CREEKSIDE MEADOWS SECTION 5

APPROVED
OCT 0 3 2017
VANDERBURGH COUNT
DRAINAGE BOA

OCTOBER 2017

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

August 31, 2017

APPROVED
OCT 03 2017
VANDERBURGH COUNTY DRAINAGE BOARD

Vanderburgh County Drainage Board
Civic Center Complex – Room 305
Evansville, IN 47708

RE: Creekside Meadows – Section 5
Variance Request
Project No.: 09-0559

On behalf of the owner, Land Visions LLC, we request a variance to allow the channels of swales #45 and #47A to be lined with Flexamat, which is a permanent erosion control mat, instead of a concrete ribbon.

If you have any questions or require additional information, please contact our office.

Sincerely,

Glen Meritt, Jr.
Project Engineer

cc: File

W:\090559\Civil Section 5\Documents\Flexamat Variance Ltr.doc

Approved by the Vanderburgh County Drainage Board on this 3RD day of OCTOBER, 2017.

Cheryl W. Musgrave, President

Ben Shoulders, Vice President

Bruce Ungethiem, Member

RECEIVED BY THE
VANDERBURGH COUNTY
SURVEYOR'S OFFICE
9-5-17 CA

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715

PH: 812.401.5561
FAX: 812.401.5563

The final drainage plan was submitted on July 14th, 2017 with additional information submitted on September 5th, September 11th, September 14th and September 20th. The plan that is requested to be approved consists of the submitted document with a receipt date of July 14th, 2017, revisions and additional information submitted on September 5th September 14th and emails and attachments dated September 11th and September 20th ,2017 along with the following drawings.

Drainage Plan C101 and C102 submitted September 5th, 2017

Undeveloped Drawing 1 and Developed Drawing 2 Subbasin sheets submitted July 14th , 2017

Road & Storm Sewer Details C113 and Drainage Details C114 submitted September 5th, 2017

Road Drawings for reference to drainage C104, C105, C106 and C107 submitted September 5th, 2017

APPROVED

OCT 0 3 2017

VANDERBURGH COUNT

Creekside Meadows Section 5 -FINAL DRAINAGE PLAN

13.04.095 Conditions of drainage plan approval.
In order for an applicant to obtain approval of a final drainage plan, the following requirements must be met:

A. The applicant shall be eligible under the terms of this chapter to apply for and obtain drainage plan approval.

B. The drainage plan and supporting submittals required by this chapter shall have been prepared and submitted in a timely and proper manner in accordance with the provisions of this chapter. **Final Drainage Plan submitted on 7/14/2017 Revisions submitted on 9/5/2017, email 9/11/2017 and revised discussion 9/14/2017, email 9/20/2017**

C. The drainage plan and supporting submittals shall reflect compliance with the requirements of this chapter, and compliance with any conditions of approval applied to the plan by the drainage board. **Required Revisions are shown in red.**

D. The submitted data shall be gathered, analyzed, assembled into the drainage plan and supporting submittals; and shall be certified, and presented to the drainage board all by a civil engineer or land surveyor regularly engaged in stormwater drainage design, and registered to practice in the state of Indiana.

E. An easement has been dedicated to house any off-site drainage facilities if such facilities are required to serve the project's stormwater drainage system.

F. The person, persons, partnership, corporation, or other entity to whom approval of the drainage plan is granted must be the person, persons, partnership, corporation, or entity who will be responsible for accomplishing the project for which the drainage plan is developed. **Land Visions LLC 3638 Citadel Circle, Newburgh, IN 47630**

13.04.125 Building permits conditioned.
The Vanderburgh County building commissioner shall not allow construction of buildings, or other impervious structures or facilities to commence at the site of a project requiring final drainage plan approval until:

A. Such approval has been expressed by the drainage board;

B. And all storm drainage facilities are constructed.

13.04.130 Phased development of large projects allowed.

8. Existing detention basins or ponds within the project, or outside the project but affecting it, to be maintained, enlarged, or otherwise altered, together with any new basins or ponds to be built; and their basis of design;

9. The estimated depth and amount of storage required of the basins and ponds, and their available freeboards; ***Stage storage diagrams provided.***

10. The estimated location and percentage of impervious surface existing and expected to be constructed at completion of the project. ***Provided.***

10. The estimated location and percentage of impervious surface existing and expected to be constructed at completion of the project. ***Provided.***

11. Any interim plan which is to be incorporated into the project pending its completion according to the final drainage plan.

B. Notations and Explanations on the Preliminary Plan. All notations necessary to indicate the existing conditions, and the proposed functions of the various features shown thereon; and shall include the following.

C. Geographic Orientation Required. A north arrow, scale, location insert, and other information necessary for geographic clarification shall be included on a preliminary plan. ***Provided***

D. Data Required to Accompany Preliminary Plan. Descriptive data sufficient to support the feasibility of the preliminary drainage plan with regard to the requirements of this chapter, including calculations of the predevelopment and post development runoff rates using rainfall data supplied herein shall accompany a preliminary drainage plan.

13.04.165 Contents of the final drainage plan.

The contents of the final drainage plan shall include all the items listed above for a preliminary drainage plan, plus:

A. Soils Map. A soils map indicating soils names and their hydrologic classification must be provided for a proposed project. **Provided-Hosmer and Bonnie silt loam**

B. Location and Topographic Map. In addition, a location and topographic map must be provided showing the land to be developed, and such adjoining land whose location and topography may affect or be affected by the layout or drainage of the project. **Provided**

C. Contour Intervals.

1. The contour intervals shown on the topographic map shall be two and one-half feet for slopes less than four percent; and five feet for slopes four percent or greater; or best available; **1' Contours**

3. The location and design of the proposed street system, including depressed pavements used to convey or detain overflow from storm sewers and over-the-curb runoff resulting from heavier rainstorms, and the outlets for such overflows; all with their designed elevations; **No street plans were provided-drainage plan needs to insures that overflow swales will be placed at all street sags. Street plans provided. Appears that drainage easements are provided where overflow shales would be needed.**

4. The locations, cross sections, and profiles of existing streams, floodways, and floodplains to be maintained, and the same for all new channels to be constructed. **Provided for new swales. Swales 45 and 47A propose utilizing Flexamat. Design for swales shows Manning coefficient being the same as vegetative covered swales; is this the case? Revised calculations provided with "n" value as supplied by manufacturer**

5. The materials, elevations, waterway openings, size, and basis for design of the proposed culverts and bridges; **Provided**

6. Existing ponds and basins to be altered, enlarged, filled, or maintained; and new ponds, basins, swales, to be built, and the basis of their design **The drainage plan proposes utilizing the planned Basin 3 which will be utilized for the southern portion of the subdivision (Section 5) plus previous areas in Section 4. The calculations are based upon the undeveloped area for undeveloped Area 8 only less undetained areas on the east. However, the basin will be receiving drainage from a significantly larger area. Provide calculations that show that this basin sizing and release rate meets the original plan for entire portion of subdivision which it serves. The allowable runoff rate was to have been 11.34 cfs - 3.86 cfs = 7.4 cfs with required storage of 207,699 ft^3 - please address what has changed? Addressed in revised submitted discussion.**

7. The location and percentage of impervious surfaces existing and expected to be constructed; **Provided**

8. The material types sizes slopes grades and other details of all the stormwater drainage facilities; **Provided**

9. The estimated depth and amount of storage required in the new ponds or basins, the freeboard above the normal pool and highwater pool of wet basins, and details of the emergency overflows from the basins **Provide details on emergency overflow and pipe-will any erosion control be applied to outlet ditch and area of emergency overflow? Noted on revised sheet C-102 that erosion control is to be installed**

10. For all controlled release basins, a plot or tabulation of the storage volumes with corresponding water surface elevations, and a plot or tabulation of the basin outflow rates for those water surface elevations; **Storage volumes provided. Outflow rates provided for 25 and 100 year storms**

Flexamat to be utilized on Swale 45 and 47A-please show on cross section on sheet C-114
Revised drawing provided

A. Must show the elevation of the existing land immediately adjacent to all drainage facilities; **Provided**

B. Must show the high water elevations adjacent to all waterways and impoundments as expected from the one hundred (100) year storm in relationship to permanent structures **Elevations Provided**

13.04.440 General detention/retention basin design requirements.
The following design principles shall be observed for detention and retention basins:

A. Duration of Storage. The maximum volume of water stored and subsequently released at the design release rate shall not result in a storage duration in excess of forty-eight (48) hours, unless additional storms occur within the period **Not Provided Provided**

B. Depth of Stored Water. The maximum depth of stormwater to be stored, without a permanent pool shall not exceed four feet; and the maximum depth of stormwater to be stored above a permanent pool shall not exceed four feet. **1.71' for 182,704 ft^3** ***Revised calcs are 1.67' for 178,421 ft^3***

C. Finished Floor Elevations Adjacent to Basins. The lowest floor of any building or structure occupied by humans must be at least two (2) feet above the one-hundred (100) year storm water elevation of detention/retention basins. **Basin in flood zone; homes are above 100 year storm elevation**

D. Earthen Side Slopes 4:1 Maximum Steepness for Basins. All detention and retention basins with grassed, earthen side slopes shall have side slopes no steeper than four horizontal units of measurement to one vertical unit of measurement (4:1) to the base of dry basins, and to the typical low waterline of wet basins. **Cross section shows 4:1 to below water**

E. Riprap Side Slopes 2:1 Maximum Steepness for Basins. Wet retention basins with riprap armored side slopes shall have slopes no steeper than two horizontal units of measurements to one vertical unit of measurement (2:1) at any point in the side slope. **Cross section shows 2:1 below water**

F. Riprap to Extend Two Vertical Feet Below Waterline. The armored portion of the side slope must extend to a minimum depth below the permanent pool elevation of two vertical feet. **No rip rap proposed**

G. Underwater Earthen Side Slopes 2:1 Maximum Steepness. Nonarmored earthen side slopes shall have slopes no steeper than two horizontal units of measurement to one vertical unit of measurements from a point two vertical feet below permanent pool, thence downward. **No slopes steeper than 2:1**

H. Minimum Depth of Riprap Application. Riprap side slope armor shall be a minimum twelve (12) inches in depth at all points of application. **No rip rap shown**

R. Wet Basin Cover and Maintenance. The earthen side slopes of wet basins shall be provided with grass cover above the low water elevation, which shall be maintained equal to turfed residential lawns, and in no case shall the cover growth exceed twelve (12) inches in height, or the most current county standard **Provide seeding information Provided-Tenbarge Green Alliance**

S. Maintenance Pathway for Basins. A flat pathway with a minimum width of ten (10) feet shall be constructed completely around the top of the embankment of all detention/retention basins. **Per cross section will match surrounding ground-sufficient easement is shown**

T. Maintenance Easement for Basins. An easement dedicated for the purpose of accessing and maintaining the basin and its appurtenances shall be provided, and the easement shall be configured so that it includes the entire basin, the entire earthwork encompassing the basin, the maintenance pathways into and around the basin, and all inletting and outletting appurtenances of the basin. **Easement provided for basin. LM&SDE does not outlet to proposed County maintained street. New LM&SDE or change of proposed DE to LMSDE must be shown to allow for access from proposed County maintained street. New Easements shown that access pond from streets**

U. Maintenance Report Required for Basin. **Maintenance requirements will be noted on plat**

1. A brief and concise report shall be prepared, by the design engineer, consisting of a description of the location, intended function of all parts appurtenant to the basin, together with a description of the ways in which the basin and its appurtenances should be maintained, all worded in language easily understood by residential or commercial property owners; and;

2. The report shall be attached to the restrictions for the property on which the basin and its parts are located.

3. Such restrictions shall be shown to exist prior to the board's final approval of the drainage plan for a project whose plans include a basin. **The drainage plan is being submitted prior to final plat. See note under 13.04.460.**

V. Copy of Report Must be Submitted With the As-Builts. A copy of the maintenance report described above shall be included with the as-built plans required to be submitted hereinabove.

W. Elevation of Dry Basin Bottom Marked. A continuous concrete liner at least equal in characteristics to that described in Section 13.04.315F shall be installed in all dry basins from the point of inflow of each channel entering a basin to the point of outflow from the basin. The concrete liner shall be installed at an elevation slightly lower than the earthen floor of the basin, so that it may serve as a trickle trough or low flow liner. **Wet Basin, not applicable**

X. No tree limbs, trunks, refuse from legally burnt vegetation, nor construction waste, demolition materials, or other man made material may be buried within the area in which an impounding structure will be located. Notice shall be placed on construction drawings noting the prohibition to the burying of

Mueller, Jeffrey

From: Glen Meritt <GMeritt@cashwaggner.com>
Sent: Wednesday, September 20, 2017 4:39 PM
To: Mueller, Jeffrey
Subject: Creekside Meadows - Section 5
Attachments: doc05853220170920162923.pdf; doc05853320170920163144.pdf; doc05853420170920163244.pdf; doc05853520170920163322.pdf; doc05853620170920163352.pdf

Jeff,

Attached are the certificates of mailing for the Asbury Pointe adjoiners.

Glen Meritt Jr.
Project Engineer
CASH WAGGNER & ASSOCIATES, PC
414 Citadel Circle, Suite B
Evansville, IN 47715
Main: 812-401-5561 Cell: 812-774-2988

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING

Click Here to send large files

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES N
PROVIDE FOR INSURANCE—POSTMASTER

Rec Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.028-030
Lowe, Brandon Michael
12720 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES
PROVIDE FOR INSURANCE—POSTMASTER

R Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.029-030
Murphy, Michell
12710 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILIN**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES
PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.026-030
Newton, Justin F
12740 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES N
PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.027-030
Cook, Mary E
12730 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

Sent 9/20/17

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.023-030
Euler, Bryan D & Jamie L T/E
12832 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.025-030
Payton, Amanda M & Kurtis R T/E
12800 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.022-030
Miller, Gregg & Karen T/E
12842 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.024-030
Bunys, Andrew W
12812 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

Email 9/20/2017

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

R Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.020-030
Vogt, Shawn J & Janel M H/W
12908 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES N PROVIDE FOR INSURANCE—POSTMASTER

F Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.021-030
Taylor, Darryl L
12900 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES PROVIDE FOR INSURANCE—POSTMASTER

Re Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.018-030
Lockyear, Doris J & Seib, Julia A &
Lockyear, Scott A J/T/R/S
12928 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps and e of rrent

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.019-030
Crane, Scott C & Corrie L H/W
12918 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 17 AMOUNT $1.35 R2304M111588-05

Exhibit 9/20/2017

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.016-030
Henderson, Adam M
12948 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 '17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.017-030
Lemay, Brian P
12938 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 '17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.014-030
Potts, Dale & Mary Beth T/E
13010 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 '17 AMOUNT $1.35 R2304M111588-05

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.015-030
Martin, Rita Y
13000 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

Affix fee here in stamps

U.S. POSTAGE PAID EVANSVILLE, IN 47715 SEP 20 '17 AMOUNT $1.35 R2304M111588-05

Email 9/20/2017

U.S. POSTAL SERVICE **CERTIFICATE OF MAILING**

MAY BE USED FOR DOMESTIC AND INTERNATIONAL MAIL, DOES NOT PROVIDE FOR INSURANCE—POSTMASTER

Rec

Cash Waggner & Associates, PC
414 Citadel Circle
Suite B
Evansville, IN 47715

One piece of ordinary mail addressed to:

82-04-11-009-334.013-030
Beshears, Michelle N
13020 Mattison Court
Evansville, IN 47725

PS Form 3817, Mar. 1989

U.S. POSTAGE
PAID
EVANSVILLE, IN
47715
SEP 20 17
AMOUNT
$1.35
R2304M111588-05

Sent 9/20/2017

RECEIVED EMAIL
9/14/2017

CASH WAGGNER & ASSOCIATES, PC

CONSULTING ENGINEERS • LAND SURVEYORS

9-14-17

GLEN A. MERITT, JR.
REGISTERED
No. PE10403870
STATE OF INDIANA
PROFESSIONAL ENGINEER

September 14, 2017

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Drainage Report
Creekside Meadows – Section 5
Petersburg Road
Our Project #: 09-0559

Mr. Mueller:

Below is a summary of the drainage calculations for the above-referenced project.

SITE DESCRIPTION

This development consists of a single family residential subdivision with 106 lots and its associated improvements (i.e. roads, utilities). The site is located on a 41.36-acre parcel south of Creekside Meadows – Section 4 approximately 400 feet south and 800 feet east of the Prairie Drive and Chappell Drive intersection. The utility and roadway improvements will be constructed in multiple phases and the entire property will be disturbed during construction. The first phase of construction will consist of Lots 500 – 556.

No regulated drains, inlets or outfalls exist on this site. An existing sanitary sewer main is located along the west property line. No existing combined sewers or outfalls are located on this site. No known wells, septic tanks systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

The developer will be utilizing Repair Fund "B" for the maintenance and repair of all storm water drainage systems and facilities outside the county accepted road right-of-way. The earthwork for detention basin #3 will be completed during the construction of Section 5 – Phase 1. Tenbarge – Green Alliance seed mixture will be used for permanent seeding all green space areas and the earthen side slopes of the basin. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man made material may be buried within detention basin #3.

DRAINAGE PATTERNS

The existing site is rolling and was previously utilized as a cultivated field. Sub-basin (UN-5) contains 0.76-acres and is located along the east property line and drains to the east to an existing swale located within Asbury Pointe Subdivision. The southeast 8.06-acres (UN-6) drains to the southeast and flows off-site to an existing

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715
E-MAIL: GMERITT@CASHWAGGNER.COM
PH: 812.401.5561
FAX: 812.401.5563

swale located within Asbury Pointe Subdivision. The southeast 1.99-acres (UN-7) drains to the south and sheet flows off-site. The southwest 8.07-acres (UN-8) drains to the south and flows off-site to an existing ditch that lies just south of the south property line of the subdivision. All runoff ultimately drains to Schlensker Ditch. See attached Undeveloped Sub-basin Exhibit for the locations of each sub-basin.

The proposed development has been divided into 44 developed drainage sub-basins with the 25-year and 100-year flows calculated for each sub-basin. Sub-basin #45 is located off-site adjacent to the east property line in Asbury Pointe Subdivision. See attached Developed Sub-basin Exhibit for locations of each sub-basin. A drainage swale and storm sewer network will be installed within the development to capture the majority of the storm water runoff and convey it to detention basin #3 located at the southwest corner of the site. The primary and emergency spillways of detention basin #3 will discharge to the existing ditch located along the south property line.

CALCULATIONS

The Rational Method and HERPICC Manual were utilized in performing the drainage calculations for this project. All storm sewers and swales were designed to carry the 25-year developed runoff. Detention basin #3 was designed to contain the peak 25-year developed runoff from the site while allowing a release rate less than the peak 10-year undeveloped runoff rate from the site. The emergency spillway for the detention basin was designed to carry the 100-year storm flow.

The original drainage report for Creekside Meadows showed a required storage volume for Detention Basin #3 to be 207,699 cubic feet with a 50.69-acre watershed and a weighted "c" value of 0.494. In Creekside Meadows – Section 4 several lot lines were adjusted and as a result, storm sewer pipes (P-598 and P-599B) were rerouted west to CI #591. These two pipes collect 10.94 cfs of runoff from the 5.20-acre watershed which now flows offsite undetained to swale #19 located along the west property line instead of flowing south to Detention Basin #3 as originally planned. Detention basins #1 and #2 have a designed release rate of 40.00 cfs and the allowable release rate was calculated to be 127.36 cfs. Therefore there is 87.36 cfs of excess runoff being detained in these two basins which easily makes up for the 10.94 cfs of increased undetained runoff from Section 4. In this report I have calculated the required storage volume for Detention Basin #3 to be 178,421 cubic feet with a 45.49-acre watershed and a weighted "c" value of 0.484. The 29,278 cubic feet decrease in storage volume is the result of the smaller watershed and lower weighted "c" value that is now draining to Detention Basin #3.

Undeveloped sub-basins UN-5 and UN-6, which consist entirely of a cultivated field, currently flow east to the swale that is located along the west property line of Asbury Pointe Subdivision. These two sub-basins contain a watershed area of 8.82-acres with a weighted "c" value of 0.35 which creates 14.46 cfs of runoff from the 10-year storm. The proposed subdivision design allows four developed sub-basins (#41 - #44), which consist of the back half of the future houses and the entire grassed rear yard of the lots that are directly adjacent to Asbury Pointe Subdivision, to drain to this same off-site swale. These four sub-basins contain a watershed area of 3.69–

acres with a weighted "c" value of 0.377 which creates 8.17 cfs of runoff from the 25-year storm.

