

CITY OF MITCHELL
CITY PLANNING COMMISSION AGENDA
COUNCIL CHAMBERS, CITY HALL, 612 N MAIN ST
JUNE 8, 2020, 12:00 PM (NOON)

1. **CALL TO ORDER:**
2. **ROLL CALL:**
3. **Declaration Of Conflicts Of Interests**
4. **APPROVE AGENDA:**
5. **Approval Of Minutes: May 26, 2020 Meeting**

Documents:

[PLANNINGCOMMINUTES5262020.PDF](#)

6. **Schedule Next Meeting: June 22, 2020**
7. **Plat: A Plat Of Lots 12G-1 And 12J-1, Within Lot 12 Of Fiala's Addition In The East 1/2 Of The NW 1/4 Of Section 4, T 103 N, R 60 W Of The 5th P.M., City Of Mitchell, Davison County, South Dakota**

Documents:

[PLATLOT12G-112G-1.PDF](#)
[AERIALFLACKPLAT.PDF](#)

8. **Plan Approval: County Fair, 1305 W Havens (In The Rear) Addition, Highway Oriented Business District**

Documents:

[COUNTYFAIRPROJECT.PDF](#)
[AERIALCOUNTYFAIRADDN.PDF](#)

9. **Drainage Report & Findings Westwood Addition**

Documents:

[WESTWOODDRAINAGE.PDF](#)

10. **Approval: Westwood Master Plan**

Documents:

[WESTWOODMASTERPALN.PDF](#)

11. **OTHER BUSINESS:**

12. **PUBLIC INPUT: If You Need To Address The City Planning Commission On An Item That Was Not On The Agenda, Excluding Personnel Items, Please Come Forward To The Podium And State Your Name And Your Concern. Presentations Are Limited To Three Minutes. Items Will Be Considered But No Action Will Be Taken At This Time.**

13. ADJOURNMENT:

"The City of Mitchell invites all interested parties to give oral or written comments. If special accommodations are required, please notify the Public Works Department at 605-995-8433 at least 24 hour prior to the scheduled meeting."

**CITY OF MITCHELL
CITY PLANNING COMMISSION MINUTES
May 26, 2020**

NOT APPROVED

Chairman Larson called the May 26, 2020 City Planning Commission meeting to order at 12:00 pm (Noon) in the Council Chambers, City Hall, 612 N Main St, Mitchell, SD.

Members Present: Larson, Molumby, Jirsa, Osterloo, Vaux, Genzlinger, and Allen
Member Absent: Fergen

Staff Present: Putnam, Croce, Hegg, London, Sandoval, Ellwein, J. Johnson, Schroeder

Declaration of Conflicts of Interests: Jirsa Agenda Item # 7

Approval of Agenda: Motion by Genzlinger, seconded by Jirsa to approve the agenda as presented. All members present voting aye, motion carried.

Approval of Minutes: Motion by Jirsa, seconded by Molumby to approve the minutes of 5/11/2020 meeting. All members present voting aye, motion carried.

Schedule Next Meeting: Motion by Osterloo, seconded by Vaux to schedule the next meeting for June 8, 2020. All members present voting aye, motion carried.

Review Plan: 1801 N Main St, "Former Palace Mall", per Board of Adjustment approval of the Conditional Use Permit; proposed outside storage is to be approved by the planning commission. The owner would like to place an UHaul business at this location. Mark Bigelow and Roman Daniels-Brown owners and Michael Crompton of UHaul joined the meeting via telephone. Mr. Crompton described the business plan and the proposed location of the trucks and trailers. He indicated they would like an area of about 20 spaces with another overflow area if necessary. He did not think the business is 'outside storage'. There is another UHaul business in Mitchell. J. Johnson shared with the commission definitions of outside storage, outside commercial storage, and business services. The owners indicated they desire to insure the business is attractive. Osterloo made a motion to deny the proposal. Motion died lack of a second. The commission held an extensive discussion on what is the appropriate definition, location and the proposed use. Some commissioners were concerned about this activity on Main Street. By consensus, the commission determined the best definition for this use is Business Services, which is a permitted use under the zoning code.

Plat: A Plat of Lot 3-A of North Maui's First Addition, A Subdivision of Lot 1 in the West ½ of the NW ¼, Also Described as Lot 1, Subdivision of Government Lot 1, All in Section 31, T 104 N, R 60 W of the 5th P.M., Davison County, South Dakota. The adjoining property owner is purchasing this parcel. The county will be hearing this plat soon. Motion by Genzlinger, seconded by Jirsa to approve the plat. All members present voting aye, motion carried.

Plat: A Plat of Lot N, A Subdivision of Previously Platted Lot S of Maui Farms Second Addition, City of Mitchell, Davison County, South Dakota. Chuck Mauszycki Sr told Putnam that sometime in the future he would be proposing a similar development. Motion by Molumby, seconded by Jirsa to approve the plat. All members present voting aye, motion carried.

Plat: A Plat of Lot 10, Block 7 of Westwood First Addition, A Subdivision of the SW ¼ of Section 16, T 103 N, R 60 W of 5th P.M., City of Mitchell, Davison County, South Dakota. Putnam and Schroeder reported they have received an update drainage plan and new master plan. The commission will review and approve the plans later. Motion by Osterloo, seconded by Jirsa to approve the plat. All members present voting aye, motion carried.

Public Input: Justin Thiese, neighboring property owner, expressed concerns about the overgrown lawn and condition of the parking lot of the old Palace Mall property.

Chairman Larson adjourned the meeting at 12:45 pm.



1 Inch = 60 Feet

LEGEND

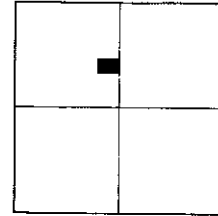
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- = SET 5/8" X 18" REBAR WITH PLASTIC CAP NO. 8296
- 100' (P) = PLATTED BEARING OR DISTANCE
- 100' = MEASURED BEARING OR DISTANCE
- = SET NAIL
- ▲ = SET SURVEY SPIKE
- 4.00 CH (P) = PLATTED DISTANCE IN CHAINS
- = FOUND NAIL
- ◇ = SET 3/4" X 12" SPIKE W/ WASHER POK-8296
- WM = WITNESS MONUMENT

PREPARED BY: PAUL C. KIEPKE, R.L.S.
 2100 NORTH SANBORN BLVD. - P.O. BOX 398
 MITCHELL, SOUTH DAKOTA 57301
 PHONE: (605) 996-7761

