EAST BASIN MODIFICATIONS ON LOT 2 OF SCHNUCKS NORTH SUBDIVISION

SUPPLEMENTAL INFORMATION

to the

FINAL STORM DRAINAGE ANALYSIS

SCHNUCKS NORTH SUBDIVISION

As Approved March 17, 2016

Located on

US 41 North at Boonville-New Harmony Road

Evansville, Indiana

BLA Project No.: 107-0141-HPD

Prepared for:

The Desco Group

25 N. Brentwood Blvd.

St. Louis, MO 63105

APPROVED

JUN 07 2016

VANDERBURGH COUNTY DRAINAGE BOARD

By:

LOCHMUELLER GROUP

6200 Vogel Road, Evansville, Indiana 47715

PHONE: 812.479.6200 •TOLL FREE: 800.423.7411

April 28, 2016

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE

4/29/16

13.04.085 Request by applicant for plan review and approval.

A. All requests for drainage plan approval shall be made by the applicant to the drainage board through the county surveyor's office by the presentation to the surveyor of the drainage plan and the supporting data, all in duplicate, by the close of the business day two full weeks prior to the meeting at which approval of the drainage plan shall be sought. **Provided on 4/29/2016**

C. Included with the Drainage Plan shall be the following information regarding the applicant that shall be provided on FORM 801. **Not Provided-Provided**

1. For an individual(s), legal name, current mailing address, email address, name of project and general location of the project. The application must be signed by the individual(s) making such application.

2. For a partnership, corporation or other private entity the legal name of the partnership, corporation or other private entity, mailing address, email address, name of project and general location of the project. For a partnership, the application must be signed by the managing or senior partner or if none exists by all partners. For a Limited Liability Company (LLC), the application must be signed by the manager, or senior member or if one does not exist, by all members. For a corporation, the application must be signed by;

i) the President or Vice-President of the corporation or

ii) by a person whose authority has been delegated to sign such application. If the signature is by a person with a delegation of authority, a copy of such delegation must be included with the application.

D. In all cases the person signing the application will affirm that;

i) the information provided on the application FORM 801 is true and correct and

ii) that the applicant is committing with their signature that an as built plan or record drawing or certification statement will be provided upon completion of the project and that failure to provide an as built plan or record drawing or certification could result in fines under Section 13.04.110 and/or declaring the applicant ineligible for future drainage plan approvals for any project within the County Drainage Board's jurisdiction until such time as an as built drawing or certification is submitted. The County Surveyor or other Technical Advisors to the Board will inform the Drainage Board of any applicants that are not in compliance with submittal of an as built drawing or certification statement prior to any action being taken against such applicant.

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. **Submitted on 4/29/2016 Revisions submitted 5/19/2016**

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.

D. The submitted data shall be gathered, analyzed, assembled into the drainage plan and supporting submittals; and shall be certified in accordance with 864 IAC 1.1-7-3 Application of seal; signature, 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. **Certified by Professional Engineer**

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. **No Offsite facilities**

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. **The Desco Group, 25 North Brentwood Blvd, St. Louis, MO 63105**

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.

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. **All facilities already constructed- this is a revision to an existing basin**

13.04.170 Final drainage plan layout (Includes information from preliminary).

A. In addition to the requirements listed for a preliminary drainage plan, the final drainage plan shall depict the following:

1. The extent and area of each watershed affecting the design of the drainage facilities for the project; The extent and area of each watershed tributary to the drainage facilities within the project; The existing man-made and natural waterways, ponds, basins, pipes, culverts, and other drainage facilities or features within or affecting the project **Revision of basin-watersheds have not changed**

2. The final layout and design of proposed storm sewers, their inlet and outfall locations and elevations, the receiving streams or channels; all with the basis of their design; **Structure 100 and 101 as well as pipe added-no design information provided Provided**

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 change from previously approved plan**

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 **No change from previously approved plan**

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; **East basin to be altered**

7. The location and percentage of impervious surfaces existing and expected to be constructed; **No change from previously approved plan**

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; **Revised stage storage calculations provided.**

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; **Not provided-minor change from approved plan**

11. The location of any applicable "impacted drainage areas" or other areas designated to remain totally undisturbed, natural, or for common and/or recreational use. **Entire site within impacted drainage area and requires 100 year storm retention over and above 10 year undeveloped**

B. Protection of Structures From One Hundred Year Flooding. All structures to be occupied as residences or businesses shall have finished floor elevations two feet above the high water calculated to occur during a one hundred (100) year return period storm for the subject **building** site; and the required floor elevations shall be depicted on the plan drawings for such affected sites.

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; **None mentioned**

B. The analysis procedure used to identify and evaluate the drainage problems associated with the project; **Rational-10/100**

C. Any assumptions or special conditions associated with the use of the procedures, especially hydrologic or hydraulic methods, used to identify and evaluate drainage problems associated with the project; **Provided**

D. The proposed design of the drainage control system; **No change from previously approved plan**

E. The results of the analysis of the proposed drainage control system showing that it does solve the project's identified and anticipated drainage problems;

F. Descriptive data sufficient to support the feasibility of the drainage plan including calculations of the predevelopment and post development runoff rates using rainfall data supplied herein. A detailed description, depiction, and log of all hydrologic and hydraulic calculations or modeling, and the results obtained thereby; together with the input and output files for all computer runs; **Provided**

G. Maps showing individual drainage areas within the project subdivided for use in the analysis thereof. **Revision of original plan**

13.04.180 Typical cross sections of the drainage facilities.
One or more typical cross sections must be provided for each existing and proposed channel, basin, pond, or other open drainage facility, which cross sections:

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

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

SINGLE North-South cross section needed that shows the following: Current cross section, alterations to north end (cut out of bottom, wall and filled material), pool elevation at 100 year storm (445.03) and elevation of emergency spillway (445.5), location of 20' drainage easement as it exists on north end and proposed drainage easement line **Provided**

13.04.440 General detention/retention basin design requirements.

The following design principles shall be observed for detention and retention basins: (CODE SECTIONS AS APPLY TO DRY BASINS ONLY)

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. **Form 800 basin will empty within allotted time frame.**

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. **Approved basin did not meet code and was granted variance**

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.

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. **Will not meet as the proposal is for wall on north end**

J. Safety Ledges and/or Fencing of Wet Basins. Safety fencing surrounding the basin, and/or shallow safety ledges shall be provided if deemed necessary by the design engineer or the board. **Currently a fence surrounds basin-fence to be moved and reinstalled**

K. Outlet Controls to Operate Automatically. Outlet control structures shall be designed to operate as simply as possible, and shall require little or no maintenance for proper operation. **Dry Basin**

M. Emergency Spillway Requirements.

1. An emergency overflow spillway shall be provided for the release of storm runoffs exceeding the designed maximum detention volume, or all overflow volumes in emergency conditions, should the normal discharge devices become totally or partially inoperative.

2. A minimum freeboard of one-half foot above the calculated elevation of the design storm detention high water level to the elevation of the spillway flowline peak is required as a safety factor for all basins. **Actual basin design is 0.47' which should be allowed**

N. Automatically Operating Emergency Spillway Required. The emergency overflow spillway shall be designed so that it operates openly, automatically, does not require manual attention, and will pass all the one hundred (100) year return period storm flow with a one-half foot vertical minimum above the one hundred (100) year return storm flow to the lowest dirt elevation in the surrounding earthwork. **See above**

P. Dry Basin Cover and Maintenance. Dry basins shall be planted and maintained in vegetative cover equal to that of residential lawns. **Current basin is stable and being maintained**

Q. Side Slopes to Remain Stable. All side slopes of a basin shall be constructed stable and shall be maintained in a stable condition by the same criteria as specified herein for open channels **Current basin slopes are stable and being maintained**

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. **Appears to be sufficient room to maintain**

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. **The letter requests existing drainage easement to be revised, however, no proposed revised easement area is shown. This needs to be provided, though actual change to the easement will need to go through normal vacation procedures. Provided**

An additional inlet and pipe are shown to be added. This needs to be shown on a proposed easement, which will need to be recorded. Recording of this easement will be a condition of approval and will be required to be completed prior to any sign off on the development of the lot. Provided though additional area will be required-conditional approval will require easement to be recorded prior to modifications to lot 2

U. Maintenance Report Required for Basin. **Previously provided**

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.