Below is a summary of the detention basin design elements:

Detention Basin #3		**NOTES**
Developed Q(25)	128.74 – cfs	
Developed Q(100)	156.46 – cfs	
Detention Basin #3 Undeveloped Q(10)	11.34 – cfs	UN-8
10/25-yr. Req'd Volume	178,421 c.f.	
10/25-yr. Provided Volume	187,757 c.f.	
Undetained Developed Q(25)	3.21 – cfs	#40A
Allowable Release Rate	8.13 – cfs	Undeveloped Q(10) – Undetained Developed Q(25)
Proposed Release Rate	6.98 - cfs	Detention Basin #3 Primary Spillway
Outfall Structure	*29-LF of 15" RCP*	P-871
Outfall I.E.	389. 00	
25-year Storage Vol. Elev.	390.67	
HW (25-yr. elev. – I.E.)	1.67 – ft.	
Minimum Top/Bank	391.75	

Runoff Discharge to Asbury Pointe		**NOTES**
Undeveloped Q(10)	14.46 – cfs	UN-5 and UN-6
Undetained Developed Q(25)	8.17 – cfs	#41 - #44

W:\090559\Civil Section 5\Drainage\FINAL DRAINAGE REPORT.doc

CASH WAGGNER & ASSOCIATES, PC
414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563

Mueller, Jeffrey

From: Glen Meritt <GMeritt@cashwaggner.com>
Sent: Monday, September 11, 2017 12:23 PM
To: Mueller, Jeffrey
Cc: Stoll, John
Subject: RE: Creekside
Attachments: Detention Basin 3 Cross Section 9-11-17.pdf

Jeff,

Attached is the record drawing for detention basin #3. The earthwork has not been completed on the south side of the basin and the emergency spillway has not been constructed at this point. What work remains will be completed during the first construction phase of Section 5. Thanks

Glen Meritt Jr.
Project Engineer
CASH WAGGNER & ASSOCIATES, PC
414 Citadel Circle, Suite B
Evansville, IN 47715
Main: 812-401-5561 Cell: 812-774-2988

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING

Click Here to send large files

From: Mueller, Jeffrey [mailto:jmueller@vanderburghsurveyor.com]
Sent: Thursday, September 07, 2017 8:51 AM
To: Glen Meritt <GMeritt@cashwaggner.com>
Cc: Stoll, John <JStoll@vanderburghgov.org>
Subject: FW: Creekside

Glen,

John may have some additional comments-but mine are as follows. I do want a notification to the adjoiners in Asbury Pointe since they did not receive a notification and since the preliminary plan did not have the drainage going to their backyard swale. I have no problems with the area leaving undeveloped I just want to be up front with the adjoiners.

If you can get the notices out and address the other two issues we can take this to the 9/19 meeting.

Jeff

13.04.130 Phased development of large projects allowed.
Large projects may be divided into phases for the purpose of constructing drainage facilities and obtaining permits in accordance with the requirements of this chapter. ***To be constructed in phases; first phase on construction will be lots 500-556. Please provide a time table for completion of the basin and submittal of as built drawings for the basin in relation to phasing of the subdivision. The majority of detention basin #3 has been constructed. See attached record drawing. The remaining earthwork for detention basin #3 will be completed during the first phase of Section 5.***

13.04.175 Submittal of a written drainage design report.
The final drainage plan shall be accompanied by a written report containing the following:

A. Any significant stormwater drainage problems existing or anticipated to be associated with the project; ***the proposed design shows that developed watershed areas 41-44 (3.7 acres) are to leave undetained. Most of this area is to flow into the swale located entirely within the west side of Asbury Pointe Subdivision. This drainage was not shown to flow into this swale in the original approved plan. No notification was required on this subdivision to the adjoiners in Asbury Pointe due to when it was originally developed. Notices will be sent the week of September 18th.***

R. Wet Basin Cover and Maintenance. The earthen side slopes of wet basins shall be provided with grass cover above the low water elevation, which shall be maintained equal to turfed residential lawns, and in no case shall the cover growth exceed twelve (12) inches in height, or the most current county standard ***Provide seeding information; Permanent seeding shall be applied to the basin when the earthwork is completed.***

Jeffrey D Mueller, PE
Vanderburgh County Surveyor
1 NW M L King Blvd Room 325
Evansville, IN 47708
(812) 435-5117

Mueller, Jeffrey

From: Glen Meritt <GMeritt@cashwaggner.com>
Sent: Monday, September 11, 2017 12:23 PM
To: Mueller, Jeffrey
Cc: Stoll, John
Subject: RE: Creekside
Attachments: Detention Basin 3 Cross Section 9-11-17.pdf

Jeff,

Attached is the record drawing for detention basin #3. The earthwork has not been completed on the south side of the basin and the emergency spillway has not been constructed at this point. What work remains will be completed during the first construction phase of Section 5. Thanks

Glen Meritt Jr.
Project Engineer
CASH WAGGNER & ASSOCIATES, PC
414 Citadel Circle, Suite B
Evansville, IN 47715
Main: 812-401-5561 Cell: 812-774-2988

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING

Click Here to send large files

From: Mueller, Jeffrey [mailto:jmueller@vanderburghsurveyor.com]
Sent: Thursday, September 07, 2017 8:51 AM
To: Glen Meritt <GMeritt@cashwaggner.com>
Cc: Stoll, John <JStoll@vanderburghgov.org>
Subject: FW: Creekside

Glen,

John may have some additional comments-but mine are as follows. I do want a notification to the adjoiners in Asbury Pointe since they did not receive a notification and since the preliminary plan did not have the drainage going to their backyard swale. I have no problems with the area leaving undeveloped I just want to be up front with the adjoiners.

If you can get the notices out and address the other two issues we can take this to the 9/19 meeting.

Jeff

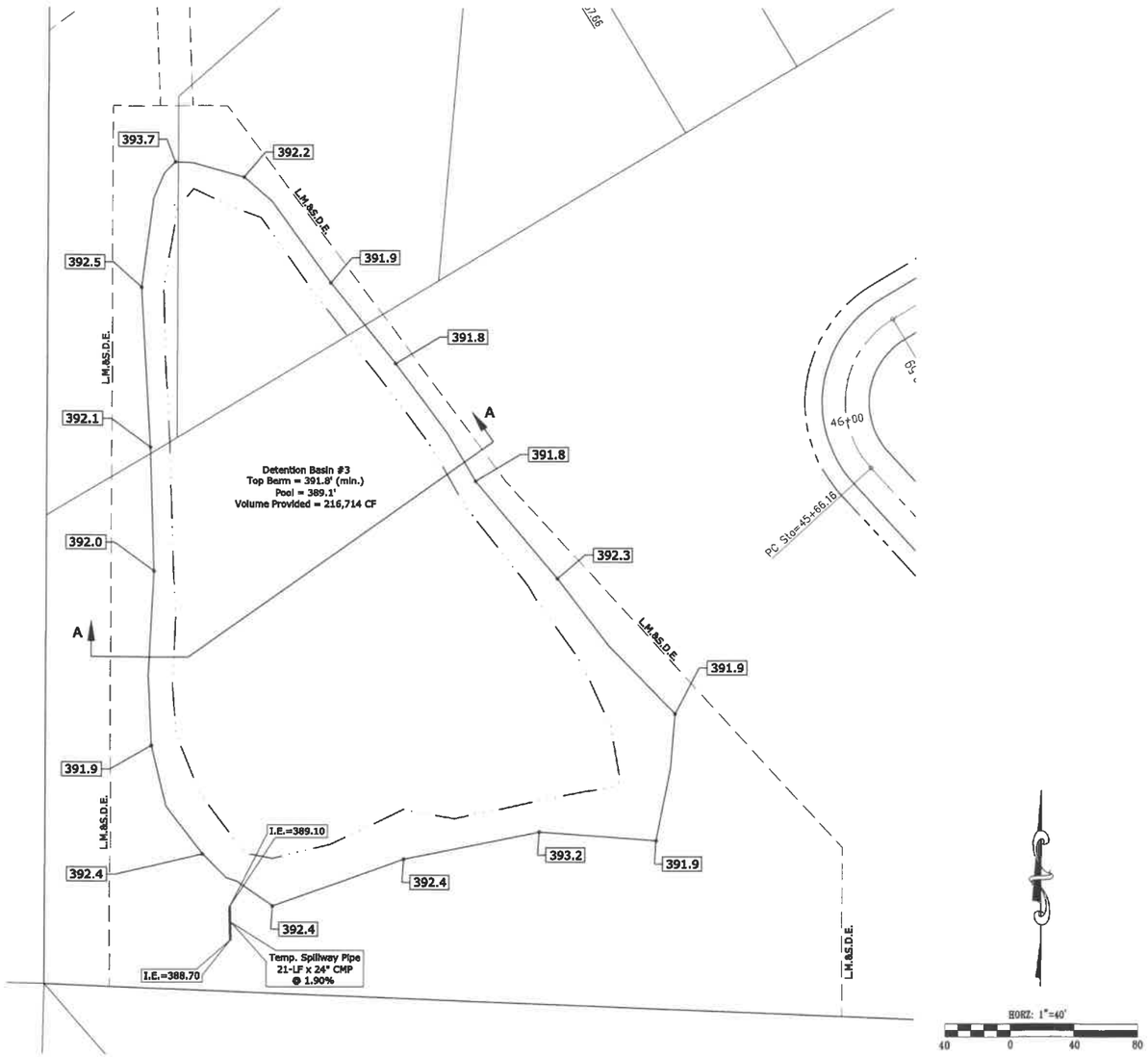
13.04.130 Phased development of large projects allowed.
Large projects may be divided into phases for the purpose of constructing drainage facilities and obtaining permits in accordance with the requirements of this chapter. ***To be constructed in phases; first phase on construction will be lots 500-556. Please provide a time table for completion of the basin and submittal of as built drawings for the basin in relation to phasing of the subdivision. The majority of detention basin #3 has been constructed. See attached record drawing. The remaining earthwork for detention basin #3 will be completed during the first phase of Section 5.***

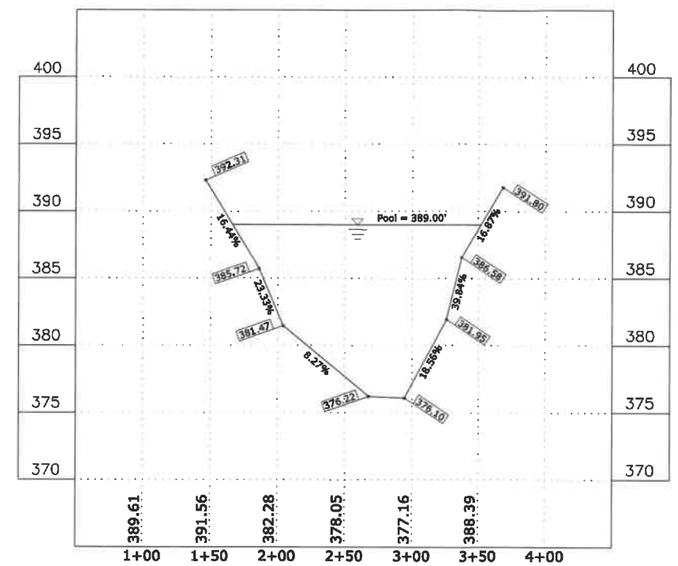
13.04.175 Submittal of a written drainage design report.
The final drainage plan shall be accompanied by a written report containing the following:

A. Any significant stormwater drainage problems existing or anticipated to be associated with the project; ***the proposed design shows that developed watershed areas 41-44 (3.7 acres) are to leave undetained. Most of this area is to flow into the swale located entirely within the west side of Asbury Pointe Subdivision. This drainage was not shown to flow into this swale in the original approved plan. No notification was required on this subdivision to the adjoiners in Asbury Pointe due to when it was originally developed. Notices will be sent the week of September 18th.***

R. Wet Basin Cover and Maintenance. The earthen side slopes of wet basins shall be provided with grass cover above the low water elevation, which shall be maintained equal to turfed residential lawns, and in no case shall the cover growth exceed twelve (12) inches in height, or the most current county standard ***Provide seeding information; Permanent seeding shall be applied to the basin when the earthwork is completed.***

Jeffrey D Mueller, PE
Vanderburgh County Surveyor
1 NW M L King Blvd Room 325
Evansville, IN 47708
(812) 435-5117





SECTION A-A

GLEN A. MERITT, JR. REGISTERED No. PE10403870 STATE OF INDIANA PROFESSIONAL ENGINEER

Signature — 11 Sept 17 — Date

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563
CELL: 812.774.2988
E-MAIL: GMERITT@CASHWAGGNER.COM

REVISIONS No.	Date	By	Description
△			
△			
△			
△			
△			
△			
△			

Project No.:	09-0559
Designed By:	G.A.M.
Drawn By:	A.W.W.
Filename:	0559 BASE SECT 4 RECORD
Layout Tab:	Basin Cross Sections
Scale:	As Shown

Project: CREEKSIDE MEADOWS
Address: PETERSBURGH ROAD, EVANSVILLE, INDIANA
Sheet Title: DET. BASIN #3 CROSS SECTION

Date: 09.11.17
Drawing No.: 1
Of:

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

LETTER OF TRANSMITTAL

DATE:	09.05.17	ATTENTION:	Jeff Mueller
PROJECT NO.:	09-0559	COMPANY:	Vanderburgh County Surveyor
REFERENCE:	Creekside Meadows – Section 5	ADDRESS:	Civic Center Complex – Room 325
YOUR FILE NO.:		CITY, ST, ZIP:	Evansville, IN 47708
		PHONE:	

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	08.13.17	Revised Drainage Plan & Details
1	08.31.17	Revised Drainage Report & Calculations
1	08.31.17	Revised Developed Sub-basin Exhibit

ARE TRANSMITTED:

- ☐ PER YOUR REQUEST
- ☐ FOR YOUR FILES
- ☒ FOR REVIEW & COMMENT
- ☐ OTHER

FOR YOUR:

- ☒ APPROVAL
- ☐ USE
- ☐ INFORMATION
- ☐ OTHER

VIA:

- ☐ COURIER
- ☐ FOR PICK UP
- ☐ USPS
- ☐ NEXT DAY ☐ FED EX ☐ UPS ☐ DHL
  - ☐ SATURDAY DELIVERY
  - ☐ TRACKING # _____
- ☒ OTHER DELIVERED

COMMENTS:

Please review the revised final drainage plan and report. If you have any questions or comments, please give me a call. Thank you

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
9-5-17 CA

FROM:

GLEN MERITT, JR., P.E.

CC: File

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563
GMERITT@CASHWAGGNER.COM

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

Discussion Revised By 9/14/2017

8-31-17

GLEN A. MERITT, JR.
REGISTERED
No. PE10403870
STATE OF INDIANA
PROFESSIONAL ENGINEER

August 31, 2017

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Drainage Report
Creekside Meadows – Section 5
Petersburg Road
Our Project #: 09-0559

Mr. Mueller:

Below is a summary of the drainage calculations for the above-referenced project.

SITE DESCRIPTION

This development consists of a single family residential subdivision with 106 lots and its associated improvements (i.e. roads, utilities). The site is located on a 41.36-acre parcel south of Creekside Meadows – Section 4 approximately 400 feet south and 800 feet east of the Prairie Drive and Chappell Drive intersection. The utility and roadway improvements will be constructed in multiple phases and the entire property will be disturbed during construction. The first phase of construction will consist of Lots 500 – 556.

No regulated drains, inlets or outfalls exist on this site. An existing sanitary sewer main is located along the west property line. No existing combined sewers or outfalls are located on this site. No known wells, septic tanks systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

The developer will be utilizing Repair Fund "B" for the maintenance and repair of all storm water drainage systems and facilities outside the county accepted road right-of-way. When the detention basin construction has been completed, the earthen side slopes will have permanent seeding applied. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man made material may be buried within detention basin #3.

DRAINAGE PATTERNS

The existing site is rolling and was previously utilized as a cultivated field. Sub-basin (UN-5) contains 0.76-acres and is located along the east property line and drains to the east to an existing swale located within Asbury Pointe Subdivision. The southeast 8.06-acres (UN-6) drains to the southeast and flows off-site to an existing swale located within Asbury Pointe Subdivision. The southeast 1.99-acres (UN-7) drains to the south and sheet flows off-site. The southwest 8.07-acres (UN-8) drains

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
9-5-17 CA

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715
E-MAIL: GMERITT@CASHWAGGNER.COM
PH: 812.401.5561
FAX: 812.401.5563

Revised BY 9/11/2017

to the south and flows off-site to an existing ditch that lies just south of the south property line of the subdivision. All runoff ultimately drains to Schlensker Ditch. See attached Undeveloped Sub-basin Exhibit for the locations of each sub-basin.

The proposed development has been divided into 44 developed drainage sub-basins with the 25-year and 100-year flows calculated for each sub-basin. Sub-basin #45 is located off-site adjacent to the east property line in Asbury Pointe Subdivision. See attached Developed Sub-basin Exhibit for locations of each sub-basin. A drainage swale and storm sewer network will be installed within the development to capture the majority of the storm water runoff and convey it to detention basin #3 located at the southwest corner of the site. The primary and emergency spillways of detention basin #3 will discharge to the existing ditch located along the south property line.

CALCULATIONS

The Rational Method and HERPICC Manual were utilized in performing the drainage calculations for this project. All storm sewers and swales were designed to carry the 25-year developed runoff. Detention basin #3 was designed to contain the peak 25-year developed runoff from the site while allowing a release rate less than the peak 10-year undeveloped runoff rate from the site. The emergency spillway for the detention basin was designed to carry the 100-year storm flow.

The original drainage report for Creekside Meadows showed a required storage volume for Detention Basin #3 to be 207,699 cubic feet with a 50.69-acre watershed and a weighted "c" value of 0.494. In Creekside Meadows – Section 4 several lot lines were adjusted and as a result, storm sewer pipes (P-598 and P-599B) were rerouted west to CI #591. These two pipes collect 10.94 cfs of runoff from the 5.20-acre watershed which now flows offsite undetained to swale #19 located along the west property line instead of flowing south to Detention Basin #3 as originally planned. Detention basins #1 and #2 have a designed release rate of 40.00 cfs and the allowable release rate was calculated to be 127.36 cfs. Therefore there is 87.36 cfs of excess runoff being detained in these two basins which easily makes up for the 10.94 cfs of increased undetained runoff from Section 4. In this report I have calculated the required storage volume for Detention Basin #3 to be 178,421 cubic feet with a 45.49-acre watershed and a weighted "c" value of 0.484. The 29,278 cubic feet decrease in storage volume is the result of the smaller watershed and lower weighted "c" value that is now draining to Detention Basin #3.

Undeveloped sub-basins UN-5 and UN-6, which consist entirely of a cultivated field, currently flow east to the swale that is located along the west property line of Asbury Pointe Subdivision. These two sub-basins contain a watershed area of 8.82-acres with a weighted "c" value of 0.35 which creates 14.46 cfs of runoff from the 10-year storm. The proposed subdivision design allows four developed sub-basins (#41 - #44), which consist of the back half of the future houses and the entire grassed rear yard of the lots that are directly adjacent to Asbury Pointe Subdivision, to drain to this same off-site swale. These four sub-basins contain a watershed area of 3.69–acres with a weighted "c" value of 0.377 which creates 8.17 cfs of runoff from the 25-year storm.

REVISED BY 9/11/2017

Below is a summary of the detention basin design elements:

Detention Basin #3		**NOTES**
Developed Q(25)	128.74 – cfs	
Developed Q(100)	156.46 – cfs	
Detention Basin #3 Undeveloped Q(10)	11.34 – cfs	UN-8
10/25-yr. Req'd Volume	178,421 c.f.	
10/25-yr. Provided Volume	187,757 c.f.	
Undetained Developed Q(25)	3.21 – cfs	#40A
Allowable Release Rate	8.13 – cfs	Undeveloped Q(10) – Undetained Developed Q(25)
Proposed Release Rate	6.98 - cfs	Detention Basin #3 Primary Spillway
Outfall Structure	*29-LF of 15" RCP*	P-871
Outfall I.E.	389. 00	
25-year Storage Vol. Elev.	390.67	
HW (25-yr. elev. – I.E.)	1.67 – ft.	
Minimum Top/Bank	391.75	

Runoff Discharge to Asbury Pointe		**NOTES**
Undeveloped Q(10)	14.46 – cfs	UN-5 and UN-6
Undetained Developed Q(25)	8.17 – cfs	#41 - #44

W:\090559\Civil Section 5\Drainage\FINAL DRAINAGE REPORT.doc

CASH WAGGNER & ASSOCIATES, PC
414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: Creekside Meadows - Sect. 3
Detention Basin #3

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 45.49 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.484

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)-O$ (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.208	158.70	6.98	151.72	1.054
0.17	5.925	130.45	6.98	123.47	1.715
0.25	5.033	110.81	6.98	103.83	2.163
0.33	4.571	100.63	6.98	93.65	2.601
0.42	4.108	90.45	6.98	83.47	2.898
0.50	3.646	80.27	6.98	73.29	3.054
0.58	3.385	74.52	6.98	67.54	3.283
0.67	3.123	68.77	6.98	61.79	3.433
0.75	2.862	63.01	6.98	56.03	3.502
0.83	2.601	57.26	6.98	50.28	3.492
0.92	2.339	51.51	6.98	44.53	3.401
1.00	2.078	45.75	6.98	38.77	3.231
1.25	1.909	42.02	6.98	35.04	3.650
1.50	1.739	38.29	6.98	31.31	3.913
1.75	1.570	34.56	6.98	27.58	4.021
2.00	1.400	30.82	6.98	23.84	3.974
2.25	1.305	28.73	6.98	21.75	4.079
2.50	1.210	26.64	6.98	19.66	4.096
2.75	1.115	24.55	6.98	17.57	4.026
3.00	1.019	22.44	6.98	15.46	3.864

PEAK STORAGE (ACRE/FT):	**4.10**
PEAK STORAGE (CUBIC FT):	**178,421**

$$\frac{178,421\ ft^3}{6.98\ ft^3/sec} = 25,562\ sec. \times \frac{1\ min.}{60\ sec.} \times \frac{1\ hour}{60\ min}$$

= 7.10 hours to return to normal pool elev.