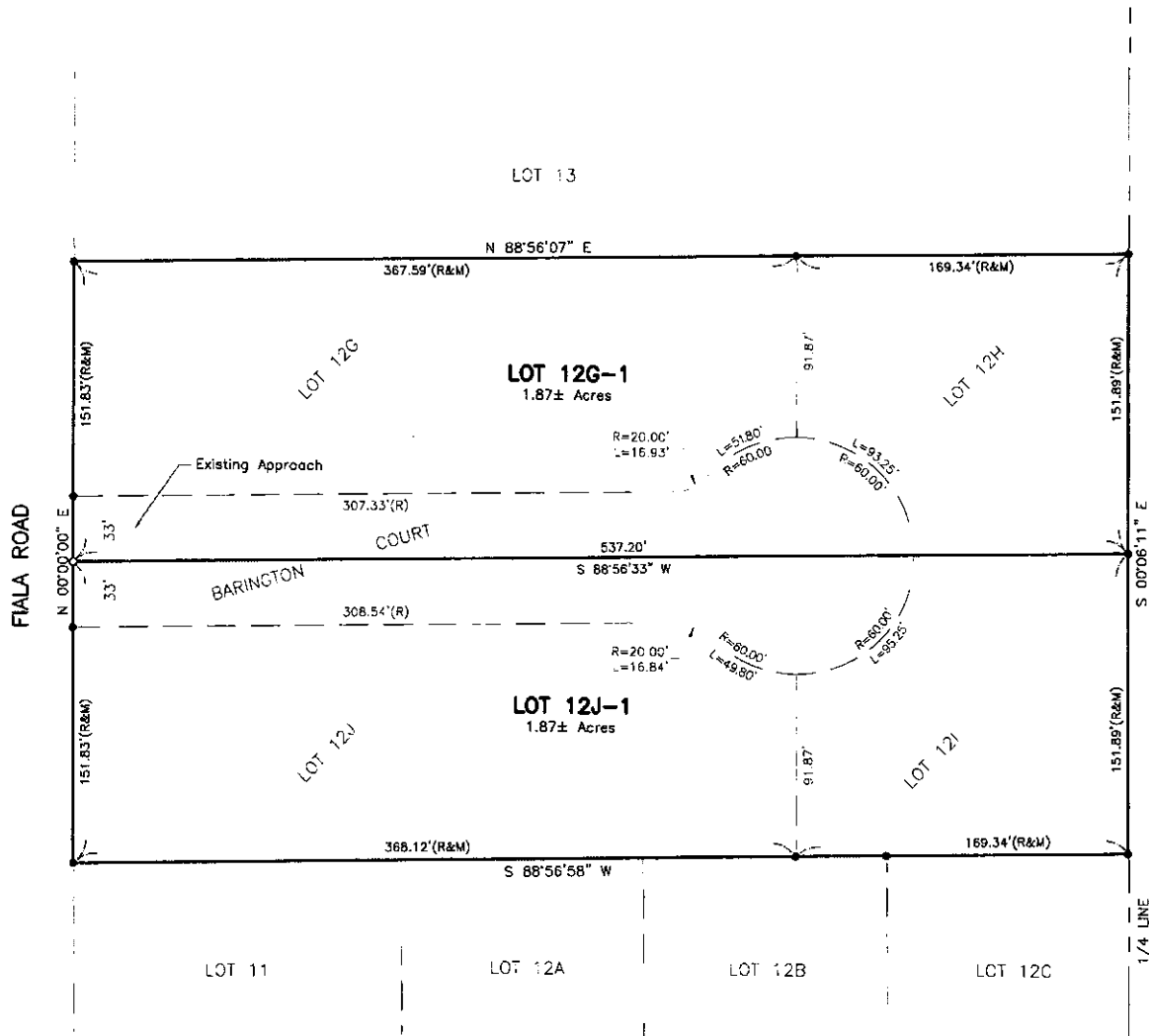
COORDINATE SYSTEM IS SOUTH DAKOTA SOUTH
 ZONE STATE PLANE - NORTH AMERICAN
 DATUM 1983 - GEOID 12B

NOTE:
 THIS SURVEY WAS PERFORMED WITHOUT
 THE BENEFIT OF A TITLE REPORT OR TITLE
 COMMITMENT. EASEMENTS OF RECORD WERE
 NOT RESEARCHED AND ARE NOT SHOWN
 UNLESS OTHERWISE NOTED.

SEC. 4, T 103 N, R 60 W



LOCATION MAP
 SCALE: 1" = 3600'



A PLAT OF LOTS 12G-1 AND 12J-1, WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5th P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA

SURVEYOR'S CERTIFICATE

I, Paul C. Kiepke, the undersigned, do hereby certify that I am a Registered Land Surveyor in and for the State of South Dakota. At the request of Jack L. Winegardner and Pamela J. Winegardner, as owners of Lots 12G and 12H; and Henry R. Flack and Patricia A. Flack, as owners of Lot 12I and 12J, all within Lot 12 of Fiala's Addition, City of Mitchell, Davison County, South Dakota, and under their direction for purposes indicated therein, I did on or prior to May 29, 2020, survey those parcels of land described as follows: LOTS 12G-1 and 12J-1, WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA. This plat does hereby vacate previously platted LOTS 12G, 12H, 12I, 12J AND BARINGTON COURT WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, AS RECORDED IN PLAT BOOK 24, ON PAGE 16, MAY 30, 2008.

In my professional opinion and to the best of my knowledge, information and belief, the within and foregoing plat is true and correct.
 Dated this 1st day of June, 2020.

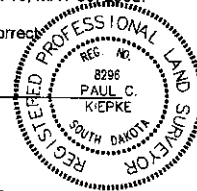
Registered Land Surveyor #SD8296

SPN

& Associates

Engineers, Planners and Surveyors

2100 North Sanborn Blvd. - P.O. Box 398 Mitchell, South Dakota 57301
 Phone: (605) 996-7761 Fax: (605) 996-0015



A PLAT OF LOTS 12G-1 AND 12J-1, WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5th P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA

OWNER'S CERTIFICATE, DEDICATION AND AGREEMENT OF PROTECTION OF WATER

KNOW ALL MEN BY THESE PRESENTS that Jack L. Winegardner and Pamela J. Winegardner; and Henry R. Flack and Patricia M. Flack hereby certify that they are the owners of record of all of the land included in the within and foregoing plat; the plat is of a parcel of ground located in PREVIOUSLY PLATTED LOTS 12G, 12H, 12I, 12J AND BARRINGTON COURT WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., DAVISON COUNTY, SOUTH DAKOTA; that the plat has been made at our request and under our direction for the purposes indicated therein; which said property as so surveyed and platted shall hereafter be known as LOTS 12G-1 and 12J-1 WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, as shown by this plat; and we hereby dedicate to the public, for public use forever as such, the streets and alleys, if any, as shown and marked on said plat; and that development of the land included within the boundaries of said Lot 12G-1 and 12J-1 shall conform to all existing applicable zoning, subdivision, and erosion and sediment control regulations; further that there now exists Fiala Road. Pursuant to SDCL 11-3-8.1 and 11-3-8.2 the developer of the property described within this plat shall be responsible for protecting any waters of the state located adjacent to or within such platted area from pollution from sewage from such subdivision and shall, in prosecution of such protections conform to and follow all regulations of the South Dakota Department of Environment and Natural Resources relating to the same. Additionally, the developer of the property described within this plat shall be liable for any pollution that occurs from failure to execute such protections or follow such regulations, exception being those lots in subdivisions that show documentation that wastewater drainage shall be connected to a municipal system.

