



# Aisin Building Expansion

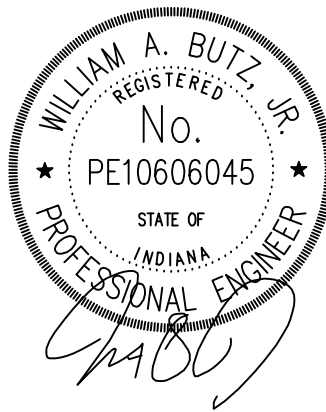
187 Bartram Parkway  
Franklin, Indiana

## Drainage Report

Prepared For:  
Compass Commercial Construction Group  
250 East 96<sup>th</sup> Street, Suite 100  
Indianapolis, IN 46240

Prepared By:  
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Issued: February 3, 2021



**Kimley»Horn**

Table of Contents

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1.0. Project Summary ..... 3

2.0. Introduction..... 3

3.0. Existing Conditions..... 3

4.0. Proposed Conditions..... 4

5.0 Appendices ..... 5

    Appendix A: Aerial Photograph .....6

    Appendix B: FEMA Flood Insurance Rate Map.....8

    Appendix C: Soil Map .....9

    Appendix D: Master-planned Drainage Area Map .....10

    Appendix E: Proposed Drainage Map .....11

    Appendix F: Storm Sewer Design Calculations.....12

    Appendix G: Excerpts of Masterplan Drainage Report.....13

## 1.0. Project Summary

Project Name:	Aisin Building Expansion
Location:	187 Bartram Parkway, Franklin, Johnson County, Indiana
Type:	Drainage Report
Reviewing Agency:	City of Franklin
Detention Policy:	Master-Planned
Water Quality:	Master-Planned
Storm Sewer Modeling:	Rational Method

### Design:

Water Quality:	Master-Planned Wet Detention Basin
Receiving Body:	The existing wet detention basin releases stormwater eastward under CR 525 E to the Amity Legal Drain.

## 2.0. Introduction

Kimley-Horn and Associates, Inc. has been retained by Compass Construction to prepare construction documents and provide civil engineering services for the proposed Aisin Building Expansion (Project) in Franklin, Indiana. The Project includes an approximately 153,000 SF expansion of an existing industrial building and site improvements. The site improvements include expanding the truck dock areas and adding additional car and trailer parking. The 30.71 acre property located at 187 Bartram Parkway, Franklin, IN, was master planned from a drainage perspective by others. The existing wet pond on the south side of the property was master-planned to detain the project area in the developed condition.

This Drainage Report focuses on demonstrating how the proposed improvements comply with the master planned drainage report by showing the proposed additional impervious area do not result in the site exceeding the composite curve number. In addition, supporting calculations for storm sewer sizing based on the *City of Franklin Stormwater Technical Standards Manual* are provided.

## 3.0. Existing Conditions

The existing project site is currently developed. There is an existing 147,150 SF industrial building with truck docks and surrounding parking. The property was master planned for the building to be expanded to the east. The 2004 drainage report completed by KOE Engineering & Surveying master planned for the development of this property and several surrounding properties. The existing wet pond on the south side of the project site was sized for stormwater detention and stormwater quality for the master planned area. The developed portion of the project site drains to an existing storm sewer network that outfalls to the pond or sheet drains directly to the pond. The undeveloped portion of the project site, which is currently being used for agricultural purposes, drains to a ditch that conveys runoff to the pond. The master planned pond outfalls at the east end of the pond and drains to a culvert under CR 525 E. The ditch on the east side of CR 525 E ultimately leads to the Amity Legal Drain. The master-plan drainage report states that the pond was designed with the post-developed contributing areas having a composite

curve number of 89.3 for water quality and a calculated 90.7 for detention. Excerpts of the existing drainage report can be found in **Appendix G**.

#### **Aerial Photograph**

An aerial photograph of the Project Site has been included in **Appendix A** for reference.

#### **FEMA**

The Project Site is located on the Flood Insurance Rate Map number 18081C0232D and resides within Zone "X", indicating it lies outside of the 500-year flood limits. See **Appendix B** for the FEMA FIRMette.

#### **Soil Characteristics**

The Natural Resources Conservation Service (NRCS) Web Soil Survey of Johnson County, Indiana, indicates Brookston silty clay loam, Crosby silt loam, Crosby-Miami silt loam, and Miami silt loam are the predominant soil groups on site. A soil map can be found in **Appendix C**.

## **4.0. Proposed Conditions**

### **General Storm Routing & Provided Detention**

The proposed building expansion and site improvements will be constructed primarily on the east side of the property. Small parking expansions will also be added along the north and west sides of the existing building. Proposed storm sewers and swales will capture runoff from the proposed roof drains, truck docks, and parking areas. The stormwater runoff will be conveyed to the existing master-planned wet pond on the south side of the property.

### **Proposed Hydrology**

The development of the project area was master-planned as a part of the 2004 KOE Drainage Report. The proposed project falls within Area #4 referenced in the master report for water quality and "Block C Lot 1" for detention volume. The drainage report states that the wet pond was designed for the contributing drainage areas to have a curve number of 89.3 for water quality and 90.7 for detention. The proposed project will bring the contributing drainage areas to a combined curve number of 89.3 in which is at the allowable water quality assumption and below the detention volume assumption. The calculated proposed curve number assumed a curve number of 98 for impervious areas and a curve number of 77 for landscaped areas. Refer to **Appendix D** for an exhibit displaying the pervious and impervious areas on the post-developed site.

### **Proposed Hydraulics**

The software package Storm and Sanitary Analysis, an Autodesk Civil 3D extension was used for this project to size the proposed storm sewer facilities onsite for the 10yr storm event. The storm sewer network was designed with 0.1' drops at manhole structures and maintains flow velocities between 2.5 and 10 ft/s. Hydraflow utilizes the Rational Method to generate peak runoff flow rates at each inlet and then routes flow through a closed conduit system using the Manning's equation. A Manning's  $n$  value of 0.013 and 0.012 were used for the RCP and HDPE storm sewers respectively. An inlet time of concentration of 5-minutes was assumed for all the catchment areas. Refer to **Appendix F** for Hydraflow calculations



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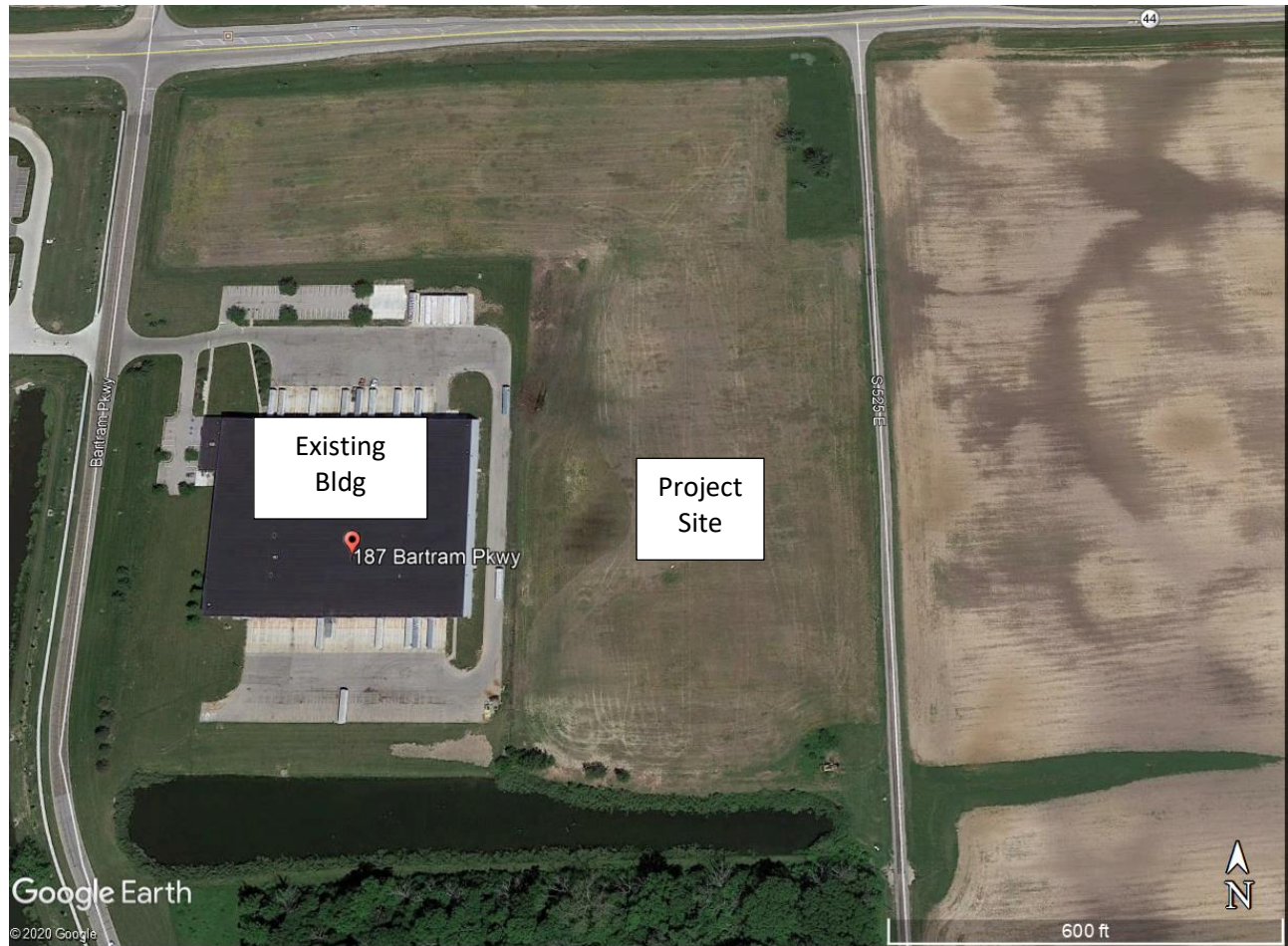
## 5.0 Appendices

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## **Appendix A: Aerial Photograph**

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## **Appendix B: FEMA Flood Insurance Rate Map**

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# National Flood Hazard Layer FIRMette



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **10/17/2019 at 9:57:11 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

39°29'10.62"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

39°28'42.85"N

85°59'56.48"W



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## Appendix C: Soil Map

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# Soil Map—Johnson County, Indiana (SOIL MAP)



Soil Map—Johnson County, Indiana  
(SOIL MAP)

## 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: Johnson County, Indiana

Survey Area Data: Version 27, Sep 16, 2019

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

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	11.3	37.3%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	9.3	30.5%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	2.1	6.8%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	5.1	16.9%
W	Water	2.6	8.5%
<b>Totals for Area of Interest</b>		<b>30.4</b>	<b>100.0%</b>

# Hydrologic Soil Group—Johnson County, Indiana (SOIL MAP)



Map Scale: 1:2,780 if printed on A landscape (11" x 8.5") sheet.