Creekside Meadows - Section 5

Detention Basin #3

Proposed 25-yr Design Release Rate
P-871

CALCULATIONS FOR PIPE FLOWING FULL
(Pressure Conditions)

SOLVE FOR Q

Ø=	1.25	FT.
h'=	5	IN.
h=	1.0417	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	29	FT.
HW=	1.6667	FT.
Q=	**6.98**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: Creekside Meadows - Sect. 1
Detention Basin #3

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 45.49 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.484

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)-O$ (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	8.469	186.46	8.36	178.10	1.237
0.17	7.126	156.89	8.36	148.53	2.063
0.25	6.194	136.37	8.36	128.01	2.667
0.33	5.665	124.73	8.36	116.37	3.233
0.42	5.137	113.09	8.36	104.73	3.637
0.50	4.608	101.46	8.36	93.10	3.879
0.58	4.284	94.32	8.36	85.96	4.179
0.67	3.960	87.18	8.36	78.82	4.379
0.75	3.636	80.04	8.36	71.68	4.480
0.83	3.311	72.91	8.36	64.55	4.482
0.92	2.987	65.77	8.36	57.41	4.385
1.00	2.663	58.63	8.36	50.27	4.189
1.25	2.444	53.80	8.36	45.44	4.733
1.50	2.224	48.97	8.36	40.61	5.076
1.75	2.005	44.13	8.36	35.77	5.217
2.00	1.785	39.30	8.36	30.94	5.157
2.25	1.662	36.58	8.36	28.22	5.292
2.50	1.538	33.86	8.36	25.50	5.313
2.75	1.415	31.14	8.36	22.78	5.221
3.00	1.291	28.42	8.36	20.06	5.016

PEAK STORAGE (ACRE/FT): 5.31
PEAK STORAGE (CUBIC FT): 231,434

Creekside Meadows - Section 5

Detention Basin #3

Proposed 100-yr Design Release Rate
P-871

CALCULATIONS FOR PIPE FLOWING FULL
(Pressure Conditions)

SOLVE FOR Q

Ø=	1.25	FT.
h'=	10.44	IN.
h=	1.495	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	29	FT.
HW=	2.12	FT.
Q=	**8.36**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Creekside Meadows - Section 5

Detention Basin #3

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	389.00	102,184			
	390.00	108,003	105,094	105,094	105,094
E.O.S.	390.75	112,433	110,218	82,664	187,757
T.B.	391.75	122,936	117,685	117,685	305,442

Detention volume provided at Elev. 391.00 = 187,757 c.f.

Total, required 25-YR detention volume = 178,421 c.f.

25-YR Req'd detention volume provided @ Elev. = 390.67 ft.

Req'd HW= 1.67 ft.

Detention volume provided at Elev. 391.75 = 305,442 c.f.

Total, required 100-YR detention volume = 231,434 c.f.

100-YR Req'd detention volume provided @ Elev. = 391.12 ft.

Req'd HW= 2.12 ft.

Weighted c calculations for sub-basins captured by Detention Basin #3

DEVELOPED WEIGHTED c CALCULATIONS

Total Area = 45.49 Acres

Sub-basin	Area (A)		c	c x A
#1	0.57	Ac.	0.495	0.006
#2	0.21	Ac.	0.595	0.003
#3	0.74	Ac.	0.567	0.009
#4	0.72	Ac.	0.562	0.009
#5	1.43	Ac.	0.362	0.011
#6	0.20	Ac.	0.503	0.002
#7	0.84	Ac.	0.351	0.006
#8	1.03	Ac.	0.477	0.011
#9	0.05	Ac.	0.420	0.000
#10	0.84	Ac.	0.555	0.010
#11	0.73	Ac.	0.563	0.009
#12	0.88	Ac.	0.560	0.011
#13	1.03	Ac.	0.549	0.012
#14	0.33	Ac.	0.352	0.003
#14A	0.31	Ac.	0.358	0.002
#15	0.62	Ac.	0.660	0.009
#16	0.88	Ac.	0.565	0.011
#17	7.95	Ac.	0.504	0.088
#18	0.55	Ac.	0.502	0.006
#19	0.65	Ac.	0.571	0.008
#20	0.68	Ac.	0.493	0.007
#21	0.18	Ac.	0.658	0.003
#22	0.88	Ac.	0.594	0.011
#23	0.09	Ac.	0.669	0.001
#24	0.84	Ac.	0.371	0.007
#25	0.42	Ac.	0.351	0.003
#26	0.78	Ac.	0.369	0.006
#27	0.55	Ac.	0.597	0.007
#28	0.51	Ac.	0.576	0.006
#29	0.59	Ac.	0.589	0.008
#30	0.87	Ac.	0.512	0.010
#31	0.29	Ac.	0.491	0.003
#32	0.29	Ac.	0.366	0.002
#33	0.30	Ac.	0.426	0.003
#34	1.62	Ac.	0.328	0.012
#35	0.53	Ac.	0.578	0.007
#36	0.46	Ac.	0.676	0.007
#37	0.42	Ac.	0.518	0.005
#38	1.37	Ac.	0.555	0.017
#39	1.37	Ac.	0.555	0.017
P-713	6.04	Ac.	0.401	0.053
P-751B	3.61	Ac.	0.488	0.039
P-731B	2.24	Ac.	0.434	0.021

Weighted c = 0.484

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Creekside Meadows - Section 5**
Project #: 09-0559
Date: 8/14/17

1 NO.	SUB-BASIN NO.	UPSTREAM STRUCTURE	PIPE #	DOWNSTREAM STRUCTURE	LENGTH (ft)	Cj	Aj (ac.)	CjAj	SUM CjAj	Tj (min)	Tcum (min)	I (in/hr)	PIPE Q (cfs)	PIPE DIA. (in)	PIPE SLOPE (ft/ft)	I.E. (Upstream)	I.E. (Downstream)	CAP. (cfs)	TRAVEL VELOCITY (ft/sec)	TIME (min)
1		731B	732	733	162				1.43		19.99	4.572	6.54	15	0.0110	408.40	406.62	7.34	5.98	0.45
1	3	733	734	735	28	0.567	0.74	0.42	1.85	15.91	20.44	4.530	8.38	18	0.0068	406.62	406.43	9.38	5.31	0.09
1	4	735	736	737	154	0.562	0.72	0.40	2.25	15.75	20.53	4.522	10.19	18	0.0100	406.43	404.89	11.38	6.44	0.40
1	5	737	738	739	50	0.362	1.43	0.52	2.77	11.10	20.93	4.485	12.43	18	0.0214	404.89	403.82	16.64	9.42	0.09
1	6	739	740	745	215	0.503	0.20	0.10	2.87	8.16	21.02	4.476	12.86	18	0.0215	403.82	399.20	16.68	9.44	0.38
1	12	741	742	743	47	0.560	0.88	0.49	0.49	18.01	18.01	4.755	2.34	12	0.0239	403.59	402.47	5.96	7.60	0.10
1	13	743	744	745	158	0.549	1.03	0.57	1.06	18.58	18.58	4.702	4.98	12	0.0206	402.47	399.21	5.54	7.05	0.37
1	7	745	746	757	85	0.351	0.84	0.29	4.23	8.33	21.40	4.441	18.77	18	0.0370	399.20	396.05	21.88	12.39	0.11
1		Exist. 751B	752	753	147				2.05	15.72	15.72	4.966	10.18	18	0.0100	398.53	397.06	11.38	6.44	0.38
1	10	753	754	755	27	0.555	0.84	0.47	2.52	14.12	16.10	4.931	12.41	18	0.0147	397.06	396.66	13.79	7.81	0.06
1	11	755	756	757	147	0.563	0.73	0.41	2.93	13.62	16.16	4.926	14.42	24	0.0044	396.66	396.02	16.25	5.18	0.47
1	14	757	758	758A	70	0.352	0.33	0.12	7.27	9.47	21.51	4.427	32.18	24	0.0225	396.02	394.44	36.75	11.70	0.10
1	14A	758A	758B	759	22	0.358	0.31	0.11	7.38	8.97	21.61	4.418	32.60	24	0.0225	394.44	393.95	36.75	11.70	0.03
1	15	759	760	761	26	0.660	0.62	0.41	7.79	6.18	21.64	4.415	34.39	30	0.0075	393.95	393.75	38.47	7.84	0.06
1	16	761	762	763	173	0.565	0.88	0.50	8.29	14.44	21.70	4.410	36.54	30	0.0085	393.75	392.28	40.95	8.35	0.35
2		Exist. 713	714	715	137				2.93		17.42	4.809	14.09	24	0.0038	392.52	392.00	15.10	4.81	0.47
2	19	715	716	717	30	0.571	0.65	0.37	3.30	14.23	17.89	4.767	15.74	24	0.0046	392.00	391.86	16.62	5.29	0.09
2	20	717	718	719	21	0.493	0.68	0.34	3.64	17.11	17.99	4.758	17.30	24	0.0054	391.86	391.75	18.00	5.73	0.06
3	21	765	766	769	190	0.609	0.38	0.23	0.23	15.09	15.09	5.025	1.16	12	0.0282	413.00	407.64	6.48	8.25	0.38
3	22	767	768	769	26	0.594	0.88	0.52	0.52	15.66	15.66	4.972	2.60	12	0.0057	407.79	407.64	2.91	3.71	0.12
3	23	769	770	771	88	0.669	0.09	0.06	0.81	8.69	15.78	4.961	4.04	12	0.0323	407.64	404.80	6.93	8.83	0.17
3	24	771	772	773	251	0.371	0.84	0.31	1.13	9.06	15.94	4.946	5.57	15	0.0078	404.80	402.84	6.18	5.04	0.83
3	25	773	774	775	116	0.351	0.42	0.15	1.27	9.14	16.77	4.869	6.20	15	0.0097	402.84	401.72	6.89	5.62	0.34
3	26	775	776	777	192	0.369	0.78	0.29	1.56	8.76	17.12	4.837	7.55	15	0.0143	401.72	398.97	8.37	6.82	0.47
3		777	778	779	198				1.56		17.59	4.794	7.48	15	0.0145	398.97	396.10	8.42	6.87	0.48
4	27	787	788	793	186	0.597	0.55	0.33	0.33	13.91	13.91	5.227	1.72	12	0.0182	402.66	399.27	5.21	6.63	0.47
4	28	789	790	791	35	0.576	0.51	0.29	0.29	16.86	16.86	4.861	1.43	12	0.0081	399.93	399.65	3.47	4.42	0.13
4	29	791	792	793	38	0.589	0.59	0.35	0.64	13.25	16.99	4.849	3.11	12	0.0100	399.65	399.27	3.86	4.92	0.13
4	30	793	794	795	160	0.512	0.87	0.45	1.42	16.00	17.12	4.837	6.84	15	0.0118	399.27	397.38	7.60	6.20	0.43
4	31	795	796	799	79	0.491	0.29	0.14	1.56	7.75	17.55	4.797	7.47	15	0.0141	397.38	396.26	8.31	6.77	0.19
4	32	797	798	799	68	0.366	0.29	0.11	0.11	9.91	9.91	5.948	0.63	12	0.0376	399.10	396.54	7.48	9.53	0.12
4	33	799	800	807	245	0.426	0.30	0.13	1.69	8.79	17.75	4.779	8.05	15	0.0165	396.26	392.22	8.99	7.33	0.56
4	35	803	804	805	27	0.578	0.53	0.31	0.31	14.72	14.72	5.083	1.56	12	0.0040	401.19	401.08	2.44	3.11	0.14
4	36	805	806	807	167	0.676	0.46	0.31	0.62	12.49	14.86	5.058	3.12	12	0.0530	401.08	392.23	8.88	11.32	0.25
4	34	807	808	809	127	0.328	1.62	0.53	2.83	13.35	18.30	4.728	13.40	24	0.0055	392.22	391.52	18.17	5.79	0.37
4	37	809	810	811	35	0.518	0.42	0.22	3.05	8.07	18.67	4.694	14.32	24	0.0060	391.52	391.31	18.98	6.04	0.10
4	38	811	812	813	26	0.555	1.37	0.76	3.81	16.23	18.77	4.684	17.85	24	0.0090	391.31	391.08	23.24	7.40	0.06
4	39	813	814	815	180	0.588	1.94	1.14	4.95	16.83	18.82	4.680	23.18	24	0.0115	391.08	389.01	26.27	8.37	0.36
5	42 + 45	821	822	823	60	0.416	3.28	1.36	1.36	16.61	16.61	4.884	6.66	15	0.0150	397.00	396.10	8.57	6.99	0.14

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 13 — Total Area = 44,901 S.F. / 1.03 Acres

Surface									C	N
Structures	3.5	@	2000	=	7,000	S.F. =	0.16	Ac.	0.92	0.02
Pavement				=	8,149	S.F. =	0.19	Ac.	0.92	0.02
Drives	7	@	700	=	4,900	S.F. =	0.11	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			24,852 S.F.	=			0.57	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.549**		
Weighted N =	0.230		
Sheet Flow			
L =	300	Ft.	
H =	3.6	Ft.	
S =	0.0120	Ft./Ft.	
t1=	16.79	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	295	Ft.	
H =	5.4	Ft.	
S =	0.0183	Ft./Ft.	
v =	2.75	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.79	Minutes	
tc=	18.58	Minutes	
I(10) =		In./Hr.	
I(25) =	4.702	In./Hr.	
I(50) =		In./Hr.	
I(100) =	5.816	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.66**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.29**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 14 — Total Area = 14,450 S.F. / 0.33 Acres

Surface									C	N
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			12,250 S.F.	=			0.28	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.352**		
Weighted N =	0.342		
Sheet Flow			
L =	81	Ft.	
H =	2.1	Ft.	
S =	0.0259	Ft./Ft.	
t1=	9.16	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	72	Ft.	
H =	1.3	Ft.	
S =	0.0181	Ft./Ft.	
v =	3.83	Ft./sec.	
t2=	0.31	Minutes	
tc=	9.47	Minutes	
I(10) =		In./Hr.	
I(25) =	6.060	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.267	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.71**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.85**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 14A

Total Area = 13,600 S.F.
0.31 Acres

Surface									C	N
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			11,400 S.F.	=			0.26	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.358**	
Weighted N =	0.339	
Sheet Flow		
L =	81	Ft.
H =	2.5	Ft.
S =	0.0309	Ft./Ft.
t1=	8.75	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	57	Ft.
H =	1.3	Ft.
S =	0.0228	Ft./Ft.
v =	4.29	Ft./sec.
t2=	0.22	Minutes
tc=	8.97	Minutes
I(10) =		In./Hr.
I(25) =	6.190	In./Hr.
I(50) =		In./Hr.
I(100) =	7.403	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.69**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.83**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 39

Total Area = 84,304 S.F.
1.94 Acres

Surface									C	N
Structures	8.5	@	2000	=	17,000	S.F. =	0.39	Ac.	0.92	0.02
Pavement				=	13,625	S.F. =	0.31	Ac.	0.92	0.02
Drives	17	@	700	=	11,900	S.F. =	0.27	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)		0	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)		41,779	S.F.	=			0.96	Ac.	0.25	0.40
Lawn (5-10%)		0	S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00	Ac.	0.55	0.40
Water		0	S.F.	=			0.00	Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.588**		
Weighted N =	0.208		
Sheet Flow			
L =	300	Ft.	
H =	5.2	Ft.	
S =	0.0173	Ft./Ft.	
t1=	14.70	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	332	Ft.	
H =	5.3	Ft.	
S =	0.0160	Ft./Ft.	
v =	2.60	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	2.13	Minutes	
tc=	16.83	Minutes	
I(10) =		In./Hr.	
I(25) =	4.864	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.001	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**5.53**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**6.83**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 40A

Total Area = 64,803 S.F.
1.49 Acres

Surface									C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	6	@	100	=	600	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)		0	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)		28,203	S.F.	=			0.65	Ac.	0.25	0.40
Lawn (5-10%)		30,000	S.F.	=			0.69	Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)		0	S.F.	=			0.00	Ac.	0.48	0.60
Water		0	S.F.	=			0.00	Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.388**		
Weighted N =	0.361		
Sheet Flow			
L =	163	Ft.	
H =	5.9	Ft.	
S =	0.0362	Ft./Ft.	
t1=	12.04	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	12.04	Minutes	
I(10) =		In./Hr.	
I(25) =	5.561	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.746	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**3.21**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.89**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 40B

Total Area = 89,986 S.F.
2.07 Acres

Surface									C	N
Structures	0	@	2000	=	0	S.F. =	0.00	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			49,986 S.F.	=			1.15	Ac.	0.25	0.40
Lawn (5-10%)			40,000 S.F.	=			0.92	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.317**		
Weighted N =	0.400		
Sheet Flow			
L =	154	Ft.	
H =	2.0	Ft.	
S =	0.0130	Ft./Ft.	
t1=	15.62	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	15.62	Minutes	
I(10) =		In./Hr.	
I(25) =	4.975	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.128	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**3.25**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**4.01**	**CFS**	

Open Channel Flow Calculations

Swale #: **45**

Side slope = 3
Bottom width = 4
Manning's coefficient = 0.055
Slope of channel = 0.0033

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	4.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	4.63	0.43	0.09	0.09	0.14	0.32	1.1
0.2	5.26	0.92	0.17	0.18	0.45	0.49	1.2
0.3	5.90	1.47	0.25	0.25	0.91	0.62	1.3
0.32	6.02	1.59	0.26	0.27	1.02	0.64	1.4
0.4	6.53	2.08	0.32	0.33	1.51	0.73	1.4
0.5	7.16	2.75	0.38	0.39	2.26	0.82	1.5
0.6	7.79	3.48	0.45	0.46	3.16	0.91	1.6
0.7	8.43	4.27	0.51	0.52	4.22	0.99	1.7
0.8	9.06	5.12	0.57	0.58	5.45	1.06	1.8
0.9	9.69	6.03	0.62	0.64	6.84	1.13	1.9
1.0	10.32	7.00	0.68	0.70	8.41	1.20	2.0
1.1	10.96	8.03	0.73	0.76	10.16	1.27	2.1
1.2	11.59	9.12	0.79	0.81	12.10	1.33	2.2
1.3	12.22	10.27	0.84	0.87	14.23	1.39	2.3
1.4	12.85	11.48	0.89	0.93	16.57	1.44	2.4
1.5	13.49	12.75	0.95	0.98	19.11	1.50	2.5
1.6	14.12	14.08	1.00	1.04	21.87	1.55	2.6
1.7	14.75	15.47	1.05	1.09	24.85	1.61	2.7
1.8	15.38	16.92	1.10	1.14	28.06	1.66	2.8
1.9	16.02	18.43	1.15	1.20	31.49	1.71	2.9
2.0	16.65	20.00	1.20	1.25	35.17	1.76	3.0

Open Channel Flow Calculations

Swale #: **47A**

Side slope = 3
Bottom width = 4
Manning's coefficient = 0.055
Slope of channel = 0.004

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	4.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	4.63	0.43	0.09	0.09	0.15	0.35	1.1
0.2	5.26	0.92	0.17	0.18	0.49	0.54	1.2
0.3	5.90	1.47	0.25	0.25	1.00	0.68	1.3
0.32	6.02	1.59	0.26	0.27	1.12	0.70	1.4
0.4	6.53	2.08	0.32	0.33	1.66	0.80	1.4
0.5	7.16	2.75	0.38	0.39	2.49	0.91	1.5
0.6	7.79	3.48	0.45	0.46	3.48	1.00	1.6
0.7	8.43	4.27	0.51	0.52	4.65	1.09	1.7
0.8	9.06	5.12	0.57	0.58	6.00	1.17	1.8
0.9	9.69	6.03	0.62	0.64	7.53	1.25	1.9
1.0	10.32	7.00	0.68	0.70	9.26	1.32	2.0
1.1	10.96	8.03	0.73	0.76	11.18	1.39	2.1
1.2	11.59	9.12	0.79	0.81	13.32	1.46	2.2
1.3	12.22	10.27	0.84	0.87	15.67	1.53	2.3
1.4	12.85	11.48	0.89	0.93	18.24	1.59	2.4
1.5	13.49	12.75	0.95	0.98	21.04	1.65	2.5
1.6	14.12	14.08	1.00	1.04	24.08	1.71	2.6
1.7	14.75	15.47	1.05	1.09	27.36	1.77	2.7
1.8	15.38	16.92	1.10	1.14	30.89	1.83	2.8
1.9	16.02	18.43	1.15	1.20	34.67	1.88	2.9
2.0	16.65	20.00	1.20	1.25	38.72	1.94	3.0

Navigate to...

FLEXAMAT BENEFITS

- Permanent solution
- High performance - un-vegetated, capable of 19ft./sec. and 24psf
- Easy maintenance - commercial mowers can be used
- Fast and simple installation - roll design makes installation efficient
- Reduces construction cost - low material cost, less labor, and faster project completion
- Reduces runoff velocities - 0.055 Manning's "n" value un-vegetated
- Aesthetic solution - blends in with natural surroundings
- Improves safety - safe to walk or drive across
- Environmentally friendly - wildlife can walk across
- Versatile solution - customizable for site conditions

G+ Like 0 Tweet Share

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

LETTER OF TRANSMITTAL

DATE:	07.14.17	ATTENTION:	Jeff Mueller
PROJECT NO.:	09-0559	COMPANY:	Vanderburgh County Surveyor
REFERENCE:	Creekside Meadows – Section 5	ADDRESS:	Civic Center Complex – Room 325
YOUR FILE NO.:		CITY, ST, ZIP:	Evansville, IN 47708
		PHONE:	

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	07.12.17	Drainage Plan & Details
1	07.12.17	Drainage Report & Calculations
1	07.12.17	Sub-basin Exhibits

ARE TRANSMITTED:

- ☐ PER YOUR REQUEST
- ☐ FOR YOUR FILES
- ☒ FOR REVIEW & COMMENT
- ☐ OTHER

FOR YOUR:

- ☒ APPROVAL
- ☐ USE
- ☐ INFORMATION
- ☐ OTHER

VIA:

- ☐ COURIER
- ☐ FOR PICK UP
- ☐ USPS
- ☐ NEXT DAY ☐ FED EX ☐ UPS ☐ DHL
  - ☐ SATURDAY DELIVERY
  - ☐ TRACKING # _____
- ☒ OTHER DELIVERED

COMMENTS:

Please review the revised final drainage plan and report. If you have any questions or comments, please give me a call. Thank you

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563
GMERITT@CASHWAGGNER.COM

FROM:

GLEN MERITT, JR., P.E.

