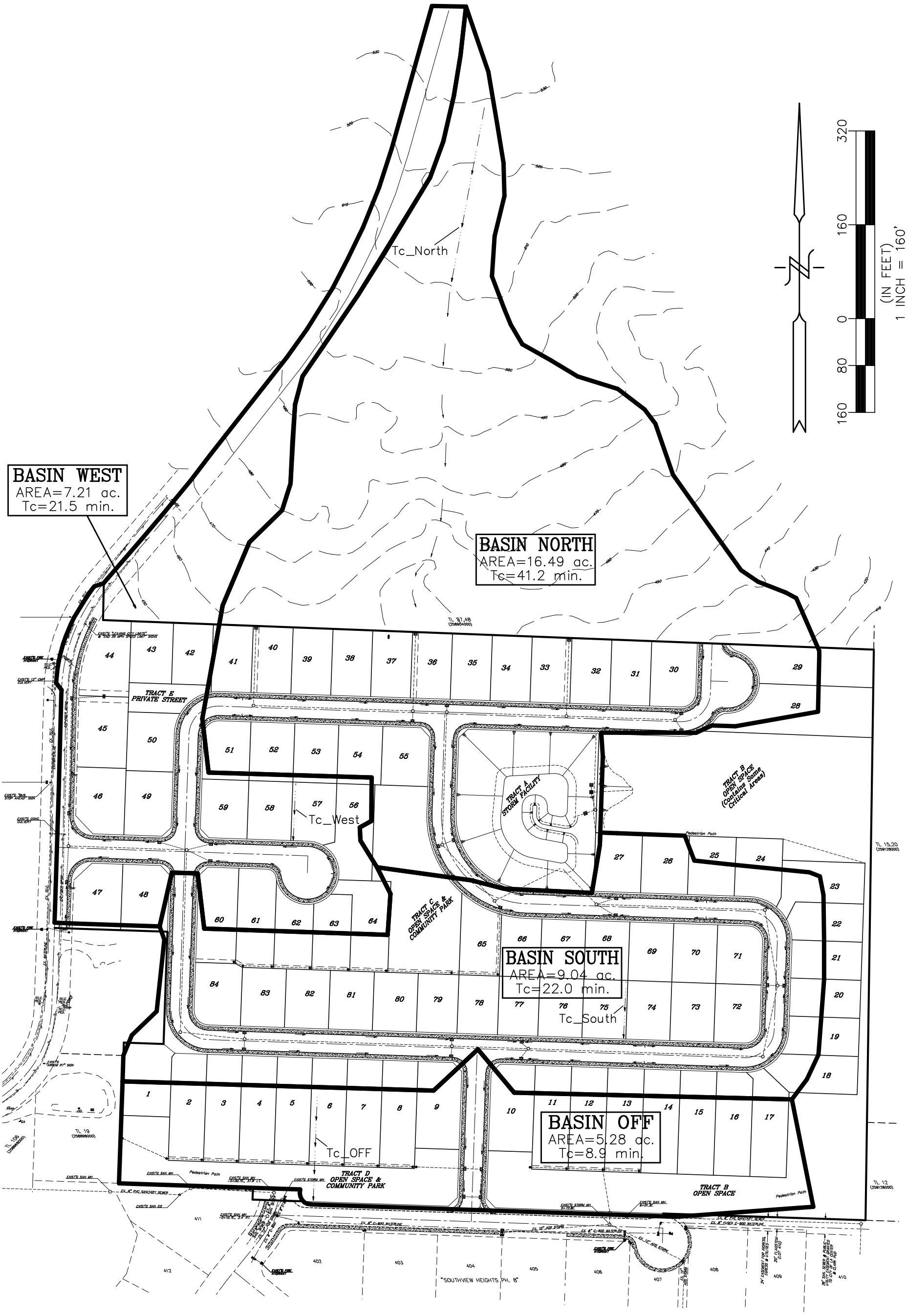
DEVELOPED TIME OF CONCENTRATION CALCULATIONS

	Sheet Flow				Gutter Flow				
	2 yr., 24 hr. rainfall total (inches) 2.5								
Drainage Basin:	Flow Length (ft.):	Average Slope (ft./ft.):	Rough. Coeff. (n):	Overland Flow Time (min.):	Flow Length (ft.):	Average Slope (ft./ft.):	Shallow Conc. Flow Time (min.):	Total Time of Conc. (min.)	Drainage Basin:
Basin North	300	0.065	0.400	35.6	600	0.130	5.5	41.2	**Basin North**
Basin South	100	0.010	0.240	20.8	250	0.015	1.3	22.0	**Basin South**
Basin West	100	0.010	0.240	20.8	150	0.015	0.8	21.5	**Basin West**
Basin OFF	205	0.230	0.240	10.5	220	0.014	1.1	11.7	**Basin OFF**