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. **Provided but will require a revised drawing upon completion**

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. **Basin has liner installed and the plans do not show this being modified**

LOCHMUELLER GROUP

6200 Vogel Road, Evansville, Indiana 47715
PHONE: 812.479.6200 •TOLL FREE: 800.423.7411

May 17, 2016

Mr. Jeffrey Mueller
Vanderburgh County Surveyor
Room 325 Civic Center Complex
Evansville, IN 47708

RE: Schnucks North East Basin Revisions
Lochgroup No. 107-0141-HPD

Dear Jeff,

Following are responses to your email review of the above referenced project dated May 5, 2016 in **green**:

13.04.085 Request by applicant for plan review and approval.

A. All requests for drainage plan approval shall be made by the applicant to the drainage board through the county surveyor's office by the presentation to the surveyor of the drainage plan and the supporting data, all in duplicate, by the close of the business day two full weeks prior to the meeting at which approval of the drainage plan shall be sought. **Provided on 4/29/2016**

C. Included with the Drainage Plan shall be the following information regarding the applicant that shall be provided on FORM 801. **Not Provided - Copy attached**

13.04.170 Final drainage plan layout (Includes information from preliminary).

A. In addition to the requirements listed for a preliminary drainage plan, the final drainage plan shall depict the following:

1. The extent and area of each watershed affecting the design of the drainage facilities for the project; The extent and area of each watershed tributary to the drainage facilities within the project; The existing man-made and natural waterways, ponds, basins, pipes, culverts, and other drainage facilities or features within or affecting the project **Revision of basin-watersheds have not changed**

2. The final layout and design of proposed storm sewers, their inlet and outfall locations and elevations, the receiving streams or channels; all with the basis of their design; **Structure 100 and 101 as well as pipe added-no design information provided – see attached Storm Sewer Pipe Sizing**

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SURVEYOR'S OFFICE
5/19/16 BA

13.04.180 Typical cross sections of the drainage facilities.
One or more typical cross sections must be provided for each existing and proposed channel, basin, pond, or other open drainage facility, which cross sections:

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

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

SINGLE North-South cross section needed that shows the following: Current cross section, alterations to north end (cut out of bottom, wall and filled material), pool elevation at 100 year storm (445.03) and elevation of emergency spillway (445.5), location of 20' drainage easement as it exists on north end and proposed drainage easement line **- see attached Appendix A-3 Lots 2 Wall Plan & Section.**

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. **Appears to be sufficient room to maintain**

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. **The letter requests existing drainage easement to be revised, however, no proposed revised easement area is shown. This needs to be provided, though actual change to the easement will need to go through normal vacation procedures.**

An additional inlet and pipe are shown to be added. This needs to be shown on a proposed easement, which will need to be recorded. Recording of this easement will be a condition of approval and will be required to be completed prior to any sign off on the development of the lot.

- see attached Vacation of Drainage Easement Description with Exhibit Drawing and Proposed Drainage Easement with Exhibit Drawing.

Respectfully submitted,

LOCHMUELLER GROUP

James A. Farny, P.E., P.S.
Senior Project Engineer

jaf/tac

Enclosures as noted

cc: File

APPLICANT INFORMATION FORM 801

Project Name:	Schnucks North (Lot 2) East Basin Revisions
Approximate Location:	630 E Boonville-New Harmony Road
Applicant Name:	SM Properties Darmstadt, L.L.C.
Applicant is (check one)	☐Individual (s) ☒Partnership or legal LLC ☐Corporation
Applicant Address:	25 N Brentwood Blvd
City:	St Louis
State:	MO
Zip Code:	63105
Email:	kwildhaber@descogroup.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 _____ Daté 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.

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VANDERBURGH COUNTY
SURVEYOR'S OFFICE
5/19/16 CA

Signature of ~~Senior or Managing Partner~~ Manager By: [signature]

Printed Name Mark J. Schrunk, President of The DESCO Grp. Inc., Sole Manager of SM Properties Dornstadt, L.L.C.

Date 05/13/2016

If partnership does not have a Senior or Managing Partner than signatures of all partners

Signature _____ Date _____

Printed Name _____

Signature _____ Date _____

Printed Name _____

Signature _____ Date _____

Printed Name _____

Signature _____ Date _____

Printed Name _____

Signature _____ Date _____

Printed Name _____

For Corporation

I do hereby certify that the Information contained on this application is to true and correct. I 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 the corporation ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

Signature _____ Date _____

Printed Name _____

Title _____ (note if not a vice president or above of applicant company, than attached a Delegation of Authority)

STORM SEWER PIPE SIZING

Schnucks North East Basin Modifications on Lot 2 - May 17, 2016

Addendum to Supplemental Information to the Final Storm Drainage Analysis Approved 3/1716

STRUCTURE NO. 102

Drainage Area = 0.27 acre

Q = cia

$$TC = .827\left[\frac{(N)(L)}{\sqrt{S}}\right]^{.467}$$

$$TC = .827\left[\frac{(.0.2)(100)}{\sqrt{.07}}\right]^{.467} = \cong 2 \text{ minutes} + 5 \text{ minute saturation time} = 7 \text{ minutes}$$

$$i_{25} = \frac{1.9533(25)^{.1747}}{(7/60+.522)^{1.6408}} = \frac{3.43}{.4792} = 7.15$$

c = (0.85)

Q = cia = (.85)(7.15)(.27) = 1.64 cfs

Capacity – 12" pipe @ 2% ≅ 5 cfs
Therefore okay

STRUCTURE NO. 101

Drainage Area = 0.33 acre

Q = cia

$$TC = .827\left[\frac{(N)(L)}{\sqrt{S}}\right]^{.467}$$

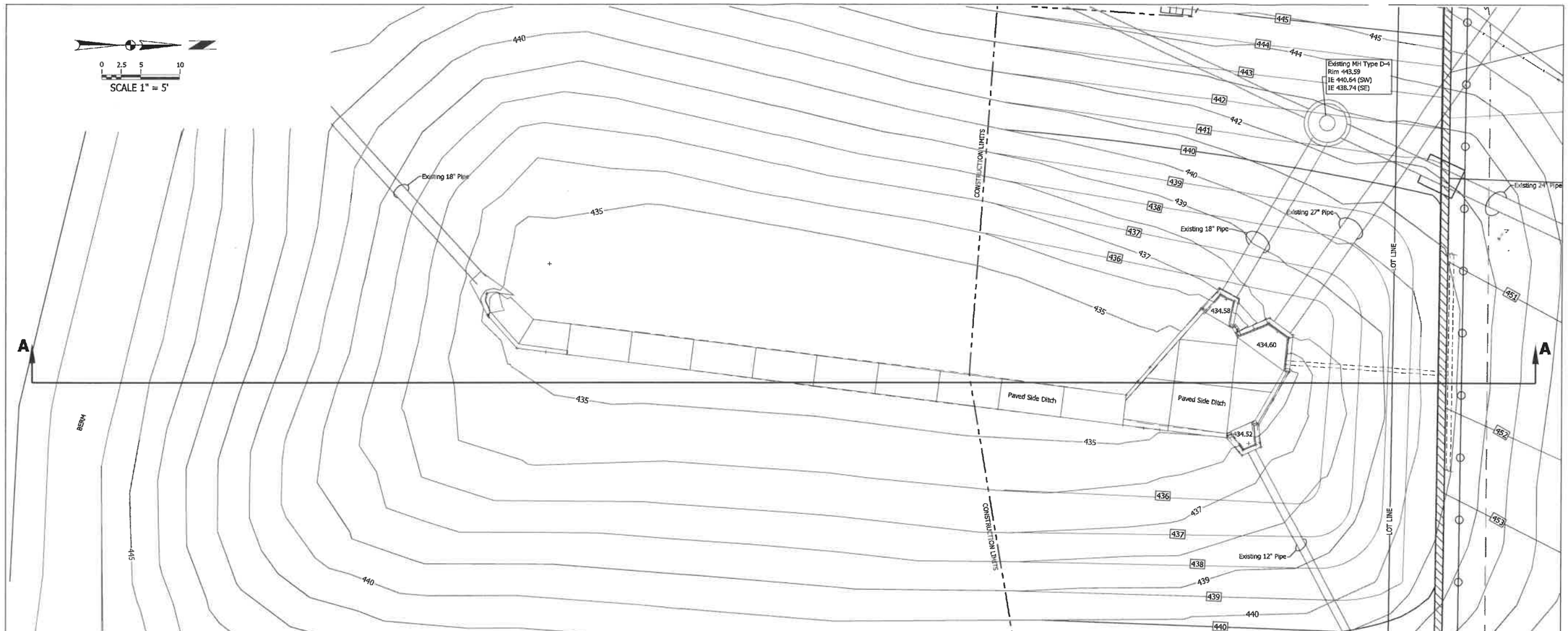
$$TC = .827\left[\frac{(.02)(150)}{\sqrt{.08}}\right]^{.467} = \cong 2.5 \text{ minutes} + 5 \text{ minute saturation time} = 7.5 \text{ minutes}$$

$$i_{25} = \frac{1.9533(25)^{.1747}}{(7.5/60+.522)^{1.6408}} = \frac{3.14}{.4895} = 6.41$$

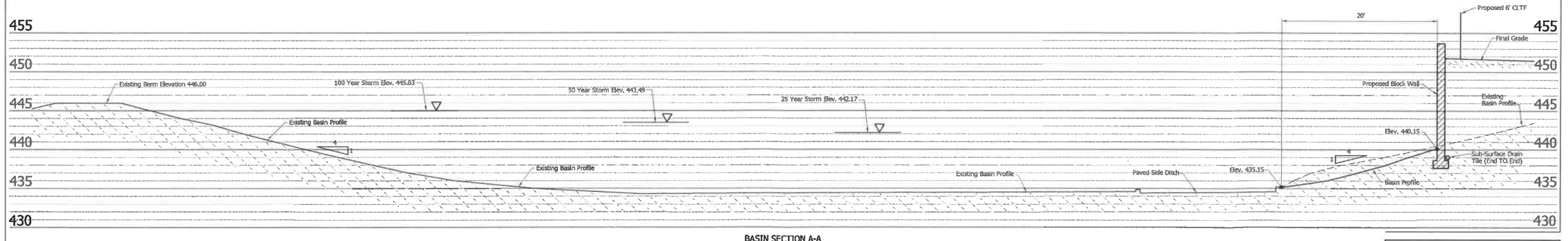
c = 0.65 (pavement & lawn)

Q = cia = (.65)(6.41)(.33) = 1.37 cfs

Capacity – 12" pipe @ 3.4% ≅ 7 cfs
Therefore okay



BASIN PLAN VIEW
SCALE: 1"=5'



BASIN SECTION A-A
SCALE: 1"=5'