CC: File

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
7/14/17 CA

APPLICANT INFORMATION FORM 801

Project Name:	Creekside Meadows – Section 5
Approximate Location:	Located on the west side of Seib Road approximately 600 feet north of the Seib Road and Berwick Blvd intersection.
Applicant Name:	Land Visions LLC
Applicant is (check one)	☐Individual (s) ☒Partnership or legal LLC ☐Corporation
Applicant Address:	3638 Citadel Circle
City:	Newburgh
State:	Indiana
Zip Code:	47630
Email:	bruce@bmbnewburgh.com

For Individual (s)

I (we) do hereby certify that the Information contained on this application is to true and correct. I (we) further understand that upon completion of the project that an as built drawing or certification statement as required by the Vanderburgh County Code will be submitted as required and that failure to provide such certification could result in fines under Section 13.04.110 and/or make me (us) ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

Signature _____ Date Click here to enter a date.

Signature _____ Date Click here to enter a date.

For Partnership (s)

I (we) do hereby certify that the Information contained on this application is to true and correct. I (we) further understand that upon completion of the project that an as built drawing or certification statement as required by the Vanderburgh County Code will be submitted as required and that failure to provide such certification could result in fines under Section 13.04.110 and/or make me (us) ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

REVISED - SEE MEET REPORT DATED DISCUSSION
7-12-17

GLEN A. MERITT, JR.
REGISTERED
No. PE10403870
STATE OF
INDIANA
PROFESSIONAL ENGINEER

July 12, 2017

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Drainage Report
Creekside Meadows – Section 5
Petersburg Road
Our Project #: 09-0559

Mr. Mueller:

Below is a summary of the drainage calculations for the above-referenced project.

SITE DESCRIPTION

This development consists of a single family residential subdivision with 106 lots and its associated improvements (i.e. roads, utilities). The site is located on a 41.36-acre parcel south of Creekside Meadows – Section 4 approximately 400 feet south and 800 feet east of the Prairie Drive and Chappell Drive intersection. The utility and roadway improvements will be constructed in multiple phases and the entire property will be disturbed during construction. The first phase of construction will consist of Lots 500 – 556.

No regulated drains, inlets or outfalls exist on this site. An existing sanitary sewer main is located along the west property line. No existing combined sewers or outfalls are located on this site. No known wells, septic tanks systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

The developer will be utilizing Repair Fund "B" for the maintenance and repair of all storm water drainage systems and facilities outside the county accepted road right-of-way. When the detention basin construction has been completed, the earthen side slopes will have permanent seeding applied. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man made material may be buried within detention basin #3.

DRAINAGE PATTERNS

The existing site is rolling and was previously utilized as a cultivated field. Sub-basin (UN-5) contains 0.76-acres and is located along the east property line and drains to the east to the existing ditch located within Asbury Pointe Subdivision. The southeast 8.06-acres (UN-6) drains to the southeast and flows off-site to an existing ditch located within Asbury Pointe Subdivision. The southeast 1.99-acres (UN-7) drains to the south and sheet flows off-site. The southwest 8.07-acres (UN-8) drains

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715
E-MAIL: GMERITT@CASHWAGGNER.COM
PH: 812.401.5561
FAX: 812.401.5563

REVISED - SEE MOST RECENTLY DATED DISCUSSION

to the south and flows off-site to an existing ditch that lies just south of the south property line of the subdivision. All runoff ultimately drains to Schlensker Ditch. See attached Undeveloped Sub-basin Exhibit for the locations of each sub-basin.

The proposed development has been divided into 44 developed drainage sub-basins with the 25-year and 100-year flows calculated for each sub-basin. Sub-basin #45 is located off-site adjacent to the east property line in Asbury Pointe Subdivision. See attached Developed Sub-basin Exhibit for locations of each sub-basin. A drainage swale and storm sewer network will be installed within the development to capture the majority of the storm water runoff and convey it to detention basin #3 located at the southwest corner of the site. The primary and emergency spillways of detention basin #3 will discharge to the existing ditch located along the south property line.

CALCULATIONS

The Rational Method and HERPICC Manual were utilized in performing the drainage calculations for this project. All storm sewers and swales were designed to carry the 25-year developed runoff. Detention basin #3 was designed to contain the peak 25-year developed runoff from the site while allowing a release rate less than the peak 10-year undeveloped runoff rate from the site. The emergency spillway for the detention basin was designed to carry the 100-year storm flow.

Below is a summary of the detention basin design elements:

Detention Basin #3		**NOTES**
Developed Q(25)	128.74 – cfs	
Developed Q(100)	156.46 – cfs	
Detention Basin #3 Undeveloped Q(10)	15.27 – cfs	UN-8
10/25-yr. Req'd Volume	183,705 c.f.	
Undetained Developed Q(25)	5.15 – cfs	#40
Allowable Release Rate	10.12 – cfs	Undeveloped Q(10) – Undetained Developed Q(25)
Proposed Release Rate	7.12 - cfs	Detention Basin #3 Primary Spillway
Outfall Structure	*29-LF of 15" RCP*	P-871
Outfall I.E.	389. 00	
25-year Storage Vol. Elev.	390.71	
HW (25-yr. elev. – I.E.)	1.71 – ft.	
Minimum Top/Bank	391.75	

Runoff Discharge to Asbury Pointe		**NOTES**
Undeveloped Q(10)	14.46 – cfs	UN-5 and UN-6
Undetained Developed Q(25)	8.17 – cfs	#41 - #44

CASH WAGGNER & ASSOCIATES, PC
414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Creekside Meadows - Sect. 5**
Detention Basin #3

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 46.82 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.483

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)-O$ (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.208	163.00	7.12	155.88	1.083
0.17	5.925	133.99	7.12	126.87	1.762
0.25	5.033	113.82	7.12	106.70	2.223
0.33	4.571	103.36	7.12	96.24	2.673
0.42	4.108	92.91	7.12	85.79	2.979
0.50	3.646	82.45	7.12	75.33	3.139
0.58	3.385	76.54	7.12	69.42	3.375
0.67	3.123	70.63	7.12	63.51	3.528
0.75	2.862	64.72	7.12	57.60	3.600
0.83	2.601	58.81	7.12	51.69	3.590
0.92	2.339	52.90	7.12	45.78	3.497
1.00	2.078	46.99	7.12	39.87	3.323
1.25	1.909	43.16	7.12	36.04	3.754
1.50	1.739	39.33	7.12	32.21	4.026
1.75	1.570	35.49	7.12	28.37	4.138
2.00	1.400	31.66	7.12	24.54	4.090
2.25	1.305	29.51	7.12	22.39	4.198
2.50	1.210	27.36	7.12	20.24	4.217
2.75	1.115	25.21	7.12	18.09	4.147
3.00	1.019	23.04	7.12	15.92	3.981

PEAK STORAGE (ACRE/FT): 4.22
PEAK STORAGE (CUBIC FT): 183,705

Creekside Meadows - Section 5

Detention Basin #3

Proposed 25-yr Design Release Rate
P-871

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	1.25	FT.
h'=	5.5	IN.
h=	1.0833	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	29	FT.
HW=	1.7083	FT.
Q=	**7.12**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Creekside Meadows - Sect. 5**
Detention Basin #3

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 46.82 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.483

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)-O$ (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	8.469	191.52	8.56	182.96	1.271
0.17	7.126	161.15	8.56	152.59	2.119
0.25	6.194	140.07	8.56	131.51	2.740
0.33	5.665	128.12	8.56	119.56	3.321
0.42	5.137	116.16	8.56	107.60	3.736
0.50	4.608	104.21	8.56	95.65	3.985
0.58	4.284	96.87	8.56	88.31	4.293
0.67	3.960	89.54	8.56	80.98	4.499
0.75	3.636	82.21	8.56	73.65	4.603
0.83	3.311	74.88	8.56	66.32	4.606
0.92	2.987	67.55	8.56	58.99	4.506
1.00	2.663	60.22	8.56	51.66	4.305
1.25	2.444	55.26	8.56	46.70	4.864
1.50	2.224	50.29	8.56	41.73	5.217
1.75	2.005	45.33	8.56	36.77	5.362
2.00	1.785	40.37	8.56	31.81	5.301
2.25	1.662	37.57	8.56	29.01	5.440
2.50	1.538	34.78	8.56	26.22	5.463
2.75	1.415	31.99	8.56	23.43	5.369
3.00	1.291	29.19	8.56	20.63	5.159

PEAK STORAGE (ACRE/FT):	**5.46**
PEAK STORAGE (CUBIC FT):	**237,950**

Creekside Meadows - Section 5

Detention Basin #3

Proposed 100-yr Design Release Rate
P-871

CALCULATIONS FOR PIPE FLOWING FULL
(Pressure Conditions)

SOLVE FOR Q

Ø=	1.25	FT.
h'=	11.3	IN.
h=	1.5667	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	29	FT.
HW=	2.1917	FT.
Q=	**8.56**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Creekside Meadows - Section 5

Detention Basin #3

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	389.00	102,184			
	390.00	108,003	105,094	105,094	105,094
E.O.S.	390.75	112,433	110,218	82,664	187,757
T.B.	391.75	122,936	117,685	117,685	305,442

Detention volume provided at Elev. 391.00 = *187,757* *c.f.*

Total, required 25-YR detention volume = 183,705 c.f.

25-YR Req'd detention volume provided @ Elev. = 390.71 ft.

Req'd HW= 1.71 ft.

Detention volume provided at Elev. 391.75 = *305,442* *c.f.*

Total, required 100-YR detention volume = 237,950 c.f.

100-YR Req'd detention volume provided @ Elev. = 391.18 ft.

Req'd HW= 2.18 ft.

Open Channel Flow Calculations

Swale #: **Emergency Spillway** Det. Basin #3

Side slope = 4
Bottom width = 52
Manning's coefficient = 0.035
Slope of channel = 0.05

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	52.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	52.82	5.24	0.10	0.10	10.69	2.04	1.1
0.2	53.65	10.56	0.20	0.20	34.01	3.22	1.2
0.3	54.47	15.96	0.29	0.29	67.02	4.20	1.3
0.4	55.30	21.44	0.39	0.39	108.52	5.06	1.4
0.5	56.12	27.00	0.48	0.48	157.80	5.84	1.5

Weighted c calculations for sub-basins captured by Detention Basin #3

DEVELOPED WEIGHTED c CALCULATIONS

Total Area = 46.82 Acres

Sub-basin	*Area (A)*		*c*	*c x A*
#1	0.57	Ac.	0.495	0.006
#2	0.21	Ac.	0.595	0.003
#3	0.74	Ac.	0.567	0.009
#4	0.72	Ac.	0.562	0.009
#5	1.43	Ac.	0.362	0.011
#6	0.20	Ac.	0.503	0.002
#7	0.84	Ac.	0.351	0.006
#8	1.03	Ac.	0.477	0.010
#9	0.05	Ac.	0.420	0.000
#10	0.84	Ac.	0.555	0.010
#11	0.73	Ac.	0.563	0.009
#12	0.88	Ac.	0.560	0.011
#13	1.03	Ac.	0.549	0.012
#14	0.64	Ac.	0.355	0.005
#15	0.62	Ac.	0.660	0.009
#16	0.88	Ac.	0.565	0.011
#17	7.95	Ac.	0.504	0.086
#18	0.55	Ac.	0.502	0.006
#19	0.65	Ac.	0.571	0.008
#20	0.68	Ac.	0.493	0.007
#21	0.18	Ac.	0.658	0.003
#22	0.88	Ac.	0.594	0.011
#23	0.09	Ac.	0.669	0.001
#24	0.84	Ac.	0.371	0.007
#25	0.42	Ac.	0.351	0.003
#26	0.78	Ac.	0.369	0.006
#27	0.55	Ac.	0.597	0.007
#28	0.51	Ac.	0.576	0.006
#29	0.59	Ac.	0.589	0.007
#30	0.87	Ac.	0.512	0.010
#31	0.29	Ac.	0.491	0.003
#32	0.29	Ac.	0.366	0.002
#33	0.30	Ac.	0.426	0.003
#34	1.62	Ac.	0.328	0.011
#35	0.53	Ac.	0.578	0.007
#36	0.46	Ac.	0.676	0.007
#37	0.42	Ac.	0.518	0.005
#38	1.37	Ac.	0.555	0.016
#39	1.37	Ac.	0.555	0.016
P-713	6.04	Ac.	0.401	0.052
P-751B	4.20	Ac.	0.488	0.044
P-731B	2.98	Ac.	0.434	0.028

Weighted c = 0.483

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Creekside Meadows - Section 5**
Project #: 09-0559
Date: 7/12/17

1 NO.	SUB-BASIN NO.	UPSTREAM STRUCTURE	PIPE #	DOWNSTREAM STRUCTURE	LENGTH (ft)	Cj	Aj (ac.)	CjAj	SUM CjAj	Tj (min)	Tcum (min)	I (in/hr)	PIPE Q (cfs)	PIPE DIA. (in)	PIPE SLOPE (ft/ft)	I.E. (Upstream)	I.E. (Downstream)	CAP. (cfs)	TRAVEL VELOCITY (ft/sec)	TIME (min)
1		731B	732	733	162				1.43		19.99	4.572	6.54	15	0.0110	408.40	406.62	7.34	5.98	0.45
1	3	733	734	735	28	0.567	0.74	0.42	1.85	15.91	20.44	4.530	8.38	18	0.0066	406.62	406.43	9.24	5.23	0.09
1	4	735	736	737	154	0.562	0.72	0.40	2.25	15.75	20.53	4.522	10.19	18	0.0098	406.43	404.92	11.26	6.38	0.40
1	5	737	738	739	50	0.362	1.43	0.52	2.77	11.10	20.93	4.485	12.43	18	0.0145	404.92	404.20	13.70	7.76	0.11
1	6	739	740	745	215	0.503	0.20	0.10	2.87	8.16	21.04	4.475	12.85	18	0.0200	404.20	399.91	16.07	9.10	0.39
1	12	741	742	743	47	0.560	0.88	0.49	0.49	18.01	18.01	4.755	2.34	12	0.0255	407.45	406.25	6.16	7.85	0.10
1	13	743	744	745	158	0.549	1.03	0.57	1.06	18.58	18.58	4.702	4.98	12	0.0378	406.25	400.28	7.50	9.56	0.28
1	7	745	746	757	85	0.351	0.84	0.29	4.23	8.33	21.43	4.438	18.75	18	0.0370	399.91	396.76	21.88	12.39	0.11
1		Exist. 751B	752	753	147				2.05	15.72	15.72	4.966	10.18	18	0.0100	398.53	397.06	11.38	6.44	0.38
1	10	753	754	755	27	0.555	0.84	0.47	2.52	14.12	16.10	4.931	12.41	18	0.0147	397.06	396.66	13.79	7.81	0.06
1	11	755	756	757	147	0.563	0.73	0.41	2.93	13.62	16.16	4.926	14.42	24	0.0044	396.66	396.02	16.25	5.18	0.47
1	14	757	758	759	92	0.355	0.64	0.23	7.38	8.61	21.55	4.427	32.67	24	0.0225	396.02	393.95	36.75	11.70	0.13
1	15	759	760	761	26	0.660	0.62	0.41	7.79	6.18	21.68	4.415	34.39	30	0.0075	393.95	393.75	38.47	7.84	0.06
1	16	761	762	763	173	0.565	0.88	0.50	8.29	14.44	21.74	4.410	36.54	30	0.0085	393.75	392.28	40.95	8.35	0.35
2		Exist. 713	714	715	137				2.93		17.42	4.809	14.09	24	0.0040	392.52	391.97	15.49	4.93	0.46
2	19	715	716	717	30	0.571	0.65	0.37	3.30	14.23	17.88	4.767	15.74	24	0.0050	391.97	391.82	17.32	5.52	0.09
2	20	717	718	719	21	0.493	0.68	0.34	3.64	17.11	17.97	4.758	17.30	24	0.0060	391.82	391.70	18.98	6.04	0.06
3	21	765	766	769	190	0.609	0.38	0.23	0.23	15.09	15.09	5.025	1.16	12	0.0282	413.00	407.64	6.48	8.25	0.38
3	22	767	768	769	26	0.594	0.88	0.52	0.52	15.66	15.66	4.972	2.60	12	0.0057	407.79	407.64	2.91	3.71	0.12
3	23	769	770	771	88	0.669	0.09	0.06	0.81	8.69	15.78	4.961	4.04	12	0.0323	407.64	404.80	6.93	8.83	0.17
3	24	771	772	773	251	0.371	0.84	0.31	1.13	9.06	15.94	4.946	5.57	15	0.0078	404.80	402.84	6.18	5.04	0.83
3	25	773	774	775	116	0.351	0.42	0.15	1.27	9.14	16.77	4.869	6.20	15	0.0097	402.84	401.72	6.89	5.62	0.34
3	26	775	776	777	192	0.369	0.78	0.29	1.56	8.76	17.12	4.837	7.55	15	0.0143	401.72	398.97	8.37	6.82	0.47
3		777	778	779	198				1.56		17.59	4.794	7.48	15	0.0145	398.97	396.10	8.42	6.87	0.48
4	27	787	788	793	186	0.597	0.55	0.33	0.33	13.91	13.91	5.227	1.72	12	0.0182	402.66	399.27	5.21	6.63	0.47
4	28	789	790	791	35	0.576	0.51	0.29	0.29	16.86	16.86	4.861	1.43	12	0.0081	399.93	399.65	3.47	4.42	0.13
4	29	791	792	793	38	0.589	0.59	0.35	0.64	13.25	16.99	4.849	3.11	12	0.0100	399.65	399.27	3.86	4.92	0.13
4	30	793	794	795	160	0.512	0.87	0.45	1.42	16.00	17.12	4.837	6.84	15	0.0118	399.27	397.38	7.60	6.20	0.43
4	31	795	796	799	79	0.491	0.29	0.14	1.56	7.75	17.55	4.797	7.47	15	0.0141	397.38	396.26	8.31	6.77	0.19
4	32	797	798	799	68	0.366	0.29	0.11	0.11	9.91	9.91	5.948	0.63	12	0.0376	399.10	396.54	7.48	9.53	0.12
4	33	799	800	807	245	0.426	0.30	0.13	1.69	8.79	17.75	4.779	8.05	15	0.0165	396.26	392.22	8.99	7.33	0.56
4	35	803	804	805	27	0.578	0.53	0.31	0.31	14.72	14.72	5.083	1.56	12	0.0040	403.30	403.19	2.44	3.11	0.14
4	36	805	806	807	167	0.676	0.46	0.31	0.62	12.49	14.86	5.058	3.12	12	0.0597	403.19	393.22	9.43	12.01	0.23
4	34	807	808	809	127	0.328	1.62	0.53	2.83	13.35	18.30	4.728	13.40	24	0.0055	392.22	391.52	18.17	5.79	0.37
4	37	809	810	811	35	0.518	0.42	0.22	3.05	8.07	18.67	4.694	14.32	24	0.0060	391.52	391.31	18.98	6.04	0.10
4	38	811	812	813	26	0.555	1.37	0.76	3.81	16.23	18.77	4.684	17.85	24	0.0090	391.31	391.08	23.24	7.40	0.06
4	39	813	814	815	180	0.588	1.94	1.14	4.95	16.83	18.82	4.680	23.18	24	0.0115	391.08	389.01	26.27	8.37	0.36
5	42 + 45	821	822	823	60	0.416	3.28	1.36	1.36	16.61	16.61	4.884	6.66	15	0.0150	397.00	396.10	8.57	6.99	0.14

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UN-5

Total Area = 33,265 S.F.
0.76 Acres

Surface									*C*	*N*
Structures			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Asphalt)			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Gravel)			=	0	S.F. =	0.00	Ac.		0.92	0.15
Pavement			=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios			=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks			=	0	S.F. =	0.00	Ac.		0.92	0.02
Cult. Field (0-2%)	0	S.F.	=			0.00	Ac.		0.20	0.20
Cult. Field (2-5%)	33,265	S.F.	=			0.76	Ac.		0.35	0.20
Cult. Field (5-10%)	0	S.F.	=			0.00	Ac.		0.50	0.20
Cult. Field (>10%)	0	S.F.	=			0.00	Ac.		0.65	0.20
Water		S.F.	=			0.00	Ac.		1.00	0.00
Misc.		S.F.	=			0.00	Ac.		0.92	0.02

Weighted c =	**0.350**		
Weighted N =	0.200		
Sheet Flow			
L =	143	Ft.	
H =	3.0	Ft.	
S =	0.0210	Ft./Ft.	
t1 =	9.76	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	3.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
Open Channel Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	2.90	Ft./sec.	
t3=	0.00	Minutes	
tc =	9.76		
I(10) =	5.440	In./Hr.	
I(25) =	0.000	In./Hr.	
I(50) =	0.000	In./Hr.	
I(100) =	0.000	In./Hr.	
Q(10) =	**1.45**	**CFS**	
Q(25) =	**0.00**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.00**	**CFS**	