Shallow Conc.Flow (n

"VINEYARD VISTA"

DEVELOPED DRAINAGE BASINS



Basin North (Developed)

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
12.6 82 3.89 98 41.2

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      16.5       12.6  82.0    3.9  98.0       41.2

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.28          8.00          37594

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_N_BIO


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
12.6 82 3.89 98 41.2

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      16.5       12.6  82.0    3.9  98.0       41.2

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.01          8.00          77135

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_N_2


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
12.6 82 3.89 98 41.2

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      16.5       12.6  82.0    3.9  98.0       41.2

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      5.05          7.83         121405

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_N_10
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------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
12.6 82 3.89 98 41.2

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      16.5       12.6  82.0    3.9  98.0       41.2

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      6.27          7.83         147341

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_N_25


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
12.6 82 3.89 98 41.2

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      16.5       12.6  82.0    3.9  98.0       41.2

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      8.80          7.83         200930

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_N_100
```

Basin South (Developed)

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.63 86 6.41 98 22

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       9.0       2.6  86.0    6.4  98.0       22.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      2.11          7.83          37258

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_S_BIO


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.63 86 6.41 98 22

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       9.0       2.6  86.0    6.4  98.0       22.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.68          7.83          64438

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_S_2


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.63 86 6.41 98 22

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       9.0       2.6  86.0    6.4  98.0       22.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      5.30          7.83          92501

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_S_10
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------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.63 86 6.41 98 22

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       9.0       2.6  86.0    6.4  98.0       22.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      6.21          7.83         108300

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_S_25


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.63 86 6.41 98 22

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       9.0       2.6  86.0    6.4  98.0       22.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      8.04          7.83         140167

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_S_100
```

Basin West (Developed)

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
4.28 83 2.93 98 21.5

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.2       4.3  83.0    2.9  98.0       21.5

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.09          7.83          21356

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_W_BIO


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
4.28 83 2.93 98 21.5

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.2       4.3  83.0    2.9  98.0       21.5

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      2.20          7.83          40369

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_W_2


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
4.28 83 2.93 98 21.5

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.2       4.3  83.0    2.9  98.0       21.5

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.42          7.83          60988

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_W_10
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
4.28 83 2.93 98 21.5

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.2       4.3  83.0    2.9  98.0       21.5

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      4.12          7.83          72846

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_W_25


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
4.28 83 2.93 98 21.5

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.2       4.3  83.0    2.9  98.0       21.5

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      5.57          7.83          97107

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_W_100
```

Basin Off (Developed)

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
5.01 86 .27 98 11.7

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       5.3       5.0  86.0     .3  98.0       11.7

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .62          7.83          11512

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_O_BIO


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
5.01 86 .27 98 11.7

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       5.3       5.0  86.0     .3  98.0       11.7

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.57          7.83          24809

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_O_2


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
5.01 86 .27 98 11.7

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       5.3       5.0  86.0     .3  98.0       11.7

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      2.64          7.83          39616

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_O_10
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
5.01 86 .27 98 11.7

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       5.3       5.0  86.0     .3  98.0       11.7

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.26          7.83          48205

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_O_25


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
5.01 86 .27 98 11.7

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       5.3       5.0  86.0     .3  98.0       11.7

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      4.53          7.83          65861

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:VV_O_100
```