LOCHMUELLER GROUP
6200 Vogel Road
Evansville, Indiana 47715
Phone: 812.479.6200
Toll Free: 800.423.7411

EAST BASIN MODIFICATIONS
FOR LOT 2 SCHNUCKS NORTH SUB
EVANSVILLE, INDIANA

SHEET TITLE:
LOT 2 WALL PLAN & SECTION

JAMES A. TARR REGISTERED No. PE60020434 STATE OF INDIANA PROFESSIONAL ENGINEER

HORIZ. SCALE AS SHOWN	LOCH. GROUP PROJ. 107-0141-HPD
VERT. SCALE AS SHOWN	PROJECT --
DRAWN BY DAG	DATE: 02/10/16
DESIGNED BY JAP	ISSUED: _/_/15
	SHEET NO.: C2.0

REVISIONS
NO. | DATE | DESCRIPTION

APPENDIX A-3
05/16/16

RECEIVED BY THE
VANDERBURGH COUNTY
SURVEYOR'S OFFICE
5/17/16 CA

Date: May 11, 2016, 11:17am User Name: AGriggert
File: S:\Projects\107-0141\DESIGN\3-HPD\LOT 2 WALLS_Pond Walk.dwg

DRAINAGE EASEMENT VACATION
LOCATED WITHIN LOT 2 OF SCHNUCKS NORTH SUBDIVISION

All that part of the drainage easement shown as 20.00 feet in width and being a part of the Southeast Quarter of Section 8, Township 5 South, Range 10 West, lying within Lot 2 of Schnucks North Subdivision, as per plat thereof, recorded in Plat Book T, page 171 in the office of the Recorder of Vanderburgh County, Indiana, more particularly described as follows:

BEGINNING at the southwest corner of said Lot 2; thence 12.00 feet along a curve to the left, concave to the west, said curve having a radius of 305.50 feet and a chord of 12.00 feet, bearing North 11 degrees 08 minutes 00 seconds East; thence 8.38 feet along a curve to the right, concave to the east, said curve having a radius of 94.50 feet and a chord of 8.38 feet bearing North 12 degrees 32 minutes 57 seconds East; thence South 89 degrees 19 minutes 51 seconds East 108.01 feet; thence South 00 degrees 18 minutes 47 seconds West 20.00 feet to a point on the south line of said Lot 2; thence North 89 degrees 19 minutes 51 seconds West 113.50 feet along the south line of said Lot 2 to the POINT OF BEGINNING.

Witness my hand and seal this 18th day of May, 2016.

James A. Farny, P.S.
Indiana Registration No. S80040051

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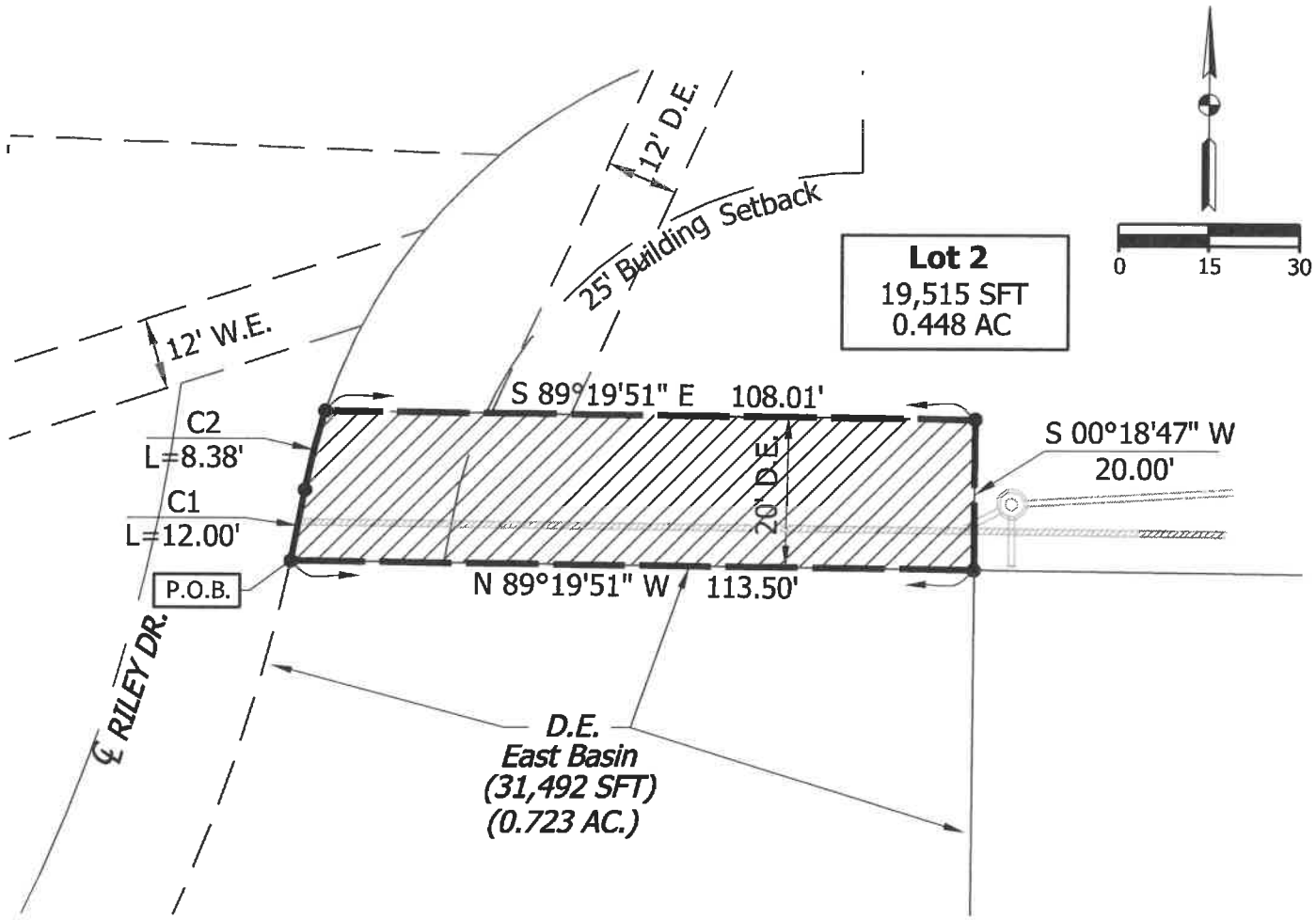
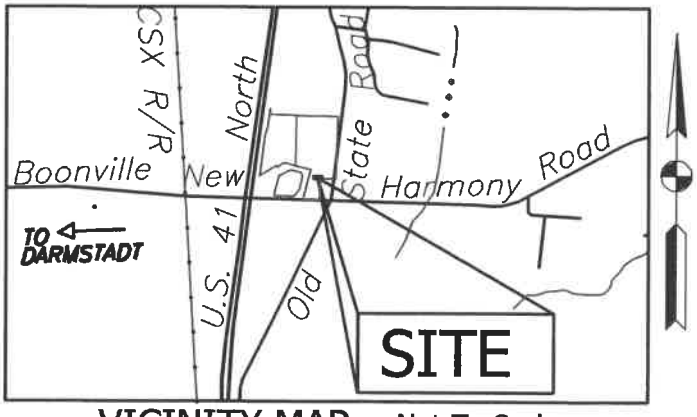
VANDERBURGH COUNTY
SURVEYOR'S OFFICE
5/19/16 CA



CURVE TABLE

NUMBER	DELTA ANGLE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD DIRECTION
C1	02°15'02"	305.50'	12.00'	12.00'	N11°08'00"E
C2	05°04'56"	94.50'	8.38'	8.38'	N12°32'57"E



VICINITY MAP Not To Scale

JAMES A. FARNY
REGISTERED
No. PE60020434
STATE OF
INDIANA
PROFESSIONAL ENGINEER

DRAINAGE EASEMENT VACATION

REVISION	NO.	DATE
ISSUED	0	

LOCHMUELLER GROUP
6200 Vogel Road Evansville, Indiana 47715
Phone: 812.479.6200 Toll Free: 800.423.7411

DRAWN BY:	DATE:
D.A.G.	05/18/16
CHECKED BY:	SCALE:
J.A.F.	1"=30'
LOCH. GROUP PROJECT NO.	
107-0141 HPD	

PROPOSED DRAINAGE EASEMENT
LOCATED WITHIN LOT 2 OF SCHNUCKS NORTH SUBDIVISION

A part of the Southeast Quarter of Section 8, Township 5 South, Range 10 West, lying within Lot 2 of Schnucks North Subdivision, as per plat thereof, recorded in Plat Book T, page 171 in the office of the Recorder of Vanderburgh County, Indiana, more particularly described as follows:

BEGINNING at the southwest corner of said Lot 2; thence 10.18 feet along a curve to the left, concave to the west, said curve having a radius of 305.50 feet and a chord of 10.17 feet, bearing North 11 degrees 18 minutes 16 seconds East; thence South 89 degrees 19 minutes 51 seconds East 24.31 feet; thence North 24 degrees 54 minutes 50 seconds East 16.45 feet to a point on an existing 12.00 foot drainage easement; thence South 89 degrees 19 minutes 51 seconds East 13.16 feet along said drainage easement; thence South 24 degrees 54 minutes 50 seconds West 16.45 feet; thence South 89 degrees 19 minutes 51 seconds East 74.09 feet; thence North 00 degrees 18 minutes 47 seconds East 5.00 feet; thence South 89 degrees 19 minutes 51 seconds East 10.00 feet; thence South 00 degree 18 minutes 47 seconds West 15.00 feet to a point on the south line of Lot 2; thence North 89 degrees 19 minutes 51 seconds West 123.50 feet along the south line of said Lot 2 to the POINT OF BEGINNING.