0 40 80 160 240 Meters

0 100 200 400 600 Feet

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



**Natural Resources  
Conservation Service**

Web Soil Survey  
National Cooperative Soil Survey

10/17/2019  
Page 1 of 4

Hydrologic Soil Group—Johnson County, Indiana  
(SOIL MAP)

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available


### 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: Johnson County, Indiana  
 Survey Area Data: Version 27, Sep 16, 2019

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

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

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.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	B/D	11.3	37.3%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	9.3	30.5%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	2.1	6.8%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	5.1	16.9%
W	Water		2.6	8.5%
<b>Totals for Area of Interest</b>			<b>30.4</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

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## **Appendix D: Master-planned Drainage Area Map**

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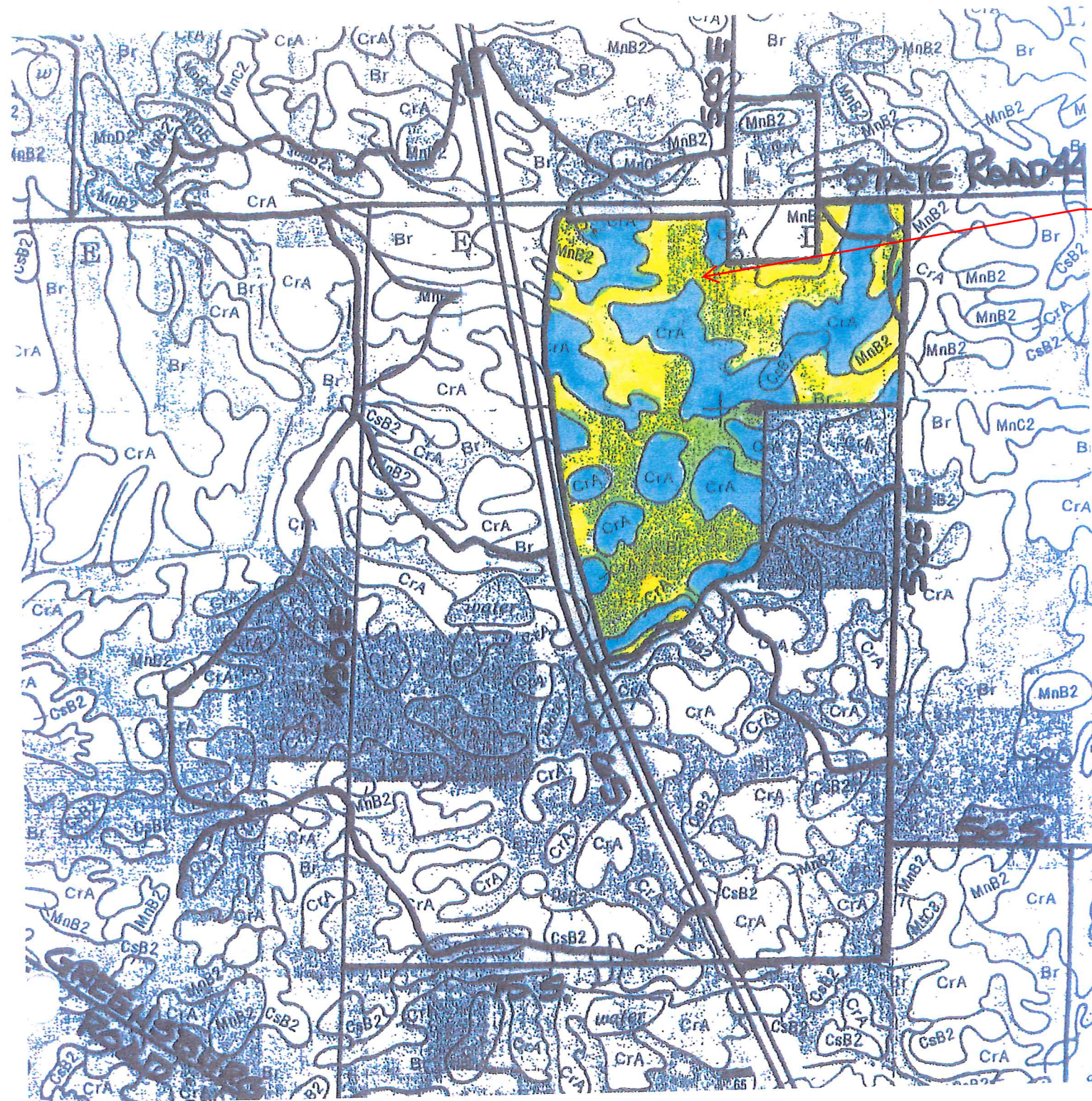
POST DEVELOPMENT  
 AREA TO POND IN BLOCK C  
 TO BE USED FOR WATER  
 QUALITY DESIGN ONLY

~~28~~  
 31

□ = SOIL GROUP B  
 □ = SOIL GROUP C



SCALE: 1" = 1000'



PROPOSED SITE

MASTER PLANNED WATER QUALITY DESIGN

OBTAINED FROM "HYDROLOGICAL STUDY FOR  
 FRANKLIN TECH PARK BLK C LOT 1" BY KOE  
 ENGINEERING & SURVEYING

ORIGINAL JUNE 26, 2004  
 REVISED JULY 17TH, 2004

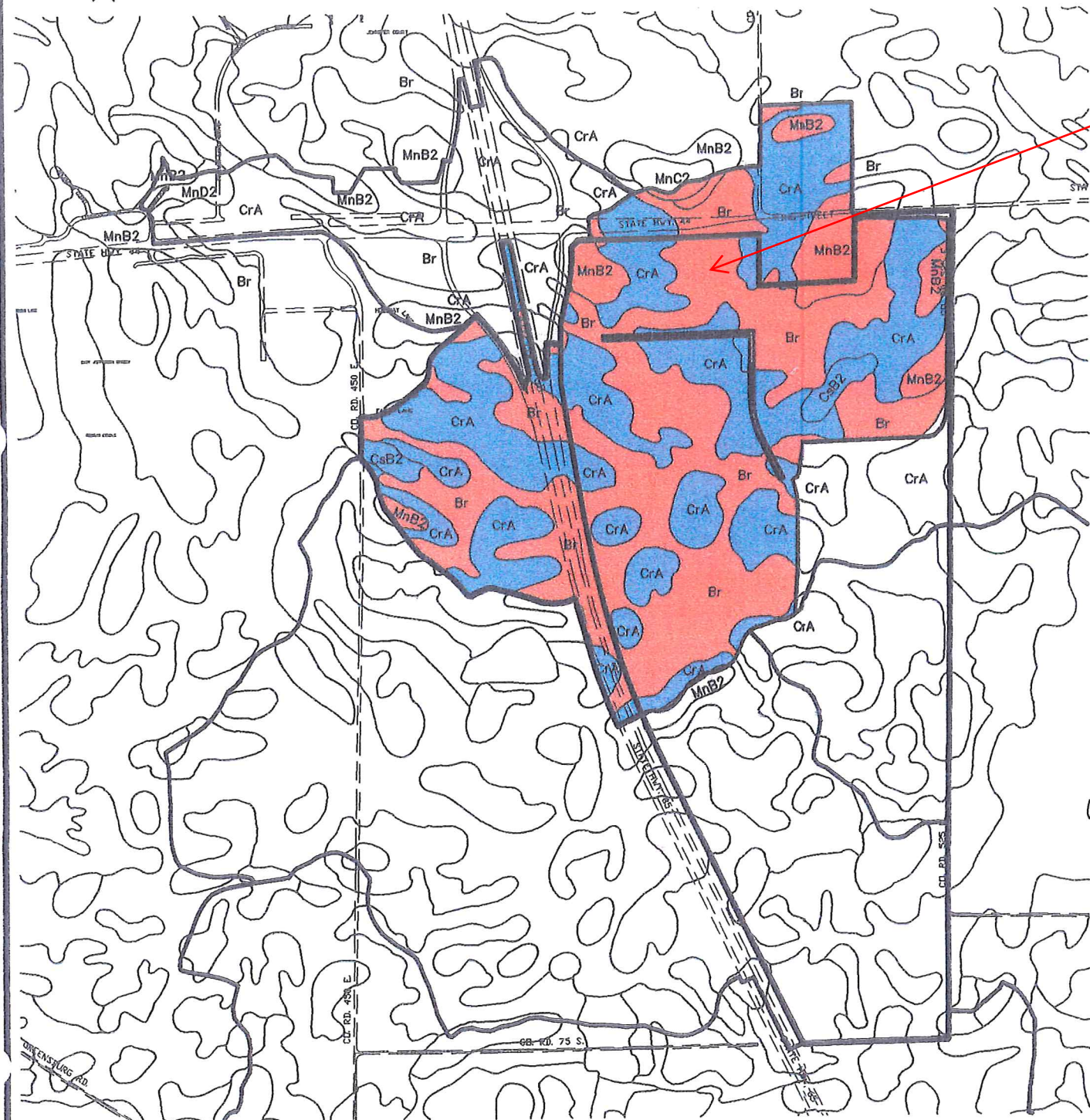


**FRANKLIN TECH PARK**  
TOTAL POST DEVELOPMENT AREA  
TO POND IN BLOCK C, LOT 1

SCALE: 1" = 1000'

 SOIL GROUP B

 SOIL GROUP C



PROPOSED SITE

MASTER PLANNED DETENTION DESIGN

OBTAINED FROM "HYDROLOGICAL STUDY FOR  
FRANKLIN TECH PARK BLK C LOT 1" BY KOE  
ENGINEERING & SURVEYING

ORIGINAL JUNE 26, 2004  
REVISED JULY 17TH, 2004

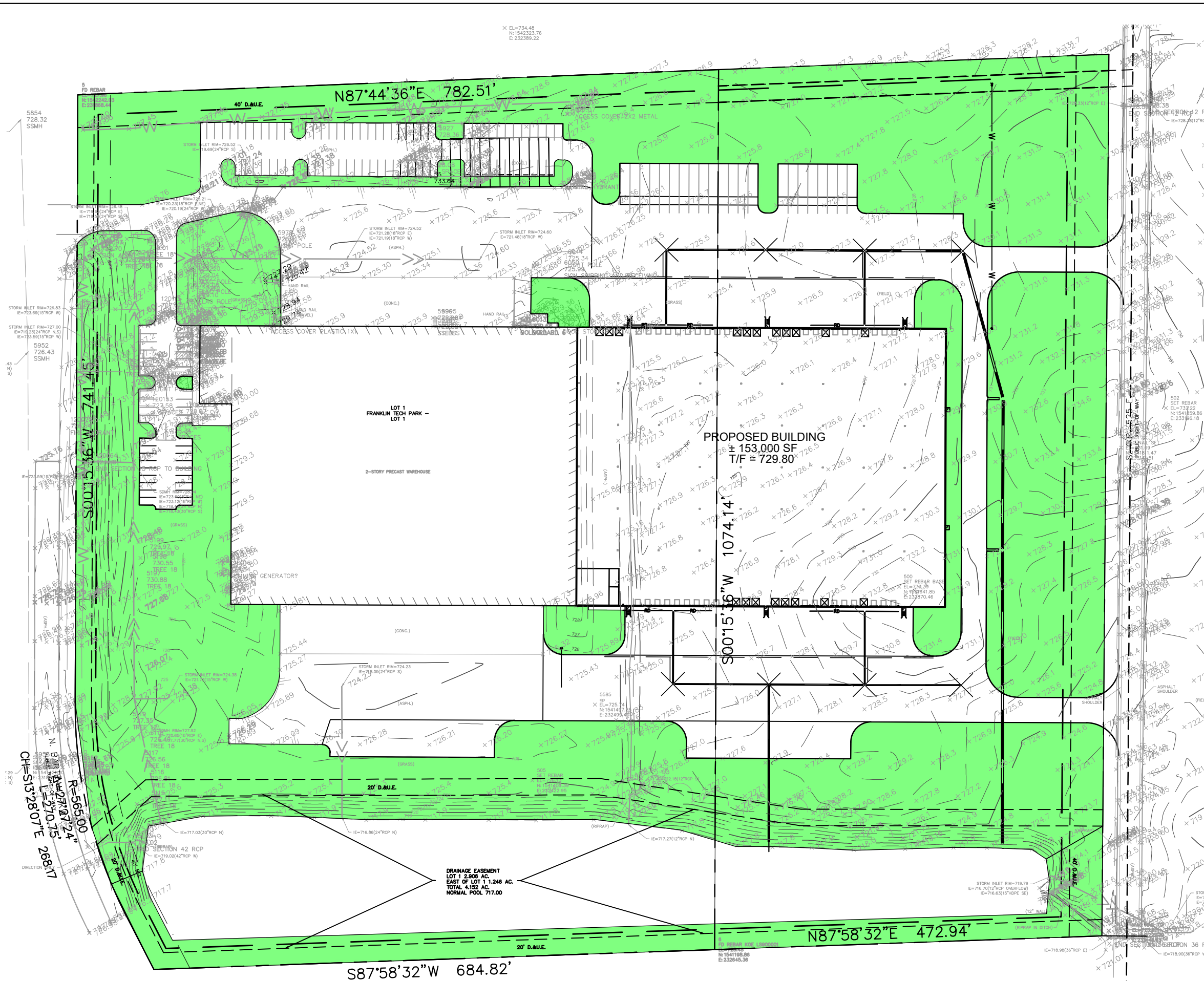


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## **Appendix E: Proposed Drainage Map**

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Project By: February 1, 2021 2:47:14 PM K:\NO\_DRAW\70125000\_Franklin Tech Park\_Aisin Expansion\_Franklin\_MV3\_Design\Drawings\Maping\Maping.dwg  
This document, together with the complete and complete set of drawings, is intended only for the specific purpose and shall not be used for any other purpose without the written authorization and adaptation by Kimley-Horn and Associates, Inc. and shall be without liability to Kimley-Horn and Associates, Inc.