Existing Condition

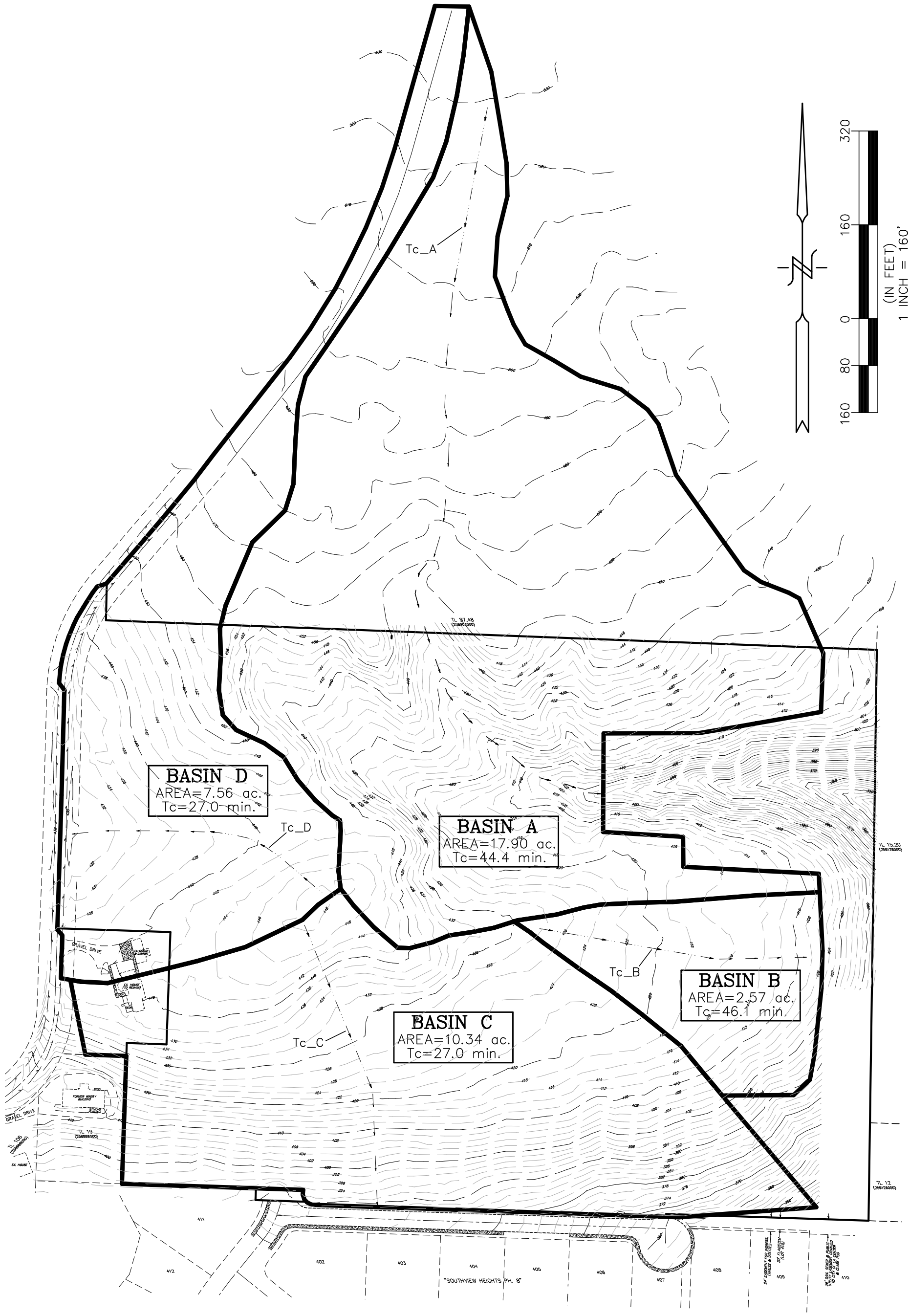
EXISTING RUNOFF VOLUMES/DISCHARGE								
	2-Yr, 24-hr. Storm		10 yr., 24 hr. Storm		25 yr., 24 hr. Storm		100 yr., 24 hr. Storm	
Drainage Basin	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):
Basin A	1.95	60,800	3.92	105,000	5.13	131,200	7.68	186,600
Basin B	0.28	8,700	0.55	15,060	0.72	18,860	1.09	26,800
Basin C	1.60	36,300	3.13	62,200	4.06	77,700	6.03	109,800
Basin D	1.23	28,000	2.30	48,050	2.95	59,500	4.31	83,400
TOTALS:	5.06	133,800	9.90	230,310	12.86	287,260	19.11	406,600