Witness my hand and seal this 18th day of May, 2016.

James A. Farny, P.S.
Indiana Registration No. S80040051

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VANDERBURGH COUNTY
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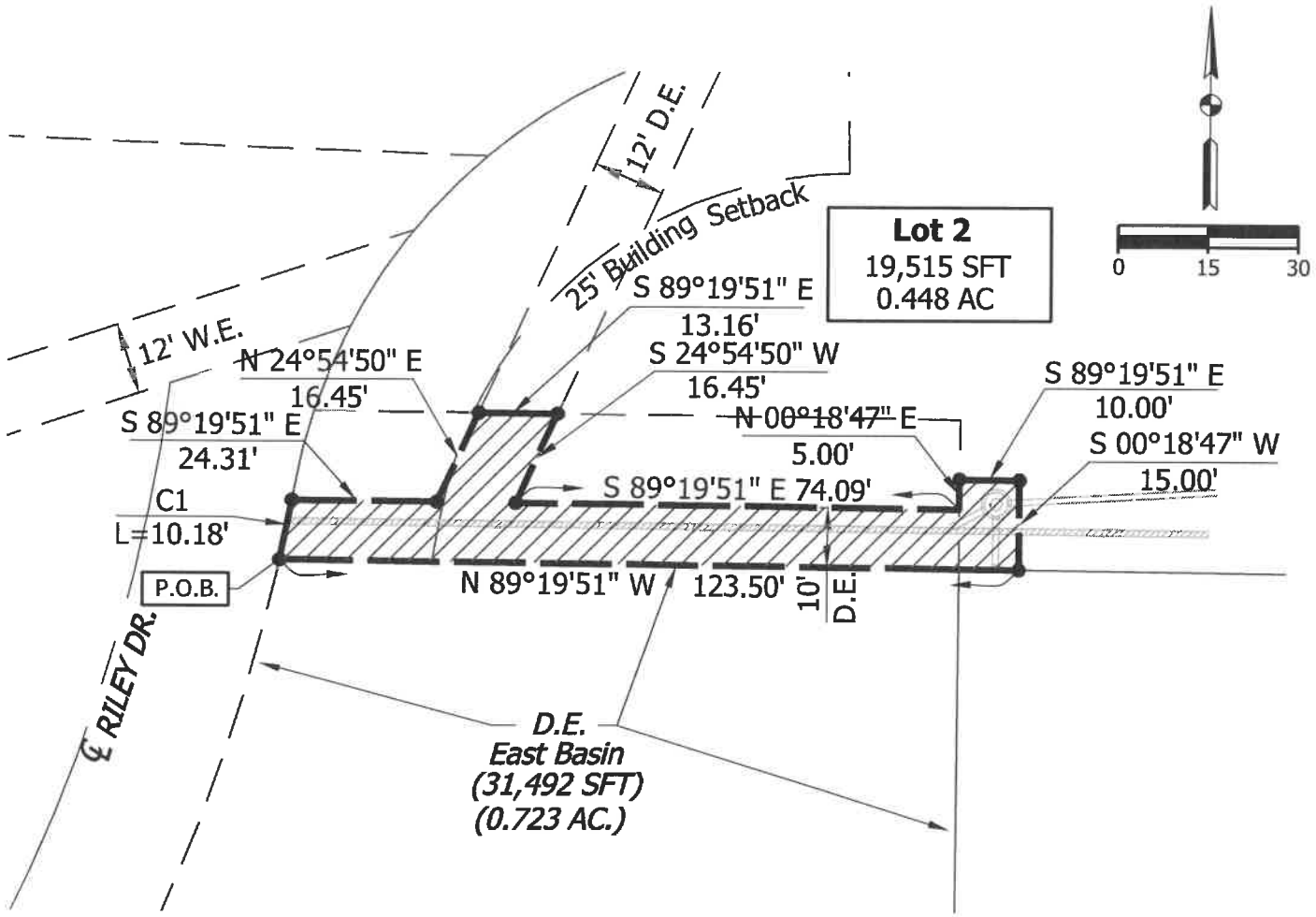
5/19/16 CA



CURVE TABLE					
NUMBER	DELTA ANGLE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD DIRECTION
C1	01°54'30"	305.50'	10.18'	10.17'	N11°18'16"E

VICINITY MAP Not To Scale

JAMES A. FARNY
REGISTERED
No. PE60020434
STATE OF
INDIANA
PROFESSIONAL ENGINEER

PROPOSED DRAINAGE EASEMENT

ISSUED	0	
REVISION	NO.	DATE

LOCHMUELLER GROUP
6200 Vogel Road Evansville, Indiana 47715
Phone: 812.479.6200 Toll Free: 800.423.7411

DRAWN BY:	DATE:
D.A.G.	05/18/16
CHECKED BY:	SCALE:
J.A.F.	1"=30'
LOCH. GROUP PROJECT NO.	
107-0141 HPD	

File: S:\Projects\107-0141\DESIGN\0-HPD LOT 2 WALL\2016 WALL DRAINAGE EASMENT.dwg

LOCHMUELLER GROUP

6200 Vogel Road, Evansville, Indiana 47715-4006

April 28, 2016

Mr. Jeffrey Mueller
Vanderburgh County Surveyor
Room 325 Civic Center Complex
Evansville, IN 47708

RE: East Basin Modifications
Schnucks North Subdivision – Lot 2
Project No. 107-0141-HPD

Dear Jeff,

Attached are the plans for a wall to be constructed on Lot 2 of the Schnucks North Subdivision project located at Boonville-New Harmony Road and Highway 41 North. We have prepared Supplemental Information to the Final Storm Drainage Analysis for the Schnucks North Subdivision that was approved March 17, 2016. Within this Supplemental Information Report are changes to the original approved report that are shown in **red**.

This wall will have no measurable impact with regards to the requirements set forth in the drainage ordinance. The attached report shows that there will still be adequate storage volume in the basin that is in excess of the 100 year requirement for both the Schnucks development and the adjoining Habermel property.

We will also request that the drainage easement be revised to reflect these plans changes.

The wall plan will be submitted to the Building Commissioner's office for their approval.

If you have any questions or revisions please let us know.

The Owner/Developer appreciates your consideration in this matter and asks that you place this request on the next Vanderburgh County Drainage Board agenda and recommend for approval.

Respectfully submitted,

James A. Farny, P.E., P.S.
Senior Project Engineer

jaf/tac

Attachments: Drainage Analysis – East Basin Modification on Lot 2 at Schnucks North Subdivision

cc: Bruce Edwards
File

RECEIVED BY THE
VANDERBURGH COUNTY
SURVEYOR'S OFFICE
4/29/16 CA

S:\Projects\107-0141\ADMN\A_Lot_2_Basin_Wall - HPD\SUPPLEMENTAL_TO_FINAL_DRAINAGE 4-28-16\JeffMuellerLtr_Basin_Wall_revisions_Lot 2(2).docx

Table of Contents

Introduction **1-4**
Method **4-6**
Results **6-7**
Summary **7-8**

Appendices

A-1 ..... **Lot 2 Wall Plan**
A-2 ..... **Lot 2 Wall Details**
B ..... **Basin Volume**

INTRODUCTION

This report is intended to address a request to build a retaining wall along the north end of the East Basin in the Schnucks North Subdivision. The information presented in this **Supplemental Information for the Final Drainage Report as approved March 17, 2015**, of the original basin, shows that the construction of this wall will have no impact on the basin as originally designed, except for a small increase in the ponding levels as originally reported. The basin has capacity remaining over and above the 100 year storage elevation.

Enclosed in this report are new drawings that show how this wall will be constructed. The report still has included additional storage capacity for the Habermel property and provides to said property a point of connection to the basin. Please refer to the highlighted changes on page 6 of this report. Also refer to Appendix E of the original report that has been revised. All other appendices remain unchanged from the previously approved report.

The proposed development of Schnucks North subdivision **(Appendix A-8a of the original approved report)** and Schnucks North Minor subdivision **(Appendix A-8b of the original approved report)** is to be constructed along the Highway 41 North Corridor at the northeast quadrant of the intersection of Boonville-New Harmony Road and US Highway 41 North in Evansville, Indiana. The westerly portion of this subject area is currently known as Grant Hills Commercial Park, as recorded in Plat Book R, page 89 **(Appendix A-9 of the original approved report)**, which received final drainage approval June 23, 2003. The easterly portion has never been platted and, consequently, has not received final drainage approval. However, the entire site, as it is depicted in **Appendix A-8a of the original approved report** received Preliminary Drainage approval on August 19, 2014.

Contained in the final drainage report for Grant Hills Commercial Park are drainage basin requirements (for the large Schnucks parcel) for the westerly outlots in this development which front on U.S. 41, the German American Bank (formerly the Bank of Evansville) lot and the lot east

of German American Bank. In the Preliminary Drainage Report for Schnucks North Subdivision, the outlots along US 41 including the German American Bank lot were to drain to a basin constructed north of the German American Bank lot. The lot east of German American Bank was to drain to a basin located at the northeast corner of the lot. For this Final Drainage Report, the German American Bank lot is currently drained into the West Basin and will continue to do so. The westerly 200 feet (+/-) of the original Lot 1 of Grant Hills Commercial Park will be developed as outlots and the storm water from this area will be rerouted to the East Basin. The newly purchased lot north of Schnucks North Subdivision will also drain to the East Basin, as well as all of the remainder of the property that had previously routed to the East Basin (see attached **Appendix A-7 of the original approved report** – Overall Drainage Routing Plan).