POST DEVELOPMENT CONDITION  
TOTAL AREA: 30.71 ACRES  
IMPERVIOUS AREA: 17.96 ACRES  
PERVIOUS AREA: 12.75 ACRES  
CN: 89.3

## POST-DEVELOPMENT CN EXHIBIT

**Kimley»Horn**

AININ BUILDING EXPANSION  
187 BARTRAM PARKWAY, FRANKLIN, IN

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.  
250 EAST 96TH STREET, SUITE 580, INDIANAPOLIS, IN 46240  
PHONE: 317-218-9560 WWW.KIMLEY-HORN.COM

2/4/21  
SHEET NUMBER  
D1

Kimley»Horn	
PROJECT:	Aisin Building Expansion
BY:	MJT
DATE:	3-Feb-21

Site Soil	
Hydrologic Group	%
A	0.0%
B	56.0%
C	44.0%
D	0.0%
Total	100.0%

Cover	Type	Condition	Soil Group Weighted Runoff Coefficient	Soil Group Weighted CN	
			C	Actual Soil Group	Next Less Impervious Soil Group
Fully Developed	Impervious	Paved	0.95	98	98
Fully Developed	Impervious	Rooftop	0.95	98	98
Fully Developed	Open Space	Good Condition (>75% Cover)	0.85	67	77

Basin	Area (ac)							Weighted CN	Weighted CN
	Impervious - Paved	Impervious - Rooftop & Pond	Open Space - Good Condition (>75% Cover)	Open Space - Good Condition (>75% Cover)	Pasture - Good	Fully Developed - Open Space	Total	Actual Soil Group	Next Less Impervious Soil Group
PROPOSED CONDITION	8.12	9.84	12.75	-	-	-	30.71	85	89.28

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## **Appendix F: Storm Sewer Design Calculations**

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<b>PROJECT:</b>	<b>Aisin Building Expansion</b>
<b>BY:</b>	<b>MJT</b>
<b>DATE:</b>	<b>3-Feb-21</b>

Impervious Factor	0.82		Catchment Area D2	
Pervious Factor	0.21		area	0.50
			pervious	0.00
			impervious	0.50
	Inputs		coefficient	0.82
	Outputs			

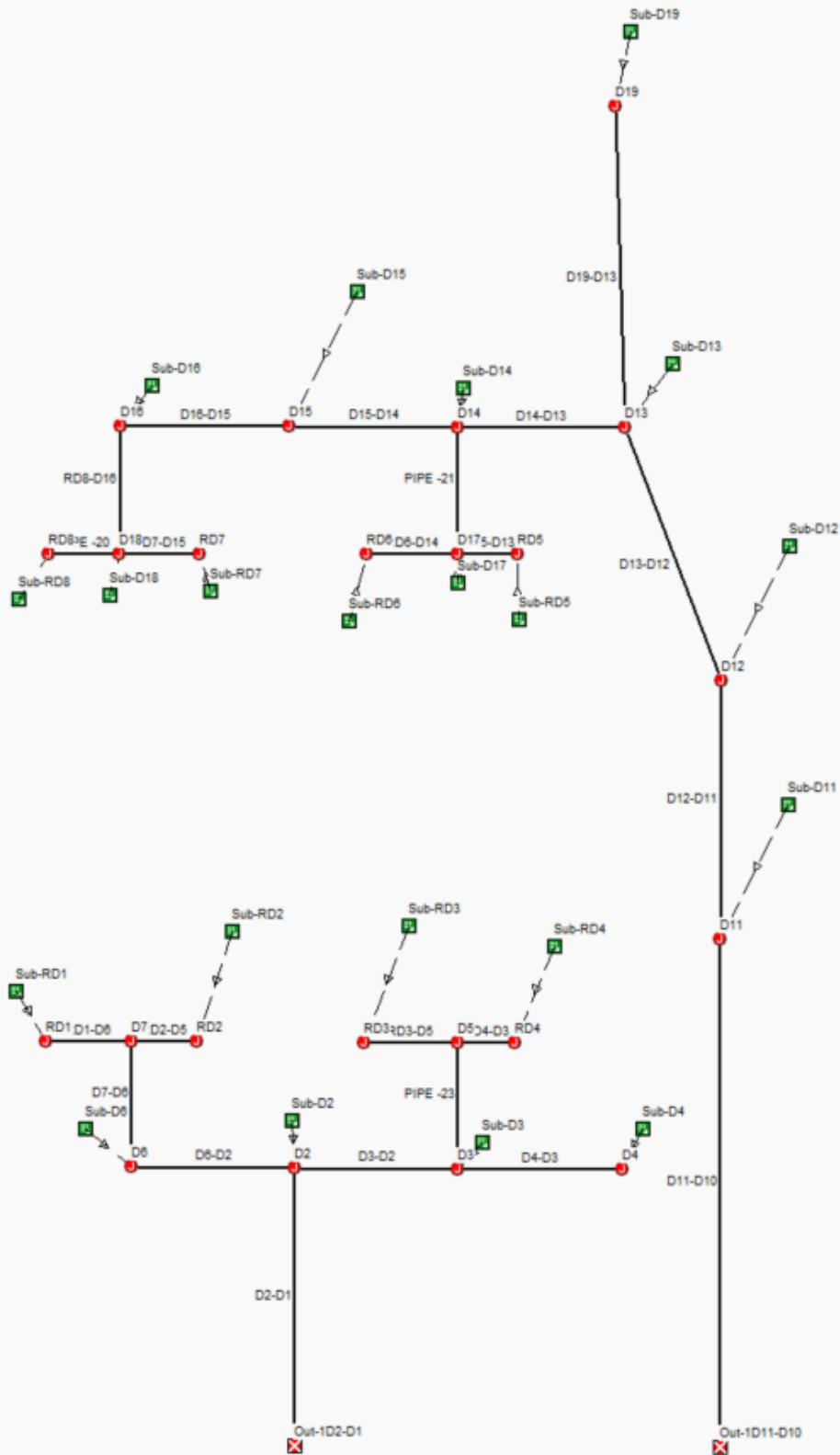
Catchment Area D11	
area	1.31
pervious	1.09
impervious	0.22
coefficient	0.31
*Includes 0.08 AC of future row parking)	

Catchment Area D15	
area	0.56
pervious	0.03
impervious	0.53
coefficient	0.79

Catchment Area D3	
area	0.42
pervious	0.00
impervious	0.42
coefficient	0.82

Catchment Area D12	
area	0.82
pervious	0.62
impervious*	0.20
coefficient	0.36
*Includes 0.08 AC of future row parking)	

Catchment Area D15	
area	0.56
pervious	0.06
impervious	0.50
coefficient	0.75



## Project Description

File Name ..... StormSTM.SPF

## Project Options

Flow Units ..... CFS  
 Elevation Type ..... Elevation  
 Hydrology Method ..... Rational  
 Time of Concentration (TOC) Method ..... User-Defined  
 Link Routing Method ..... Kinematic Wave  
 Enable Overflow Ponding at Nodes ..... YES  
 Skip Steady State Analysis Time Periods ..... NO

## Analysis Options

Start Analysis On ..... Feb 02, 2021 00:00:00  
 End Analysis On ..... Feb 03, 2021 00:00:00  
 Start Reporting On ..... Feb 02, 2021 00:00:00  
 Antecedent Dry Days ..... 0 days  
 Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss  
 Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss  
 Reporting Time Step ..... 0 00:05:00 days hh:mm:ss  
 Routing Time Step ..... 30 seconds

## Number of Elements

	Qty
Rain Gages .....	0
Subbasins.....	21
Nodes.....	25
<i>Junctions</i> .....	23
<i>Outfalls</i> .....	2
<i>Flow Diversions</i> .....	0
<i>Inlets</i> .....	0
<i>Storage Nodes</i> .....	0
Links.....	23
<i>Channels</i> .....	0
<i>Pipes</i> .....	23
<i>Pumps</i> .....	0
<i>Orifices</i> .....	0
<i>Weirs</i> .....	0
<i>Outlets</i> .....	0
Pollutants .....	0
Land Uses .....	0

## Rainfall Details

Return Period..... 10 year(s)



**Subbasin Summary**

SN	Subbasin ID	Area	Weighted Runoff Coefficient	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	Sub-D11	1.31	0.3100	0.61	0.19	0.25	2.95	0 00:05:00
2	Sub-D12	0.82	0.3600	0.61	0.22	0.18	2.15	0 00:05:00
3	Sub-D13	0.36	0.7000	0.61	0.42	0.15	1.83	0 00:05:00
4	Sub-D14	0.46	0.8200	0.61	0.50	0.23	2.74	0 00:05:00
5	Sub-D15	0.56	0.7500	0.61	0.45	0.25	3.05	0 00:05:00
6	Sub-D16	0.56	0.8200	0.61	0.50	0.28	3.34	0 00:05:00
7	Sub-D17	0.01	0.9000	0.61	0.55	0.01	0.07	0 00:05:00
8	Sub-D18	0.59	0.9000	0.61	0.55	0.32	3.86	0 00:05:00
9	Sub-D19	5.00	0.9000	0.74	0.66	3.32	28.44	0 00:07:00
10	Sub-D2	0.50	0.8200	0.61	0.50	0.25	2.98	0 00:05:00
11	Sub-D3	0.42	0.8200	0.61	0.50	0.21	2.50	0 00:05:00
12	Sub-D4	0.30	0.6800	0.61	0.41	0.12	1.48	0 00:05:00
13	Sub-D6	0.64	0.7400	0.61	0.45	0.29	3.44	0 00:05:00
14	Sub-RD1	0.59	0.9000	0.61	0.55	0.32	3.86	0 00:05:00
15	Sub-RD2	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
16	Sub-RD3	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
17	Sub-RD4	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
18	Sub-RD5	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
19	Sub-RD6	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
20	Sub-RD7	0.39	0.9000	0.61	0.55	0.21	2.55	0 00:05:00
21	Sub-RD8	0.01	0.9000	0.61	0.55	0.01	0.07	0 00:05:00

## Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft <sup>2</sup> )	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 D11	Junction	717.73	724.85	717.73	724.85	0.00	45.42	724.85	0.00	0.00	0 00:08	0.00	1.00
2 D12	Junction	718.20	726.02	718.20	726.02	0.00	44.21	721.05	0.00	4.97	0 00:00	0.00	0.00
3 D13	Junction	718.68	724.75	718.68	724.75	0.00	43.14	721.43	0.00	3.32	0 00:00	0.00	0.00
4 D14	Junction	719.51	724.74	719.51	724.74	0.00	19.44	721.45	0.00	3.29	0 00:00	0.00	0.00
5 D15	Junction	719.91	724.75	719.91	724.75	0.00	12.30	721.46	0.00	3.29	0 00:00	0.00	0.00
6 D16	Junction	720.51	724.74	720.51	724.74	0.00	9.58	721.76	0.00	2.98	0 00:00	0.00	0.00
7 D17	Junction	721.18	725.78	721.18	725.78	0.00	5.11	721.85	0.00	3.93	0 00:00	0.00	0.00
8 D18	Junction	721.69	725.78	721.69	725.78	0.00	6.41	722.62	0.00	3.16	0 00:00	0.00	0.00
9 D19	Junction	719.57	726.36	719.57	726.36	0.00	28.44	721.91	0.00	4.45	0 00:00	0.00	0.00
10 D2	Junction	718.69	724.75	718.69	724.75	0.00	21.06	724.75	0.00	0.00	0 00:05	0.00	0.00
11 D3	Junction	719.75	724.76	719.75	724.76	0.00	8.83	720.89	0.00	3.87	0 00:00	0.00	0.00
12 D4	Junction	720.81	724.63	720.81	724.63	0.00	1.48	721.29	0.00	3.34	0 00:00	0.00	0.00
13 D5	Junction	721.25	725.77	721.25	725.77	0.00	5.05	721.93	0.00	3.84	0 00:00	0.00	0.00
14 D6	Junction	720.54	724.75	720.54	724.75	0.00	9.58	721.53	0.00	3.22	0 00:00	0.00	0.00
15 D7	Junction	721.63	725.77	721.63	725.77	0.00	6.35	722.53	0.00	3.24	0 00:00	0.00	0.00
16 RD1	Junction	722.30	723.38	722.30	723.38	0.00	3.86	723.08	0.00	0.30	0 00:00	0.00	0.00
17 RD2	Junction	722.30	723.38	722.30	723.38	0.00	2.55	722.83	0.00	0.55	0 00:00	0.00	0.00
18 RD3	Junction	722.30	723.38	722.30	723.38	0.00	2.55	722.82	0.00	0.56	0 00:00	0.00	0.00
19 RD4	Junction	722.30	723.38	722.30	723.38	0.00	2.55	722.75	0.00	0.63	0 00:00	0.00	0.00
20 RD5	Junction	722.30	721.93	722.30	721.93	0.00	2.55	722.74	0.00	0.56	0 00:00	0.00	0.00
21 RD6	Junction	722.30	723.38	722.30	723.38	0.00	2.55	722.80	0.00	0.58	0 00:00	0.00	0.00
22 RD7	Junction	722.30	723.38	722.30	723.38	0.00	2.55	722.88	0.00	0.50	0 00:00	0.00	0.00
23 RD8	Junction	722.30	722.83	722.30	722.83	0.00	0.07	722.39	0.00	0.91	0 00:00	0.00	0.00
24 Out-1D11-D10	Outfall	717.00					47.48	720.08					
25 Out-1D2-D1	Outfall	717.00					21.79	718.73					

## Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/Total Depth Ratio	Total Time Reported	Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	D11-D10	Pipe	D11	Out-1D11-D10	363.98	717.73	717.00	0.2000	42.000	0.0130	47.48	45.06	1.05	5.80	3.12	0.90	0.00 > CAPACITY
2	D12-D11	Pipe	D12	D11	184.93	718.20	717.83	0.2000	42.000	0.0130	44.17	45.00	0.98	5.51	2.80	0.80	0.00 Calculated
3	D13-D12	Pipe	D13	D12	193.13	718.68	718.30	0.2000	42.000	0.0130	43.14	44.99	0.96	5.50	2.73	0.78	0.00 Calculated
4	D14-D13	Pipe	D14	D13	119.63	719.51	719.21	0.2500	30.000	0.0130	19.34	20.54	0.94	4.87	1.92	0.77	0.00 Calculated
5	D15-D14	Pipe	D15	D14	121.00	719.91	719.51	0.3300	24.000	0.0130	12.21	13.01	0.94	4.83	1.53	0.77	0.00 Calculated
6	D16-D15	Pipe	D16	D15	121.00	720.51	719.91	0.5000	21.000	0.0130	9.49	11.16	0.85	5.31	1.24	0.71	0.00 Calculated
7	D19-D13	Pipe	D19	D13	230.00	719.57	719.11	0.2000	36.000	0.0130	27.52	29.83	0.92	8.04	2.26	0.75	0.00 Calculated
8	D2-D1	Pipe	D2	Out-1D2-D1	198.57	718.69	717.00	0.8500	24.000	0.0130	21.79	20.87	1.04	7.85	1.78	0.89	0.00 > CAPACITY
9	D3-D2	Pipe	D3	D2	117.00	719.75	718.79	0.8200	18.000	0.0130	8.78	9.51	0.92	6.22	1.13	0.76	0.00 Calculated
10	D4-D3	Pipe	D4	D3	117.61	720.81	719.85	0.8200	12.000	0.0130	1.43	3.22	0.45	6.33	0.47	0.47	0.00 Calculated
11	D6-D2	Pipe	D6	D2	117.00	720.54	718.79	1.5000	18.000	0.0130	9.54	12.85	0.74	8.04	0.96	0.64	0.00 Calculated
12	D7-D6	Pipe	D7	D6	89.71	721.63	720.64	1.1000	15.000	0.0120	6.30	7.35	0.86	6.81	0.89	0.71	0.00 Calculated
13	PIPE -20	Pipe	RD8	D18	51.37	722.30	721.69	1.1900	12.000	0.0120	0.06	4.21	0.02	3.00	0.09	0.09	0.00 Calculated
14	PIPE -21	Pipe	D17	D14	91.00	721.18	719.61	1.7300	15.000	0.0120	5.08	9.19	0.55	7.74	0.66	0.53	0.00 Calculated
15	PIPE -23	Pipe	D5	D3	90.04	721.25	719.85	1.5500	15.000	0.0120	5.01	8.73	0.57	7.41	0.68	0.54	0.00 Calculated
16	RD1-D6	Pipe	RD1	D7	61.39	722.30	721.63	1.0900	12.000	0.0120	3.82	4.03	0.95	7.68	0.77	0.77	0.00 Calculated
17	RD2-D5	Pipe	RD2	D7	46.61	722.30	721.63	1.4400	12.000	0.0120	2.53	4.63	0.55	7.08	0.53	0.53	0.00 Calculated
18	RD3-D5	Pipe	RD3	D5	67.03	722.30	721.25	1.5700	12.000	0.0120	2.52	4.83	0.52	7.92	0.51	0.51	0.00 Calculated
19	RD4-D3	Pipe	RD4	D5	40.97	722.30	721.25	2.5600	12.000	0.0120	2.53	6.18	0.41	7.94	0.45	0.45	0.00 Calculated
20	RD5-D13	Pipe	RD5	D17	42.60	722.30	721.18	2.6300	12.000	0.0120	2.53	6.26	0.40	8.13	0.44	0.44	0.00 Calculated
21	RD6-D14	Pipe	RD6	D17	65.40	722.30	721.18	1.7100	12.000	0.0120	2.52	5.05	0.50	8.14	0.50	0.50	0.00 Calculated
22	RD7-D15	Pipe	RD7	D18	57.00	722.30	721.69	1.0700	12.000	0.0120	2.53	3.99	0.63	6.82	0.58	0.58	0.00 Calculated
23	RD8-D16	Pipe	D18	D16	91.70	721.69	720.74	1.0400	15.000	0.0120	6.36	7.12	0.89	6.64	0.92	0.74	0.00 Calculated

**Junction Input**

SN	Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1	D11	717.73	724.85	7.12	717.73	0.00	724.85	0.00	0.00	42.24
2	D12	718.20	726.02	7.82	718.20	0.00	726.02	0.00	0.00	50.64
3	D13	718.68	724.75	6.07	718.68	0.00	724.75	0.00	0.00	30.84
4	D14	719.51	724.74	5.23	719.51	0.00	724.74	0.00	0.00	32.76
5	D15	719.91	724.75	4.84	719.91	0.00	724.75	0.00	0.00	34.08
6	D16	720.51	724.74	4.23	720.51	0.00	724.74	0.00	0.00	29.76
7	D17	721.18	725.78	4.60	721.18	0.00	725.78	0.00	0.00	40.20
8	D18	721.69	725.78	4.09	721.69	0.00	725.78	0.00	0.00	34.08
9	D19	719.57	726.36	6.79	719.57	0.00	726.36	0.00	0.00	45.48
10	D2	718.69	724.75	6.06	718.69	0.00	724.75	0.00	0.00	48.72
11	D3	719.75	724.76	5.01	719.75	0.00	724.76	0.00	0.00	42.12
12	D4	720.81	724.63	3.82	720.81	0.00	724.63	0.00	0.00	33.84
13	D5	721.25	725.77	4.52	721.25	0.00	725.77	0.00	0.00	39.24
14	D6	720.54	724.75	4.21	720.54	0.00	724.75	0.00	0.00	32.52
15	D7	721.63	725.77	4.14	721.63	0.00	725.77	0.00	0.00	34.68
16	RD1	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
17	RD2	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
18	RD3	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
19	RD4	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
20	RD5	722.30	721.93	-0.37	722.30	0.00	721.93	0.00	0.00	0.00
21	RD6	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
22	RD7	722.30	723.38	1.08	722.30	0.00	723.38	0.00	0.00	0.96
23	RD8	722.30	722.83	0.53	722.30	0.00	722.83	0.00	0.00	0.00

## Junction Results

SN	Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1	D11	45.42	2.95	724.85	7.12	0.00	0.00	717.85	0.12	0 00:07	0 00:08	0.00	1.00
2	D12	44.21	2.15	721.05	2.85	0.00	4.97	718.32	0.12	0 00:07	0 00:00	0.00	0.00
3	D13	43.14	1.83	721.43	2.75	0.00	3.32	719.22	0.54	0 00:07	0 00:00	0.00	0.00
4	D14	19.44	2.74	721.45	1.94	0.00	3.29	719.62	0.11	0 00:05	0 00:00	0.00	0.00
5	D15	12.30	3.05	721.46	1.55	0.00	3.29	719.92	0.01	0 00:05	0 00:00	0.00	0.00
6	D16	9.58	3.34	721.76	1.25	0.00	2.98	720.74	0.23	0 00:05	0 00:00	0.00	0.00
7	D17	5.11	0.07	721.85	0.67	0.00	3.93	721.18	0.00	0 00:05	0 00:00	0.00	0.00
8	D18	6.41	3.86	722.62	0.93	0.00	3.16	721.69	0.00	0 00:05	0 00:00	0.00	0.00
9	D19	28.44	28.44	721.91	2.34	0.00	4.45	719.58	0.01	0 00:07	0 00:00	0.00	0.00
10	D2	21.06	2.98	724.75	6.06	0.00	0.00	718.80	0.11	0 00:05	0 00:05	0.00	0.00
11	D3	8.83	2.50	720.89	1.14	0.00	3.87	719.85	0.10	0 00:05	0 00:00	0.00	0.00
12	D4	1.48	1.48	721.29	0.48	0.00	3.34	720.81	0.00	0 00:05	0 00:00	0.00	0.00
13	D5	5.05	0.00	721.93	0.68	0.00	3.84	721.25	0.00	0 00:05	0 00:00	0.00	0.00
14	D6	9.58	3.44	721.53	0.99	0.00	3.22	720.64	0.10	0 00:05	0 00:00	0.00	0.00
15	D7	6.35	0.00	722.53	0.90	0.00	3.24	721.63	0.00	0 00:05	0 00:00	0.00	0.00
16	RD1	3.86	3.86	723.08	0.78	0.00	0.30	722.30	0.00	0 00:05	0 00:00	0.00	0.00
17	RD2	2.55	2.55	722.83	0.53	0.00	0.55	722.30	0.00	0 00:05	0 00:00	0.00	0.00
18	RD3	2.55	2.55	722.82	0.52	0.00	0.56	722.30	0.00	0 00:05	0 00:00	0.00	0.00
19	RD4	2.55	2.55	722.75	0.45	0.00	0.63	722.30	0.00	0 00:05	0 00:00	0.00	0.00
20	RD5	2.55	2.55	722.74	0.44	0.00	0.56	722.30	0.00	0 00:05	0 00:00	0.00	0.00
21	RD6	2.55	2.55	722.80	0.50	0.00	0.58	722.30	0.00	0 00:05	0 00:00	0.00	0.00
22	RD7	2.55	2.55	722.88	0.58	0.00	0.50	722.30	0.00	0 00:05	0 00:00	0.00	0.00
23	RD8	0.07	0.07	722.39	0.09	0.00	0.91	722.30	0.00	0 00:05	0 00:00	0.00	0.00

## Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Pipe Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flap Flow Gate	No. of Barrels
1	D11-D10	363.98	717.73	0.00	717.00	0.00	0.73	0.2000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
2	D12-D11	184.93	718.20	0.00	717.83	0.10	0.37	0.2000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
3	D13-D12	193.13	718.68	0.00	718.30	0.10	0.38	0.2000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
4	D14-D13	119.63	719.51	0.00	719.21	0.53	0.30	0.2500	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
5	D15-D14	121.00	719.91	0.00	719.51	0.00	0.40	0.3300	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
6	D16-D15	121.00	720.51	0.00	719.91	0.00	0.60	0.5000	CIRCULAR	21.000	21.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
7	D19-D13	230.00	719.57	0.00	719.11	0.43	0.46	0.2000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
8	D2-D1	198.57	718.69	0.00	717.00	0.00	1.69	0.8500	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
9	D3-D2	117.00	719.75	0.00	718.79	0.10	0.96	0.8200	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
10	D4-D3	117.61	720.81	0.00	719.85	0.10	0.96	0.8200	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
11	D6-D2	117.00	720.54	0.00	718.79	0.10	1.75	1.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00 No	1
12	D7-D6	89.71	721.63	0.00	720.64	0.10	0.99	1.1000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
13	PIPE -20	51.37	722.30	0.00	721.69	0.00	0.61	1.1900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
14	PIPE -21	91.00	721.18	0.00	719.61	0.10	1.57	1.7300	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
15	PIPE -23	90.04	721.25	0.00	719.85	0.10	1.40	1.5500	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
16	RD1-D6	61.39	722.30	0.00	721.63	0.00	0.67	1.0900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
17	RD2-D5	46.61	722.30	0.00	721.63	0.00	0.67	1.4400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
18	RD3-D5	67.03	722.30	0.00	721.25	0.00	1.05	1.5700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
19	RD4-D3	40.97	722.30	0.00	721.25	0.00	1.05	2.5600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
20	RD5-D13	42.60	722.30	0.00	721.18	0.00	1.12	2.6300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
21	RD6-D14	65.40	722.30	0.00	721.18	0.00	1.12	1.7100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
22	RD7-D15	57.00	722.30	0.00	721.69	0.00	0.61	1.0700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1
23	RD8-D16	91.70	721.69	0.00	720.74	0.23	0.95	1.0400	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00 No	1