EXISTING AREA QUANTITIES (acres)								
Drainage Basin:	Total Area:	Streets & Sidewalks:	Driveways:	Roofs:	Contrib. Impervious Area: (Roofs incl.):	Contrib. Impervious Area: (no Roofs):	Contrib. Pervious Area:	
Basin A	17.90	0.00	0.00	0.00	0.00	0.00	17.90	Perv. CN=81
Basin B	2.57	0.00	0.00	0.00	0.00	0.00	2.57	Perv. CN=81
Basin C	10.34	0.01	0.00	0.04	0.05	0.01	10.29	Comp. Perv. CN=81.4 (7
Basin D	7.56	0.41	0.08	0.03	0.52	0.49	7.04	Comp. Perv. CN=81.4 (2
TOTALS:	38.37			**TOTALS:**	0.00	0.50	37.80	

EXISTING TIME OF CONCENTRATION CALCULATIONS												
	Sheet Flow				Shallow Conc. Flow			Channel Flow				
	2 yr., 24 hr. rainfall total (inches) 2.5											
Drainage Basin:	Flow Length (ft.):	Average Slope (ft./ft.):	Rough. Coeff. (n):	Overland Flow Time (min.):	Flow Length (ft.):	Average Slope (ft./ft.):	Shallow Conc. Flow Time (min.):	Flow Length (ft.):	Average Slope (ft./ft.):	Shallow Conc. Flow Time (min.):	Total Time of Conc. (min.)	Drainage Basin:
Basin A	300	0.065	0.400	35.6	470	0.130	4.3	570	0.095	4.4	44.4	**Basin A**
Basin B	300	0.040	0.400	43.3	200	0.055	2.8				46.1	**Basin B**
Basin C	300	0.090	0.250	21.5	200	0.180	1.6				23.0	**Basin C**
Basin D	230	0.048	0.300	25.8	240	0.330	1.2				27.0	**Basin D**

"VINEYARD VISTA"

EXISTING DRAINAGE BASINS



Basin A (Existing)-actual land use

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.
17.9 81 0 98 44.4

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      17.9       17.9  81.0     .0  98.0       44.4

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .47          8.50          23798


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
17.9 81 0 98 44.4

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      17.9       17.9  81.0     .0  98.0       44.4

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.95          8.00          60815


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
17.9 81 0 98 44.4

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      17.9       17.9  81.0     .0  98.0       44.4

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.92          8.00         104973
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
17.9 81 0 98 44.4

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      17.9       17.9  81.0     .0  98.0       44.4

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      5.13          8.00         131196


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
17.9 81 0 98 44.4

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      17.9       17.9  81.0     .0  98.0       44.4

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      7.68          8.00         186646
```

Basin B (Existing)-actual land use

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.57 81 0 98 46.1

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.6       2.6  81.0     .0  98.0       46.1

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .07          8.50           3418


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.57 81 0 98 46.1

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.6       2.6  81.0     .0  98.0       46.1

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .28          8.00           8725


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.57 81 0 98 46.1

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.6       2.6  81.0     .0  98.0       46.1

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .55          8.00          15061
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.57 81 0 98 46.1

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.6       2.6  81.0     .0  98.0       46.1

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .72          8.00          18858


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
2.57 81 0 98 46.1

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.6       2.6  81.0     .0  98.0       46.1

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.09          8.00          26778
```

Basin C (Existing)-actual land use

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
10.29 81.4 .05 98 23

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
      10.3      10.3  81.4     .1  98.0       23.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .39          8.00          14452


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
10.29 81.4 .05 98 23

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
      10.3      10.3  81.4     .1  98.0       23.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.60          7.83          36269


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
10.29 81.4 .05 98 23

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
      10.3      10.3  81.4     .1  98.0       23.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      3.13          7.83          62205
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
10.29 81.4 .05 98 23

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      10.3       10.3  81.4     .1  98.0       23.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      4.06          7.83          77667