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UN-6

Total Area = 350,915 S.F.
8.06 Acres

Surface									*C*	*N*
Structures			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Asphalt)			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Gravel)			=	0	S.F. =	0.00	Ac.		0.92	0.15
Pavement			=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios			=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks			=	0	S.F. =	0.00	Ac.		0.92	0.02
Cult. Field (0-2%)	0	S.F.	=			0.00	Ac.		0.20	0.20
Cult. Field (2-5%)	350,915	S.F.	=			8.06	Ac.		0.35	0.20
Cult. Field (5-10%)	0	S.F.	=			0.00	Ac.		0.50	0.20
Cult. Field (>10%)	0	S.F.	=			0.00	Ac.		0.65	0.20
Water		S.F.	=			0.00	Ac.		1.00	0.00
Misc.		S.F.	=			0.00	Ac.		0.92	0.02

Weighted c =	**0.350**		
Weighted N =	0.200		
Sheet Flow			
L =	300	Ft.	
H =	8.0	Ft.	
S =	0.0267	Ft./Ft.	
t1 =	13.04	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	233	Ft.	
H =	7.0	Ft.	
S =	0.0300	Ft./Ft.	
v =	2.80	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.39	Minutes	
Open Channel Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	2.90	Ft./sec.	
t3=	0.00	Minutes	
tc =	14.43		
I(10) =	4.613	In./Hr.	
I(25) =	0.000	In./Hr.	
I(50) =	0.000	In./Hr.	
I(100) =	0.000	In./Hr.	
Q(10) =	**13.01**	**CFS**	
Q(25) =	**0.00**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.00**	**CFS**	

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UN-7

Total Area = 86,545 S.F.
1.99 Acres

Surface								*C*	*N*
Structures			=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives (Asphalt)			=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives (Gravel)			=	0	S.F. =	0.00	Ac.	0.92	0.15
Pavement			=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios			=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks			=	0	S.F. =	0.00	Ac.	0.92	0.02
Cult. Field (0-2%)	0	S.F.	=			0.00	Ac.	0.20	0.20
Cult. Field (2-5%)	86,545	S.F.	=			1.99	Ac.	0.35	0.20
Cult. Field (5-10%)	0	S.F.	=			0.00	Ac.	0.50	0.20
Cult. Field (>10%)	0	S.F.	=			0.00	Ac.	0.65	0.20
Water		S.F.	=			0.00	Ac.	1.00	0.00
Misc.		S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.350**		
Weighted N =	0.200		
Sheet Flow			
L =	300	Ft.	
H =	8.6	Ft.	
S =	0.0287	Ft./Ft.	
t1 =	12.83	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	159	Ft.	
H =	2.6	Ft.	
S =	0.0164	Ft./Ft.	
v =	2.10	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.26	Minutes	
Open Channel Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	2.90	Ft./sec.	
t3=	0.00	Minutes	
tc =	14.09		
I(10) =	4.673	In./Hr.	
I(25) =	0.000	In./Hr.	
I(50) =	0.000	In./Hr.	
I(100) =	0.000	In./Hr.	
Q(10) =	**3.25**	**CFS**	
Q(25) =	**0.00**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.00**	**CFS**	

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UN-8

Total Area = 351,357 S.F.
8.07 Acres

Surface									*C*	*N*
Structures			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Asphalt)			=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives (Gravel)			=	0	S.F. =	0.00	Ac.		0.92	0.15
Pavement			=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios			=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks			=	0	S.F. =	0.00	Ac.		0.92	0.02
Cult. Field (0-2%)	94,024	S.F.	=			2.16	Ac.		0.20	0.20
Cult. Field (2-5%)	0	S.F.	=			0.00	Ac.		0.35	0.20
Cult. Field (5-10%)	257,333	S.F.	=			5.91	Ac.		0.50	0.20
Cult. Field (>10%)	0	S.F.	=			0.00	Ac.		0.65	0.20
Water		S.F.	=			0.00	Ac.		1.00	0.00
Misc.		S.F.	=			0.00	Ac.		0.92	0.02

Weighted c =	**0.420**		
Weighted N =	0.200		
Sheet Flow			
L =	300	Ft.	
H =	13.0	Ft.	
S =	0.0433	Ft./Ft.	
t1 =	11.65	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	300	Ft.	
H =	9.0	Ft.	
S =	0.0300	Ft./Ft.	
v =	3.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.67	Minutes	
Open Channel Flow			
L =	304	Ft.	
H =	2.5	Ft.	
S =	0.0082	Ft./Ft.	
v =	2.90	Ft./sec.	
t3=	1.75	Minutes	
tc =	15.06		
I(10) =	4.510	In./Hr.	
I(25) =	0.000	In./Hr.	
I(50) =	0.000	In./Hr.	
I(100) =	0.000	In./Hr.	
Q(10) =	**15.27**	**CFS**	
Q(25) =	**0.00**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.00**	**CFS**	

Open Channel Flow Calculations

Swale #: **27**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0173

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	1.04	1.1
0.2	2.26	0.32	0.14	0.15	0.49	1.52	1.2
0.3	2.90	0.57	0.20	0.20	1.08	1.89	1.3
0.4	3.53	0.88	0.25	0.26	1.95	2.22	1.4
0.5	4.16	1.25	0.30	0.31	3.14	2.51	1.5
0.55	4.48	1.46	0.33	0.34	3.86	2.65	1.6
0.7	5.11	1.92	0.38	0.39	5.59	2.91	1.7
0.8	5.74	2.44	0.42	0.44	7.71	3.16	1.8
0.9	6.38	3.02	0.47	0.49	10.26	3.40	1.9
1.0	7.01	3.66	0.52	0.55	13.28	3.63	2.0

Open Channel Flow Calculations

Swale #: **27A**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0156

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	0.98	1.1
0.2	2.26	0.32	0.14	0.15	0.46	1.44	1.2
0.3	2.90	0.57	0.20	0.20	1.03	1.80	1.3
0.4	3.53	0.88	0.25	0.26	1.85	2.11	1.4
0.5	4.16	1.25	0.30	0.31	2.98	2.38	1.5
0.55	4.48	1.46	0.33	0.34	3.67	2.52	1.6
0.7	5.11	1.92	0.38	0.39	5.30	2.77	1.7
0.8	5.74	2.44	0.42	0.44	7.32	3.00	1.8
0.9	6.38	3.02	0.47	0.49	9.74	3.23	1.9
1.0	7.01	3.66	0.52	0.55	12.61	3.45	2.0

Open Channel Flow Calculations

Swale #: **26**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0092

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.10	0.76	1.1
0.2	2.26	0.32	0.14	0.15	0.35	1.11	1.2
0.3	2.90	0.57	0.20	0.20	0.79	1.38	1.3
0.32	3.02	0.63	0.21	0.21	0.90	1.43	1.4
0.4	3.53	0.88	0.25	0.26	1.42	1.62	1.4
0.5	4.16	1.25	0.30	0.31	2.29	1.83	1.5
0.6	4.79	1.68	0.35	0.37	3.41	2.03	1.6
0.7	5.43	2.17	0.40	0.42	4.81	2.22	1.7
0.8	6.06	2.72	0.45	0.47	6.51	2.39	1.8
0.9	6.69	3.33	0.50	0.52	8.54	2.56	1.9
1.0	7.32	4.00	0.55	0.57	10.91	2.73	2.0

Open Channel Flow Calculations

Swale #: **26A**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0192

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.14	1.09	1.1
0.2	2.26	0.32	0.14	0.15	0.51	1.60	1.2
0.3	2.90	0.57	0.20	0.20	1.14	2.00	1.3
0.32	3.02	0.63	0.21	0.21	1.30	2.07	1.4
0.4	3.53	0.88	0.25	0.26	2.06	2.34	1.4
0.5	4.16	1.25	0.30	0.31	3.31	2.65	1.5
0.6	4.79	1.68	0.35	0.37	4.93	2.93	1.6
0.7	5.43	2.17	0.40	0.42	6.95	3.20	1.7
0.8	6.06	2.72	0.45	0.47	9.41	3.46	1.8
0.9	6.69	3.33	0.50	0.52	12.33	3.70	1.9
1.0	7.32	4.00	0.55	0.57	15.76	3.94	2.0

Open Channel Flow Calculations

Swale #: 45

Side slope = 3
Bottom width = 4
Manning's coefficient = 0.035
Slope of channel = 0.0033

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	4.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	4.63	0.43	0.09	0.09	0.22	0.50	1.1
0.2	5.26	0.92	0.17	0.18	0.70	0.76	1.2
0.3	5.90	1.47	0.25	0.25	1.42	0.97	1.3
0.32	6.02	1.59	0.26	0.27	1.60	1.01	1.4
0.4	6.53	2.08	0.32	0.33	2.37	1.14	1.4
0.5	7.16	2.75	0.38	0.39	3.55	1.29	1.5
0.6	7.79	3.48	0.45	0.46	4.97	1.43	1.6
0.7	8.43	4.27	0.51	0.52	6.64	1.55	1.7
0.8	9.06	5.12	0.57	0.58	8.56	1.67	1.8
0.9	9.69	6.03	0.62	0.64	10.75	1.78	1.9
1.0	10.32	7.00	0.68	0.70	13.21	1.89	2.0
1.1	10.96	8.03	0.73	0.76	15.96	1.99	2.1
1.2	11.59	9.12	0.79	0.81	19.01	2.08	2.2
1.3	12.22	10.27	0.84	0.87	22.36	2.18	2.3
1.4	12.85	11.48	0.89	0.93	26.04	2.27	2.4
1.5	13.49	12.75	0.95	0.98	30.03	2.36	2.5
1.6	14.12	14.08	1.00	1.04	34.37	2.44	2.6
1.7	14.75	15.47	1.05	1.09	39.05	2.52	2.7
1.8	15.38	16.92	1.10	1.14	44.09	2.61	2.8
1.9	16.02	18.43	1.15	1.20	49.49	2.69	2.9
2.0	16.65	20.00	1.20	1.25	55.27	2.76	3.0

Open Channel Flow Calculations

Swale #: **46**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0138

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.12	0.93	1.1
0.2	2.26	0.32	0.14	0.15	0.43	1.36	1.2
0.3	2.90	0.57	0.20	0.20	0.96	1.69	1.3
0.32	3.02	0.63	0.21	0.21	1.10	1.75	1.4
0.4	3.53	0.88	0.25	0.26	1.74	1.98	1.4
0.5	4.16	1.25	0.30	0.31	2.80	2.24	1.5
0.6	4.79	1.68	0.35	0.37	4.18	2.49	1.6
0.7	5.43	2.17	0.40	0.42	5.89	2.71	1.7
0.8	6.06	2.72	0.45	0.47	7.97	2.93	1.8
0.9	6.69	3.33	0.50	0.52	10.46	3.14	1.9
1.0	7.32	4.00	0.55	0.57	13.37	3.34	2.0

Open Channel Flow Calculations

Swale #: **47**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.022

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.15	1.17	1.1
0.2	2.26	0.32	0.14	0.15	0.55	1.71	1.2
0.3	2.90	0.57	0.20	0.20	1.22	2.14	1.3
0.32	3.02	0.63	0.21	0.21	1.39	2.21	1.4
0.4	3.53	0.88	0.25	0.26	2.20	2.50	1.4
0.5	4.16	1.25	0.30	0.31	3.54	2.83	1.5
0.6	4.79	1.68	0.35	0.37	5.27	3.14	1.6
0.7	5.43	2.17	0.40	0.42	7.44	3.43	1.7
0.8	6.06	2.72	0.45	0.47	10.07	3.70	1.8
0.9	6.69	3.33	0.50	0.52	13.20	3.97	1.9
1.0	7.32	4.00	0.55	0.57	16.87	4.22	2.0

Open Channel Flow Calculations

Swale #: **47A**

Side slope = 3
Bottom width = 4
Manning's coefficient = 0.035
Slope of channel = 0.004

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	4.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	4.63	0.43	0.09	0.09	0.24	0.55	1.1
0.2	5.26	0.92	0.17	0.18	0.77	0.84	1.2
0.3	5.90	1.47	0.25	0.25	1.57	1.07	1.3
0.32	6.02	1.59	0.26	0.27	1.76	1.11	1.4
0.4	6.53	2.08	0.32	0.33	2.61	1.26	1.4
0.5	7.16	2.75	0.38	0.39	3.91	1.42	1.5
0.6	7.79	3.48	0.45	0.46	5.47	1.57	1.6
0.7	8.43	4.27	0.51	0.52	7.31	1.71	1.7
0.8	9.06	5.12	0.57	0.58	9.42	1.84	1.8
0.9	9.69	6.03	0.62	0.64	11.83	1.96	1.9
1.0	10.32	7.00	0.68	0.70	14.55	2.08	2.0
1.1	10.96	8.03	0.73	0.76	17.57	2.19	2.1
1.2	11.59	9.12	0.79	0.81	20.93	2.29	2.2
1.3	12.22	10.27	0.84	0.87	24.62	2.40	2.3
1.4	12.85	11.48	0.89	0.93	28.66	2.50	2.4
1.5	13.49	12.75	0.95	0.98	33.07	2.59	2.5
1.6	14.12	14.08	1.00	1.04	37.84	2.69	2.6
1.7	14.75	15.47	1.05	1.09	42.99	2.78	2.7
1.8	15.38	16.92	1.10	1.14	48.54	2.87	2.8
1.9	16.02	18.43	1.15	1.20	54.49	2.96	2.9
2.0	16.65	20.00	1.20	1.25	60.85	3.04	3.0

Open Channel Flow Calculations

Swale #: **48**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0172

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	1.03	1.1
0.2	2.26	0.32	0.14	0.15	0.48	1.51	1.2
0.3	2.90	0.57	0.20	0.20	1.08	1.89	1.3
0.32	3.02	0.63	0.21	0.21	1.23	1.96	1.4
0.4	3.53	0.88	0.25	0.26	1.95	2.21	1.4
0.5	4.16	1.25	0.30	0.31	3.13	2.50	1.5
0.6	4.54	1.50	0.33	0.34	4.01	2.67	1.6
0.7	5.17	1.97	0.38	0.40	5.76	2.93	1.7
0.8	5.81	2.49	0.43	0.45	7.92	3.18	1.8
0.9	6.44	3.08	0.48	0.50	10.51	3.41	1.9
1.0	7.07	3.72	0.53	0.55	13.56	3.64	2.0

Open Channel Flow Calculations

Swale #: **49**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0319

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.18	1.41	1.1
0.2	2.26	0.32	0.14	0.15	0.66	2.06	1.2
0.3	2.90	0.57	0.20	0.20	1.47	2.57	1.3
0.32	3.02	0.63	0.21	0.21	1.67	2.66	1.4
0.4	3.53	0.88	0.25	0.26	2.65	3.01	1.4
0.5	4.16	1.25	0.30	0.31	4.26	3.41	1.5
0.6	4.79	1.68	0.35	0.37	6.35	3.78	1.6
0.7	5.43	2.17	0.40	0.42	8.95	4.13	1.7
0.8	6.06	2.72	0.45	0.47	12.12	4.46	1.8
0.9	6.69	3.33	0.50	0.52	15.90	4.77	1.9
1.0	7.32	4.00	0.55	0.57	20.32	5.08	2.0

Open Channel Flow Calculations

Swale #: **50**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.09	0.70	1.1
0.2	2.26	0.32	0.14	0.15	0.33	1.03	1.2
0.3	2.90	0.57	0.20	0.20	0.73	1.29	1.3
0.32	3.02	0.63	0.21	0.21	0.84	1.33	1.4
0.4	3.53	0.88	0.25	0.26	1.33	1.51	1.4
0.5	4.16	1.25	0.30	0.31	2.13	1.71	1.5
0.6	4.79	1.68	0.35	0.37	3.18	1.89	1.6
0.7	5.43	2.17	0.40	0.42	4.48	2.07	1.7
0.8	6.06	2.72	0.45	0.47	6.07	2.23	1.8
0.9	6.69	3.33	0.50	0.52	7.96	2.39	1.9
1.0	7.32	4.00	0.55	0.57	10.18	2.54	2.0

Open Channel Flow Calculations

Swale #: **51**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0189

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.14	1.08	1.1
0.2	2.26	0.32	0.14	0.15	0.51	1.59	1.2
0.3	2.90	0.57	0.20	0.20	1.13	1.98	1.3
0.32	3.02	0.63	0.21	0.21	1.29	2.05	1.4
0.4	3.53	0.88	0.25	0.26	2.04	2.32	1.4
0.5	4.16	1.25	0.30	0.31	3.28	2.62	1.5
0.6	4.79	1.68	0.35	0.37	4.89	2.91	1.6
0.7	5.43	2.17	0.40	0.42	6.89	3.18	1.7
0.8	6.06	2.72	0.45	0.47	9.33	3.43	1.8
0.9	6.69	3.33	0.50	0.52	12.24	3.68	1.9
1.0	7.32	4.00	0.55	0.57	15.64	3.91	2.0

Open Channel Flow Calculations

Swale #: **52**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.05

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.23	1.76	1.1
0.2	2.26	0.32	0.14	0.15	0.83	2.58	1.2
0.3	2.90	0.57	0.20	0.20	1.84	3.22	1.3
0.32	3.02	0.63	0.21	0.21	2.09	3.34	1.4
0.4	3.53	0.88	0.25	0.26	3.32	3.77	1.4
0.5	4.16	1.25	0.30	0.31	5.34	4.27	1.5
0.6	4.79	1.68	0.35	0.37	7.95	4.73	1.6
0.7	5.43	2.17	0.40	0.42	11.21	5.17	1.7
0.8	6.06	2.72	0.45	0.47	15.18	5.58	1.8
0.9	6.69	3.33	0.50	0.52	19.91	5.98	1.9
1.0	7.32	4.00	0.55	0.57	25.44	6.35	2.0

Open Channel Flow Calculations

Swale #: **56**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0206

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.15	1.13	1.1
0.2	2.26	0.32	0.14	0.15	0.53	1.66	1.2
0.3	2.90	0.57	0.20	0.20	1.18	2.07	1.3
0.32	3.02	0.63	0.21	0.21	1.34	2.14	1.4
0.4	3.53	0.88	0.25	0.26	2.13	2.42	1.4
0.5	4.16	1.25	0.30	0.31	3.43	2.74	1.5
0.6	4.79	1.68	0.35	0.37	5.10	3.04	1.6
0.7	5.43	2.17	0.40	0.42	7.20	3.32	1.7
0.8	6.06	2.72	0.45	0.47	9.74	3.58	1.8
0.9	6.69	3.33	0.50	0.52	12.78	3.84	1.9
1.0	7.32	4.00	0.55	0.57	16.33	4.08	2.0

Open Channel Flow Calculations

Swale #: **57**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0279

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.17	1.32	1.1
0.2	2.26	0.32	0.14	0.15	0.62	1.93	1.2
0.3	2.90	0.57	0.20	0.20	1.37	2.41	1.3
0.32	3.02	0.63	0.21	0.21	1.56	2.49	1.4
0.4	3.53	0.88	0.25	0.26	2.48	2.82	1.4
0.5	4.16	1.25	0.30	0.31	3.99	3.19	1.5
0.6	4.79	1.68	0.35	0.37	5.94	3.53	1.6
0.7	5.43	2.17	0.40	0.42	8.37	3.86	1.7
0.8	6.06	2.72	0.45	0.47	11.34	4.17	1.8
0.9	6.69	3.33	0.50	0.52	14.87	4.47	1.9
1.0	7.32	4.00	0.55	0.57	19.00	4.75	2.0

Open Channel Flow Calculations

Swale #: **58**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0085

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.09	0.73	1.1
0.2	2.26	0.32	0.14	0.15	0.34	1.06	1.2
0.3	2.90	0.57	0.20	0.20	0.76	1.33	1.3
0.32	3.02	0.63	0.21	0.21	0.86	1.38	1.4
0.4	3.53	0.88	0.25	0.26	1.37	1.55	1.4
0.5	4.16	1.25	0.30	0.31	2.20	1.76	1.5
0.6	4.79	1.68	0.35	0.37	3.28	1.95	1.6
0.7	5.43	2.17	0.40	0.42	4.62	2.13	1.7
0.8	6.06	2.72	0.45	0.47	6.26	2.30	1.8
0.9	6.69	3.33	0.50	0.52	8.21	2.46	1.9
1.0	7.32	4.00	0.55	0.57	10.49	2.62	2.0

Open Channel Flow Calculations

Swale #: **59**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0171

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	1.03	1.1
0.2	2.26	0.32	0.14	0.15	0.48	1.51	1.2
0.3	2.90	0.57	0.20	0.20	1.07	1.88	1.3
0.32	3.02	0.63	0.21	0.21	1.22	1.95	1.4
0.4	3.53	0.88	0.25	0.26	1.94	2.21	1.4
0.5	4.16	1.25	0.30	0.31	3.12	2.50	1.5
0.6	4.79	1.68	0.35	0.37	4.65	2.77	1.6
0.7	5.43	2.17	0.40	0.42	6.56	3.02	1.7
0.8	6.06	2.72	0.45	0.47	8.88	3.26	1.8
0.9	6.69	3.33	0.50	0.52	11.64	3.50	1.9
1.0	7.32	4.00	0.55	0.57	14.88	3.72	2.0

Open Channel Flow Calculations

Swale #: **60**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0333

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.19	1.44	1.1
0.2	2.26	0.32	0.14	0.15	0.67	2.11	1.2
0.3	2.90	0.57	0.20	0.20	1.50	2.63	1.3
0.32	3.02	0.63	0.21	0.21	1.71	2.72	1.4
0.4	3.53	0.88	0.25	0.26	2.71	3.08	1.4
0.5	4.16	1.25	0.30	0.31	4.35	3.48	1.5
0.6	4.79	1.68	0.35	0.37	6.49	3.86	1.6
0.7	5.43	2.17	0.40	0.42	9.15	4.22	1.7
0.8	6.06	2.72	0.45	0.47	12.39	4.55	1.8
0.9	6.69	3.33	0.50	0.52	16.24	4.88	1.9
1.0	7.32	4.00	0.55	0.57	20.76	5.19	2.0