**Pipe Results**

SN	Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
		(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1	D11-D10	47.48	0 00:08	45.06	1.05	5.80	1.05	3.12	0.90	0.00		> CAPACITY
2	D12-D11	44.17	0 00:08	45.00	0.98	5.51	0.56	2.80	0.80	0.00		Calculated
3	D13-D12	43.14	0 00:07	44.99	0.96	5.50	0.59	2.73	0.78	0.00		Calculated
4	D14-D13	19.34	0 00:05	20.54	0.94	4.87	0.41	1.92	0.77	0.00		Calculated
5	D15-D14	12.21	0 00:05	13.01	0.94	4.83	0.42	1.53	0.77	0.00		Calculated
6	D16-D15	9.49	0 00:05	11.16	0.85	5.31	0.38	1.24	0.71	0.00		Calculated
7	D19-D13	27.52	0 00:07	29.83	0.92	8.04	0.48	2.26	0.75	0.00		Calculated
8	D2-D1	21.79	0 00:05	20.87	1.04	7.85	0.42	1.78	0.89	0.00		> CAPACITY
9	D3-D2	8.78	0 00:05	9.51	0.92	6.22	0.31	1.13	0.76	0.00		Calculated
10	D4-D3	1.43	0 00:05	3.22	0.45	6.33	0.31	0.47	0.47	0.00		Calculated
11	D6-D2	9.54	0 00:05	12.85	0.74	8.04	0.24	0.96	0.64	0.00		Calculated
12	D7-D6	6.30	0 00:05	7.35	0.86	6.81	0.22	0.89	0.71	0.00		Calculated
13	PIPE -20	0.06	0 00:05	4.21	0.02	3.00	0.29	0.09	0.09	0.00		Calculated
14	PIPE -21	5.08	0 00:05	9.19	0.55	7.74	0.20	0.66	0.53	0.00		Calculated
15	PIPE -23	5.01	0 00:05	8.73	0.57	7.41	0.20	0.68	0.54	0.00		Calculated
16	RD1-D6	3.82	0 00:05	4.03	0.95	7.68	0.13	0.77	0.77	0.00		Calculated
17	RD2-D5	2.53	0 00:05	4.63	0.55	7.08	0.11	0.53	0.53	0.00		Calculated
18	RD3-D5	2.52	0 00:05	4.83	0.52	7.92	0.14	0.51	0.51	0.00		Calculated
19	RD4-D3	2.53	0 00:05	6.18	0.41	7.94	0.09	0.45	0.45	0.00		Calculated
20	RD5-D13	2.53	0 00:05	6.26	0.40	8.13	0.09	0.44	0.44	0.00		Calculated
21	RD6-D14	2.52	0 00:05	5.05	0.50	8.14	0.13	0.50	0.50	0.00		Calculated
22	RD7-D15	2.53	0 00:05	3.99	0.63	6.82	0.14	0.58	0.58	0.00		Calculated
23	RD8-D16	6.36	0 00:05	7.12	0.89	6.64	0.23	0.92	0.74	0.00		Calculated

---

## **Appendix G: Excerpts of Masterplan Drainage Report**

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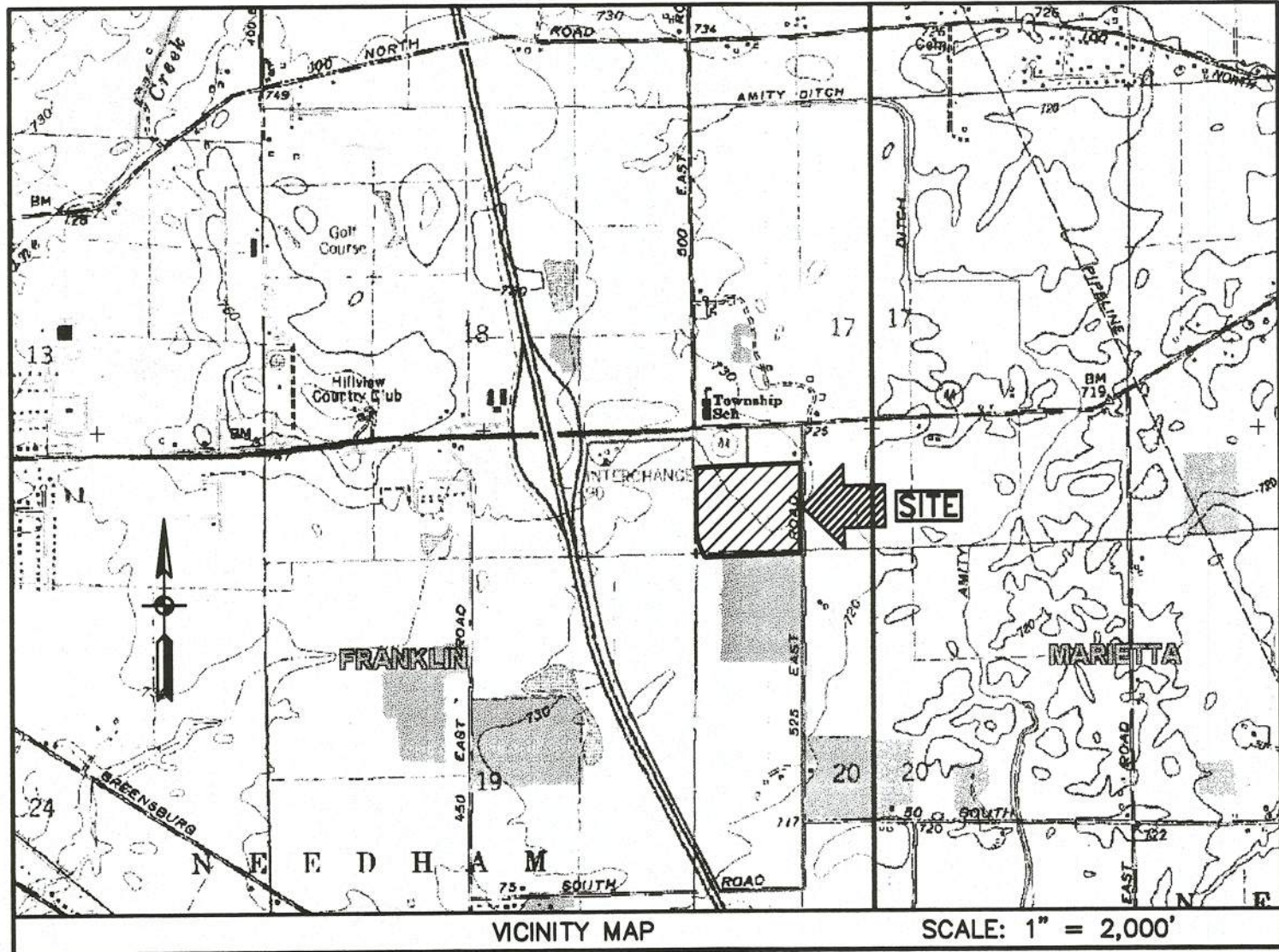


Commercial Site Plans For:

Franklin Tech Park  
LOT 1 (BLOCK "C")

DEVELOPER:  
Franklin Tech Park Associates, LLC  
3815 River Crossing Parkway, Suite 160  
Indianapolis, IN 46240  
Contact: Mac McNaught - (317) 472-0038

	INDEX
SHT No.	DESCRIPTION
1	TITLE SHEET
2	EXISTING SITE CONDITIONS
3	SITE AND GRADING PLAN
4	OFF-SITE STORM SEWER
5	EXISTING AND PROPOSED DRAINAGE DIVIDES
6	DETENTION POND DETAIL
7	EROSION CONTROL PLAN
8	EROSION CONTROL DETAILS
9	EROSION CONTROL DETAILS (RULE 5 COMPLIANCE)
10	WATER SERVICE PLAN
11	WATER SERVICE DETAILS
12	UTILITIES AND EXTERIOR LIGHTING PLAN
13	LANDSCAPE PLAN
14	STORM SEWER AND PAVEMENT DETAILS
15	SPECIFICATIONS



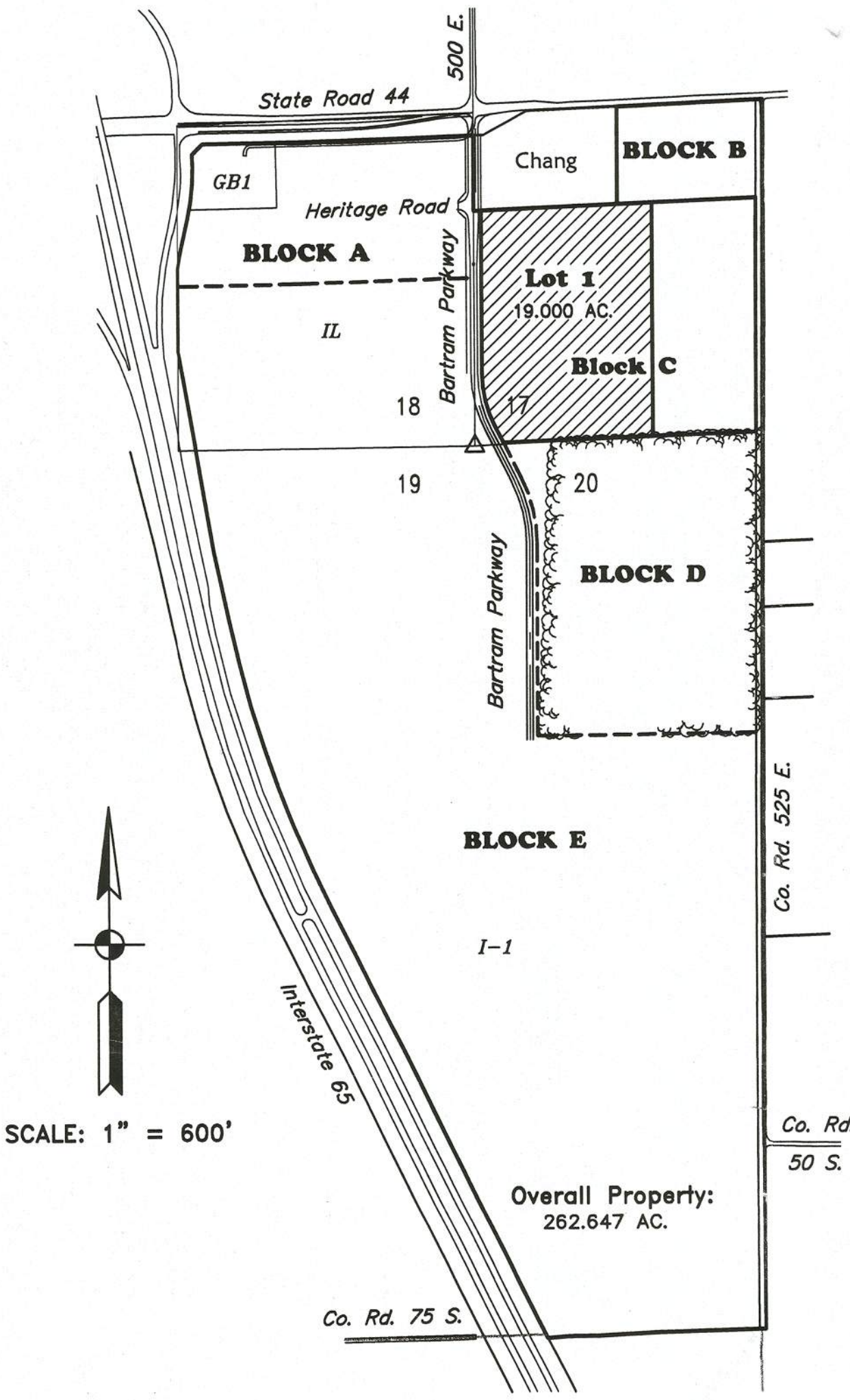
**LEGAL DESCRIPTION**

A part of the Southwest Quarter of Section 17 and a part of the Northwest Quarter of Section 20, all in Township 12 North, Range 5 East of the Second Principal Meridian, Johnson County, Indiana, more particularly described as follows:

Commencing at the Southwest corner of the Southwest Quarter of said Section 17; thence North 00 degrees 00 minutes 06 seconds North on and along the West line of said Southwest Quarter Section a distance of 1080.00 feet; thence North 87 degrees 29 minutes 06 seconds East a distance of 35.03 feet to a point on the East right-of-way line of Bartram Parkway, said point also being the POINT OF BEGINNING of this described tract of land; thence continuing North 87 degrees 29 minutes 06 seconds East a distance of 782.51 feet; thence South 00 degrees 00 minutes 06 seconds West a distance of 1074.14 feet; thence South 87 degrees 43 minutes 02 seconds West a distance of 684.82 feet to a point on the East right-of-way line of said Bartram Parkway, the next three (3) calls being on and along said East right-of-way line; (1) thence North 27 degrees 27 minutes 20 seconds West a distance of 73.38 feet to the Point of Curvature of a curve to the right having a radius of 565.00 feet; (2) thence on and along the arc of said curve a distance of 270.76 feet, said arc being subtended by a chord having a bearing of North 13 degrees 43 minutes 37 seconds West and a chord distance of 268.17 feet to the Point of Tangency of said curve; (3) thence North 00 degrees 00 minutes 06 seconds East a distance of 741.45 feet to the Point of Beginning containing 19.000 acres, more or less.

Subject to all legal rights-of-way, easements and restrictions of record.