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
10.29 81.4 .05 98 23

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                  A     CN     A     CN
      10.3       10.3  81.4     .1  98.0       23.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      6.03          7.83         109822
```

Basin D (Existing)-actual land use

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
******* 6-MONTH  24-HOUR STORM  ****  1.6" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
7.04 81.4 .52 98 27

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.6       7.0  81.4     .5  98.0       27.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .37          8.00          12299


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2-YEAR  24-HOUR STORM  ****  2.50" TOTAL PRECIP. *******
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
7.04 81.4 .52 98 27

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.6       7.0  81.4     .5  98.0       27.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      1.23          7.83          28809


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  3.4" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
7.04 81.4 .52 98 27

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.6       7.0  81.4     .5  98.0       27.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      2.30          7.83          48046
```

```
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  25-YEAR  24-HOUR STORM  ****  3.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
7.04 81.4 .52 98 27

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.6       7.0  81.4     .5  98.0       27.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      2.95          7.83          59486


------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  4.9" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
7.04 81.4 .52 98 27

DATA PRINT-OUT:

  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       7.6       7.0  81.4     .5  98.0       27.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      4.31          7.83          83362
```

Appendix II

Detention Calculations

DETENTION METHODOLOGY

THE DETENTION FACILITY IS DESIGNED TO LIMIT THE PEAK RELEASE RATES DURING THE 2-YR, 24-HR, 10-YR, 24-HR, 25-YR, 24-HR, & 100-YR, 24-HR STORM EVENTS TO THOSE THAT PRESENTLY EXIST. BASINS NORTH, SOUTH, AND WEST DRAIN TO THE DETENTION FACILITY WHILE BASIN OFF DRAINS TO THE STORMWATER FACILITIES WITHIN THE EXISTING "SOUTHVIEW HEIGHTS" PROJECT SOUTH OF THE "VINEYARD VISTA" SITE.
THE PROPOSED STORMWATER DETENTION FACILITY IS TO RELEASE STORMWATER EASTWARD FROM THE PROJECT SITE. THEREFORE, THE ALLOWABLE RELEASE RATES FROM THE DETENTION FACILITY MUST BE BASED ON ONLY THE FLOWS THAT PRESENTLY DRAIN EASTWARD FROM THE SITE. THIS REQUIRES THAT THE ALLOWABLE RELEASE RATES MUST NOT EXCEED THE EXISTING FLOWRATES OF BASINS A & B.

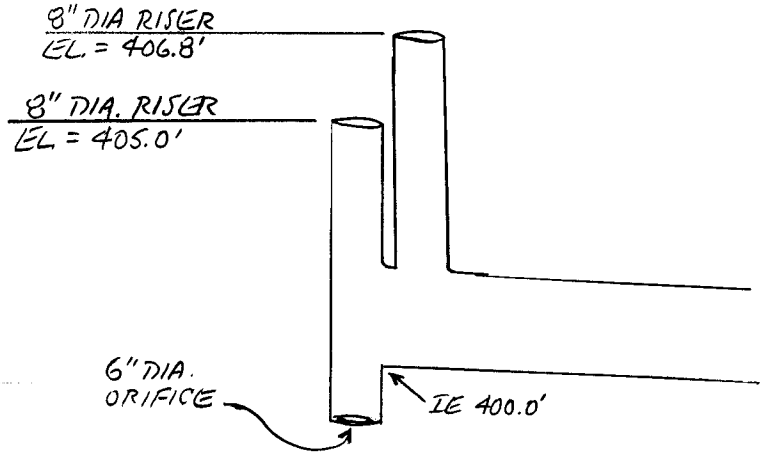
	2-YR.	10-YR.	25-YR.	100-YR.	
EXISTING SITE RUNOFF FROM BASIN A:	1.95 CFS	3.92 CFS	5.13 CFS	7.68 CFS	
EXISTING SITE RUNOFF FROM BASIN B:	0.28 CFS	0.55 CFS	0.72 CFS	1.09 CFS	
⇒ ALLOWABLE DETENTION FACILITY RELEASE:	2.23 CFS	4.47 CFS	5.85 CFS	8.77 CFS	
*PRELIMINARILY DESIGNED DETENTION RELEASE RATE:	1.94 CFS	3.54 CFS	4.31 CFS	6.57 CFS	

* AS CAN BE SEEN, THE PRELIMINARILY DESIGNED DETENTION FACILITY ACTS TO DRASTICALLY REDUCE THE PEAK DISCHARGE RATES FAR BELOW THOSE THAT ARE ALLOWED.