As reported in the Preliminary Drainage Report, no portion of this site falls within the 100 year Zone "A", as noted on Community Panel No. 180256 0015 C of the Flood Insurance Rate Maps dated August 5, 1991. The proposed commercial development is situated on dormant fields with slopes ranging from 2% to 5%. The soils are predominantly silt loams. The entire tract drains from north to south and is divided by a ridge traveling the same direction. This ridge divides the proposed development into a west and east watershed as previously described. There is currently a drained pond and outlet ditch that have been identified as a regulated stream by the U.S. Army Corps of Engineers. A mitigation site has been constructed at another location to replace this stream. The pond has been drained and will be filled along with the outlet ditch to accommodate this development. There is a drainage easement having a centerline as shown on the subdivision plat that will handle the runoff from north of the site that will be installed behind the Schnucks store.

This drainage report will address the storm detention requirements for this development of the proposed Schnucks North Subdivision in accordance with the current Vanderburgh County Drainage Ordinance. This ordinance states that a 10 year undeveloped condition should be compared to a 25 year developed condition and the quantitative difference in runoff experienced

under these conditions shall be temporarily detained onsite in a retention or detention basin. Both basins will be sized to handle no less than a 50 year storm should the need arise.

On this project storm retention will be handled in two separate dry basins. They are described as follows:

1. **East Basin** (shown in green on the Overall Drainage Routing Plan – **Appendix A-7 of the original approved report**- containing **18.2** acres). A new basin constructed on the land east of the original Grant Hills Commercial Park will be designed to accommodate the Schnucks site lying on the remainder of Lot 1 of the original Grant Hills Commercial Park and all of the additional land lying east of Grant Hills Commercial Park, west of Old State Road and north of Boonville-New Harmony Road, and also including the corner lot at the intersection of Old State Road and Boonville-New Harmony Road which is not a part of this proposed development. Located north of this onsite drainage area is an area outside of the subject development that drains through the site. The release of stormwater from this area north of the subject property is routed through the drained pond on this site as discussed above. The outflow from this pond is controlled with a 15 inch diameter outlet pipe. This pipe, when emptying the pond to its fullest capacity, generates a headwater of approximately four feet. At this headwater the pipe will convey up to **9** cfs. Therefore, the outlet pipe for the pond will be sized to allow for up to 14 cfs to pass through freely. This **9** cfs outflow combined with the **20.05** cfs outfall allowed for the onsite drainage will produce a combined total outflow of approximately **29.05** cfs. This will be used to convey the water through the second outlet only. The primary outlet will be sized for the onsite drainage area only **20.05** cfs), which will result in a very conservative design for the basin.

2. **West Basin** (shown in blue on the Overall Drainage Routing Plan – **Appendix A-7 of the original approved report**- containing 4.490 acres). An existing basin constructed near the southwest corner of Lot No. 1 of Grant Hills Commercial Park and also partially on the

north end of Lot 2 of Grant Hills Commercial Park will address the needs of the German American Bank lot located at the intersection of US 41 and Boonville-New Harmony Road. The allowable outflow from this basin will be reduced to 2.15 cfs. The outlet structure and piping will be reworked to accommodate this smaller release rate.

These two basins will act independently of each other, each satisfying the required stormwater retention without support from the other basins.

METHOD

For both of these drainage areas the Rational Method (Q = cia) will be used to compute the 10 year undeveloped flows. The undeveloped flow from each of these watersheds will be used as the allowable outflow rates for the developed site.

"c" = Runoff Coefficient (undeveloped) - The existing land slopes from north to south. The soils are silt loams. The area is currently dormant and was previously reported as low density residential and cultivated fields ranging from 2% to 5% in slope. Table 3.2.1 of the drainage ordinance suggests an undeveloped runoff coefficient of 0.36 be used. For this report, we will utilize the same value as previously reported.

"c" = Developed (runoff coefficient) - In addition, a developed "c" factor of 0.78 will be used on the proposed land use and anticipated East Basin (Schnucks) surface improvements. For the East Basin and the West Basin a slightly smaller value of 0.70 will be used, for the outlot development will not be as impervious.

"i" = Intensity – Kerby's Formula will be used to determine the time of concentration for the undeveloped site and the corresponding 10 year intensity will be calculated. For the area flowing from the north to south and west toward US 41, the previous report used a value of 24 minutes. The resulting 10 year intensity was 3.34 (see **Appendix B of the original**

approved report – Time of Concentration/Intensity). This report will utilize the same values.

For the East Basin (all land east of Grant Hills Commercial Park) no previous analysis was performed. For this report, a time of concentration of 27 minutes was calculated; the resulting 10 year intensity being 3.06 (See **Appendix B of the original approved report**– Time of Concentration).

"a" = Area - The contributory area flowing into each basin from the proposed site was measured as follows:

East Basin = **18.2** acres. Increased from the Preliminary Drainage Report to include the outlots along US 41 North and the newly acquired property along US 41 North, north of the Schnucks North Subdivision, and the south half of the new basin area and the adjoining land located at the northwest corner of Old State Road and Boonville-New Harmony Road (Habermel property).

West Basin = 4.490 acres previously – for this report is reduced to 1.79 acres, with the remainder of the 4.490 acres now being routed to the East Basin.

To the product of the developed "c" value and the area "a", a range of intensity values for different duration storms having a 25 year and 100 year specified return rate will be multiplied to compute expected inflow rates.

The difference between the inflow rates and outflow rates for each interval will establish the required storage for that interval. From this data a curve can be generated and the peak or largest value attained will be used as the required storage basin capacity.

A dry detention basin will be constructed for each watershed area to provide for the necessary

storm water storage. The outflow for each basin will be sized to limit the outflow from this increased runoff. A summary of the allowable outflow rates are as follows:

For the East Basin an outflow rate of **20.05** cfs was calculated using the existing 10 year undeveloped condition. **Q = cia = (.36)(3.06)(18.2) = 20.05 cfs (primary outlet).**
For the contributory area outside the subject property, **9** cfs will be added making the outflow rate for the secondary pipe in the two-stage outlet = **29.05 cfs.**

For the West Basin an outflow rate of 2.15 cfs was calculated using the existing 10 year undeveloped condition. **Q = cia = (.36)(3.34)(1.79 = 2.15 cfs**

RESULTS

A summary of the Results for each analysis of the two individual basins is as follows:

East Basin

The available storage in the designated dry basin from elevation 437.00 to 445.00 is 55,667 cubic feet (See **Appendix E** – Basin Volume Data).

The required 25 year storage is **51,791** cubic feet and 50 year storage is **69,571** cubic feet. The available storage meets these requirements. The allowable 10 year outflow rate used to arrive at the required storage rates is **20.05** cfs. The pass through flow from the adjoining subdivision is 9 cfs. The total outflow is **29.05**. The allowable outflow rate and storage requirements were derived as shown in **Appendix C of the original approved report** – Storage Volume Output. A dual stage outlet control structure (**Appendix D of the original approved report** – Outlet Control Structure Analysis) is recommended with the primary **18** inch diameter outlet pipe set at **433.50** and the secondary outlet control being through a casting set in the top of the structure being set at elevation **442.17**, approximately **8.67** feet above the primary outlet pipe, which exceeds the head necessary to attain the maximum allowable outlet flow and is also at or above the stormwater storage elevation necessary to achieve the

required storage. The 50 year storm will be attained at elevation ~~442.17~~ **443.49** with the required volume of **69,571** cubic feet.

The 100 year storm will be attained at elevation ~~444.64~~ 445.03 with a required volume of 2.12 acre/feet (92,413 cubic feet).

The as-built emergency overflow was built at elevation 445.50 feet, which allows for an additional 5 inches +/- of storage over and above the 100 year storm.

West Basin

The available storage in the designated dry basin from elevation 444.27 to 448.00 is 7,608 cubic feet (See **Appendix B** – Basin Volume Data).

The required 25 year storage is 4,115 cubic feet for this 1.79 acre area, down from 4.490 acres previously reported *(with revised formula)* and 50 year storage is 5,014 cubic feet *(with revised formula)*. The available storage exceeds these requirements. The allowable 10 year outflow rate used to arrive at the required storage rates was 5.39 cfs and now is 2.15 cfs, again reduced due to the lesser area of 2.15 acres. This allowable outflow rate and storage requirements were derived as shown in **Appendix C of the original approved report**– Storage Volume Output Data. An outlet control structure is recommended with the primary 12" diameter outlet pipe set at 444.27, having an orifice plate with an 8" hole. The required 50 year storage will raise the water elevation to elevation 447.30. Based on the basin geometry the required 100 year volume of 7,029 cubic feet will occur at elevation 447.85.

SUMMARY

The stormwater runoff will be detained in two separate basins located on the property. The

owner Lot 4 will assume maintenance of the proposed storm water facility referred to as the West Basin. The owner of Lot 1, the large Schnucks complex north of the east basin will assume maintenance of the proposed storm water facility referred to as the East Basin.

The runoff from all paved areas and roof tops constructed on all of the lots will be routed through one of the basins.

As previously stated, each basin has enough capacity to exceed the **100** year stormwater storage requirement.

