

# TECHNICAL INFORMATION REPORT

FOR

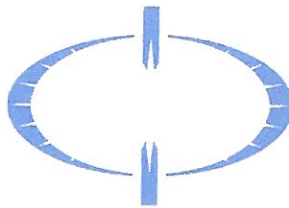
Proposed Office/Warehouse

Linville Way  
Franklin, Indiana 46131

PREPARED BY

RICHARD R. HOOVER, P.E.  
HOOVER ENGINEERING, LLC

September 14, 2017



*Richard R. Hoover*

09/14/17

### **LOCATION AND EXISTING DEVELOPMENT:**

The site is located on the north side of Commerce Drive where Commerce Drive turns south. The site will be located at the northwest corner of Commerce Drive and a proposed street called Linville Way. The site is currently vacant and formerly a farm field. The site is approximately 5.074 acres and has a zoning designation of (light Industrial). The site is within an unshaded Zone X and drains general from northeast to southwest towards Commerce Drive. There are existing ditches and culverts along Commerce Drive.

### **PROPOSED DEVELOPMENT:**

The proposed development entails the construction of a 29,700 square-foot Office/Warehouse facility that will house Direct Conveyors. The current proposed development will entail the construction of 67 parking spaces and 3 truck docks. In the future, an expansion may be necessary, so the calculations for detention take into account that expansion. The water quality calculations are based solely upon the current development.

The proposed runoff will sheet flow across the parking and dock areas to swales that will convey runoff to a detention facility located on the west side of the site. Runoff from the 100-Year storm event will be detained and released at the existing 10-Year event rate.

### **RUNOFF CALCULATIONS:**

#### Existing

DA = 5.074 Acres  
Imp = 0.000 Acres (@ C=0.90)  
Per = 5.074 Acres (@ C=0.25)  
C-Factor = 0.25  
 $t_c$  = 30 minutes  
 $i_{10}$  = 3.09 in/hr  
 $Q_{10}$  = 4.70 cfs

#### Proposed

DA = 5.074 Acres  
Imp = 2.747 Acres (@ C=0.90)  
Per = 2.327 Acres (@ C=0.30)  
C-Factor = 0.62  
 $t_c$  = 30 minutes

From the Ration Storage Worksheet, the critical storm is 0.50 hours

Storage Elevation is 752.16  
Detention Volume Required = 0.3906 Ac-Ft.  
100-Year Elevation = 752.16

**PROPOSED WATER QUALITY:**

Water quality treatment will be provided for the present construction design and will be based upon 1" of rainfall on the impervious surfaces.

Impervious Surface = 68,211 sft

(68,211 sft)(1")

Volume Required =  $\frac{(68,211 \text{ sft})(1")}{12"/\text{ft}}$  = 5684 cft = 0.1305 Ac-Ft

Volume Provided = 1305 Ac-Ft @ 752.83

**CONCLUSION:**

No adverse effects are anticipated from this design.



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MERCE DRIVE

HOLEY MOLEY SAYS

"DIG SAFELY"

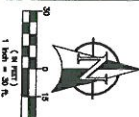


**811**  
Call before you dig.  
FOR MORE STATE LAW 808-1-1-88,  
IT IS AGAINST THE LAW TO EXCAVATE  
WITHOUT NOTIFYING THE UTILITY  
LOCATING SERVICE THE DAY BEFORE  
YOUR EXCAVATION WORK.

#### UTILITY STATEMENT

The underground utility shown have been located from field survey and/or other available data. The surveyor makes no guarantee that the utility is shown in the correct location, depth, or character. The surveyor is not responsible for any damage to property or persons caused by the use of the information provided. The surveyor has not physically located the underground utilities.

DESCRIPTION		DESCRIPTION	
1	COILING LUMINAL	1	WATER VALVE
2	COILING SINK	2	WET PUMPT
3	COILING TUB	3	WATER METER
4	THROAT COILING LIFT	4	WATER METER
5	SEWING ROOM	5	CLANK SET
6	SEWING ROOM	6	CAMP LIFT
7	SEWING ROOM	7	BLANK
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[illegible]

#### REVISION RECORD

DATE: 09/14/17

DOWN BY: RRH

CHKD. BY: RRH

SCALE:	1"=30'
DATE:	09/14/17

**Hoover Engineering**  
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Bargersville, Indiana 46106  
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[www.hooverengineering.com](http://www.hooverengineering.com)

**PROPOSED WAREHOUSE**  
LINVILLE WAY AND COMMERCE PKY  
Franklin, Indiana 46131

## GRADING PLAN

PROJECT NUMBER  
17444

III-11

## DESIGN PHASE CONSTRUCTION

PLAN NUMBER

3.0.0



## Required Storage by the Rational Method

Hoover Project No. 17-111  
 Project Direct Conveyors  
 Location Linville Way Franklin, IN  
 Description Office/Warehouse Facility

By rrh  
 Date 09/14/17  
 Checked  
 Date

Design Return Period: 100-YR  
 Release Rate Return Period: 10-YR

A = 5.07 acres  
 Undeveloped  $t_c$  = 30.00 minutes  
 Undeveloped  $i$  = 3.09 in/hr  
 Undeveloped C = 0.30  
 Undeveloped Q = 4.70 cfs  
 Developed C = 0.62

A = Drainage area (acres)  
 $t_c$  = Time of concentration (min)  
 $i$  = Rainfall intensity (in/hr)  
 C = Rational runoff coefficient  
 Q = Runoff rate (cfs)  
 $Q = CiA$   
 $i = \text{FORMULA}$