STORM DETENTION ROUTING DATA
(BEFORE VOLUME CORRECTION FACTOR APPLIED)

N	ELEV	STAGE (FT.):	6" DIA. ORIF. ADISC (CFS):	2-8"DIA. RISERS BDISC (CFS):	STORAGE (CU.FT.):	PERC-AREA
1	.00	.00	.00	.00	.0	.0
2	.20	.20	.44	.00	2000.0	.0
3	.40	.40	.62	.00	4000.0	.0
4	.60	.60	.76	.00	6100.0	.0
5	.80	.80	.87	.00	8200.0	.0
6	1.00	1.00	.98	.00	10500.0	.0
7	1.20	1.20	1.07	.00	12600.0	.0
8	1.40	1.40	1.16	.00	14900.0	.0
9	1.60	1.60	1.24	.00	17200.0	.0
10	1.80	1.80	1.31	.00	19600.0	.0
11	2.00	2.00	1.38	.00	22000.0	.0
12	2.20	2.20	1.45	.00	24400.0	.0
13	2.40	2.40	1.51	.00	26900.0	.0
14	2.60	2.60	1.58	.00	29400.0	.0
15	2.80	2.80	1.64	.00	32000.0	.0
16	3.00	3.00	1.69	.00	34600.0	.0
17	3.20	3.20	1.75	.00	37200.0	.0
18	3.40	3.40	1.80	.00	40000.0	.0
19	3.60	3.60	1.85	.00	42700.0	.0
20	3.80	3.80	1.90	.00	45500.0	.0
21	4.00	4.00	1.95	.00	48300.0	.0
22	4.20	4.20	2.00	.00	51200.0	.0
23	4.40	4.40	2.05	.00	54200.0	.0
24	4.60	4.60	2.10	.00	57100.0	.0
25	4.80	4.80	2.14	.00	60200.0	.0
26	5.00	5.00	2.18	.00	63200.0	.0
27	5.20	5.20	2.23	.58	66300.0	.0
28	5.40	5.40	2.27	1.06	69500.0	.0
29	5.60	5.60	2.31	1.30	72800.0	.0
30	5.80	5.80	2.35	1.50	76000.0	.0
31	6.00	6.00	2.39	1.68	79300.0	.0
32	6.20	6.20	2.43	1.84	82700.0	.0
33	6.40	6.40	2.47	1.99	86100.0	.0
34	6.60	6.60	2.51	2.13	89600.0	.0
35	6.80	6.80	2.55	2.26	93100.0	.0
36	7.00	7.00	2.59	2.96	96700.0	.0
37	7.20	7.20	2.62	3.55	100300.0	.0
38	7.40	7.40	2.66	3.90	104000.0	.0
39	7.60	7.60	2.69	4.21	107700.0	.0
40	7.80	7.80	2.73	4.49	111500.0	.0
41	8.00	8.00	2.76	4.75	115300.0	.0

INITIAL STAGE ELEV = .00
AVERAGE PERC-RATE = .0
FILENAME: VVDATA1



2-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(BEFORE APPLICATION OF VOLUME CORRECTION FACTOR)

```
RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA1
 DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_2

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)    PEAK-OUTFLOW(CFS)    OUTFLOW-VOL(CU-FT)
                          A        B           A          B
       8.87               2.12     .00      181828         0

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)    PEAK-STAGE-ELEV(FT)
         .00              14.83                  4.69

  REQUIRED STORAGE:     58460 CU-FT
```

Q_p = 2.12 CFS

ALLOWABLE Q_p = 2.23 CFS
⇒ O.K.

10-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(BEFORE APPLICATION OF VOLUME CORRECTION FACTOR)

```
RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA1
 DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_10

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)    PEAK-OUTFLOW(CFS)    OUTFLOW-VOL(CU-FT)
                          A        B           A          B
      13.77               2.40     1.72     400647      55997

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)    PEAK-STAGE-ELEV(FT)
         .00              11.50                  6.05

  REQUIRED STORAGE:     80180 CU-FT
```

Q_p = 4.12 CFS

ALLOWABLE Q_p = 4.47 CFS
⇒ O.K.