We also hereby certify that the platting of said LOTS 12G-1 and 12J-1 WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, does hereby vacate previously platted LOTS 12G, 12H, 12I, 12J AND BARRINGTON COURT WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, AS RECORDED IN PLAT BOOK 24, ON PAGE 16, MAY 30, 2008.

IN WITNESS WHEREOF, we have hereunto set our hands this _____ day of _____, 2020.

Jack L. Winegardner
Owner of Record of Lots 12G and 12H

Pamela J. Winegardner
Owner of Record of Lots 12G and 12H

STATE OF _____)
)SS
COUNTY OF _____)

On this, the _____ day of _____, 2020, before me, _____, the undersigned officer, personally appeared Jack L. Winegardner and Pamela J. Winegardner, known to me or satisfactorily proven to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public, _____ (State)
My Commission Expires: _____

IN WITNESS WHEREOF, we have hereunto set our hands this _____ day of _____, 2020.

Henry R. Flack
Owner of Record of Lots 12I and 12J

Patricia A. Flack
Owner of Record of Lots 12I and 12J

STATE OF SOUTH DAKOTA)
)SS
COUNTY OF DAVISON)

On this, the _____ day of _____, 2020, before me, _____, the undersigned officer, personally appeared Henry R. Flack and Patricia A. Flack, known to me or satisfactorily proven to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public, South Dakota
My Commission Expires: _____

RESOLUTION OF CITY PLANNING COMMISSION

WHEREAS, the plat of LOTS 12G-1 and 12J-1 WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, prepared by Paul C. Kiepke, duly licensed Land Surveyor in and for the State of South Dakota, heretofore filed in the office of the City Finance Officer of Mitchell, South Dakota; has been submitted to the City Planning Commission of the said City of Mitchell, South Dakota; and

WHEREAS, the City Planning Commission, in regular meeting assembled, had duly considered said plat and finds as a fact that said plat is in conformity and does not conflict with the Master Plan for the City of Mitchell, South Dakota, heretofore adopted by this Commission;

NOW THEREFORE, be it resolved by the City Planning Commission of Mitchell, South Dakota, that the plat of LOTS 12G-1 and 12J-1 WITHIN LOT 12 OF FIALA'S ADDITION IN THE EAST 1/2 OF THE NW 1/4 OF SECTION 4, T 103 N, R 60 W OF THE 5TH P.M., CITY OF MITCHELL, DAVISON COUNTY, SOUTH DAKOTA, prepared by Paul C. Kiepke, a Land Surveyor, be and the same is hereby approved and its adoption by the City Council of the City of Mitchell, South Dakota, is hereby recommended for approval.

I, _____, Chairman of the City Planning Commission for the City of Mitchell, South Dakota, do hereby certify that the foregoing resolution was passed by the City Planning Commission of Mitchell, South Dakota, at a meeting thereof held on the _____ day of _____, 2020.

Chairman/Vice Chairman of the City Planning Commission of Mitchell _____



SPN

& Associates

Engineers, Planners and Surveyors

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Phone: (605) 996-7761 Fax: (605) 996-0015



NONE

15005-00000-021-00

15180-00000-002-00

WOODS CIR

15005-00000-018-00

06043-10360-001-00

06043-10360-004-00

06043-10360-014-00

15515-00000-009-10

15515-00000-007-00

JANE CT

NONE JANE CT

15515-00000-006-00

15180-00000-005-00

15180-00000-013-00

15180-00000-012-10

15180-00000-012-20

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N HARMON DR

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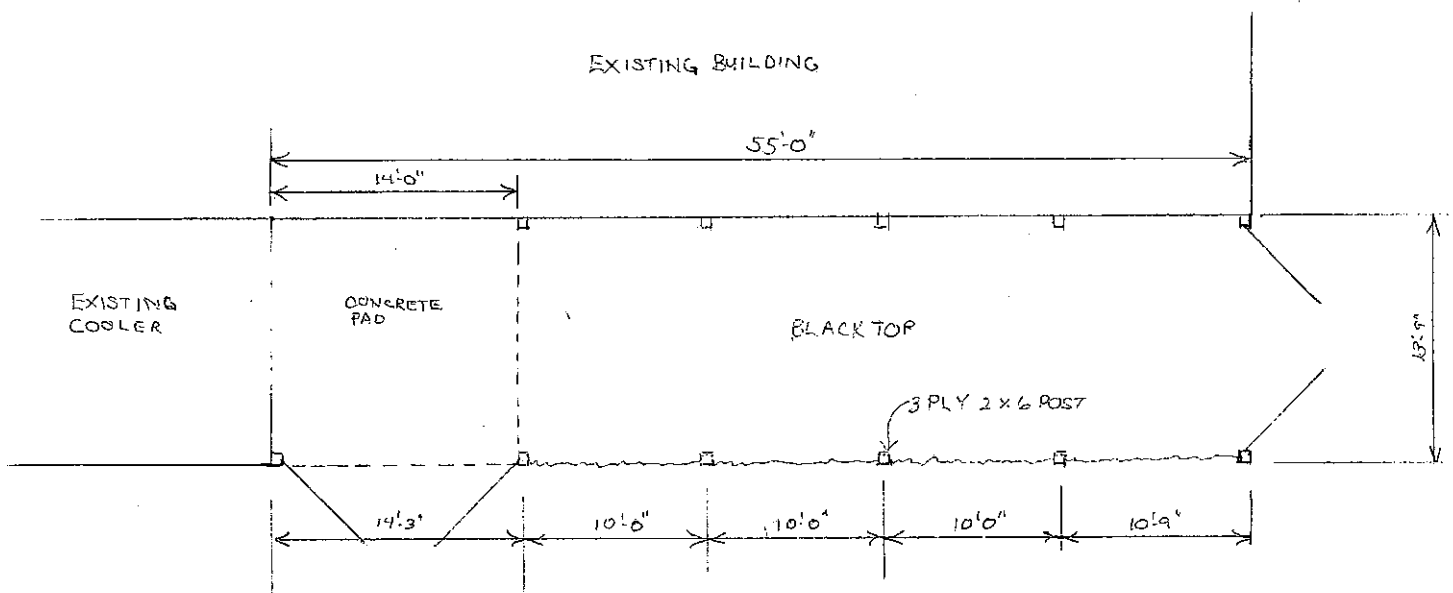
15710-00000-015-00

15710-00000-013-00

15710-00000-011-00

15710-00000-00

ONE



2 1/2 / 12 SLOPE SHED TYPE
 2x8 RAFTERS APPROX. 5'-0"
 2x6 PURLINS ON EDGE DROPPED BETWEEN
 THE RAFTERS
 THE EAVE SAME HEIGHT AS EXISTING COOLER

MICHEALS FENCE
 8' FABRIC W/ PRIVACY SLATS
 2- DOUBLE GATE
 PROTECT COUNTY GATE
 TWELLER LUMBER COMPANY
 6-2-2020

Click text location.