Open Channel Flow Calculations

Swale #: **61**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.1293

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.37	2.83	1.1
0.2	2.26	0.32	0.14	0.15	1.33	4.15	1.2
0.3	2.90	0.57	0.20	0.20	2.95	5.18	1.3
0.32	3.02	0.63	0.21	0.21	3.36	5.36	1.4
0.4	3.53	0.88	0.25	0.26	5.34	6.06	1.4
0.5	4.16	1.25	0.30	0.31	8.58	6.86	1.5
0.6	4.79	1.68	0.35	0.37	12.78	7.61	1.6
0.7	5.43	2.17	0.40	0.42	18.03	8.31	1.7
0.8	6.06	2.72	0.45	0.47	24.41	8.97	1.8
0.9	6.69	3.33	0.50	0.52	32.01	9.61	1.9
1.0	7.32	4.00	0.55	0.57	40.91	10.23	2.0

Open Channel Flow Calculations

Swale #: **62**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0198

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.14	1.11	1.1
0.2	2.26	0.32	0.14	0.15	0.52	1.62	1.2
0.3	2.90	0.57	0.20	0.20	1.15	2.03	1.3
0.32	3.02	0.63	0.21	0.21	1.32	2.10	1.4
0.4	3.53	0.88	0.25	0.26	2.09	2.37	1.4
0.5	4.16	1.25	0.30	0.31	3.36	2.69	1.5
0.6	4.79	1.68	0.35	0.37	5.00	2.98	1.6
0.7	5.43	2.17	0.40	0.42	7.06	3.25	1.7
0.8	6.06	2.72	0.45	0.47	9.55	3.51	1.8
0.9	6.69	3.33	0.50	0.52	12.53	3.76	1.9
1.0	7.32	4.00	0.55	0.57	16.01	4.00	2.0

Open Channel Flow Calculations

Swale #: **63**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0372

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.20	1.52	1.1
0.2	2.26	0.32	0.14	0.15	0.71	2.23	1.2
0.3	2.90	0.57	0.20	0.20	1.58	2.78	1.3
0.32	3.02	0.63	0.21	0.21	1.80	2.88	1.4
0.4	3.53	0.88	0.25	0.26	2.86	3.25	1.4
0.5	4.16	1.25	0.30	0.31	4.60	3.68	1.5
0.6	4.79	1.68	0.35	0.37	6.86	4.08	1.6
0.7	5.43	2.17	0.40	0.42	9.67	4.46	1.7
0.8	6.06	2.72	0.45	0.47	13.09	4.81	1.8
0.9	6.69	3.33	0.50	0.52	17.17	5.16	1.9
1.0	7.32	4.00	0.55	0.57	21.94	5.49	2.0

Open Channel Flow Calculations

Swale #: **64**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0096

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.10	0.77	1.1
0.2	2.26	0.32	0.14	0.15	0.36	1.13	1.2
0.3	2.90	0.57	0.20	0.20	0.80	1.41	1.3
0.32	3.02	0.63	0.21	0.21	0.92	1.46	1.4
0.4	3.53	0.88	0.25	0.26	1.45	1.65	1.4
0.5	4.16	1.25	0.30	0.31	2.34	1.87	1.5
0.6	4.79	1.68	0.35	0.37	3.48	2.07	1.6
0.7	5.43	2.17	0.40	0.42	4.91	2.26	1.7
0.8	6.06	2.72	0.45	0.47	6.65	2.45	1.8
0.9	6.69	3.33	0.50	0.52	8.72	2.62	1.9
1.0	7.32	4.00	0.55	0.57	11.15	2.79	2.0

Open Channel Flow Calculations

Swale #: **65**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0177

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.14	1.05	1.1
0.2	2.26	0.32	0.14	0.15	0.49	1.54	1.2
0.3	2.90	0.57	0.20	0.20	1.09	1.92	1.3
0.32	3.02	0.63	0.21	0.21	1.24	1.98	1.4
0.4	3.53	0.88	0.25	0.26	1.97	2.24	1.4
0.5	4.16	1.25	0.30	0.31	3.17	2.54	1.5
0.6	4.79	1.68	0.35	0.37	4.73	2.81	1.6
0.7	5.43	2.17	0.40	0.42	6.67	3.07	1.7
0.8	6.06	2.72	0.45	0.47	9.03	3.32	1.8
0.9	6.69	3.33	0.50	0.52	11.84	3.56	1.9
1.0	7.32	4.00	0.55	0.57	15.14	3.78	2.0

Open Channel Flow Calculations

Swale #: 66

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0106

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.81	1.1
0.2	2.26	0.32	0.14	0.15	0.38	1.19	1.2
0.3	2.90	0.57	0.20	0.20	0.85	1.48	1.3
0.32	3.02	0.63	0.21	0.21	0.96	1.54	1.4
0.4	3.53	0.88	0.25	0.26	1.53	1.74	1.4
0.5	4.16	1.25	0.30	0.31	2.46	1.97	1.5
0.6	4.79	1.68	0.35	0.37	3.66	2.18	1.6
0.7	5.43	2.17	0.40	0.42	5.16	2.38	1.7
0.8	6.06	2.72	0.45	0.47	6.99	2.57	1.8
0.9	6.69	3.33	0.50	0.52	9.17	2.75	1.9
1.0	7.32	4.00	0.55	0.57	11.71	2.93	2.0

Open Channel Flow Calculations

Swale #: **67**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0245

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.16	1.23	1.1
0.2	2.26	0.32	0.14	0.15	0.58	1.81	1.2
0.3	2.90	0.57	0.20	0.20	1.28	2.25	1.3
0.32	3.02	0.63	0.21	0.21	1.46	2.33	1.4
0.4	3.53	0.88	0.25	0.26	2.32	2.64	1.4
0.5	4.16	1.25	0.30	0.31	3.74	2.99	1.5
0.6	4.79	1.68	0.35	0.37	5.56	3.31	1.6
0.7	5.43	2.17	0.40	0.42	7.85	3.62	1.7
0.8	6.06	2.72	0.45	0.47	10.63	3.91	1.8
0.9	6.69	3.33	0.50	0.52	13.93	4.18	1.9
1.0	7.32	4.00	0.55	0.57	17.81	4.45	2.0

Open Channel Flow Calculations

Swale #: 68

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0116

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.85	1.1
0.2	2.26	0.32	0.14	0.15	0.40	1.24	1.2
0.3	2.90	0.57	0.20	0.20	0.88	1.55	1.3
0.32 -	3.02	0.63	0.21	0.21	1.01	1.61	1.4
0.4	3.53	0.88	0.25	0.26	1.60	1.82	1.4
0.5	4.16	1.25	0.30	0.31	2.57	2.06	1.5
0.6	4.79	1.68	0.35	0.37	3.83	2.28	1.6
0.7	5.43	2.17	0.40	0.42	5.40	2.49	1.7
0.8	6.06	2.72	0.45	0.47	7.31	2.69	1.8
0.9	6.69	3.33	0.50	0.52	9.59	2.88	1.9
1.0	7.32	4.00	0.55	0.57	12.25	3.06	2.0

Open Channel Flow Calculations

Swale #: **69**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0173

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	1.04	1.1
0.2	2.26	0.32	0.14	0.15	0.49	1.52	1.2
0.3	2.90	0.57	0.20	0.20	1.08	1.89	1.3
0.32	3.02	0.63	0.21	0.21	1.23	1.96	1.4
0.4	3.53	0.88	0.25	0.26	1.95	2.22	1.4
0.5	4.16	1.25	0.30	0.31	3.14	2.51	1.5
0.6	4.79	1.68	0.35	0.37	4.68	2.78	1.6
0.7	5.43	2.17	0.40	0.42	6.59	3.04	1.7
0.8	6.06	2.72	0.45	0.47	8.93	3.28	1.8
0.9	6.69	3.33	0.50	0.52	11.71	3.52	1.9
1.0	7.32	4.00	0.55	0.57	14.96	3.74	2.0

Open Channel Flow Calculations

Swale #: **70**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0298

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.18	1.36	1.1
0.2	2.26	0.32	0.14	0.15	0.64	1.99	1.2
0.3	2.90	0.57	0.20	0.20	1.42	2.49	1.3
0.32	3.02	0.63	0.21	0.21	1.62	2.58	1.4
0.4	3.53	0.88	0.25	0.26	2.56	2.91	1.4
0.5	4.16	1.25	0.30	0.31	4.12	3.30	1.5
0.6	4.79	1.68	0.35	0.37	6.14	3.65	1.6
0.7	5.43	2.17	0.40	0.42	8.66	3.99	1.7
0.8	6.06	2.72	0.45	0.47	11.72	4.31	1.8
0.9	6.69	3.33	0.50	0.52	15.37	4.61	1.9
1.0	7.32	4.00	0.55	0.57	19.64	4.91	2.0

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 1

Total Area = 24,773 S.F.
0.57 Acres

Surface										C	N
Structures	2	@	2000	=	4,000	S.F. =	0.09	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	4	@	100	=	400	S.F. =	0.01	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			0	S.F.	=		0.00	Ac.		0.25	0.40
Lawn (5-10%)			20,373	S.F.	=		0.47	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.492**		
Weighted N =	0.333		
Sheet Flow			
L =	93	Ft.	
H =	6.4	Ft.	
S =	0.0688	Ft./Ft.	
t1=	7.68	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	246	Ft.	
H =	4.0	Ft.	
S =	0.0162	Ft./Ft.	
v =	3.62	Ft./sec.	
t2=	1.13	Minutes	
tc=	8.82	Minutes	
I(10) =		In./Hr.	
I(25) =	6.229	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.444	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.74**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.08**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 2

Total Area = 9,018 S.F.
0.21 Acres

Surface										C	N
Structures	0.5	@	2000	=	1,000	S.F. =	0.02	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	1	@	100	=	100	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			0	S.F.	=		0.00	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			7,918	S.F.	=		0.18	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.595**		
Weighted N =	0.354		
Sheet Flow			
L =	93	Ft.	
H =	9.9	Ft.	
S =	0.1060	Ft./Ft.	
t1=	7.15	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	91	Ft.	
H =	2.6	Ft.	
S =	0.0287	Ft./Ft.	
v =	4.82	Ft./sec.	
t2=	0.31	Minutes	
tc=	7.47	Minutes	
I(10) =		In./Hr.	
I(25) =	6.575	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.807	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.81**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.96**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 3

Total Area = 32,060 S.F.
0.74 Acres

Surface									C	N
Structures	2.5	@	2000	=	5,000	S.F. =	0.11	Ac.	0.92	0.02
Pavement				=	6,662	S.F. =	0.15	Ac.	0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)			16,898	S.F.	=		0.39	Ac.	0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.	0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.	0.55	0.40
Water			0	S.F.	=		0.00	Ac.	1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.	0.92	0.02

Weighted c =	**0.567**		
Weighted N =	0.220		
Sheet Flow			
L =	300	Ft.	
H =	5.0	Ft.	
S =	0.0166	Ft./Ft.	
t1=	15.24	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	135	Ft.	
H =	3.9	Ft.	
S =	0.0285	Ft./Ft.	
v =	3.40	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.66	Minutes	
tc=	15.91	Minutes	
I(10) =		In./Hr.	
I(25) =	4.949	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.098	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.06**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.54**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 4

Total Area = 31,151 S.F.
0.72 Acres

Surface									C	N
Structures	2.5	@	2000	=	5,000	S.F. =	0.11	Ac.	0.92	0.02
Pavement				=	5,990	S.F. =	0.14	Ac.	0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)			16,661	S.F.	=		0.38	Ac.	0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.	0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.	0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.	0.48	0.60
Water			0	S.F.	=		0.00	Ac.	1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.	0.92	0.02

Weighted c =	**0.562**		
Weighted N =	0.223		
Sheet Flow			
L =	300	Ft.	
H =	5.2	Ft.	
S =	0.0172	Ft./Ft.	
t1=	15.21	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	126	Ft.	
H =	3.7	Ft.	
S =	0.0297	Ft./Ft.	
v =	3.90	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.54	Minutes	
tc=	15.75	Minutes	
I(10) =		In./Hr.	
I(25) =	4.964	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.115	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.99**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.46**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 5

Total Area = 62,296 S.F.
1.43 Acres

Surface									C	N
Structures	4.75	@	2000	=	9,500	S.F. =	0.22	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	9	@	100	=	900	S.F. =	0.02	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			51,896 S.F.	=			1.19	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.362**		
Weighted N =	0.337		
Sheet Flow			
L =	80	Ft.	
H =	1.5	Ft.	
S =	0.0187	Ft./Ft.	
t1=	9.78	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	345	Ft.	
H =	8.1	Ft.	
S =	0.0235	Ft./Ft.	
v =	4.36	Ft./sec.	
t2=	1.32	Minutes	
tc=	11.10	Minutes	
I(10) =		In./Hr.	
I(25) =	5.729	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.922	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.96**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.58**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 6

Total Area = 8,615 S.F.
0.20 Acres

Surface									C	N
Structures	0.75	@	2000	=	1,500	S.F. =	0.03	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			0 S.F.	=			0.00	Ac.	0.25	0.40
Lawn (5-10%)			6,915 S.F.	=			0.16	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.503**		
Weighted N =	0.325		
Sheet Flow			
L =	110	Ft.	
H =	7.7	Ft.	
S =	0.0703	Ft./Ft.	
t1=	8.16	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	8.16	Minutes	
I(10) =		In./Hr.	
I(25) =	6.398	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.621	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.64**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.76**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 7

Total Area = 36,379 S.F.
0.84 Acres

Surface									C	N
Structures	2.5	@	2000	=	5,000	S.F. =	0.11	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	5	@	100	=	500	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			30,879 S.F.	=			0.71	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.351**		
Weighted N =	0.343		
Sheet Flow			
L =	100	Ft.	
H =	8.9	Ft.	
S =	0.0889	Ft./Ft.	
t1=	7.58	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	178	Ft.	
H =	3.5	Ft.	
S =	0.0196	Ft./Ft.	
v =	3.98	Ft./sec.	
t2=	0.75	Minutes	
tc=	8.33	Minutes	
I(10) =		In./Hr.	
I(25) =	6.354	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.575	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.86**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.22**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 8

Total Area = 44,715 S.F.
1.03 Acres

Surface									C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	6	@	100	=	600	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			0 S.F.	=			0.00	Ac.	0.25	0.40
Lawn (5-10%)			38,115 S.F.	=			0.88	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.477**		
Weighted N =	0.344		
Sheet Flow			
L =	104	Ft.	
H =	8.3	Ft.	
S =	0.0796	Ft./Ft.	
t1=	7.93	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	491	Ft.	
H =	8.6	Ft.	
S =	0.0174	Ft./Ft.	
v =	3.75	Ft./sec.	
t2=	2.18	Minutes	
tc=	10.11	Minutes	
I(10) =		In./Hr.	
I(25) =	5.905	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.106	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.89**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.48**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 9

Total Area = 2,163 S.F.
0.05 Acres

Surface									C	N
Structures	0.25	@	2000	=	500	S.F. =	0.01	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	0.5	@	100	=	50	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			1,613 S.F.	=			0.04	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.420**		
Weighted N =	0.303		
Sheet Flow			
L =	84	Ft.	
H =	3.5	Ft.	
S =	0.0417	Ft./Ft.	
t1=	7.88	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	7.88	Minutes	
I(10) =		In./Hr.	
I(25) =	6.469	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.696	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.14**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.16**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 10

Total Area = 36,393 S.F.
0.84 Acres

Surface									C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.	0.92	0.02
Pavement				=	6,379	S.F. =	0.15	Ac.	0.92	0.02
Drives	6	@	700	=	4,200	S.F. =	0.10	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			19,814 S.F.	=			0.45	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.555**		
Weighted N =	0.227		
Sheet Flow			
L =	300	Ft.	
H =	10.2	Ft.	
S =	0.0340	Ft./Ft.	
t1=	13.07	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	200	Ft.	
H =	5.3	Ft.	
S =	0.0265	Ft./Ft.	
v =	3.20	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.04	Minutes	
tc=	14.12	Minutes	
I(10) =		In./Hr.	
I(25) =	5.191	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.359	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.41**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.95**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 11

Total Area = 31,870 S.F.
0.73 Acres

Surface										C	N
Structures	2.5	@	2000	=	5,000	S.F. =	0.11	Ac.		0.92	0.02
Pavement				=	6,379	S.F. =	0.15	Ac.		0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			16,991	S.F.	=		0.39	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.563**		
Weighted N =	0.223		
Sheet Flow			
L =	300	Ft.	
H =	10.9	Ft.	
S =	0.0363	Ft./Ft.	
t1=	12.76	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	157	Ft.	
H =	3.6	Ft.	
S =	0.0229	Ft./Ft.	
v =	3.05	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.86	Minutes	
tc=	13.62	Minutes	
I(10) =		In./Hr.	
I(25) =	5.280	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.452	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.17**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.66**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 12

Total Area = 38,173 S.F.
0.88 Acres

Surface										C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.		0.92	0.02
Pavement				=	7,455	S.F. =	0.17	Ac.		0.92	0.02
Drives	6	@	700	=	4,200	S.F. =	0.10	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			20,518	S.F.	=		0.47	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.560**		
Weighted N =	0.224		
Sheet Flow			
L =	300	Ft.	
H =	3.6	Ft.	
S =	0.0120	Ft./Ft.	
t1=	16.58	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	239	Ft.	
H =	4.5	Ft.	
S =	0.0188	Ft./Ft.	
v =	2.80	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.42	Minutes	
tc=	18.01	Minutes	
I(10) =		In./Hr.	
I(25) =	4.755	In./Hr.	
I(50) =		In./Hr.	
I(100) =	5.876	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.33**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.88**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 13

Total Area = 44,901 S.F.
1.03 Acres

Surface									C	N
Structures	3.5	@	2000	=	7,000	S.F. =	0.16	Ac.	0.92	0.02
Pavement				=	8,149	S.F. =	0.19	Ac.	0.92	0.02
Drives	7	@	700	=	4,900	S.F. =	0.11	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			24,852 S.F.	=			0.57	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.549**		
Weighted N =	0.230		
Sheet Flow			
L =	300	Ft.	
H =	3.6	Ft.	
S =	0.0120	Ft./Ft.	
t1=	16.79	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	295	Ft.	
H =	5.4	Ft.	
S =	0.0183	Ft./Ft.	
v =	2.75	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.79	Minutes	
tc=	18.58	Minutes	
I(10) =		In./Hr.	
I(25) =	4.702	In./Hr.	
I(50) =		In./Hr.	
I(100) =	5.816	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.66**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.29**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 14

Total Area = 28,050 S.F.
0.64 Acres

Surface									C	N
Structures	2	@	2000	=	4,000	S.F. =	0.09	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	4	@	100	=	400	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			23,650 S.F.	=			0.54	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.355**		
Weighted N =	0.340		
Sheet Flow			
L =	81	Ft.	
H =	3.2	Ft.	
S =	0.0395	Ft./Ft.	
t1=	8.28	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	72	Ft.	
H =	1.2	Ft.	
S =	0.0167	Ft./Ft.	
v =	3.68	Ft./sec.	
t2=	0.32	Minutes	
tc=	8.61	Minutes	
I(10) =		In./Hr.	
I(25) =	6.282	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.500	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.44**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.71**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 15

Total Area = 27,077 S.F.
0.62 Acres

Surface										C	N
Structures	1.5	@	2000	=	3,000	S.F. =	0.07	Ac.		0.92	0.02
Pavement				=	8,448	S.F. =	0.19	Ac.		0.92	0.02
Drives	3	@	700	=	2,100	S.F. =	0.05	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			0	S.F.	=		0.00	Ac.		0.25	0.40
Lawn (5-10%)			13,529	S.F.	=		0.31	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.660**		
Weighted N =	0.210		
Sheet Flow			
L =	91	Ft.	
H =	7.6	Ft.	
S =	0.0835	Ft./Ft.	
t1=	5.85	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	72	Ft.	
H =	1.2	Ft.	
S =	0.0167	Ft./Ft.	
v =	3.68	Ft./sec.	
t2=	0.32	Minutes	
tc=	6.18	Minutes	
I(10) =		In./Hr.	
I(25) =	6.905	In./Hr.	
I(50) =		In./Hr.	
I(100) =	8.152	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.83**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.35**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 16

Total Area = 38,395 S.F.
0.88 Acres

Surface										C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.		0.92	0.02
Pavement				=	7,869	S.F. =	0.18	Ac.		0.92	0.02
Drives	6	@	700	=	4,200	S.F. =	0.10	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			20,326	S.F.	=		0.47	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.565**		
Weighted N =	0.221		
Sheet Flow			
L =	300	Ft.	
H =	8.0	Ft.	
S =	0.0267	Ft./Ft.	
t1=	13.67	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	149	Ft.	
H =	3.9	Ft.	
S =	0.0261	Ft./Ft.	
v =	3.25	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.77	Minutes	
tc=	14.44	Minutes	
I(10) =		In./Hr.	
I(25) =	5.133	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.299	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.56**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.14**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 17

Total Area = 346,509 S.F.
7.95 Acres

Surface										C	N
Structures	7.75	@	2000	=	15,500	S.F. =	0.36	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	15.5	@	100	=	1,550	S.F. =	0.04	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.		0.15	0.40
Lawn (2-5%)			227,323 S.F.	=			5.22	Ac.		0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.		0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.		0.55	0.40
Water			102,136 S.F.	=			2.34	Ac.		1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.		0.92	0.02