25-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(BEFORE APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA1
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_25

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS)		OUTFLOW-VOL(CU-FT)	
	A	B	A	B
16.60	2.57	2.66	631552	153552

$Q_p = 5.23$ CFS

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	11.00	6.91

ALLOWABLE $Q_p = 5.85$ CFS
$\Rightarrow$ O.K.

REQUIRED STORAGE: 95150 CU-FT

100-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(BEFORE APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA1
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_100

INPUTED ROUTING-DATA HAS BEEN EXTRAPOLATED.

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS)		OUTFLOW-VOL(CU-FT)	
	A	B	A	B
22.41	2.79	5.04	884317	339002

$Q_p = 7.83$ CFS

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	10.00	8.22

ALLOWABLE $Q_p = 8.77$ CFS
$\Rightarrow$ O.K.

REQUIRED STORAGE: 119500 CU-FT

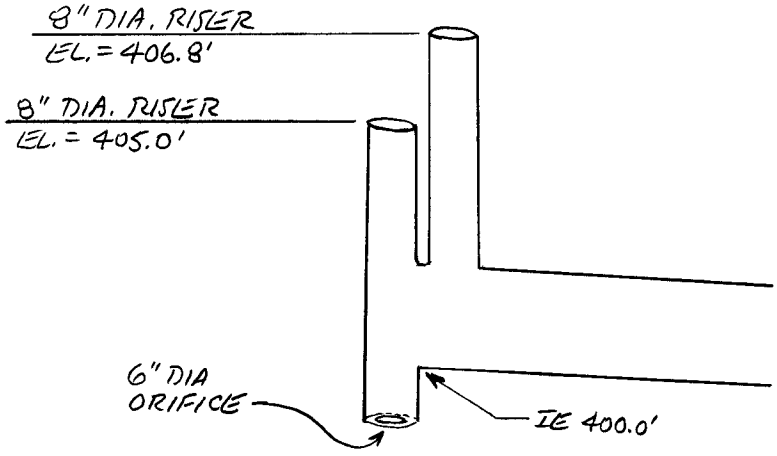
The developed site is to become approximately 70% impervious. Therefore, a volume correction factor of approximately 38% must be applied to the detention storage volumes (From Figure III-1.1 of the Puget Sound Manual).

The storage volumes presented on the following storm detention routing data table reflect the increase in detention storage volume. The stormwater detention facility as depicted on the preliminary stormwater plan provides the necessary storage volumes after the application of the volume correction factor of 38%.

STORM DETENTION ROUTING DATA
(AFTER VOLUME CORRECTION FACTOR APPLIED)

N	ELEV	STAGE (FT.):	6" DIA. ORIF. ADISC (CFS):	2-8"DIA. RISERS BDISC (CFS):	STORAGE (CU.FT.):	PERC-AREA
1	.00	.00	.00	.00	.0	.0
2	.20	.20	.44	.00	2780.0	.0
3	.40	.40	.62	.00	5600.0	.0
4	.60	.60	.76	.00	8500.0	.0
5	.80	.80	.87	.00	11400.0	.0
6	1.00	1.00	.98	.00	14500.0	.0
7	1.20	1.20	1.07	.00	17500.0	.0
8	1.40	1.40	1.16	.00	20600.0	.0
9	1.60	1.60	1.24	.00	23800.0	.0
10	1.80	1.80	1.31	.00	27100.0	.0
11	2.00	2.00	1.38	.00	30400.0	.0
12	2.20	2.20	1.45	.00	33700.0	.0
13	2.40	2.40	1.51	.00	37200.0	.0
14	2.60	2.60	1.58	.00	40600.0	.0
15	2.80	2.80	1.64	.00	44200.0	.0
16	3.00	3.00	1.69	.00	47800.0	.0
17	3.20	3.20	1.75	.00	51400.0	.0
18	3.40	3.40	1.80	.00	55200.0	.0
19	3.60	3.60	1.85	.00	59000.0	.0
20	3.80	3.80	1.90	.00	62800.0	.0
21	4.00	4.00	1.95	.00	66700.0	.0
22	4.20	4.20	2.00	.00	70700.0	.0
23	4.40	4.40	2.05	.00	74800.0	.0
24	4.60	4.60	2.10	.00	78900.0	.0
25	4.80	4.80	2.14	.00	83100.0	.0
26	5.00	5.00	2.18	.00	87300.0	.0
27	5.20	5.20	2.23	.58	91600.0	.0
28	5.40	5.40	2.27	1.06	96000.0	.0
29	5.60	5.60	2.31	1.30	100500.0	.0
30	5.80	5.80	2.35	1.50	105000.0	.0
31	6.00	6.00	2.39	1.68	109500.0	.0
32	6.20	6.20	2.43	1.84	114200.0	.0
33	6.40	6.40	2.47	1.99	118900.0	.0
34	6.60	6.60	2.51	2.13	123700.0	.0
35	6.80	6.80	2.55	2.26	128600.0	.0
36	7.00	7.00	2.59	2.96	133500.0	.0
37	7.20	7.20	2.62	3.55	138500.0	.0
38	7.40	7.40	2.66	3.90	143600.0	.0
39	7.60	7.60	2.69	4.21	148700.0	.0
40	7.80	7.80	2.73	4.49	153900.0	.0
41	8.00	8.00	2.76	4.75	159200.0	.0