Schmucker, Paul, Nohr and Associates

2100 North Sanborn Blvd — PO Box 398

Mitchell SD 57301-0398

Phone (605) 996-7761

Wats (800) 952-3598

Fax (605) 996-0015

www.spn-assoc.com

May 22, 2020

Chuck Mauszycki
CJM Consulting Inc
1050 North Harmon Drive
Mitchell SD 57301

RE: Drainage Review for Lot 10, Westwood Addition
Mitchell, South Dakota
SPN #10809

Dear Mr. Mauszycki:

SPN has reviewed the proposed drainage for Lot 10 regarding the development of this lot compared to previous drainage plans completed for the Westwood Addition Development.

Information obtained from previous reports:

1. According to the Drainage Report Summary dated March 19, 2003 (a copy of which is enclosed) the south detention pond was to provide a storm water detention capacity of 355,740 cubic feet for the 100-year event. At that time two options for a storm water detention pond were presented. One had an area of 188,000 square feet and depth of 2.00 feet. The second presented an area of 309,000 square feet and depth of 1.25 feet.
2. The 2003 study concluded that the development would have a peak five-year discharge rate of 119 cfs using a runoff coefficient of 0.39. The 119 cfs was later used in the Design Report for 23rd Avenue Storm Drainage Improvements dated August 10, 2005 (a copy of which is enclosed).

Review of revised Master Plan dated May 8, 2020, see Exhibit A:

3. The revised storm water detention area is approximately 110,640 square feet. Based on the 355,740 cubic feet of storage required, the pond depth would reach 3.2 feet following the 100-year storm event.
4. Plans indicated a ditch outlet elevation of 1294.70. This would result in a highwater elevation of 1297.90. The design elevation for the lowest point of the concrete surfacing at the Coca-Cola facility was 1299.42.
5. The existing open ditches completed throughout the Development provide additional storage prior to the storm water entering the City's detention facility. There is currently 1,875 linear feet of 10-foot-wide ditch bottom with 4:1 side slopes from the City pond to Commerce Street. The existing ditch would have an approximate capacity of 100,000 cubic feet below the 1298.00 elevation, accounting for lost ditch capacity due to estimated flow through rates.

Review of City detention pond at 23rd and Ohlman:

6. According to the calculations provided in the Design Report for 23rd Avenue Storm Drainage Improvements dated August 10, 2005, the proposed detention pond would require a capacity of 1,737,212 cubic feet. Based on the preliminary sketch provided as Exhibit B the proposed detention facility has the potential capacity of 1,762,000 cubic feet once the improvements are completed. Currently, the existing pond appears to be at approximately 50% of the design capacity.

Review of drainage for Lot 10:

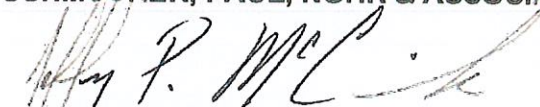
7. The revised Master Plan provided in Exhibit A has been shown on the proposed plat of Lot 10, see Exhibit C. The storm water area shown in the revised Master Plan is consistent with the location of the proposed drainage easement. The elevations collected indicate that there may be additional grading completed to meet the required design capacity; however, the bottom of the existing low area was not recorded due to the water conditions.
8. The original drainage plan as provided in the 2003 study has been overlaid on the proposed plat, see Exhibit D. The drainage easement shown in Lot 10 falls within close proximity of the footprint of the original master drainage plan shown from 2003.
9. The recorded ground elevation at the witness monuments were 1303.46 and 1303.30, well above the potential highwater elevation of 1297.90 described in Item 4.

Areas of concern:

1. The proposed pond as described in Item 1 above was based on flow from the proposed development and all flow from outside of the development being reduced to the five-year undeveloped conditions. Development that has occurred outside of the Westwood Development does not appear to be providing any similar detention which will contribute to flows higher than assumed at no fault of the Westwood developer.
2. The storm sewer calculations provided for the 23rd and Ohlman detention pond as described in Item 5 above do not appear to include any drainage area west of Ohlman and north of 15th Avenue. Since the study was completed, it appears that a culvert has been added near the 20th Avenue and Ohlman intersection. The increase in flow may have an adverse impact on the expected highwater elevation and required storage of the 23rd and Ohlman detention facility. Again, this is outside the responsibilities of the Westwood developer.

Sincerely,

SCHMUCKER, PAUL, NOHR & ASSOCIATES


Jeffrey P. McCormick, P.E.
Project Manager

cc: Joe Schroeder, City of Mitchell w/encs

West 15th Avenue

West 15th Avenue

Commerce Street

S.D. Highway No. 37 Bypass

STORM WATER
DETENTION POND
2.54 ACRES
110,640 S.F.

North Ohlman Street

33'

Commerce Street

West 8th Avenue

SPN

& Associates

Engineers, Planners and Surveyors

2100 North Sanborn Blvd. - P.O. Box 398 Mitchell, South Dakota 57301

Phone: (605) 996-7761

Fax: (605) 996-0015

EXHIBIT A



DATE: 5/21/2020
BY: NAP

23rd Avenue

North Ohlman Street

Pheasant Street

Quail Street

21st Avenue

20th Avenue

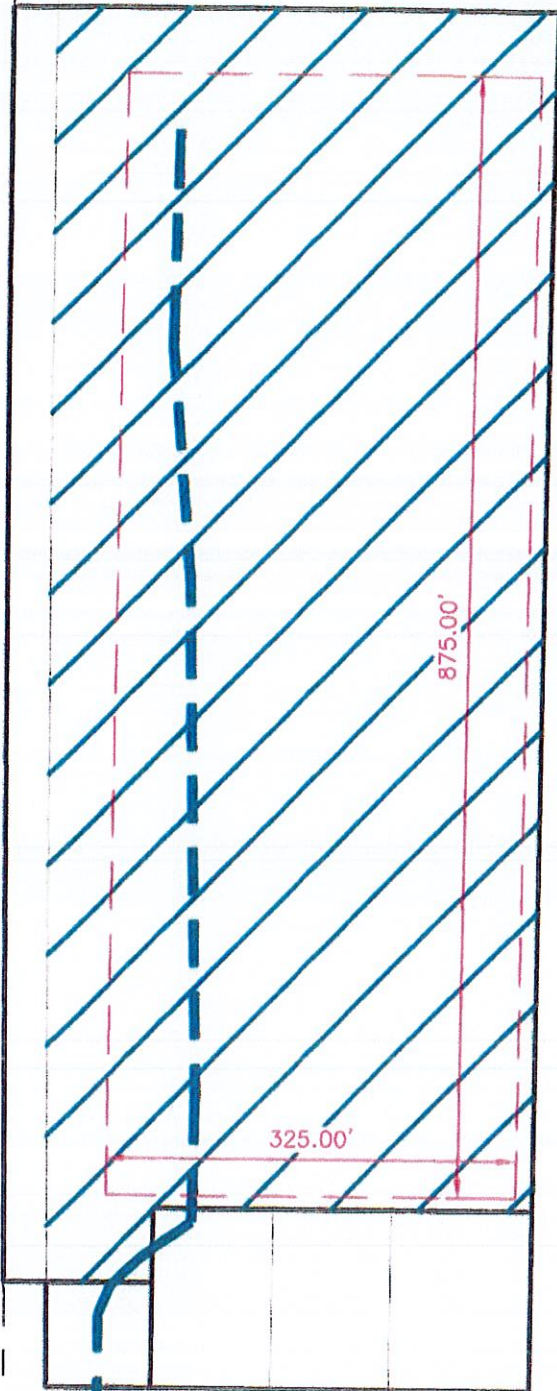


EXHIBIT B

SPN

& Associates

Engineers, Planners and Surveyors

2100 North Sanborn Blvd. - P.O. Box 398

Mitchell, South Dakota 57301

Phone: (605) 996-7761

Fax: (605) 996-0015



DATE: 5/21/2020

PAGE: 1 of 2

BY: NAP

Pond Volume Estimate Calculator

Length (Top)	875.00
Width (Top)	325.00
Total Depth	7.00
Side Slopes	4
Liquid Depth (ft)	7.00
Freeboard (ft)	0.00