Weighted c =	**0.504**		
Weighted N =	0.263		
Sheet Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	1.0000	Ft./Ft.	
t1=	5.00	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	630	Ft.	
H =	4.8	Ft.	
S =	0.0076	Ft./Ft.	
v =	2.48	Ft./sec.	
t2=	4.23	Minutes	
tc=	9.23	Minutes	
I(10) =		In./Hr.	
I(25) =	6.122	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.333	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**24.55**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**29.40**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 18

Total Area = 23,762 S.F.
0.55 Acres

Surface										C	N
Structures	3.25	@	2000	=	6,500	S.F. =	0.15	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	3.5	@	700	=	2,450	S.F. =	0.06	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.		0.15	0.40
Lawn (2-5%)			14,812 S.F.	=			0.34	Ac.		0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.		0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.		0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.		0.48	0.60
Water			0 S.F.	=			0.00	Ac.		1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.		0.92	0.02

Weighted c =	**0.502**		
Weighted N =	0.257		
Sheet Flow			
L =	81	Ft.	
H =	3.8	Ft.	
S =	0.0467	Ft./Ft.	
t1=	7.00	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	263	Ft.	
H =	4.1	Ft.	
S =	0.0156	Ft./Ft.	
v =	3.55	Ft./sec.	
t2=	1.23	Minutes	
tc=	8.23	Minutes	
I(10) =		In./Hr.	
I(25) =	6.379	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.602	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.75**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.08**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 19

Total Area = 28,167 S.F.
0.65 Acres

Surface									C	N
Structures	2	@	2000	=	4,000	S.F. =	0.09	Ac.	0.92	0.02
Pavement				=	6,714	S.F. =	0.15	Ac.	0.92	0.02
Drives	4	@	700	=	2,800	S.F. =	0.06	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			14,653 S.F.	=			0.34	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.571**		
Weighted N =	0.218		
Sheet Flow			
L =	300	Ft.	
H =	7.2	Ft.	
S =	0.0240	Ft./Ft.	
t1=	13.91	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	50	Ft.	
H =	0.8	Ft.	
S =	0.0159	Ft./Ft.	
v =	2.60	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.32	Minutes	
tc=	14.23	Minutes	
I(10) =		In./Hr.	
I(25) =	5.170	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.337	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.91**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.34**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 20

Total Area = 29,482 S.F.
0.68 Acres

Surface									C	N
Structures	1.5	@	2000	=	3,000	S.F. =	0.07	Ac.	0.92	0.02
Pavement				=	5,587	S.F. =	0.13	Ac.	0.92	0.02
Drives	3	@	700	=	2,100	S.F. =	0.05	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			18,795 S.F.	=			0.43	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.493**		
Weighted N =	0.262		
Sheet Flow			
L =	247	Ft.	
H =	2.4	Ft.	
S =	0.0097	Ft./Ft.	
t1=	17.11	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	17.11	Minutes	
I(10) =		In./Hr.	
I(25) =	4.838	In./Hr.	
I(50) =		In./Hr.	
I(100) =	5.970	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.61**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.99**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 21

Total Area = 7,729 S.F.
0.18 Acres

Surface										C	N
Structures	0	@	2000	=	0	S.F. =	0.00	Ac.		0.92	0.02
Pavement				=	4,711	S.F. =	0.11	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			3,018	S.F.	=		0.07	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.658**		
Weighted N =	0.168		
Sheet Flow			
L =	300	Ft.	
H =	4.5	Ft.	
S =	0.0148	Ft./Ft.	
t1=	13.80	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	21	Ft.	
H =	1.0	Ft.	
S =	0.0476	Ft./Ft.	
v =	4.60	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.08	Minutes	
tc=	13.88	Minutes	
I(10) =		In./Hr.	
I(25) =	5.233	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.403	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.61**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.75**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 22

Total Area = 38,157 S.F.
0.88 Acres

Surface										C	N
Structures	3.75	@	2000	=	7,500	S.F. =	0.17	Ac.		0.92	0.02
Pavement				=	7,189	S.F. =	0.17	Ac.		0.92	0.02
Drives	7	@	700	=	4,900	S.F. =	0.11	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			18,568	S.F.	=		0.43	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.594**		
Weighted N =	0.205		
Sheet Flow			
L =	300	Ft.	
H =	5.1	Ft.	
S =	0.0170	Ft./Ft.	
t1=	14.66	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	222	Ft.	
H =	7.4	Ft.	
S =	0.0333	Ft./Ft.	
v =	3.70	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.00	Minutes	
tc=	15.66	Minutes	
I(10) =		In./Hr.	
I(25) =	4.972	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.125	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.59**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.19**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 23

Total Area = 3,979 S.F.
0.09 Acres

Surface											*C*	*N*
Structures	0	@	2000	=	0	S.F. =	0.00	Ac.			0.92	0.02
Pavement				=	2,489	S.F. =	0.06	Ac.			0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.			0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.			0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.			0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.			0.15	0.40
Lawn (2-5%)			1,490	S.F.	=		0.03	Ac.			0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.			0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.			0.55	0.40
Water			0	S.F.	=		0.00	Ac.			1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.			0.92	0.02

Weighted c =	**0.669**		
Weighted N =	0.162		
Sheet Flow			
L =	181	Ft.	
H =	6.6	Ft.	
S =	0.0365	Ft./Ft.	
t1=	8.69	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	8.69	Minutes	
I(10) =		In./Hr.	
I(25) =	6.262	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.479	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.38**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.46**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 24

Total Area = 36,566 S.F.
0.84 Acres

Surface											*C*	*N*
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.			0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.			0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.			0.92	0.02
Patios	6	@	100	=	600	S.F. =	0.01	Ac.			0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.			0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.			0.15	0.40
Lawn (2-5%)			29,966	S.F.	=		0.69	Ac.			0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.			0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.			0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.			0.48	0.60
Water			0	S.F.	=		0.00	Ac.			1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.			0.92	0.02

Weighted c =	**0.371**		
Weighted N =	0.331		
Sheet Flow			
L =	81	Ft.	
H =	2.7	Ft.	
S =	0.0335	Ft./Ft.	
t1=	8.48	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	128	Ft.	
H =	2.2	Ft.	
S =	0.0171	Ft./Ft.	
v =	3.72	Ft./sec.	
t2=	0.57	Minutes	
tc=	9.06	Minutes	
I(10) =		In./Hr.	
I(25) =	6.167	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.379	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.92**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.30**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 25

Total Area = 18,157 S.F.
0.42 Acres

Surface										C	N
Structures	1.25	@	2000	=	2,500	S.F. =	0.06	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	2.5	@	100	=	250	S.F. =	0.01	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			15,407	S.F. =			0.35	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.351**		
Weighted N =	0.342		
Sheet Flow			
L =	82	Ft.	
H =	2.8	Ft.	
S =	0.0343	Ft./Ft.	
t1=	8.62	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	87	Ft.	
H =	0.8	Ft.	
S =	0.0092	Ft./Ft.	
v =	2.73	Ft./sec.	
t2=	0.53	Minutes	
tc=	9.14	Minutes	
I(10) =		In./Hr.	
I(25) =	6.145	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.356	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.90**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.08**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 26

Total Area = 33,991 S.F.
0.78 Acres

Surface										C	N
Structures	2.75	@	2000	=	5,500	S.F. =	0.13	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	5.5	@	100	=	550	S.F. =	0.01	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			27,941	S.F. =			0.64	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F. =			0.00	Ac.		0.48	0.60
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.369**		
Weighted N =	0.332		
Sheet Flow			
L =	95	Ft.	
H =	4.4	Ft.	
S =	0.0466	Ft./Ft.	
t1=	8.47	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	82	Ft.	
H =	2.2	Ft.	
S =	0.0267	Ft./Ft.	
v =	4.65	Ft./sec.	
t2=	0.29	Minutes	
tc=	8.76	Minutes	
I(10) =		In./Hr.	
I(25) =	6.244	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.459	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.80**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.15**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 27

Total Area = 24,160 S.F.
0.55 Acres

Surface										*C*	*N*
Structures	1.75	@	2000	=	3,500	S.F. =	0.08	Ac.		0.92	0.02
Pavement				=	6,224	S.F. =	0.14	Ac.		0.92	0.02
Drives	4	@	700	=	2,800	S.F. =	0.06	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			11,636	S.F. =			0.27	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.597**		
Weighted N =	0.203		
Sheet Flow			
L =	300	Ft.	
H =	6.4	Ft.	
S =	0.0213	Ft./Ft.	
t1=	13.84	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	9	Ft.	
H =	0.1	Ft.	
S =	0.0114	Ft./Ft.	
v =	2.10	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.07	Minutes	
tc=	13.91	Minutes	
I(10) =		In./Hr.	
I(25) =	5.228	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.397	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.73**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.12**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 28

Total Area = 22,388 S.F.
0.51 Acres

Surface										*C*	*N*
Structures	2	@	2000	=	4,000	S.F. =	0.09	Ac.		0.92	0.02
Pavement				=	4,090	S.F. =	0.09	Ac.		0.92	0.02
Drives	4	@	700	=	2,800	S.F. =	0.06	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			11,498	S.F. =			0.26	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F. =			0.00	Ac.		0.48	0.60
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.576**		
Weighted N =	0.215		
Sheet Flow			
L =	300	Ft.	
H =	3.3	Ft.	
S =	0.0110	Ft./Ft.	
t1=	16.60	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	23	Ft.	
H =	0.1	Ft.	
S =	0.0044	Ft./Ft.	
v =	1.45	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.26	Minutes	
tc=	16.86	Minutes	
I(10) =		In./Hr.	
I(25) =	4.861	In./Hr.	
I(50) =		In./Hr.	
I(100) =	5.997	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.44**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.78**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 29

Total Area = 25,564 S.F.
0.59 Acres

Surface										C	N
Structures	2.25	@	2000	=	4,500	S.F. =	0.10	Ac.		0.92	0.02
Pavement				=	4,950	S.F. =	0.11	Ac.		0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			12,614	S.F.	=		0.29	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.589**		
Weighted N =	0.208		
Sheet Flow			
L =	300	Ft.	
H =	9.5	Ft.	
S =	0.0317	Ft./Ft.	
t1=	12.75	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	78	Ft.	
H =	1.3	Ft.	
S =	0.0167	Ft./Ft.	
v =	2.60	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.50	Minutes	
tc=	13.25	Minutes	
I(10) =		In./Hr.	
I(25) =	5.345	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.520	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.85**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.26**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 30

Total Area = 38,059 S.F.
0.87 Acres

Surface										C	N
Structures	2.5	@	2000	=	5,000	S.F. =	0.11	Ac.		0.92	0.02
Pavement				=	6,410	S.F. =	0.15	Ac.		0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			23,149	S.F.	=		0.53	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.512**		
Weighted N =	0.251		
Sheet Flow			
L =	300	Ft.	
H =	6.7	Ft.	
S =	0.0223	Ft./Ft.	
t1=	15.12	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	152	Ft.	
H =	3.0	Ft.	
S =	0.0197	Ft./Ft.	
v =	2.90	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.87	Minutes	
tc=	16.00	Minutes	
I(10) =		In./Hr.	
I(25) =	4.941	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.089	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.21**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.73**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 31

Total Area = 12,533 S.F.
0.29 Acres

Surface										*C*	*N*
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			0	S.F.	=		0.00	Ac.		0.25	0.40
Lawn (5-10%)			10,333	S.F.	=		0.24	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.491**		
Weighted N =	0.333		
Sheet Flow			
L =	83	Ft.	
H =	5.4	Ft.	
S =	0.0651	Ft./Ft.	
t1=	7.38	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	98	Ft.	
H =	2.4	Ft.	
S =	0.0244	Ft./Ft.	
v =	4.44	Ft./sec.	
t2=	0.37	Minutes	
tc=	7.75	Minutes	
I(10) =		In./Hr.	
I(25) =	6.503	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.731	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.92**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.09**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 32

Total Area = 12,747 S.F.
0.29 Acres

Surface										*C*	*N*
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			10,547	S.F.	=		0.24	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.366**		
Weighted N =	0.334		
Sheet Flow			
L =	84	Ft.	
H =	2.0	Ft.	
S =	0.0237	Ft./Ft.	
t1=	9.43	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	124	Ft.	
H =	2.8	Ft.	
S =	0.0226	Ft./Ft.	
v =	4.28	Ft./sec.	
t2=	0.48	Minutes	
tc=	9.91	Minutes	
I(10) =		In./Hr.	
I(25) =	5.948	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.150	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.64**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.76**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 33 — Total Area = 12,951 S.F. / 0.30 Acres

Surface									C	N
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	2	@	700	=	1,400	S.F. =	0.03	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)			9,551	S.F.	=		0.22	Ac.	0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.	0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.	0.55	0.40
Water			0	S.F.	=		0.00	Ac.	1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.	0.92	0.02

Weighted c =	**0.426**		
Weighted N =	0.300		
Sheet Flow			
L =	95	Ft.	
H =	3.7	Ft.	
S =	0.0385	Ft./Ft.	
t1=	8.45	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	58	Ft.	
H =	0.6	Ft.	
S =	0.0103	Ft./Ft.	
v =	2.89	Ft./sec.	
t2=	0.33	Minutes	
tc=	8.79	Minutes	
I(10) =		In./Hr.	
I(25) =	6.236	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.452	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.79**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.94**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 34 — Total Area = 70,574 S.F. / 1.62 Acres

Surface									C	N
Structures	3.75	@	2000	=	7,500	S.F. =	0.17	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	7	@	100	=	700	S.F. =	0.02	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)			62,374	S.F.	=		1.43	Ac.	0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.	0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.	0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.	0.48	0.60
Water			0	S.F.	=		0.00	Ac.	1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.	0.92	0.02

Weighted c =	**0.328**		
Weighted N =	0.356		
Sheet Flow			
L =	146	Ft.	
H =	3.6	Ft.	
S =	0.0247	Ft./Ft.	
t1=	12.40	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	216	Ft.	
H =	3.8	Ft.	
S =	0.0176	Ft./Ft.	
v =	3.77	Ft./sec.	
t2=	0.96	Minutes	
tc=	13.35	Minutes	
I(10) =		In./Hr.	
I(25) =	5.327	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.501	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**2.83**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**3.45**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 35

Total Area = 23,131 S.F.
0.53 Acres

Surface										*C*	*N*
Structures	2.25	@	2000	=	4,500	S.F. =	0.10	Ac.		0.92	0.02
Pavement				=	4,010	S.F. =	0.09	Ac.		0.92	0.02
Drives	4	@	700	=	2,800	S.F. =	0.06	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			11,821	S.F.	=		0.27	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.578**		
Weighted N =	0.214		
Sheet Flow			
L =	300	Ft.	
H =	5.8	Ft.	
S =	0.0193	Ft./Ft.	
t1=	14.52	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	39	Ft.	
H =	1.0	Ft.	
S =	0.0255	Ft./Ft.	
v =	3.20	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.20	Minutes	
tc=	14.72	Minutes	
I(10) =		In./Hr.	
I(25) =	5.082	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.245	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.56**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.92**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 36

Total Area = 20,144 S.F.
0.46 Acres

Surface										*C*	*N*
Structures	1.5	@	2000	=	3,000	S.F. =	0.07	Ac.		0.92	0.02
Pavement				=	7,723	S.F. =	0.18	Ac.		0.92	0.02
Drives	3	@	700	=	2,100	S.F. =	0.05	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			7,321	S.F.	=		0.17	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.676**		
Weighted N =	0.158		
Sheet Flow			
L =	300	Ft.	
H =	6.2	Ft.	
S =	0.0207	Ft./Ft.	
t1=	12.41	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	16	Ft.	
H =	0.5	Ft.	
S =	0.0309	Ft./Ft.	
v =	3.20	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.08	Minutes	
tc=	12.49	Minutes	
I(10) =		In./Hr.	
I(25) =	5.481	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.662	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.71**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**2.08**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 37

Total Area = 18,135 S.F.
0.42 Acres

Surface										C	N
Structures	1	@	2000	=	2,000	S.F. =	0.05	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	3	@	700	=	2,100	S.F. =	0.05	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			0	S.F.	=		0.00	Ac.		0.25	0.40
Lawn (5-10%)			14,035	S.F.	=		0.32	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.518**		
Weighted N =	0.314		
Sheet Flow			
L =	103	Ft.	
H =	11.2	Ft.	
S =	0.1093	Ft./Ft.	
t1=	7.02	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	121	Ft.	
H =	1.1	Ft.	
S =	0.0091	Ft./Ft.	
v =	1.90	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.06	Minutes	
tc=	8.07	Minutes	
I(10) =		In./Hr.	
I(25) =	6.419	In./Hr.	
I(50) =		In./Hr.	
I(100) =	7.643	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**1.38**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**1.65**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 38

Total Area = 59,470 S.F.
1.37 Acres

Surface										C	N
Structures	4.25	@	2000	=	8,500	S.F. =	0.20	Ac.		0.92	0.02
Pavement				=	12,987	S.F. =	0.30	Ac.		0.92	0.02
Drives	8	@	700	=	5,600	S.F. =	0.13	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			32,383	S.F.	=		0.74	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.555**		
Weighted N =	0.227		
Sheet Flow			
L =	300	Ft.	
H =	6.4	Ft.	
S =	0.0213	Ft./Ft.	
t1=	14.58	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	247	Ft.	
H =	3.6	Ft.	
S =	0.0146	Ft./Ft.	
v =	2.50	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.65	Minutes	
tc=	16.23	Minutes	
I(10) =		In./Hr.	
I(25) =	4.920	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.064	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**3.73**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**4.60**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 39

Total Area = 84,304 S.F.
1.94 Acres

Surface										C	N
Structures	8.5	@	2000	=	17,000	S.F. =	0.39	Ac.		0.92	0.02
Pavement				=	13,625	S.F. =	0.31	Ac.		0.92	0.02
Drives	17	@	700	=	11,900	S.F. =	0.27	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			41,779	S.F.	=		0.96	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.588**		
Weighted N =	0.208		
Sheet Flow			
L =	300	Ft.	
H =	5.2	Ft.	
S =	0.0173	Ft./Ft.	
t1=	14.70	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	332	Ft.	
H =	5.3	Ft.	
S =	0.0160	Ft./Ft.	
v =	2.60	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	2.13	Minutes	
tc=	16.83	Minutes	
I(10) =		In./Hr.	
I(25) =	4.864	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.001	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**5.53**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**6.83**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 40

Total Area = 154,791 S.F.
3.55 Acres

Surface										C	N
Structures	3	@	2000	=	6,000	S.F. =	0.14	Ac.		0.92	0.02
Pavement				=	2,459	S.F. =	0.06	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	6	@	100	=	600	S.F. =	0.01	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F.	=		0.00	Ac.		0.15	0.40
Lawn (2-5%)			145,732	S.F.	=		3.35	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F.	=		0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F.	=		0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F.	=		0.00	Ac.		0.48	0.60
Water			0	S.F.	=		0.00	Ac.		1.00	0.00
Misc.			0	S.F.	=		0.00	Ac.		0.92	0.02

Weighted c =	**0.289**		
Weighted N =	0.378		
Sheet Flow			
L =	154	Ft.	
H =	2.0	Ft.	
S =	0.0130	Ft./Ft.	
t1=	15.21	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	15.21	Minutes	
I(10) =		In./Hr.	
I(25) =	5.014	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.172	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**5.15**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**6.34**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 41 — Total Area = 8,892 S.F. / 0.20 Acres

Surface										*C*	*N*
Structures	0	@	2000	=	0	S.F. =	0.00	Ac.		0.92	0.02
Pavement				=	5,512	S.F. =	0.13	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			3,380	S.F. =			0.08	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.665**		
Weighted N =	0.164		
Sheet Flow			
L =	152	Ft.	
H =	1.1	Ft.	
S =	0.0072	Ft./Ft.	
t1=	11.74	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	2.90	Ft./sec.	
t2=	0.00	Minutes	
tc=	11.74	Minutes	
I(10) =		In./Hr.	
I(25) =	5.614	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.801	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**0.76**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**0.92**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 42 — Total Area = 74,122 S.F. / 1.70 Acres

Surface										*C*	*N*
Structures	5.5	@	2000	=	11,000	S.F. =	0.25	Ac.		0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	11	@	100	=	1,100	S.F. =	0.03	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			62,022	S.F. =			1.42	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			0	S.F. =			0.00	Ac.		0.55	0.40
Woods (>10%)			0	S.F. =			0.00	Ac.		0.48	0.60
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.359**		
Weighted N =	0.338		
Sheet Flow			
L =	93	Ft.	
H =	1.6	Ft.	
S =	0.0172	Ft./Ft.	
t1=	10.68	Minutes	(Min. 5 minutes)
Shallow Concentrated Flow			
L =	0	Ft.	
H =	0.0	Ft.	
S =	#DIV/0!	Ft./Ft.	
v =	0.00	Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes	
tc=	10.68	Minutes	
I(10) =		In./Hr.	
I(25) =	5.803	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.998	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**3.55**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**4.28**	**CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 43 — Total Area = 7,659 S.F. / 0.18 Acres

Surface									C	N
Structures	0	@	2000	=	0	S.F. =	0.00	Ac.	0.92	0.02
Pavement				=	4,676	S.F. =	0.11	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			2,983 S.F.	=			0.07	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.659**	
Weighted N =	0.168	
Sheet Flow		
L =	144	Ft.
H =	2.7	Ft.
S =	0.0187	Ft./Ft.
t1=	9.28	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	2.90	Ft./sec.
t2=	0.00	Minutes
tc=	9.28	Minutes
I(10) =		In./Hr.
I(25) =	6.111	In./Hr.
I(50) =		In./Hr.
I(100) =	7.320	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.71**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.85**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 44 — Total Area = 70,014 S.F. / 1.61 Acres