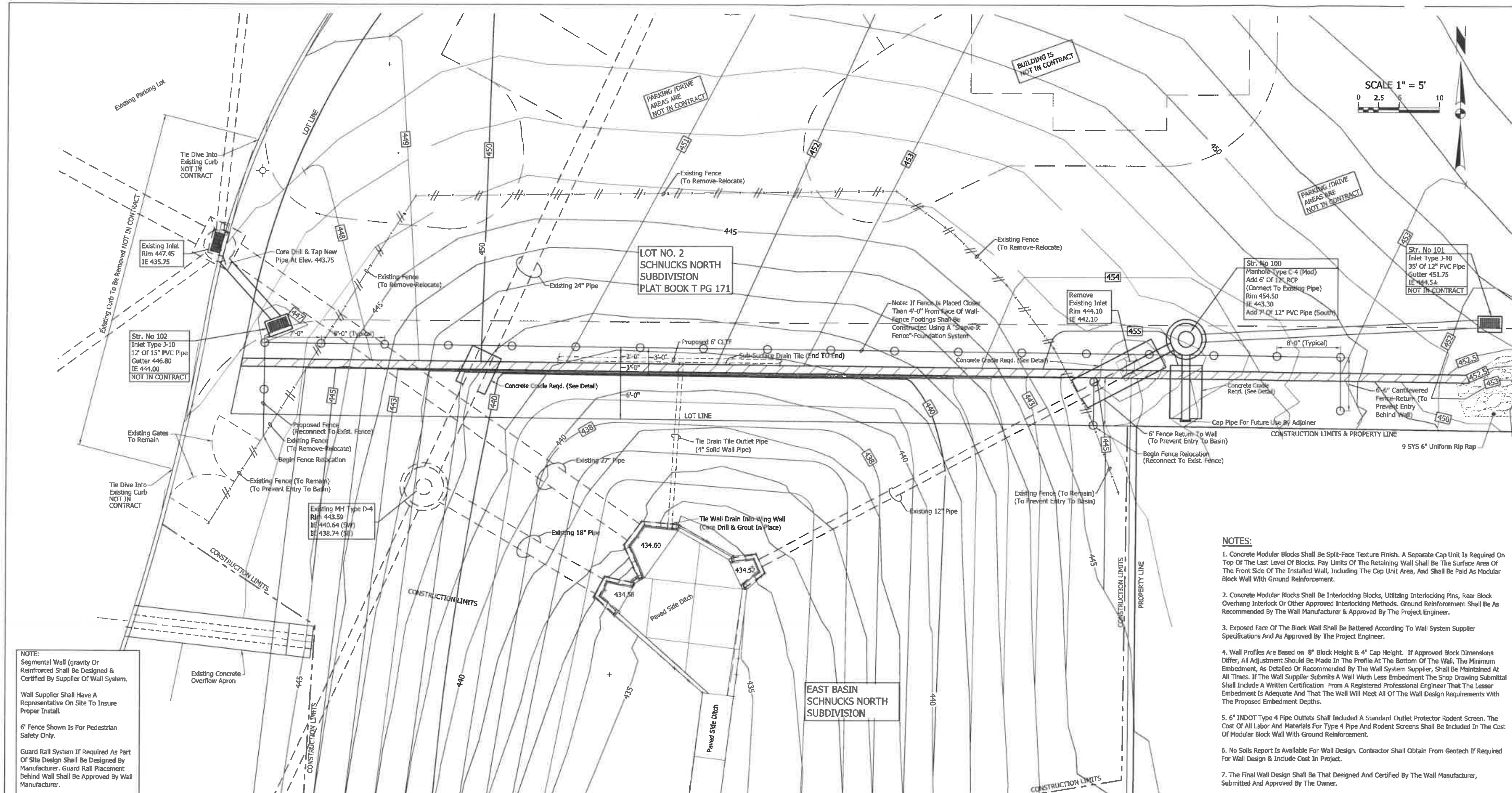
By providing dual outlet structures, storms of lesser frequencies could be detained if necessary by further restricting the primary outlet pipe and relying more frequently on the secondary outlet pipe to release the storm runoff prior to the runoff overtopping the basin.

APPENDICES INDEX

Appendix A-1	-	Lot 2 Wall Plan
Appendix A-2	-	Lot 2 Wall Details
Appendix B	-	Basin Volume Data

APPENDIX A-1

LOT 2 WALL PLAN



NOTE:
Segmental Wall (gravity Or Reinfrorced Shall Be Designed & Certified By Supplier Of Wall System.

Wall Supplier Shall Have A Representative On Site To Insure Proper Install.

6' Fence Shown Is For Pedestrian Safety Only.

Guard Rail System If Required As Part Of Site Design Shall Be Designed By Manufacturer. Guard Rail Placement Behind Wall Shall Be Approved By Wall Manufacturer.

Guard Rail System Supplier Shall Have A Representative On Site To Insure Proper Installation In Accordance With Wall Manufacturers Requirements.

NOTES:

1. Concrete Modular Blocks Shall Be Split-Face Texture Finish. A Separate Cap Unit Is Required On Top Of The Last Level Of Blocks. Pay Limits Of The Retaining Wall Shall Be The Surface Area Of The Front Side Of The Installed Wall, Including The Cap Unit Area, And Shall Be Paid As Modular Block Wall With Ground Reinforcement.

2. Concrete Modular Blocks Shall Be Interlocking Blocks, Utilizing Interlocking Pins, Rear Block Overhang Interlock Or Other Approved Interlocking Methods. Ground Reinforcement Shall Be As Recommended By The Wall Manufacturer & Approved By The Project Engineer.

3. Exposed Face Of The Block Wall Shall Be Battered According To Wall System Supplier Specifications And As Approved By The Project Engineer.

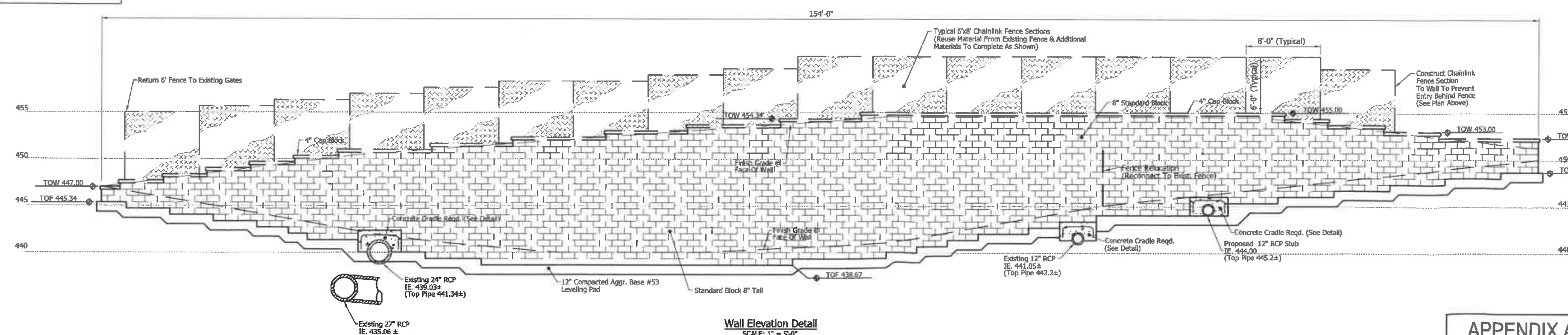
4. Wall Profiles Are Based on 8" Block Height & 4" Cap Height. If Approved Block Dimensions Differ, All Adjustment Should Be Made In The Profile At The Bottom Of The Wall. The Minimum Embedment, As Detailed Or Recommended By The Wall System Supplier, Shall Be Maintained At All Times. If The Wall Supplier Submits A Wall Wuth Less Embedment The Shop Drawing Submittal Shall Include A Written Certification From A Registered Professional Engineer That The Lesser Embedment Is Adequate And That The Wall Will Meet All Of The Wall Design Requirements With The Proposed Embedment Depths.

5. 6" INDOT Type 4 Pipe Outlets Shall Included A Standard Outlet Protector Rodent Screen. The Cost Of All Labor And Materials For Type 4 Pipe And Rodent Screens Shall Be Included In The Cost Of Modular Block Wall With Ground Reinforcement.

6. No Soils Report Is Available For Wall Design. Contractor Shall Obtain From Geotech If Required For Wall Design & Include Cost In Project.

7. The Final Wall Design Shall Be That Designed And Certified By The Wall Manufacturer, Submitted And Approved By The Owner.