- ← Distance from the top of dam to pond bottom. For a dug pond use the lowest point on the embankment.
 - ← Enter horizontal # for side slopes (e.g. for 3:1, enter 3).
 - ← Enter the vertical distance from the primary outlet to the pond bottom.
 - ← Freeboard is the vertical distance between the primary outlet (pipe) and the auxiliary outlet (spillway)
- When the spillway is the primary outlet, freeboard is the distance from the bottom of the spillway to the

	Length	Width
Pond Dims. @ Liquid Level	875.00	325.00
Pond Dims. @ Bottom	819.00	269.00

Pond Liquid Volume	Cubic Feet	Gallons
	1,762,742.33	13,185,313

EXHIBIT B
PAGE 2 of 2

LEGEND

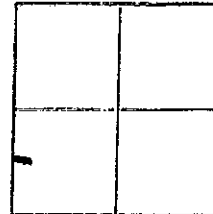
- = FOUND IRON MONUMENT
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- 100 CH (P) = PLATTED DISTANCE IN CHAINS
- = FOUND NAIL
- ◇ = SET 3/8" X 12" SPIKE W/ WASHER PUB-8702
- WM = WITNESS W/ILLUSTRATION

PREPARED BY: PAUL J. NELAND, R.L.S.
2100 NORTH SANBORN BLVD. - P.O. BOX 308
MITCHELL, SOUTH DAKOTA 57301
PHONE: (605) 996-7761

BEARINGS ARE BASED ON AN ASSUMED COORDINATE SYSTEM USING GPS GRID BEARINGS/GROUND DISTANCES

NOTE:
THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT OR TITLE COMMITMENT. EASEMENTS OF RECORD WERE NOT RESEARCHED AND ARE NOT SHOWN UNLESS OTHERWISE NOTED.

SEC. 16, T 103 N, R 60 W



LOCATION MAP
SCALE: 1" = 300'