INITIAL STAGE ELEV = .00
AVERAGE PERC-RATE = .0
FILENAME: VVDATA2



2-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(AFTER APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA2
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_2

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS) A	PEAK-OUTFLOW(CFS) B	OUTFLOW-VOL(CU-FT) A	OUTFLOW-VOL(CU-FT) B
8.87	1.94	.00	181819	0

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	16.67	3.95

REQUIRED STORAGE: 65700 CU-FT

Q_p = 1.94 CFS

ALLOWABLE Q_p = 2.23 CFS

⇒ O.K.

10-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(AFTER APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA2
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_10

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS) A	PEAK-OUTFLOW(CFS) B	OUTFLOW-VOL(CU-FT) A	OUTFLOW-VOL(CU-FT) B
13.77	2.30	1.24	419105	37521

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	13.00	5.55

REQUIRED STORAGE: 99390 CU-FT

Q_p = 3.54 CFS

ALLOWABLE Q_p = 4.47 CFS

⇒ O.K.

25-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(AFTER APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA2
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_25

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS)		OUTFLOW-VOL(CU-FT)	
	A	B	A	B
16.60	2.44	1.87	668616	116464

Q_p = 4.31 CFS

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	13.00	6.23

ALLOWABLE Q_p = 5.85 CFS
⇒ O.K.

REQUIRED STORAGE: 114980 CU-FT

100-YR., 24-HR. STORM ROUTE THROUGH DETENTION FACILITY
(AFTER APPLICATION OF VOLUME CORRECTION FACTOR)

RESERVOIR ROUTING ROUTINE W/SPLIT-OUTFLOW

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
VVDATA2
DISPLAY ROUTING DATA (Y or N)?
N

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
VV_100

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS)		OUTFLOW-VOL(CU-FT)	
	A	B	A	B
22.41	2.66	3.91	945452	277834

Q_p = 6.57 CFS

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	11.33	7.41

ALLOWABLE Q_p = 8.77 CFS
⇒ O.K.

REQUIRED STORAGE: 143740 CU-FT

Appendix III

Water Quality Calculations

	DEVELOPED RUNOFF VOLUMES/DISCHARGE									
	66% 2-Yr, 24-hr. (6 month storm)		**2 yr., 24 hr. Storm**		**10 yr., 24 hr. Storm**		**25 yr., 24 hr. Storm**		**100 yr., 24 hr. Storm**	
Drainage Basin	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):	Peak Discharge (cfs):	Total Volume (ft3):
Basin North	1.28	37,600	3.01	77,100	5.05	121,400	6.27	147,300	8.80	200,900
Basin South	2.11	37,300	3.68	64,400	5.30	92,500	6.21	108,300	8.04	140,200
Basin West	1.09	21,400	2.20	40,400	3.42	61,000	4.12	72,800	5.57	97,100
Basin OFF	0.62	11,500	1.57	24,800	2.64	39,600	3.26	48,200	4.53	65,900
TOTALS:	5.10	107,800	10.46	206,700	16.41	314,500	19.86	376,600	26.94	504,100

The wetpond will receive stormwater runoff from developed drainage basins North, South, and West. The 6-month, 24-hr. storm volume from these contributing basins is 96,300 cubic feet.

⇨ This volume must be provided as "dead storage" within the wetpond.