Revisions to Plans		
SHEET NO.	DESCRIPTION	DATE
1 THRU 6	REVISED POND AND STORM STRUCTURES	06/28/04
1 THRU 7	REVISED LAYOUT PER DEVELOPER	06/30/04
1 THRU 15	REVISED PLANS PER TECH REVIEW COMMENTS	07/22/04
1 THRU 7	REVISED OFF-SITE STORM SEWER	09/13/04
1 THRU 15	ASBUILT BY RCCI	04/12/05



PLANS PREPARED BY:  
**KOE** ENGINEERING & SURVEYING, INC.  
70 East Main Street  
Greenwood, IN 46143  
PH: (317) 881-1337  
Fax: (317) 885-6497

**UTILITIES**

**SANITARY SEWER**  
City of Franklin  
Department of Public Works  
796 South State Street  
Franklin, IN 46131  
Rick Littleton  
(317) 736-3640

**ELECTRIC**  
Cnergy / PSI  
2515 North Morton Street  
Franklin, IN 46131  
Warren Williams  
(317) 736-2017

**TELEPHONE**  
Sprint  
50 North Jackson Street  
Franklin, IN 46131  
Larry Talbot  
(317) 736-4863

**GAS**  
Vectren Energy Delivery  
600 Industrial Drive  
Franklin, IN 46131  
Steve Washburn  
(317) 736-2989

**WATER**  
Indiana-American Water Co.  
110 South Park Boulevard  
P.O. Box 99  
Greenwood, IN 46143  
Ron Ballard  
(317) 881-0270 ext. 224

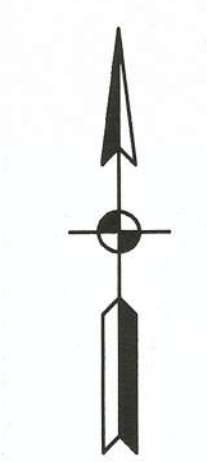
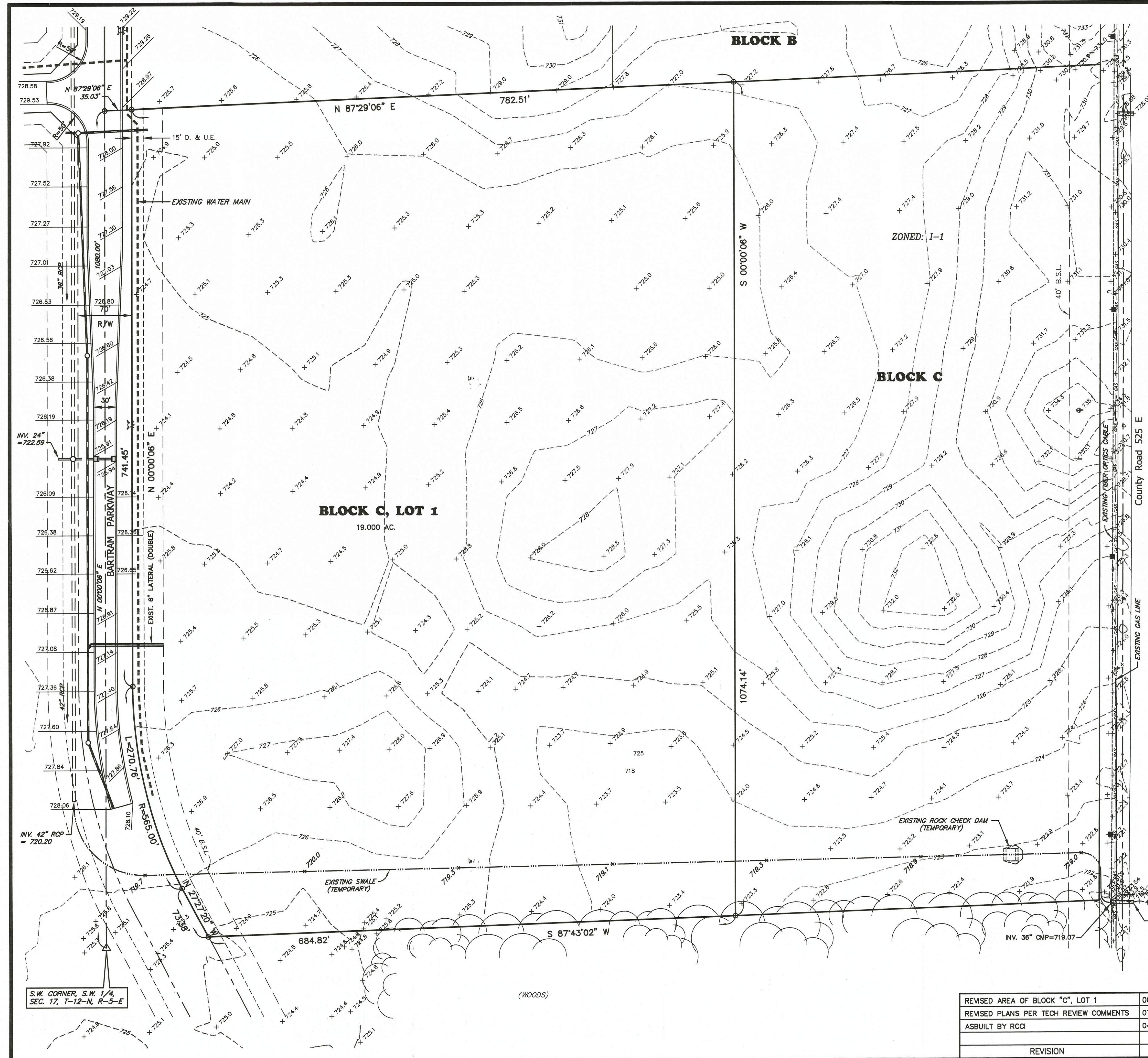
**FIRE DEPARTMENT**  
City of Franklin  
1701 North Main Street  
Franklin, IN 46131  
Jim Reece, Fire Inspector  
(317) 326-1221

Certified By:

John J. Meyer, Jr.  
Registered Engineer No. 17292  
State of Indiana







SCALE: 1" = 60'

#### LEGAL DESCRIPTION

A part of the Southwest Quarter of Section 17 and a part of the Northwest Quarter of Section 20, all in Township 12 North, Range 5 East of the Second Principal Meridian, Johnson County, Indiana, more particularly described as follows:

Commencing at the Southwest corner of the Southwest Quarter of said Section 17; thence North 00 degrees 00 minutes 06 seconds North on and along the West line of said Southwest Quarter Section a distance of 1080.00 feet; thence North 87 degrees 29 minutes 06 seconds East a distance of 35.03 feet to a point on the East right-of-way line of Bartram Parkway, said point also being the POINT OF BEGINNING of this described tract of land; thence continuing North 87 degrees 29 minutes 06 seconds East a distance of 782.51 feet; thence South 00 degrees 00 minutes 06 seconds West a distance of 1074.14 feet; thence South 87 degrees 43 minutes 02 seconds West a distance of 684.82 feet to a point on the East right-of-way line of said Bartram Parkway, the next three (3) calls being on and along said East right-of-way line; (1) thence North 27 degrees 27 minutes 20 seconds West a distance of 73.38 feet to the Point of Curvature of a curve to the right having a radius of 565.00 feet; (2) thence on and along the arc of said curve a distance of 270.76 feet, said arc being subtended by a chord having a bearing of North 13 degrees 43 minutes 37 seconds West and a chord distance of 268.17 feet to the Point of Tangency of said curve; (3) thence North 00 degrees 00 minutes 06 seconds East a distance of 741.45 feet to the Point of Beginning containing 19.000 acres, more or less. Subject to all legal rights-of-way, easements and restrictions of record.

#### LEGEND

- EXISTING WATER MAIN
- == EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- x 727.85 EXISTING SPOT ELEVATION
- - - EXISTING CONTOUR
- EXISTING POWER POLE



REVISED AREA OF BLOCK "C", LOT 1	06/30/04
REVISED PLANS PER TECH REVIEW COMMENTS	07/22/04
ASBUILT BY RCCI	04/12/05
REVISION	DATE

PROJECT	FRANKLIN TECH PARK - BLOCK "C", LOT 1
TITLE	EXISTING SITE CONDITIONS

**KOE** ENGINEERING & SURVEYING, INC.  
70 East Main Street  
Greenwood, IN 46143  
PH: (317) 881-1337  
Fax: (317) 885-6497

DATE 06/07/04  
SHEET 2 OF 15



HYDROLOGICAL STUDY FOR  
FRANKLIN TECH PARK BLK C LOT 1

CITY OF FRANKLIN, INDIANA

JOHNSON COUNTY, INDIANA

BY

KOE Engineering & Surveying

70 East Main Street

GREENWOOD, INDIANA 46143

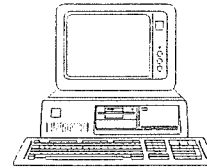
JUNE 26, 2004

REVISED JULY 17, 2004

# KOE ENGINEERING & SURVEYING, INC.

70 East Main ~ Greenwood, Indiana 46143 ~ (317) 881-1337

John J. Meyer, Jr. ~ President ~ Professional Engineer ~ Land Surveyor



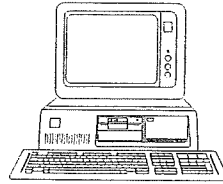
## INDEX

<u>ITEM</u>	<u>PAGE NUMBER</u>
A. NARRATIVE	1
B. DETERMINATION OF ALLOWABLE RELEASE RATES:	
1. BY PRO-RATA AREA TO AMITY DITCH	2 - 3
2. BY EXISTING PIPES FOR UPSTREAM OFFSITE	
a. UPSTREAM OFFSITE TO WEST UNDER I-65	
1. PIPE CAPACITY UNDER I-65 FROM STR 401 AND CONCLUSION	4 - 6
2. UPSTREAM OFFSITE HYDROGRAPH	7 - 13
b. UPSTREAM OFFSITE TO NORTH	
1. PIPE CAPACITIES UNDER 44 AND CONCLUSION	14 - 15
3. UPSTREAM OFFSITE HYDROGRAPH	16 - 22
C. ONSITE PREDEVELOPED WATERSHED HYDROGRAPHS	23 - 29
D. SUMMARY AND CONCLUSION OF ALLOWABLE POND DISCHARGE RATES	30
E. WATER QUALITY DESIGN	31 - 47
F. POST DEVELOPMENT 10 YEAR HYDROGRAPH AND POND ROUTING	48 - 65
G. POST DEVELOPMENT 100 YEAR HYDROGRAPH AND POND ROUTING	66 - 79
H. STORMWATER PIPE SIZING	80 - 84

# KOE ENGINEERING & SURVEYING, INC.

70 East Main ~ Greenwood, Indiana 46143 ~ (317) 881-1337

John J. Meyer, Jr. ~ President ~ Professional Engineer ~ Land Surveyor



1

## DRAINAGE TECHNICAL INFORMATION REPORT

FRANKLIN TECH PARK  
BLOCK "C" LOT 1

SOUTHEAST QUADRANT OF STATE ROAD 44 AND INTERSTATE 65  
CITY OF FRANKLIN, INDIANA

June 7, 2004  
REVISED June 26, 2004  
REVISED July 17, 2004

### SCOPE OF PROJECT

This 262.6 acre Industrial and Commercial Subdivision is in the City of Franklin, Indiana in Johnson County. Reference is made to the Preliminary Drainage Report dated December 2002 as previously submitted. This report is for the first Commercial Site to be developed in this Park.

### DRAINAGE PLAN

It is proposed to construct a Water Quality and Stormwater Detention Pond with this first site. This Pond will provide the water quality for all of the proposed Franklin Tech Park that drains eastward to the Amity Legal Drain along with an offsite underground pipe to convey by gravity flow for the peak discharge rate from the water quality control outlet. The Pond is also providing Stormwater detention for the post-development 10 and 100 year rainfall events for all of Blocks A, B & C. The Industrial area west of Bartram Parkway and South of Block A (northern portion of Block E) will need to provide for its own Detention Volumes as the area is Developed. At the time the Pond is designed West of Bartram Parkway, the Designer needs to comply with the Preliminary Drainage Report and this Drainage Report, and design the Pond to provide the needed storage volume, although Water Quality Control will not be needed.

The upstream offsite discharge from West of I-65 and passing through Structures 400 and 401 drain through the Woods South of Block C in the pre-developed condition. The Woods is currently providing some Detention and Water Quality Control. The discharge from Structure 400 will continue to be discharged through the Woods in a post-developed condition via a swale or pipe system that will be totally separate from any other onsite conveyance system. The discharge from Structure 401 will be routed through the proposed ponds.

Attached is also the Storm Drainage Flow Tabulation Form that demonstrates that the pipes have been designed to convey a 10-year rainfall event.