1 Inch = 100 Feet

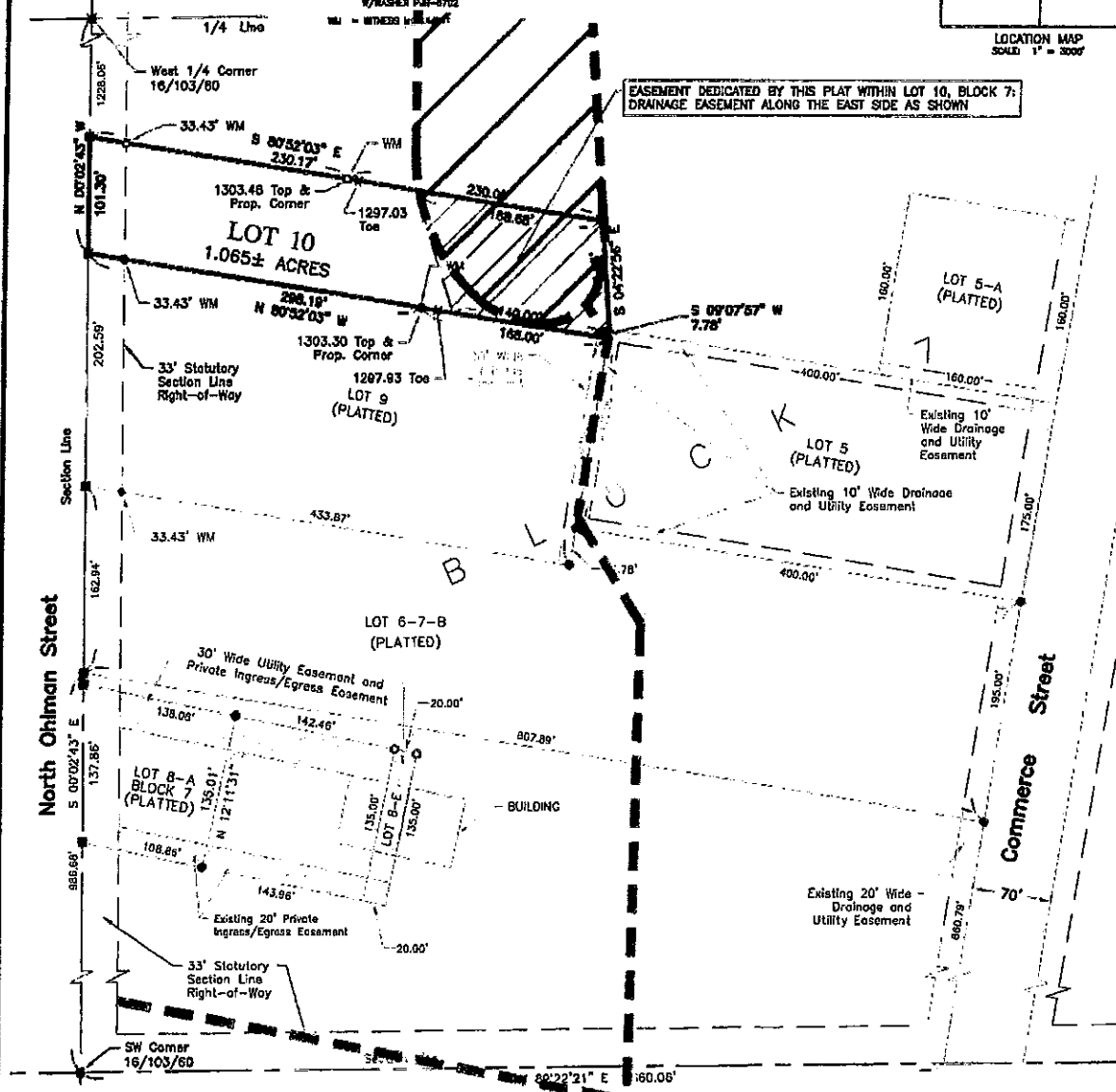


EXHIBIT C

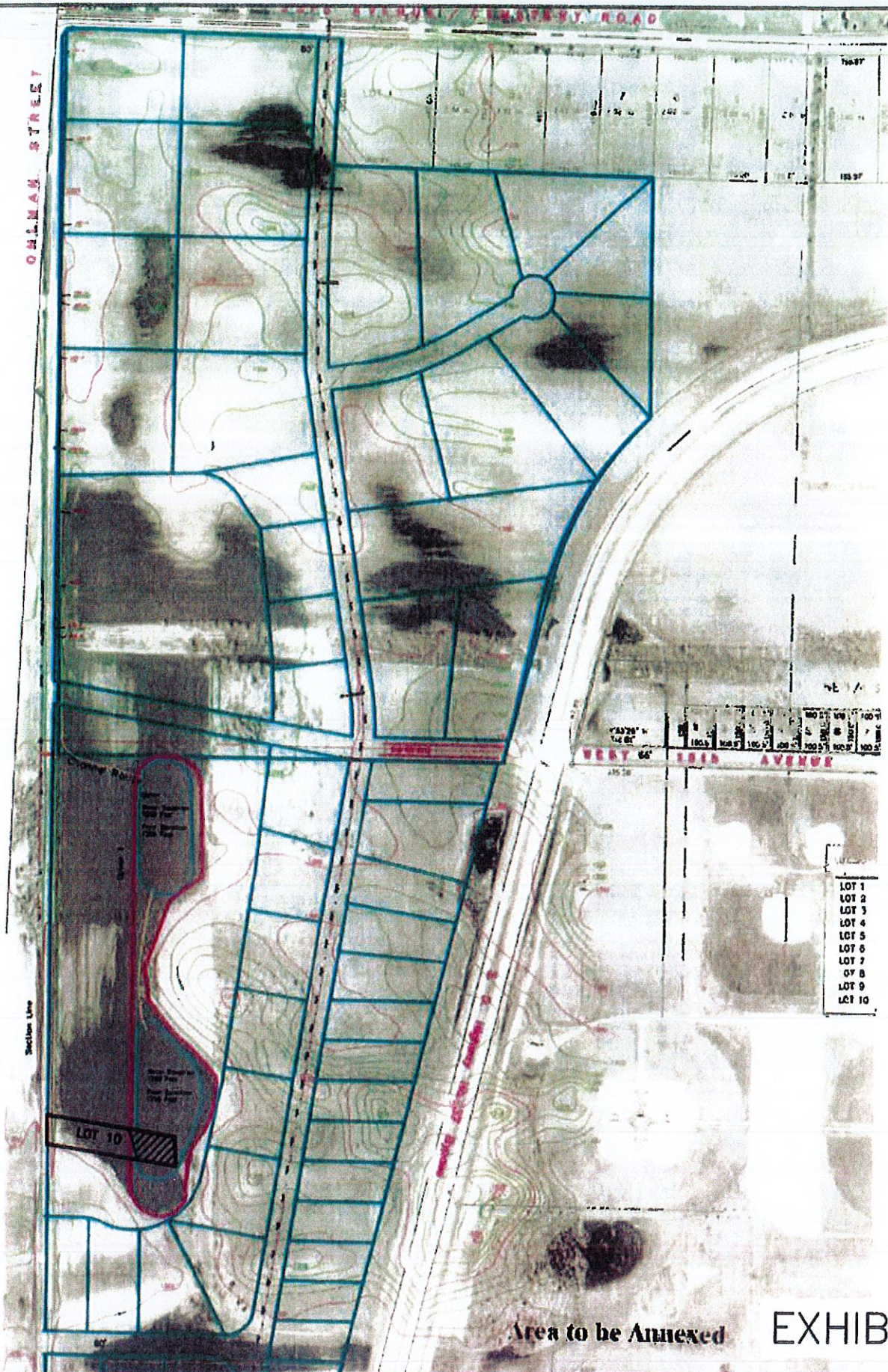
SPN**& Associates**

Engineers, Planners and Surveyors

2100 North Sanborn Blvd. - P.O. Box 308 Mitchell, South Dakota 57301

Phone (605) 996-7761

Fax (605) 996-0815



Area to be Annexed

EXHIBIT D

SPN

& Associates

Engineers, Planners and Surveyors

2100 North Sanborn Blvd. - P.O. Box 398

Mitchell, South Dakota 57301

Phone: (605) 996-7761

Fax: (605) 996-0015

Westwood Addition Storm Drainage

Design Report Summary

Mitchell, SD

SPN #10809

March 2003



SCHMUCKER, PAUL, NOHR & ASSOCIATES
ENGINEERS-PLANNERS- SURVEYORS

620 NORTH LAWLER P.O. BOX 398
MITCHELL, SOUTH DAKOTA, zip 57301



Introduction

The following summary is intended to provide an overview of the steps and alternatives considered in the preliminary drainage design for the Westwood Addition in Mitchell, SD. The City of Mitchell requires that land developers be responsible for the storm water flow that is generated from their property. Currently, the City's guidelines indicate that the rate of flow from the property be limited to what is generated from a storm event with an intensity that can statistically be expected to occur once in 5 years. When a storm of an intensity greater than the five-year storm occurs, adequate storm water detention facilities must be in place to store the storm water to be released at a rate equal to the five-year flow rate. The detention facility is to be sized to properly store the runoff from a 100-year storm event.

The design of most hydraulic structures requires, as a major design parameter, the peak runoff generated from a rainfall event. The exact storm water flow can only be estimated, because there are many factors involved, such as:

- The intensity of the precipitation event
- The beginning moisture conditions of the soil
- The amount of ground storage, such as small depressions or ponds
- The land use, such as crop land or pasture land
- The permeability of the ground
- The amount of impermeable area, such as paved parking lots or roads
- The topography of the land
- The size of the drainage area

Due to their complexity, many of these factors can only be estimated. A detailed analysis of the current and future land uses is required to provide a reasonably accurate evaluation of the above factors, which will allow an accurate determination of the peak storm water flow.

The following calculations are performed to estimate the peak runoff that can be expected from the property.

Drainage Study

1. The first set of calculations performed was needed to determine the estimated rates of storm water flow that will be generated from the property.

The area of the property within the development boundaries contributing to storm water flow was found to be:

DrainageArea := 112 × acre

An evaluation of the runoff characteristics of the ground surface within the property boundaries established a coefficient that represents how much of the water that falls as rain ends up as runoff.

RunoffCoefficient := 0.70

The time that runoff takes to reach the storm water detention facility from the most remote location was determined by analyzing the topography of the property, the distance of travel, and change in elevation.

$$\text{ConcentrationTime} := 125 \text{ min}$$

The rainfall intensity was determined for the storm event that lasts for the time established above. The rainfall intensities for a 5 and a 100-year frequency were found to be:

$$\text{Rainfall}_{5\text{yr}} := 0.8 \frac{\text{in}}{\text{hr}}$$

$$\text{Rainfall}_{100\text{yr}} := 1.4 \frac{\text{in}}{\text{hr}}$$

The rational method equation was used to determine the storm water flow generated from the property.

$$\text{EstFlow}_{5\text{yr}} := \text{DrainageArea} \times \text{RunoffCoefficient} \times \text{Rainfall}_{5\text{yr}} \quad \text{EstFlow}_{5\text{yr}} = 63 \frac{\text{ft}^3}{\text{sec}}$$

$$\text{EstFlow}_{100\text{yr}} := \text{DrainageArea} \times \text{RunoffCoefficient} \times \text{Rainfall}_{100\text{yr}} \quad \text{EstFlow}_{100\text{yr}} = 111 \frac{\text{ft}^3}{\text{sec}}$$