RETENTION BASIN AND WALL PLAN
SCALE: 1" = 5'-0"



Wall Elevation Detail
SCALE: 1" = 5'-0"

REVISIONS		
NO.	DATE	DESCRIPTION

LOCHMUELLER GROUP
6200 Vogel Road
Evansville, Indiana 47715
Phone: 812.479.6200
Toll Free: 800.423.7411

EAST BASIN MODIFICATIONS
FOR LOT 2 SCHNUCKS NORTH SUB
EVANSVILLE, INDIANA

SHEET TITLE:
LOT 2 WALL PLAN

JAMES A. FARNY REGISTERED No. PE60020434 STATE OF INDIANA PROFESSIONAL ENGINEER

HORIZ. SCALE AS SHOWN	LOCH. GROUP PROJ. 107-0141-HPD
VERT. SCALE AS SHOWN	PROJECT –
DRAWN BY DAG	DATE: 02/10/16
DESIGNED BY JAF	ISSUED: _/_/15
SHEET NO.:	C1.0

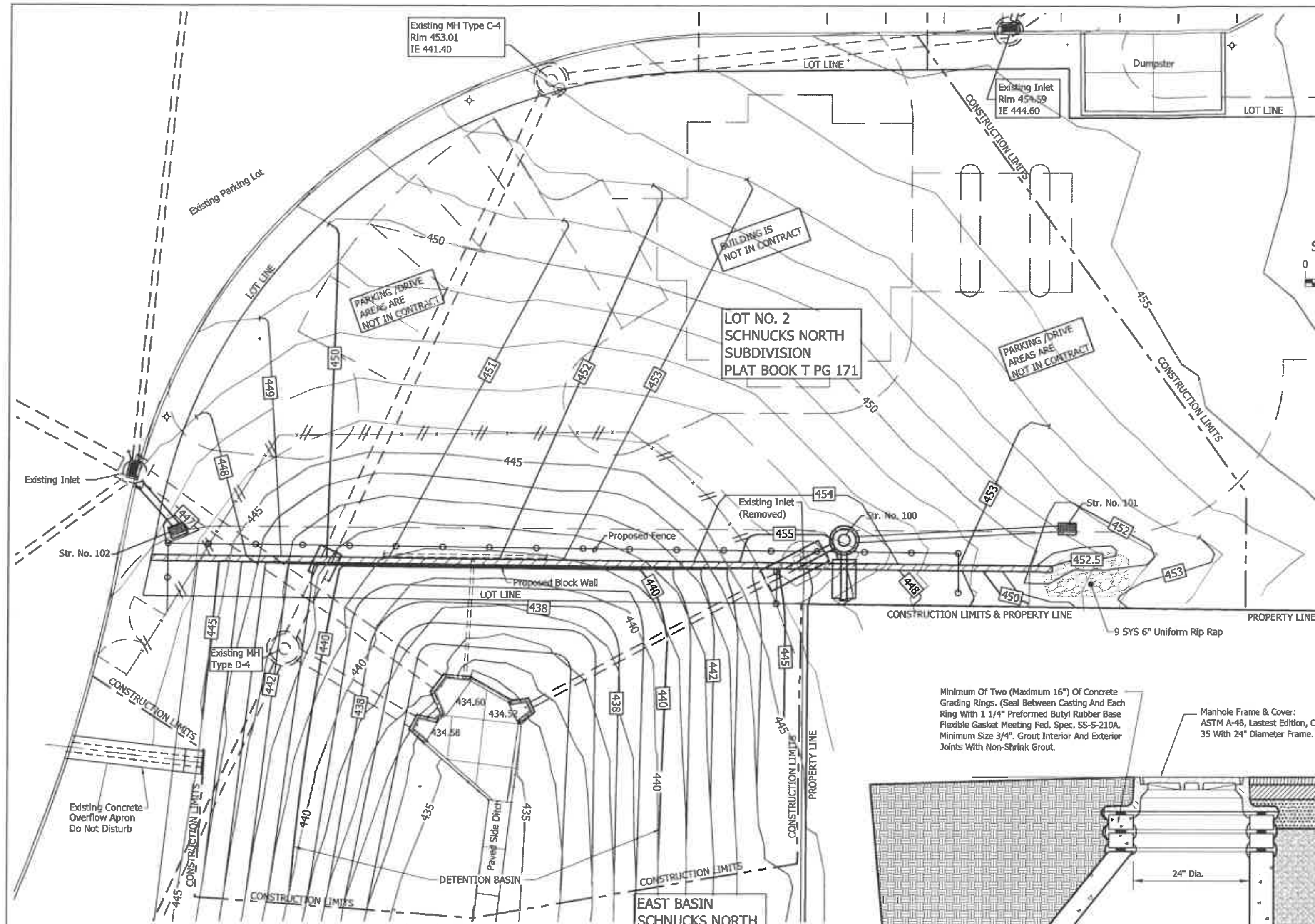
APPENDIX A-1

REVISED 04/28/16

Date: Apr 29, 2016, 10:32am User Name: bgeppert
File: S:\Projects\107-0141\DESIGN\0-HPD LOT 2 WALL\0_Pond Wall.dwg

APPENDIX A-2

LOT 2 WALL DETAILS



DETENTION BASIN GRADING PLAN

SCALE: 1" = 10'-0"

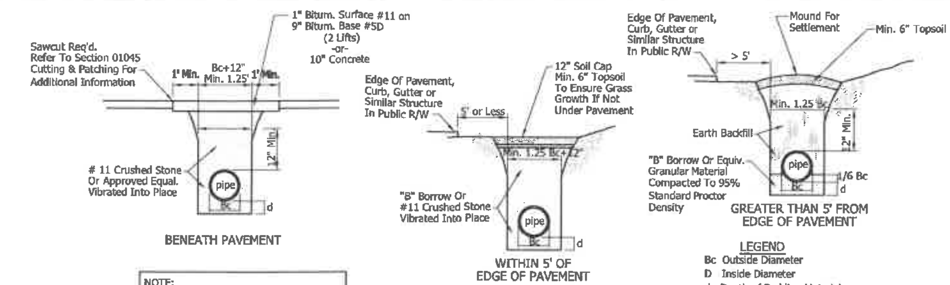
NOTE:
Segmental Wall (gravity Or Reinfrorced Shall Be Designed & Certified By Supplier Of Wall System.

Wall Supplier Shall Have A Representative On Site To Insure Proper Install.

6' Fence Shown Is For Pedestrian Safety Only.

Guard Rail System If Required As Part Of Site Design Shall Be Designed By Manufacturer. Guard Rail Placement Behind Wall Shall Be Approved By Wall Manufacturer.

Guard Rail System Supplier Shall Have A Representative On Site To Insure Proper Installation In Accordance With Wall Manufacturers Requirements.



NOTE:
Contractor Shall Install Pipe Using More Stringent Of Two Procedures
1.) That Depicted Hereon
2.) Manufacturer Recommendations

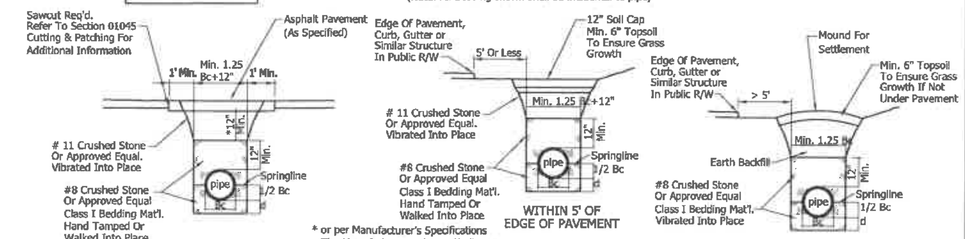
Note:
On Projects Where Flowable Fill Is Specified. Replace All Trench Materials From Top To Bottom With Flowable Fill.

STORM SEWER TRENCH/PIPE BEDDING DETAIL FOR
REINFORCED CONCRETE PIPE (RCP)
NTS

All Bedding & Initial Shall Be Installed
In 6" To 12" Balanced Lifts
A Minimum 9" Of Clearance Shall Be
Provided On Each Side Of Installed Pipe
(Note: All bedding shown shall be incidental to pipe)

LEGEND
Bc Outside Diameter
D Inside Diameter
d Depth of Bedding Material Below Pipe

Depth of Bedding Material Below Pipe	
D	d
27" & Smaller	3"
30" to 60"	4"
66" & Larger	6"