DETERMINE ALLOWABLE RELEASE RATE BY  
 PRO-RATA DRAINAGE AREAS TO CAPACITY OF  
 THE AMITY DITCH AT THE POINT OF DISCHARGE.  
 PER MIKE BUENING, THE AMITY DITCH CAPACITY  
 WITH FLOW CONFINED TO CHANNEL IS 1,078 cfs.

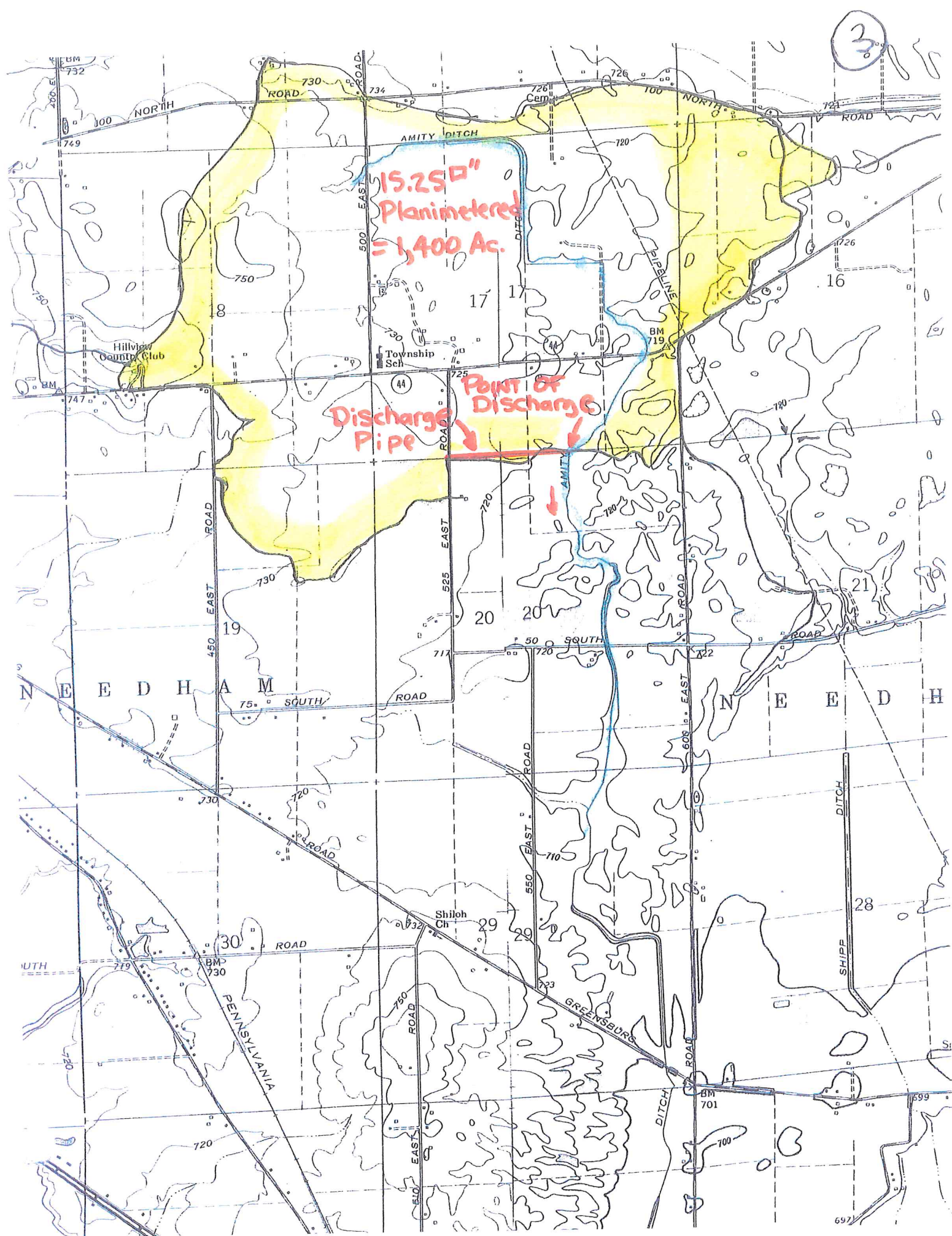
Reference is made to the attached USGS mapping  
 showing the total watershed to the Amity as:

$$15.25 \text{ " planimetered } \times 2000^2 \div 43560 = 1,400 \text{ Acres}$$

Per <sup>(Page 49)</sup> Drainage Report, total area to Detention Pond = 205.08 A

∴ allowable Release rate during 100 year Post  
 Development event =



$$205.1 / 1400 \times 1078 \text{ cfs} = 157.9 \text{ cfs}$$





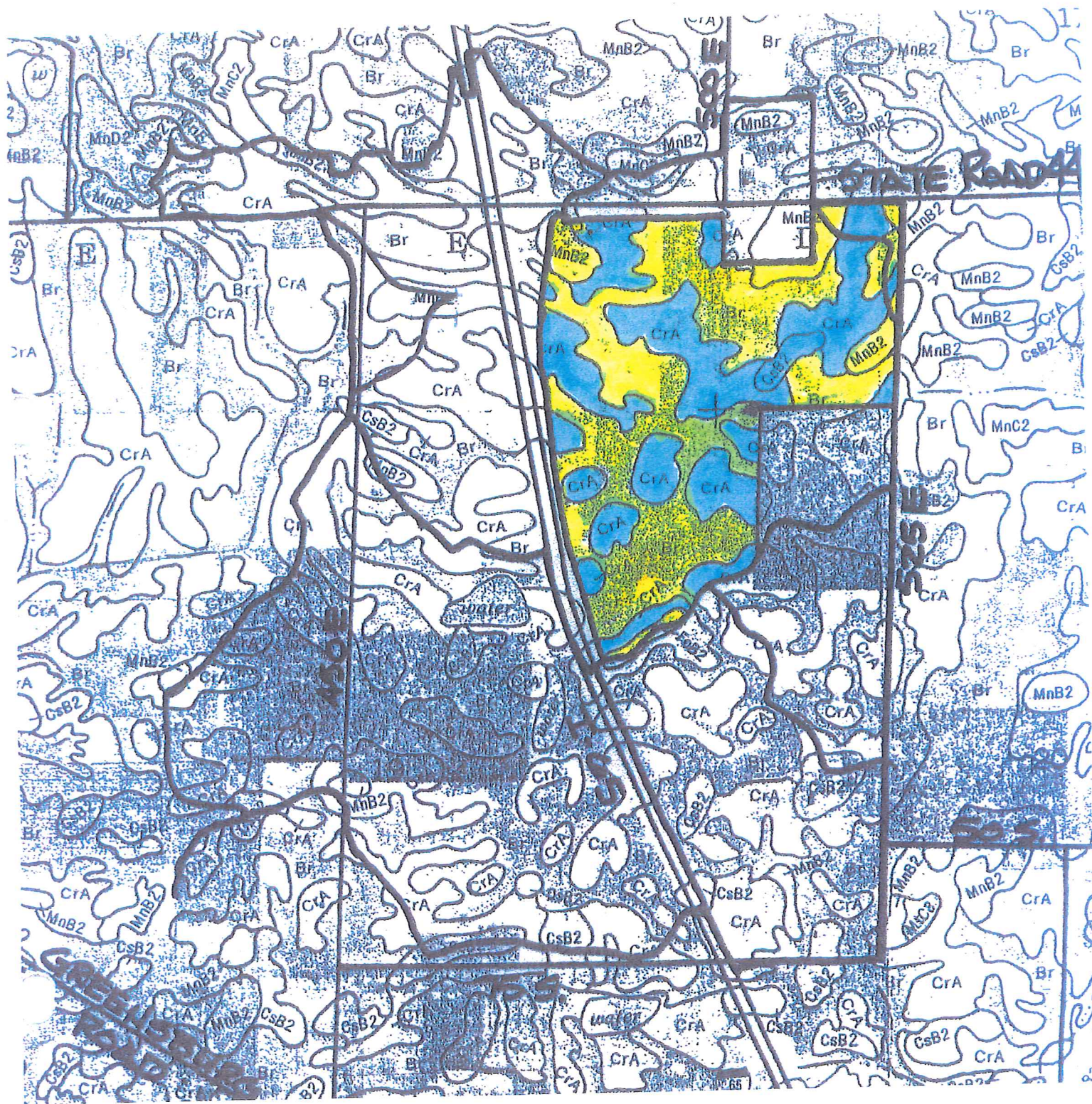
POST DEVELOPMENT  
AREA TO POND IN BLOCK C  
TO BE USED FOR WATER  
QUALITY DESIGN ONLY

~~28~~  
31

-  = SOIL GROUP B
-  = SOIL GROUP C



SCALE: 1" = 1000'





33

32

POST-DEVELOPED AREA TO POND IN  
BLOCK C TO BE USED FOR WATER  
QUALITY DESIGN

SOIL NAME		SOIL GROUP	AREA
Br	Brookston	B	$70.86 + 0.58$ $- 8.73 = 62.71$
CrA	Crosby	C	$60.88 + 3.02$ $- 8.26 = 55.64$
CsB <sub>2</sub>	Crosby/Miami	C	2.58
FoB <sub>2</sub>	Fox	B	0.42
MnB <sub>2</sub>	Miami	B	$9.30 + 1.74$ $= 11.04$

Watershed area = 132.39 acres

Watershed description = \_\_\_\_\_

Determination of CN Number:

SOIL GROUP	AREA	CN	
B	74.17	88	
C	58.22	91	

$$CN = \frac{[74.17(88) + 58.22(91)]}{132.39} = 89.3$$

$$\text{Watershed Slope} = \frac{735 - 718}{2300} = 0.74\%$$

$$\text{Hydraulic Length} = 2300 \quad c = .6$$

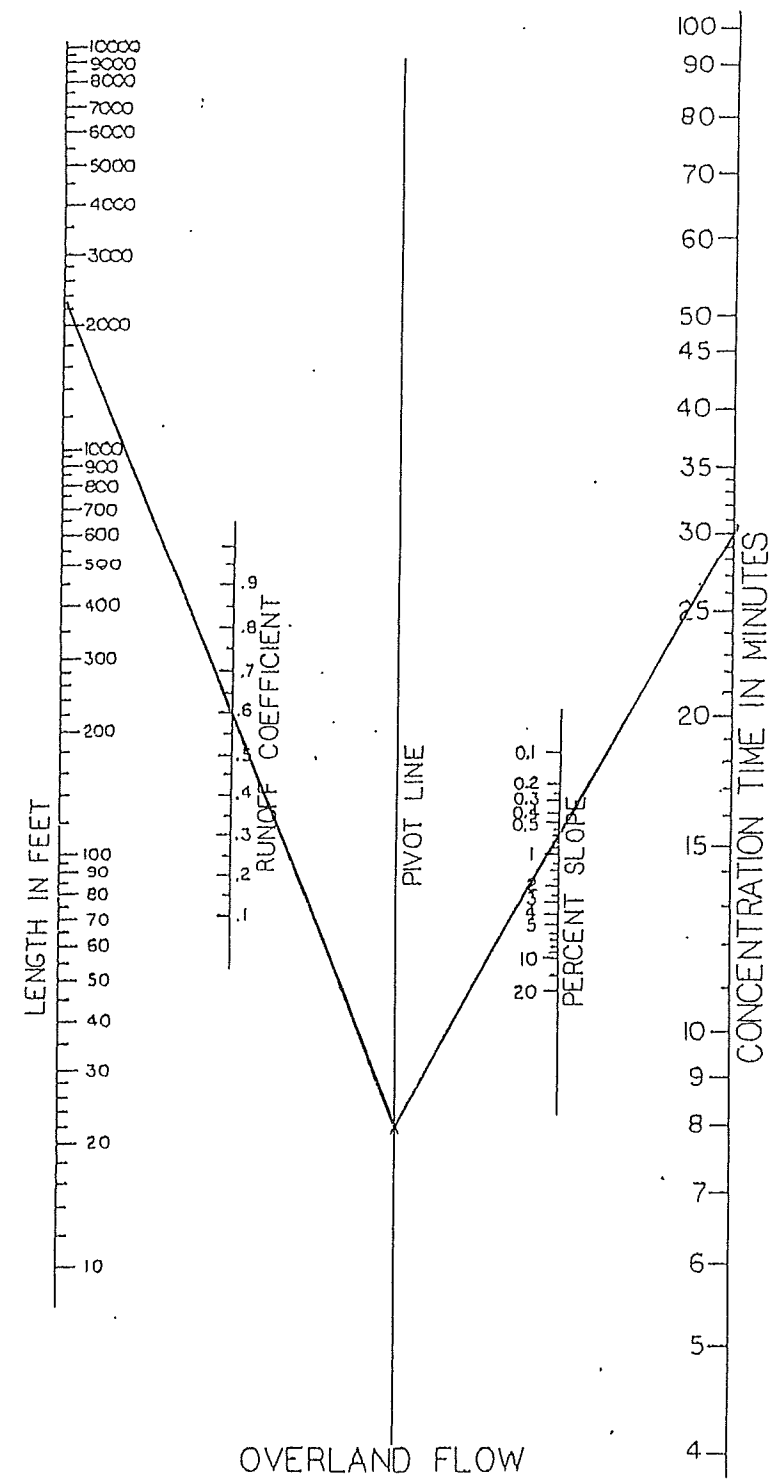
$$\text{From attached Nomograph, } T_c = 30 \text{ min.}$$

$$\text{Basin Lag} = 0.6 T_c = 0.6 (30) + 60 = .30 \text{ hours}$$

33

# OVERLAND FLOW AND RUN-OFF COEFFICIENT

FIGURE 5.3



HYDROLOGIC REPORT FOR

FRANKLIN TECH PARK BLK C LOT 1

24 HOUR S. C. S. HYDROGRAPH

BASIN IDENTIFICATION      WATER QUALITY TO POND IN BLK C  
BASIN DISCHARGES INTO      PROPOSED PIPE TO AMITY DITCH

BASIN AREA                =      132.39   ACRES  
BASIN CURVE NUMBER      =      89.30  
24-HOUR PRECIPITATION =      1.30   INCHES  
24-HOUR RUNOFF           =      0.50   INCHES  
AVERAGE BASIN SLOPE    =      0.74   %  
HYDRAULIC LENGTH        =      2,300.00   FEET  
BASIN LAG , (Tc)          =      0.30   HOURS ,      0.50   HOURS  
UNITPEAK COEFFICIENT    =      484.00  
RAINFALL DISTRIBUTION =   TYPE II