The volume of storm water flow was determined on the basis of the rate of the runoff for the time period developed above, which is the time of concentration.

$$\text{Volume}_{5\text{yr}} := \text{ConcentrationTime} \times \text{EstFlow}_{5\text{yr}} \quad \text{Volume}_{5\text{yr}} = 474320 \text{ ft}^3$$

$$\text{Volume}_{100\text{yr}} := \text{ConcentrationTime} \times \text{EstFlow}_{100\text{yr}} \quad \text{Volume}_{100\text{yr}} = 830060 \text{ ft}^3$$

The capacity of the inlet at 23rd and Ohlman has been calculated to be 5.5 cfs. Therefore, the volume the inlet can handle over the time period is calculated to be:

$$\text{Volume}_{\text{Inlet}} := 5.5 \times \frac{\text{ft}^3}{\text{sec}} \times \text{ConcentrationTime} \quad \text{Volume}_{\text{Inlet}} = 41250 \text{ ft}^3$$

Since the City of Mitchell requires storm water flow generated from a storm larger than the 5-year storm to be stored, the proposed storm water detention facility was sized to handle a volume equal to the difference between the 100 and 5-year volumes.

$$\text{Volume}_{\text{Pond}} := \text{Volume}_{100\text{yr}} - \text{Volume}_{5\text{yr}} \quad \text{Volume}_{\text{Pond}} = 355740 \text{ ft}^3$$

2. A second set of calculations was performed to determine the total estimated storm water flow that will be generated from the property as well as the runoff that will flow through the property from other areas. Even though this analysis was not used to size the proposed storm water detention facility, this information is necessary for the following reasons:
 - The analysis helped evaluate the risk of flooding the property adjacent to the storm water ditches and the detention facility.
 - The analysis was used to evaluate the channel design downstream of the storm water detention facility.
 - The analysis can be used for sizing of City detention facilities proposed at 23rd and Ohlman.

The total area contributing storm water flow was found to be:

$$\text{DrainageArea} := 552 \times \text{acre}$$

An evaluation of the runoff characteristics of the ground within the entire contributing drainage area established a coefficient that represents how much of the water that falls as rain ends up as runoff.

$$\text{RunoffCoefficient} := 0.39$$

The time that runoff takes to reach the storm water detention facility from the most remote location was determined on the basis of the topography of the drainage area and was found to be:

$$\text{ConcentrationTime} := 208 \text{min}$$

The rainfall intensity was determined for the storm event that lasts for the time established above. The rainfall intensities for a 5 and a 100-year frequency were found to be:

$$\text{Rainfall}_{5\text{yr}} := 0.55 \frac{\text{in}}{\text{hr}}$$

$$\text{Rainfall}_{10\text{yr}} := 1.0 \frac{\text{in}}{\text{hr}}$$

The rational method equation was used to determine the storm water flow generated from the property.

$$\text{EstFlow}_{5\text{yr}} := \text{DrainageArea} \times \text{RunoffCoefficient} \times \text{Rainfall}_{5\text{yr}} \quad \text{EstFlow}_{5\text{yr}} = 119 \frac{\text{ft}^3}{\text{sec}}$$

$$\text{EstFlow}_{10\text{yr}} := \text{DrainageArea} \times \text{RunoffCoefficient} \times \text{Rainfall}_{10\text{yr}} \quad \text{EstFlow}_{10\text{yr}} = 217 \frac{\text{ft}^3}{\text{sec}}$$

The volume of storm water flow for the concentration time developed above was determined to be:

$$\text{Volume}_{5\text{yr}} := \text{ConcentrationTime} \times \text{EstFlow}_{5\text{yr}}$$

$$\text{Volume}_{5\text{yr}} = 1489996 \text{ ft}^3$$

$$\text{Volume}_{10\text{yr}} := \text{ConcentrationTime} \times \text{EstFlow}_{10\text{yr}}$$

$$\text{Volume}_{10\text{yr}} = 2709084 \text{ ft}^3$$

The City of Mitchell only requires the storm water flow generated from the development to be controlled. Therefore, the flows generated from other areas are not considered to size the storm water detention facility. However, as discussed above, this information is useful in other ways.

Alternative Analysis

The required storage volume calculated from the difference of the total flows of the 100-year and 5-year storms was used to determine the size and depth of the proposed storm water detention facility. Several CADD drawings were developed that show proposed options for pond location, pond size, and pond depth. The two options chosen are shown in the attached drawing.

Option 1: Two Storm Water Ponds

Two ponds are proposed by this option to store the excess storm water flow. An area of approximately 188,000 square feet cut a depth of two feet will provide adequate storm water detention. The location of the ponds will allow efficient use of land for future lot development.

Option 2: One Storm Water Pond

One pond is proposed in this option to store the excess storm water flow. An area of approximately 309,000 square feet at a depth of 1 1/4 feet will provide adequate storm water detention. This option requires less grading, but more land is needed for the pond area. However, the placement of the pond is still such that future lot development in the area can be accomplished. This is the option apparently preferred by the City of Mitchell.

Two options for transporting the water through the property were also explored. Basically, one option evaluated the use of open channel flow, while the other option investigated using a pipeline.