Surface									C	N
Structures	3.75	@	2000	=	7,500	S.F. =	0.17	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	7.5	@	100	=	750	S.F. =	0.02	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			61,764 S.F.	=			1.42	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.329**	
Weighted N =	0.355	
Sheet Flow		
L =	125	Ft.
H =	6.1	Ft.
S =	0.0488	Ft./Ft.
t1=	9.84	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	0.00	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	0.00	Minutes
tc=	9.84	Minutes
I(10) =		In./Hr.
I(25) =	5.965	In./Hr.
I(50) =		In./Hr.
I(100) =	7.168	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**3.15**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.79**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 45

Total Area = 68,662 S.F.
1.58 Acres

Surface										*C*	*N*
Structures	5.75	@	2000	=	11,500	S.F. =	0.26	Ac.		0.92	0.02
Pavement				=	400	S.F. =	0.01	Ac.		0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.		0.92	0.02
Patios	11.5	@	100	=	1,150	S.F. =	0.03	Ac.		0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.		0.92	0.02
Lawn (0-2%)			0	S.F. =			0.00	Ac.		0.15	0.40
Lawn (2-5%)			32,492	S.F. =			0.75	Ac.		0.25	0.40
Lawn (5-10%)			0	S.F. =			0.00	Ac.		0.40	0.40
Lawn (>10%)			23,120	S.F. =			0.53	Ac.		0.55	0.40
Water			0	S.F. =			0.00	Ac.		1.00	0.00
Misc.			0	S.F. =			0.00	Ac.		0.92	0.02

Weighted c =	**0.478**		
Weighted N =	0.328		
Sheet Flow			
L =	97	Ft.	
H =	1.5	Ft.	
S =	0.0155	Ft./Ft.	
t1=	11.01	Minutes	(Min. 5 minutes)
Open Channel Flow			
L =	739	Ft.	
H =	14.0	Ft.	
S =	0.0189	Ft./Ft.	
v =	2.20	Ft./sec.	
t2=	5.60	Minutes	
tc=	16.61	Minutes	
I(10) =		In./Hr.	
I(25) =	4.884	In./Hr.	
I(50) =		In./Hr.	
I(100) =	6.024	In./Hr.	
Q(10) =	**0.00**	**CFS**	
Q(25) =	**3.68**	**CFS**	
Q(50) =	**0.00**	**CFS**	
Q(100) =	**4.54**	**CFS**	

U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands

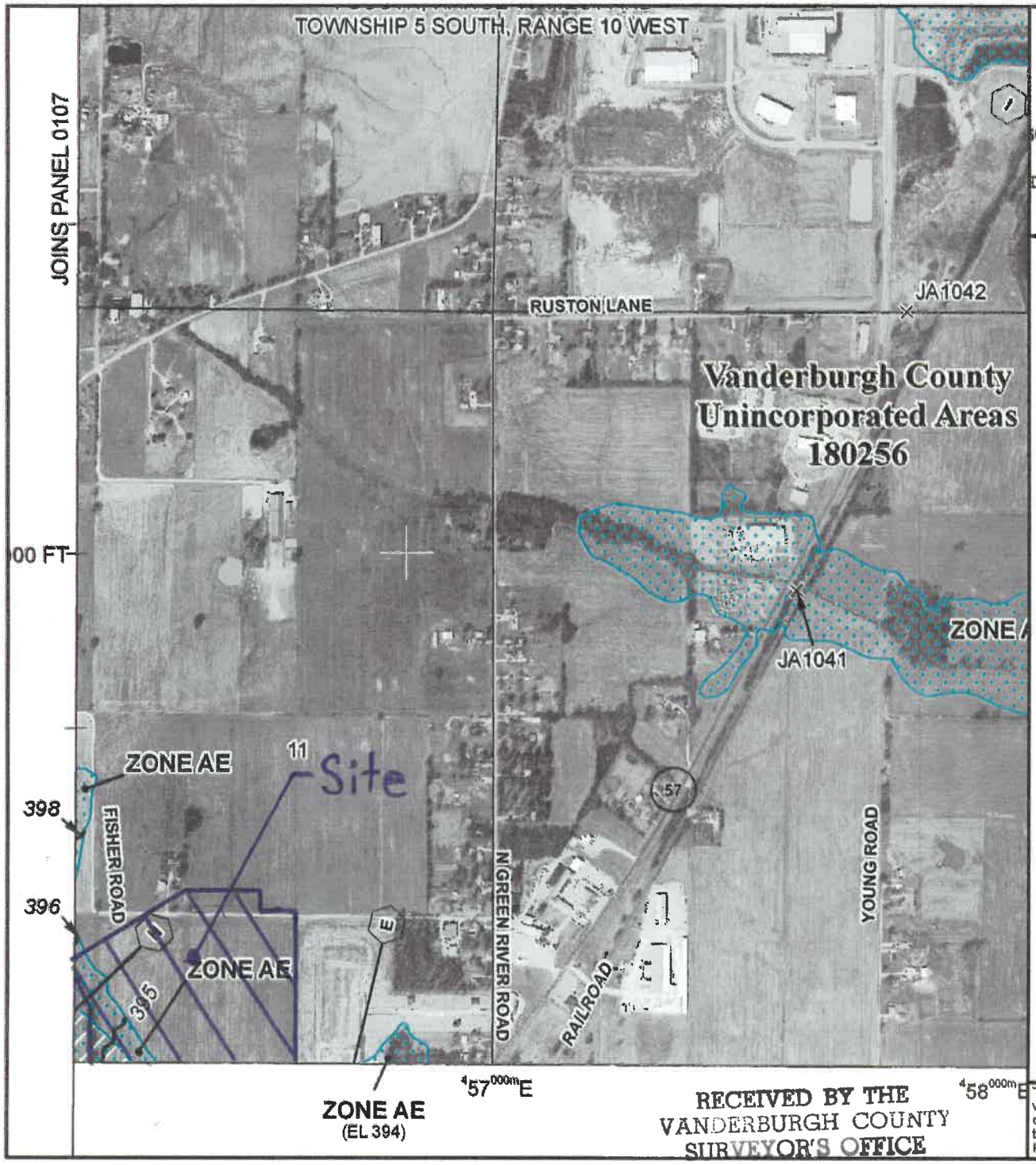
October 24, 2016

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE 7-14-17 CA

National Wetlands Inventory (NWI)



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0130D

FIRM

FLOOD INSURANCE RATE MAP

VANDERBURGH COUNTY, INDIANA
AND INCORPORATED AREAS

PANEL 130 OF 275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VANDERBURGH COUNTY	180256	0130	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
18163C0130D

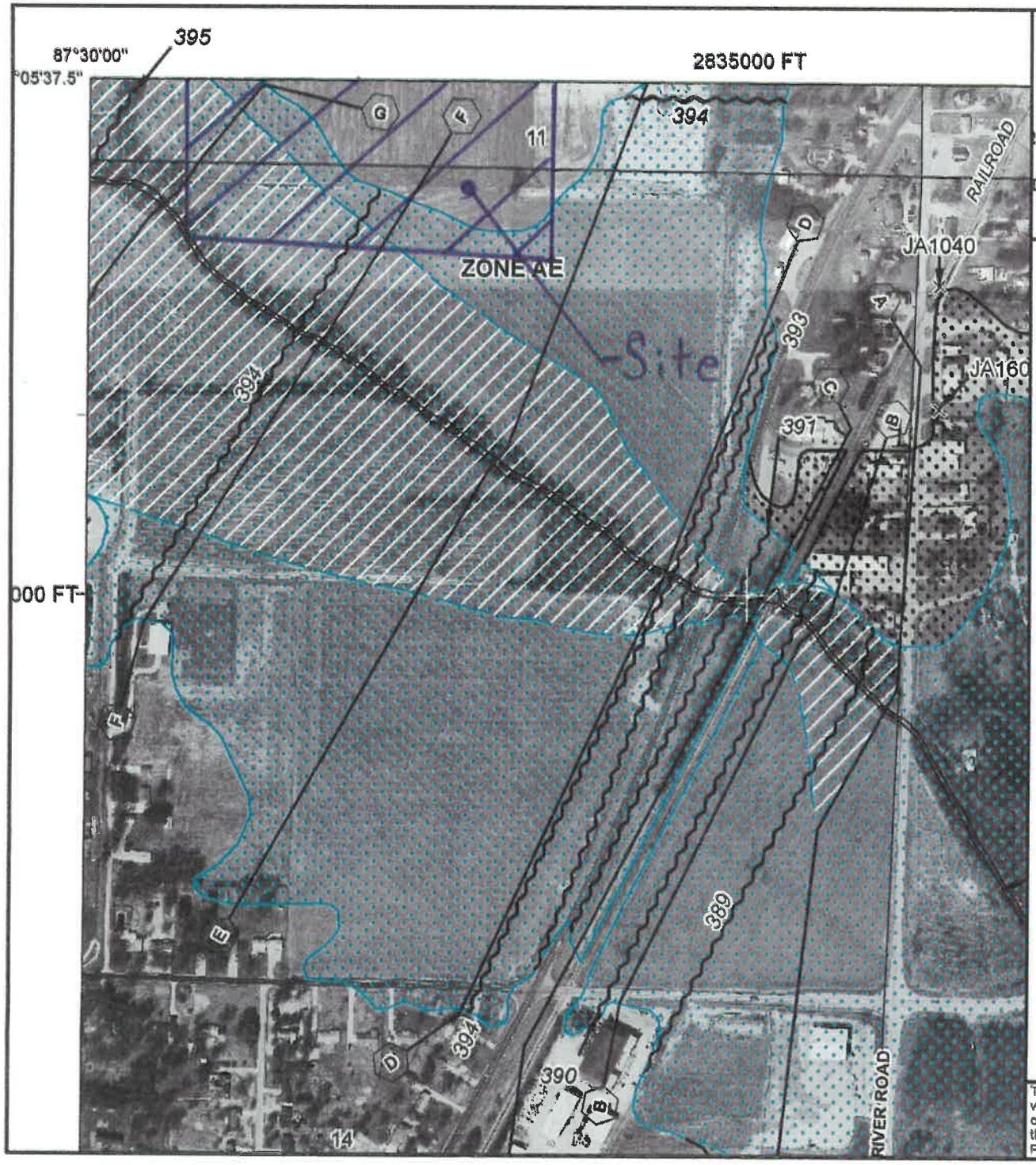
EFFECTIVE DATE
MARCH 17, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

RECEIVED BY THE
VANDERBURGH COUNTY
SURVEYOR'S OFFICE

7-14-17 CA



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0128D

FIRM

FLOOD INSURANCE RATE MAP

VANDERBURGH COUNTY, INDIANA
AND INCORPORATED AREAS

PANEL 128 OF 275
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VANDERBURGH COUNTY	180256	0128	D

RECEIVED BY THE
VANDERBURGH COUNTY
SURVEYOR'S OFFICE
7-14-17 CA

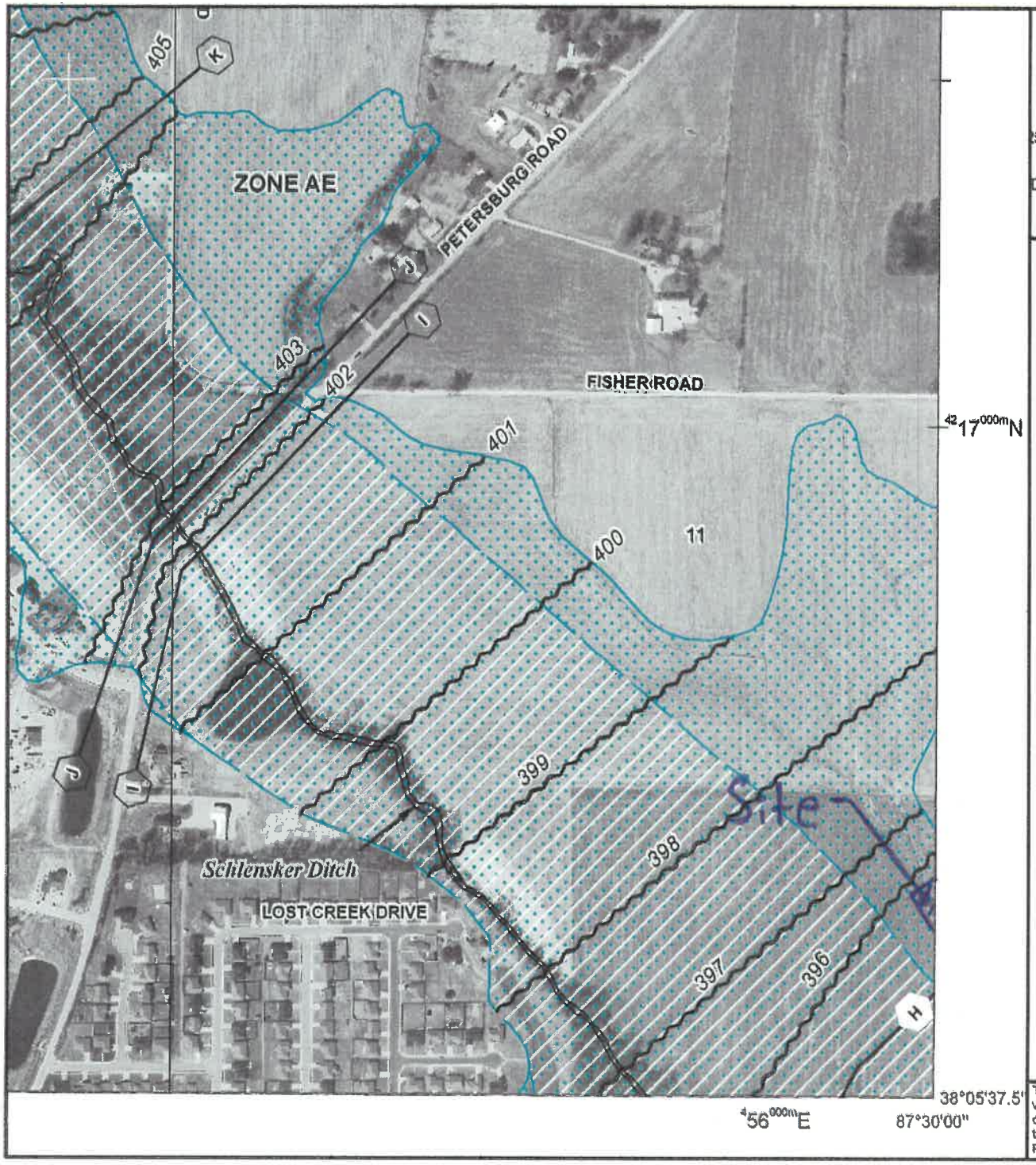
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
18163C0128D

EFFECTIVE DATE
MARCH 17, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0107D

FIRM

FLOOD INSURANCE RATE MAP

VANDERBURGH COUNTY, INDIANA
AND INCORPORATED AREAS

PANEL 107 OF 275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
VANDERBURGH COUNTY	180258	0107	D

RECEIVED BY THE
VANDERBURGH COUN.
SURVEYOR'S OFFICE
7-14-17 CA

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
18163C0107D

EFFECTIVE DATE
MARCH 17, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Vanderburgh County, Indiana

Creekside Meadows - Section 5

July 13, 2017

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

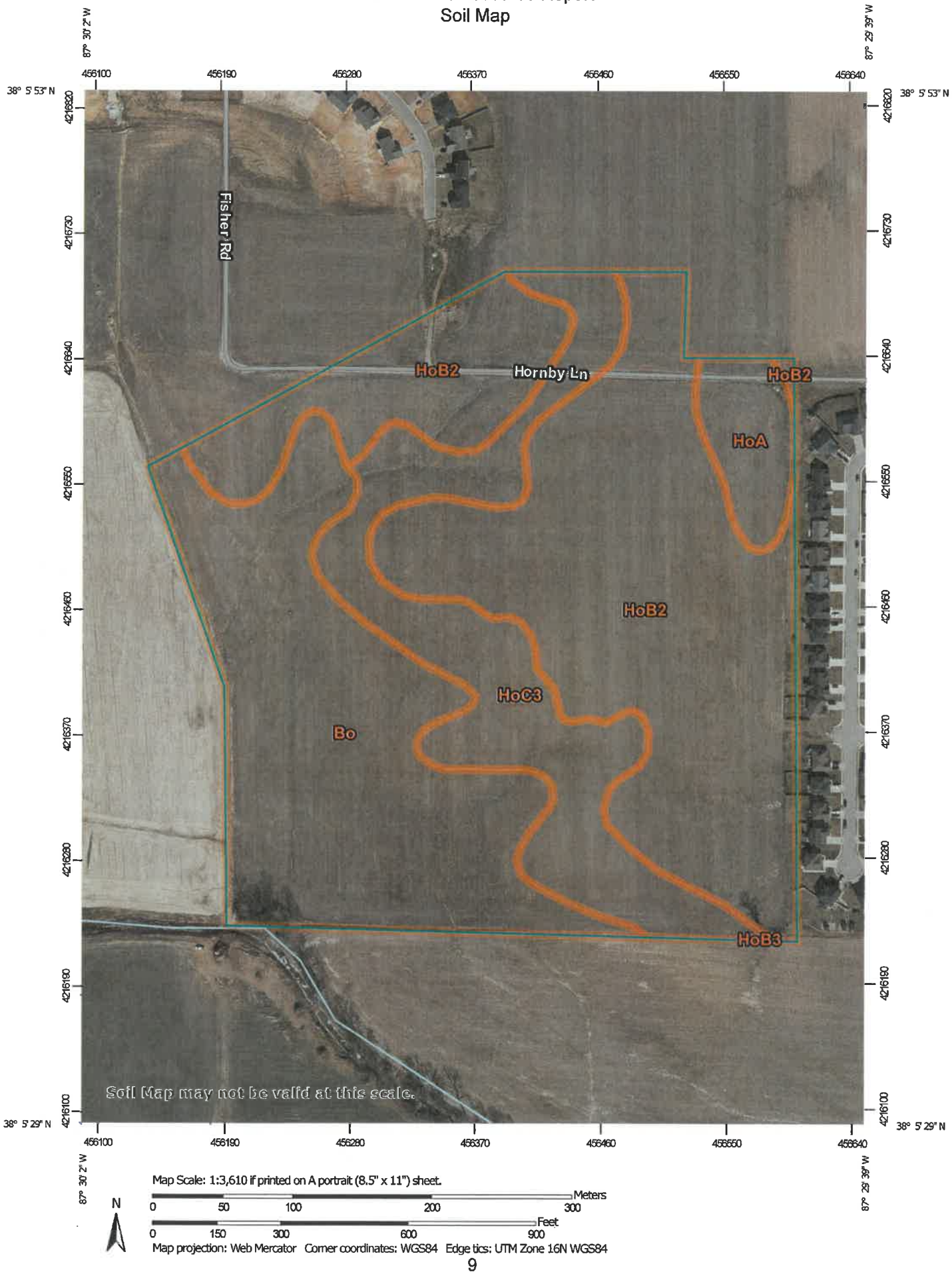
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,610 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Vanderburgh County, Indiana
Survey Area Data: Version 16, Sep 19, 2016

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

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Vanderburgh County, Indiana (IN163)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bo	Bonnie silt loam	13.9	30.5%
HoA	Hosmer silt loam, 0 to 2 percent slopes	1.8	4.0%
HoB2	Hosmer silt loam, 2 to 5 percent slopes, eroded	21.1	46.3%
HoB3	Hosmer silt loam, 2 to 5 percent slopes, severely eroded	0.0	0.0%
HoC3	Hosmer silt loam, 5 to 10 percent slopes, severely eroded	8.7	19.2%
Totals for Area of Interest		**45.5**	**100.0%**

Map Unit Descriptions

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

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

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

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Vanderburgh County, Indiana

Bo—Bonnie silt loam

Map Unit Setting

National map unit symbol: 5gbj
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Bonnie and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonnie

Setting

Landform: Backswamps, flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Acid silty alluvium

Typical profile

Ap - 0 to 9 inches: silt loam
Cg1 - 9 to 31 inches: silt loam
Cg2 - 31 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: Yes

HoA—Hosmer silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x06l
Elevation: 330 to 820 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Hosmer

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over gritty loess

Typical profile

Ap - 0 to 10 inches: silt loam
BE - 10 to 17 inches: silt loam
Bt - 17 to 32 inches: silt loam
Btx - 32 to 68 inches: silt loam
2Bt - 68 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Iva

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

HoB2—Hosmer silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2x06n
Elevation: 330 to 850 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Hosmer, Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over gritty loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 29 inches: silt loam
Btx - 29 to 65 inches: silt loam
2Bt - 65 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 17 to 33 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches

Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Alford, eroded

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

HoB3—Hosmer silt loam, 2 to 5 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2x06p
Elevation: 330 to 850 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hosmer, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over gritty loess

Typical profile

Ap - 0 to 4 inches: silt loam
Bt - 4 to 25 inches: silt loam

Btx - 25 to 61 inches: silt loam
2Bt - 61 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 14 to 29 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Alford, severely eroded

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

HoC3—Hosmer silt loam, 5 to 10 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2wyhs
Elevation: 360 to 980 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 175 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Hosmer, severely eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 29 inches: silty clay loam
Btx1 - 29 to 67 inches: silt loam
Btx2 - 67 to 75 inches: silt loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: 27 to 31 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Stoy, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No