Storm Duration $t_d$ (hours)	Rainfall Intensity $i_d$ (in/hr)	Inflow Rate $I(t_d)$ (cfs)	Outflow Rate O (cfs)	Storage Rate $I(t_d) - O$ (cfs)	Required Storage $[I(t_d) - O](t_d/12.1)$ (acre-ft)
0.17	7.77	24.44	4.70	19.74	0.2719
0.25	6.53	20.54	4.70	15.84	0.3273
0.50	4.50	14.16	4.70	9.45	0.3906
1.00	2.88	9.06	4.70	4.36	0.3600
2.00	1.75	5.51	4.70	0.80	0.1325
3.00	1.29	4.06	4.70	-0.65	-0.1600
4.00	1.11	3.49	4.70	-1.21	-0.4006
5.00	0.93	2.93	4.70	-1.78	-0.7347
6.00	0.75	2.36	4.70	-2.34	-1.1624
7.00	0.70	2.20	4.70	-2.50	-1.4471
8.00	0.64	2.01	4.70	-2.69	-1.7787
9.00	0.59	1.86	4.70	-2.85	-2.1180
10.00	0.54	1.70	4.70	-3.00	-2.4833
11.00	0.48	1.51	4.70	-3.19	-2.9033
12.00	0.43	1.35	4.70	-3.35	-3.3232
18.00	0.34	1.07	4.70	-3.63	-5.4059
24.00	0.25	0.79	4.70	-3.92	-7.7695

## Stage-Storage Computations

Hoover Project Number  
Project Name  
Location  
Description

17-111  
Direct Conveyors  
Linville Way Franklin, IN  
Proposed Detention Facility

By RRH  
Date 09/14/17  
Checked  
Date

$V_i$  = Incremental volume (acre-ft)

$h$  = Elevation difference (ft)

$A$  = Surface area (acres)

$h$  = Elevation<sub>2</sub> - Elevation<sub>1</sub>

Average Area =  $(A_1 + A_2 + (A_1 A_2)^{0.5})/3$

Conic Volume:  $V_i = h[(A_1 + A_2 + (A_1 A_2)^{0.5})/3]$

Elevation	Area	Average Area	h	$V_i$	Total Volume
(ft)	(acres)	(acres)	(ft)	(acre-ft)	(acre-ft)
749.47	0.0000				0.0000
		0.1050	1.5300	0.1606	
751.00	0.3150				0.1606
		0.1331	0.6600	0.0879	
751.66	0.0152				0.2485
		0.1786	0.3400	0.0607	
752.00	0.4390				0.3093
		0.4953	1.0000	0.4953	
753.00	0.5538				0.8045
		0.6109	1.0000	0.6109	
754.00	0.6698				1.4154
		0.2233	-754.0000	-168.3431	
					-166.9276
		0.0000	0.0000	0.0000	
					-166.9276
		0.0000	0.0000	0.0000	
					-166.9276
		0.0000	0.0000	0.0000	
					-166.9276

## Orifice Flow Computations

Hoover Project No. 17-111  
 Project Name Direct Conveyors  
 Location Linville Way Franklin, IN  
 Description 10 - 1/16" Orifice

By RRH  
 Date 09/14/17  
 Checked  
 Date

$C_d = 0.70$   
 $D = 0.8385$  ft  
 $A = 0.5522$  ft<sup>2</sup>  
 Invert Elevation = 749.47 ft  
 Orifice Center = 749.89 ft  
 32.2

Elevation (ft)	h (ft)	Q (cfs)
749.47	-0.42	0.00
750.00	0.11	1.03
750.50	0.61	2.42
751.00	1.11	3.27
751.50	1.61	3.94
751.75	1.86	4.23
752.00	2.11	4.51
752.16	2.27	4.67
753.00	3.11	5.47
753.50	3.61	5.89
754.00	4.11	6.29
	-749.89	#NUM!
	-749.89	#NUM!

$C_d$  = Coefficient of orifice flow  
 $D$  = Orifice diameter (ft)  
 $A$  = Flow area (ft<sup>2</sup>)  
 $h$  = Head (ft)  
 $Q$  = Flow rate (cfs)  
 $g = 32.2$  ft/s<sup>2</sup>

$$A = \pi(D/2)^2$$

$$\text{Orifice Center} = \text{Invert Elevation} + (D/2)$$

$$h = \text{Elevation} - \text{Orifice Center}$$

$$Q = C_d A (2gh)^{0.5}$$

$C_d$  source:

## Stage-Storage Computations

Hoover Project Number 17-111  
 Project Name Direct Conveyors  
 Location Linville Way Franklin, IN  
 Description Proposed WQU Facility

By RRH  
 Date 09/14/17  
 Checked  
 Date

$V_i$  = Incremental volume (acre-ft)

$h$  = Elevation difference (ft)

$A$  = Surface area (acres)

$h$  = Elevation<sub>2</sub> - Elevation<sub>1</sub>

Average Area =  $(A_1 + A_2 + (A_1 A_2)^{0.5})/3$

Conic Volume:  $V_i = h[(A_1 + A_2 + (A_1 A_2)^{0.5})/3]$

Elevation	Area	Average Area	h	$V_i$	Total Volume
(ft)	(acres)	(acres)	(ft)	(acre-ft)	(acre-ft)
750.04	0.0000				0.0000
		0.0084	0.9600	0.0080	
751.00	0.0251				0.0080
		0.0446	1.0000	0.0446	
752.00	0.0676				0.0527
		0.0934	0.9000	0.0841	
752.90	0.1219				0.1367
		0.1300	0.1000	0.0130	
753.00	0.1383				0.1497
		0.0461	-753.0000	-34.7133	
					-34.5636
		0.0000	0.0000	0.0000	
					-34.5636
		0.0000	0.0000	0.0000	
					-34.5636
		0.0000	0.0000	0.0000	
					-34.5636
		0.0000	0.0000	0.0000	
					-34.5636