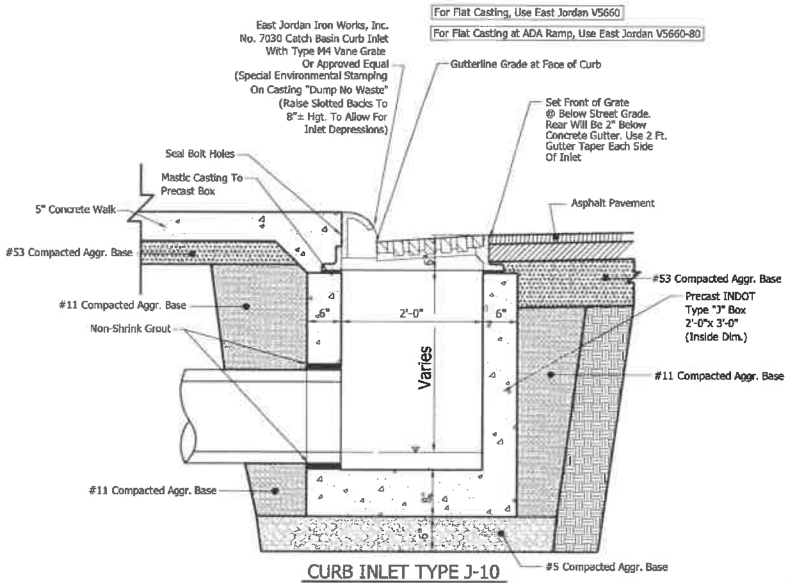


* or per Manufacturer's Specifications
The More Stringent Of Two Shall Apply

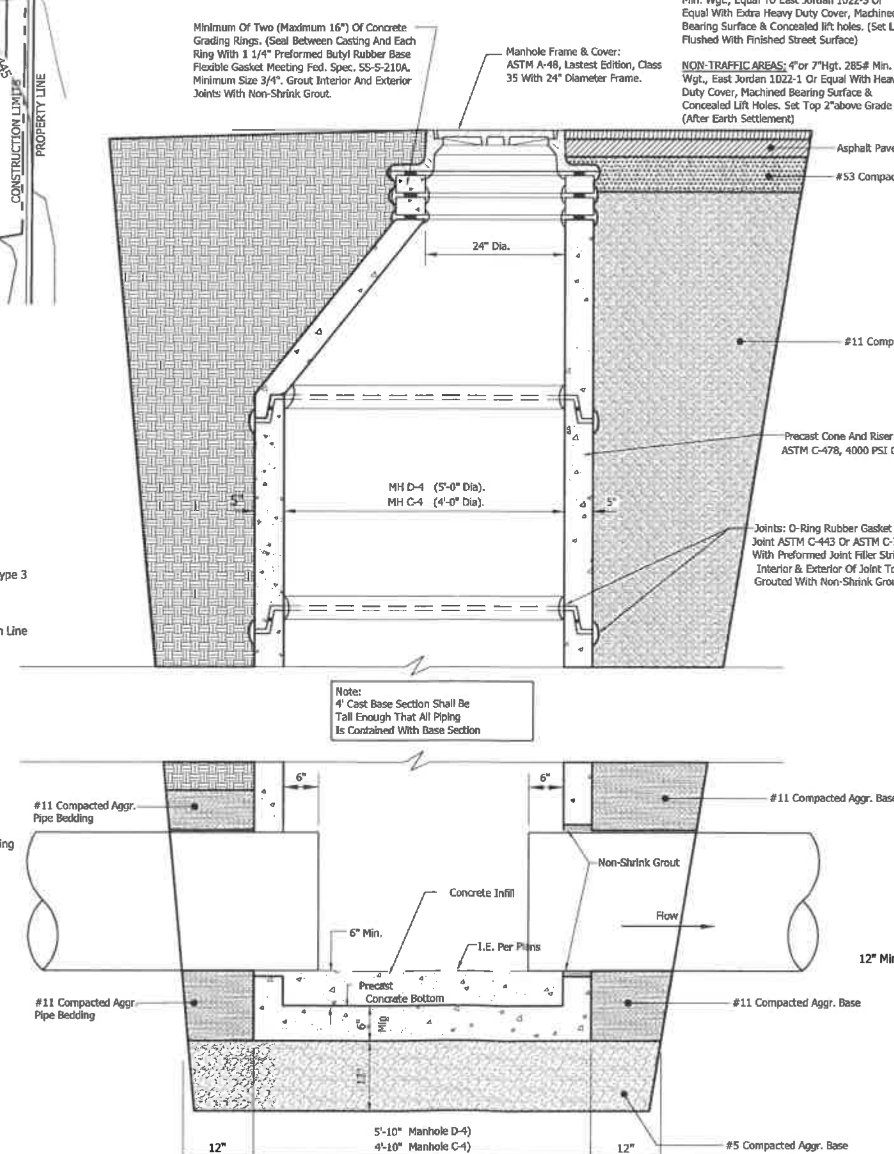
STORM SEWER TRENCH/PIPE BEDDING DETAIL FOR
PLASTIC PIPE (PVC & HDPE)
NTS
(For PP Pipe Min. Cover can be reduced to 12")

For Flat Casting, Use East Jordan V5660

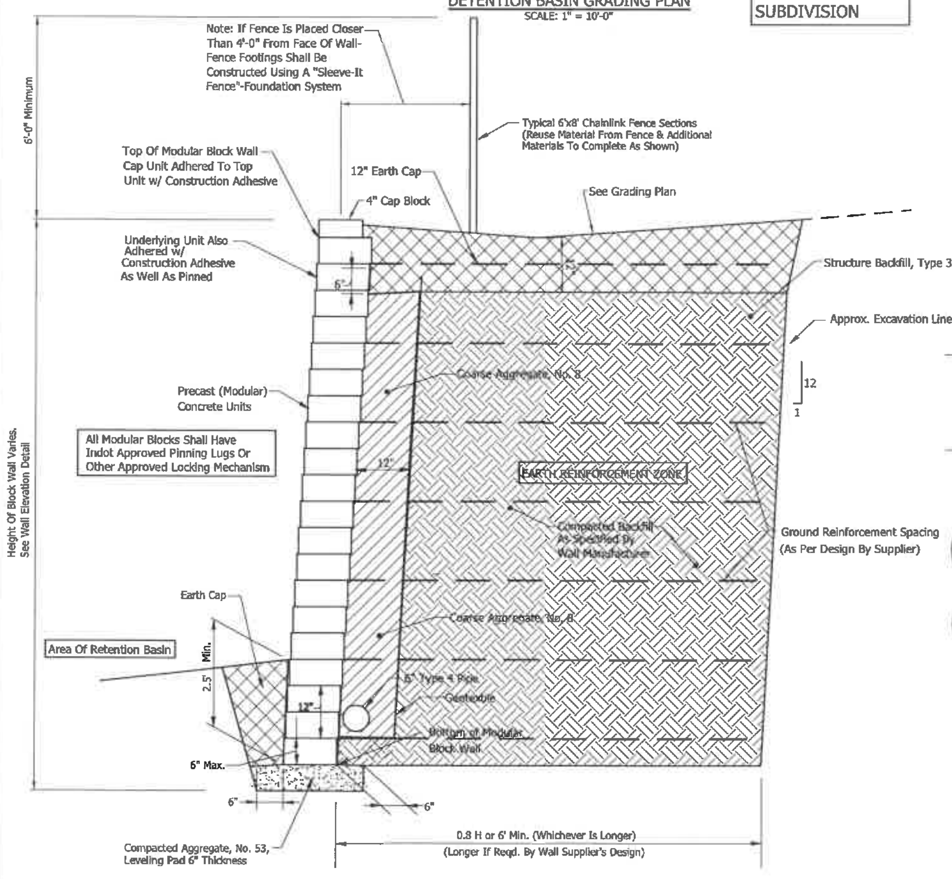
For Flat Casting at ADA Ramp, Use East Jordan V5660-80



CURB INLET TYPE J-10
NTS

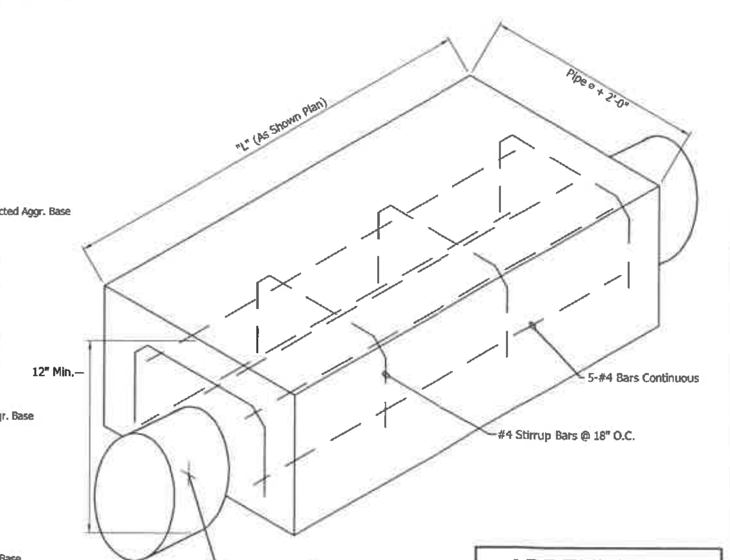


MANHOLE TYPE C-4 (4'-0" Dia).
MANHOLE TYPE D-4 (5'-0" Dia).
NTS



TYPICAL SECTION-CONCRETE MODULAR BLOCK WALL

Scale= 3/4"=1'-0"



TYPICAL PIPE CONCRETE CRADLE DETAIL

Scale= NTS

REVISIONS		
NO	DATE	DESCRIPTION

LOCHMUELLER GROUP
6200 Vogel Road
Evansville, Indiana 47715
Phone: 812.479.6200
Toll Free: 800.423.7411

EAST BASIN MODIFICATIONS
FOR LOT 2 SCHNUCKS NORTH SUB
EVANSVILLE, INDIANA

SHEET TITLE:
LOT 2 WALL DETAILS

JAMES A. FARNY REGISTERED No. PE60020434 STATE OF INDIANA PROFESSIONAL ENGINEER

HORIZ. SCALE AS SHOWN	LOCH. GROUP PROJ. 107-0141-HPD
VERT. SCALE AS SHOWN	PROJECT --
DRAWN BY DAG	DATE: 02/10/16
DESIGNED BY JAF	ISSUED: __/__/15
SHEET NO.:	C1.1

APPENDIX A-2

REVISED 04/28/16

Date: Apr 29, 2016, 10:32am User Name: bgeppert
File: S:\Projects\107-0141\DESIGN\0-HPD LOT 2 WALL\0_Pond Wall.dwg

APPENDIX B

BASIN VOLUME DATA

BASIN VOLUME

Project: SCHNUCKS EAST BASIN

Date: 4/28/2016

ELEVATION	SURFACE AREA (square feet)	Incremental Volume (cubic feet)	Accumulated Volume (cubic feet)	Accumulated Volume (acre/feet)
433.50	0	0	0	0
434.00	821	205	205	0.00
435.00	2,364	1,593	1,798	0.04
436.00	3,541	2,953	4,750	0.11
437.00	4,746	4,144	8,894	0.20
438.00	6,090	5,418	14,312	0.33
439.00	7,471	6,781	21,092	0.48
440.00	8,976	8,224	29,316	0.67
441.00	10,400	9,688	39,004	0.90
442.00	11,870	11,135	50,139	1.15
443.00	13,176	12,523	62,662	1.44
444.00	14,955	14,066	76,727	1.76
445.00	15,360	15,158	91,885	2.11
445.50	17,600	8,240	100,125	2.30
446.00	18,750	9,088	109,212	2.51