89.3 USED FOR  
WATER QUALITY  
DESIGN

HYDROGRAPH RUNOFF VALUES  
~~1~~ YEAR STORM FREQUENCY

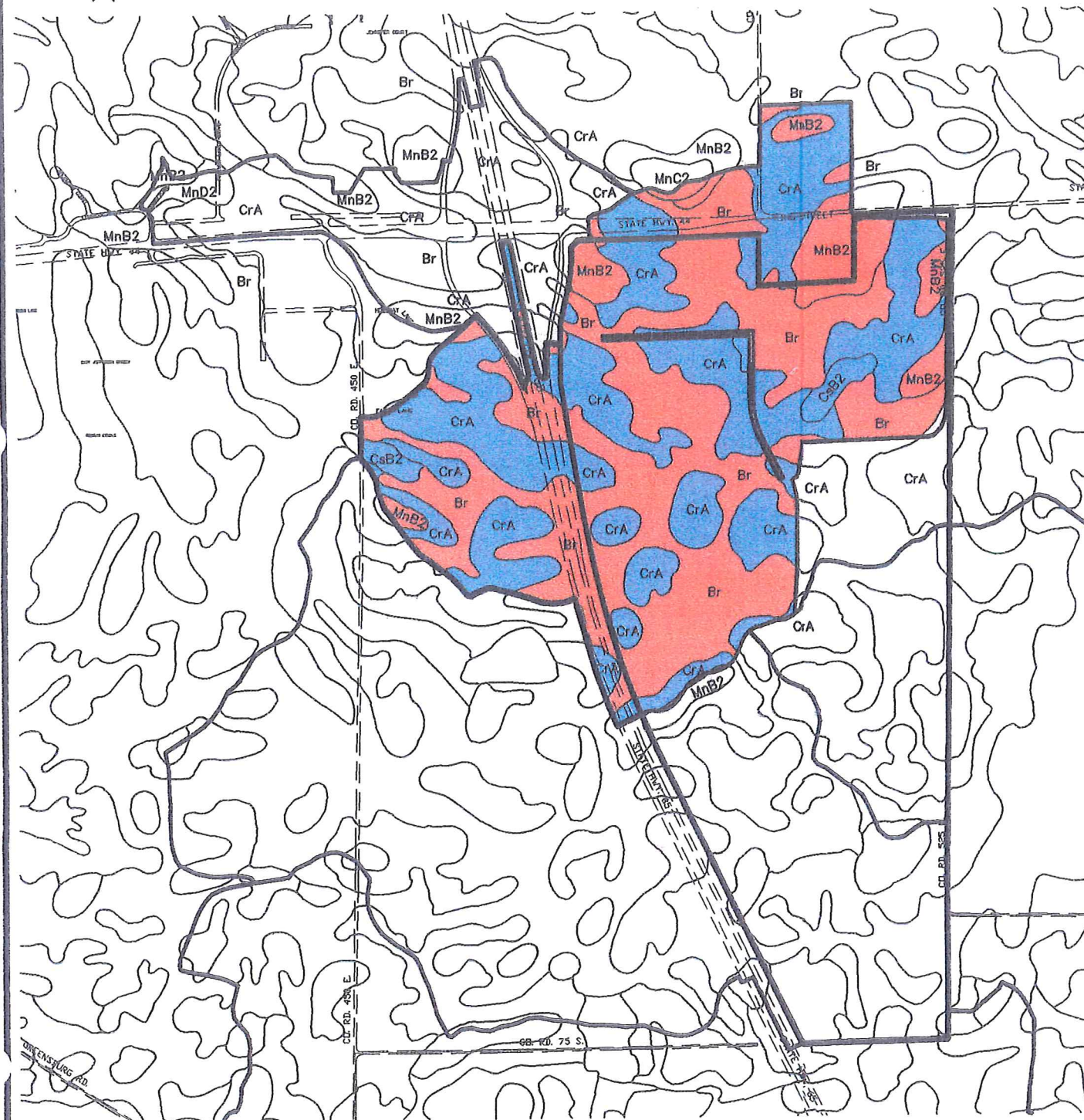
TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
9.67	0.0	9.75	0.0	9.83	0.0	9.92	0.0
10.00	0.0	10.08	0.0	10.17	0.0	10.25	0.0
10.33	0.0	10.42	0.0	10.50	0.0	10.58	0.1
10.67	0.1	10.75	0.2	10.83	0.3	10.92	0.4
11.00	0.5	11.08	0.6	11.17	0.8	11.25	0.9
11.33	1.1	11.42	1.4	11.50	1.6	11.58	2.0
11.67	2.7	11.75	4.3	11.83	7.1	11.92	12.3
12.00	21.2	12.08	33.7	12.17	46.1	12.25	52.4
12.33	50.7	12.42	43.9	12.50	35.5	12.58	28.2
12.67	22.9	12.75	19.0	12.83	16.1	12.92	14.0
13.00	12.4	13.08	11.1	13.17	10.1	13.25	9.2
13.33	8.5	13.42	7.9	13.50	7.3	13.58	6.9
13.67	6.5	13.75	6.2	13.83	5.8	13.92	5.6
14.00	5.3	14.08	5.1	14.17	4.9	14.25	4.7
14.33	4.6	14.42	4.4	14.50	4.3	14.58	4.1
14.67	4.0	14.75	3.8	14.83	3.7	14.92	3.5
15.00	3.4	15.08	3.4	15.17	3.3	15.25	3.3
15.33	3.3	15.42	3.2	15.50	3.2	15.58	3.1
15.67	3.0	15.75	3.0	15.83	2.9	15.92	2.9
16.00	2.8	16.08	2.8	16.17	2.8	16.25	2.8
16.33	2.8	16.42	2.8	16.50	2.8	16.58	2.8
16.67	2.8	16.75	2.8	16.83	2.7	16.92	2.6
17.00	2.5	17.08	2.5	17.17	2.4	17.25	2.4
17.33	2.4	17.42	2.4	17.50	2.4	17.58	2.4
17.67	2.4	17.75	2.4	17.83	2.4	17.92	2.4

FRANKLIN TECH PARK  
TOTAL POST DEVELOPMENT AREA  
TO POND IN BLOCK C, LOT 1

SCALE: 1" = 1000'

SOIL GROUP B

SOIL GROUP C



TOTAL POST- DEV AREA TO POND

IN BLK C LOT 1

SOIL NAME	SOIL GROUP	AREA
See Attached Sheet		

Watershed area = 205.08 acres

Watershed description = BLOCKS A, B & C DEVELOPED

Determination of CN Number:

SOIL GROUP	AREA	CN	

CN = \* 73.1 See Next Sheet for Composit

Watershed Slope =  $(738 - 717) \div 3200' = 0.66\%$

Hydraulic Length = 3200 c = 0.5

From attached Nomograph,  $T_c =$  41 min.

Basin Lag =  $0.6 T_c = 0.6 (41) + 60 =$  141 hours



## WEIGHTED CN DETERMINATION

TOTAL AREA TO POND IN BLOCK C

WITH ALL OF BLOCK "C" DEVELOPED AND BLOCK "B" AND  
COMMERCIAL ZONED AREA DEVELOPED (BLOCK A)

## I. OFFSITE WEST (See Page )

$$\text{Group B} = 27.69 \times 61 = 1,689$$

$$\text{Group C} = 23.50 \times 74 = 1,739$$

## II. UPSTREAM OFFSITE NORTH (See Page ) =

$$\text{Group B} = 11.79 \times 61 = 719$$

$$\text{Group C} = 15.27 \times 74 = 1,130$$

## III. BLOCKS A, B &amp; C

$$\text{Group B} = 24.58 \times 89 = 2,188$$

$$\text{Group C} = 31.03 \times 92 = 2,855$$

$$(2,188 + 2,855) / (24.58 + 31.03) = 90.68$$

AVERAGE  
ASSUMED CN FOR  
DEVELOPED LOTS

IV. ONSITE WATERSHED SOUTH OF BLOCK A AND WEST  
OF BARTRAM PARKWAY

$$\text{Group B} = 46.02 \times 61 = 2,807$$

$$\text{Group C} = 25.2 \times 74 = 1,865$$

$$\text{TOTALS } 205.08 \text{ Ac } 14,992$$

$$\text{CN} = 14,992 / 205.08 = 73.1$$

HYDROLOGIC REPORT FOR  
  
FRANKLIN TECH PARK BLK C LOT 1  
  
24 HOUR S. C. S. HYDROGRAPH

BASIN IDENTIFICATION	TOTAL AREA TO POND IN BLOCK C		
BASIN DISCHARGES INTO	POND IN BLOCK C		
BASIN AREA	=	205.08	ACRES
BASIN CURVE NUMBER	=	73.10	
24-HOUR PRECIPITATION	=	4.30	INCHES
24-HOUR RUNOFF	=	1.75	INCHES
AVERAGE BASIN SLOPE	=	0.66	%
HYDRAULIC LENGTH	=	3,200.00	FEET
BASIN LAG , (Tc)	=	0.41	HOURS ,      0.68    HOURS
UNITPEAK COEFFICIENT	=	484.00	
RAINFALL DISTRIBUTION	=	TYPE II	

HYDROGRAPH RUNOFF VALUES  
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
9.33	0.0	9.42	0.0	9.50	0.0	9.58	0.0
9.67	0.0	9.75	0.0	9.83	0.0	9.92	0.0
10.00	0.0	10.08	0.0	10.17	0.1	10.25	0.2
10.33	0.3	10.42	0.4	10.50	0.6	10.58	0.9
10.67	1.2	10.75	1.5	10.83	1.9	10.92	2.4
11.00	2.9	11.08	3.6	11.17	4.3	11.25	5.1
11.33	6.0	11.42	7.1	11.50	8.2	11.58	9.8
11.67	12.3	11.75	16.8	11.83	24.9	11.92	39.6
12.00	64.2	12.08	104.4	12.17	153.6	12.25	200.0
12.33	229.2	12.42	236.5	12.50	225.5	12.58	202.5
12.67	173.8	12.75	146.0	12.83	123.8	12.92	106.7
13.00	93.0	13.08	81.9	13.17	72.8	13.25	65.3
13.33	59.0	13.42	53.7	13.50	49.2	13.58	45.4
13.67	42.1	13.75	39.3	13.83	36.9	13.92	34.6
14.00	32.6	14.08	30.8	14.17	29.2	14.25	27.8
14.33	26.6	14.42	25.6	14.50	24.6	14.58	23.7
14.67	22.9	14.75	22.0	14.83	21.2	14.92	20.4
15.00	19.7	15.08	19.1	15.17	18.6	15.25	18.2
15.33	18.0	15.42	17.7	15.50	17.5	15.58	17.2
15.67	16.9	15.75	16.5	15.83	16.2	15.92	15.8
16.00	15.6	16.08	15.4	16.17	15.3	16.25	15.2
16.33	15.1	16.42	15.1	16.50	15.1	16.58	15.0
16.67	15.0	16.75	14.9	16.83	14.7	16.92	14.4
17.00	14.1	17.08	13.8	17.17	13.5	17.25	13.3
17.33	13.1	17.42	13.0	17.50	12.9	17.58	12.8