Option 1: Open Channel Flow

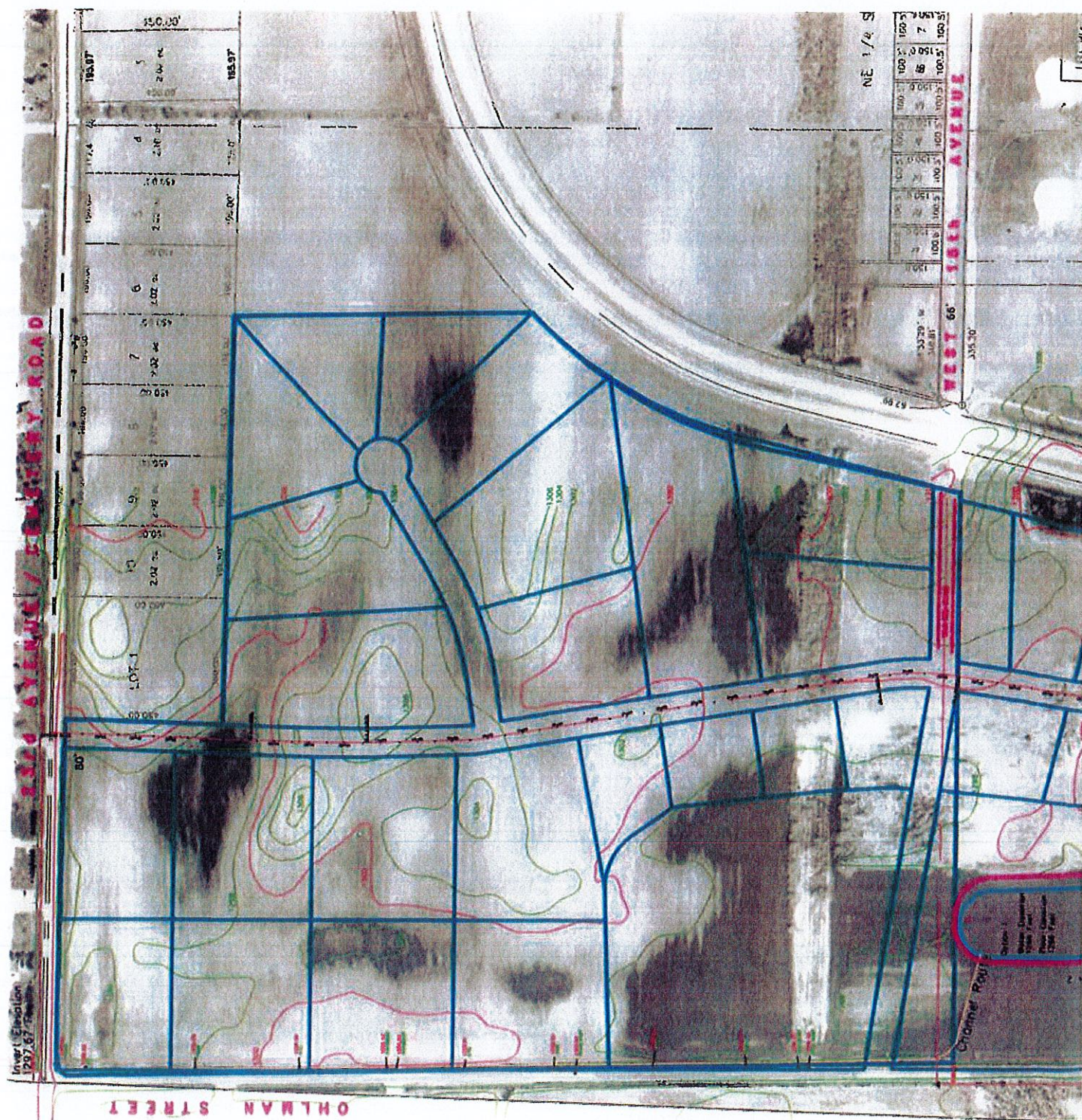
A proposed channel was considered to transport the storm water from the pond to the northwest corner of the property where an existing inlet is located. The channel was proposed with an 8-foot base, 4 to 1 side slopes, and a 0.03% slope.

Option 2: Pipe Flow From Storm Water Pond

A storm water pipeline was considered to transport the storm water from the pond to the northwest corner of the property. The proposed pipeline will connect to the invert of the existing inlet. Since the existing grade from the proposed pond to the northwest corner of the property is relatively flat, the full-flow pipe sizing requires a 60-inch pipe. The installation of this size of pipe is not cost-effective and thus, was not recommended.

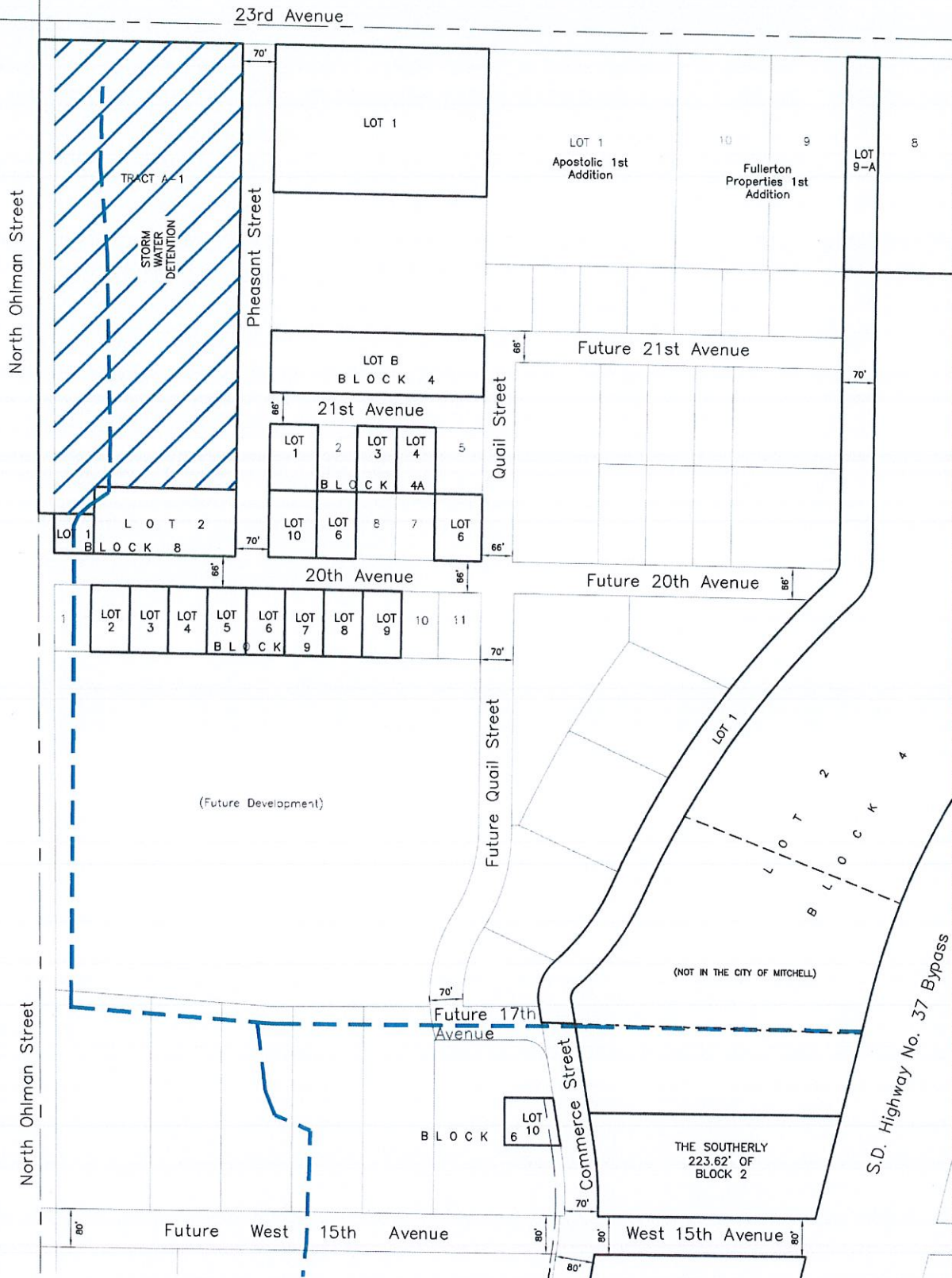
Conclusion

Based on the preliminary design, it appears Pond Option 1 with open channel flow is the least costly alternative. The two-pond layout is advantageous because it will leave more land available for development. However, the City of Mitchell prefers the larger shallower single pond alternative (Option 2), because the shallower depth will encourage the growth of cattails that are beneficial in terms of the removal of pollutants from the storm water runoff. The pond site excavation with both options will provide fill to place on other portions of the property.



WESTWOOD FIRST ADDITION MASTER PLAN

5/29/2020



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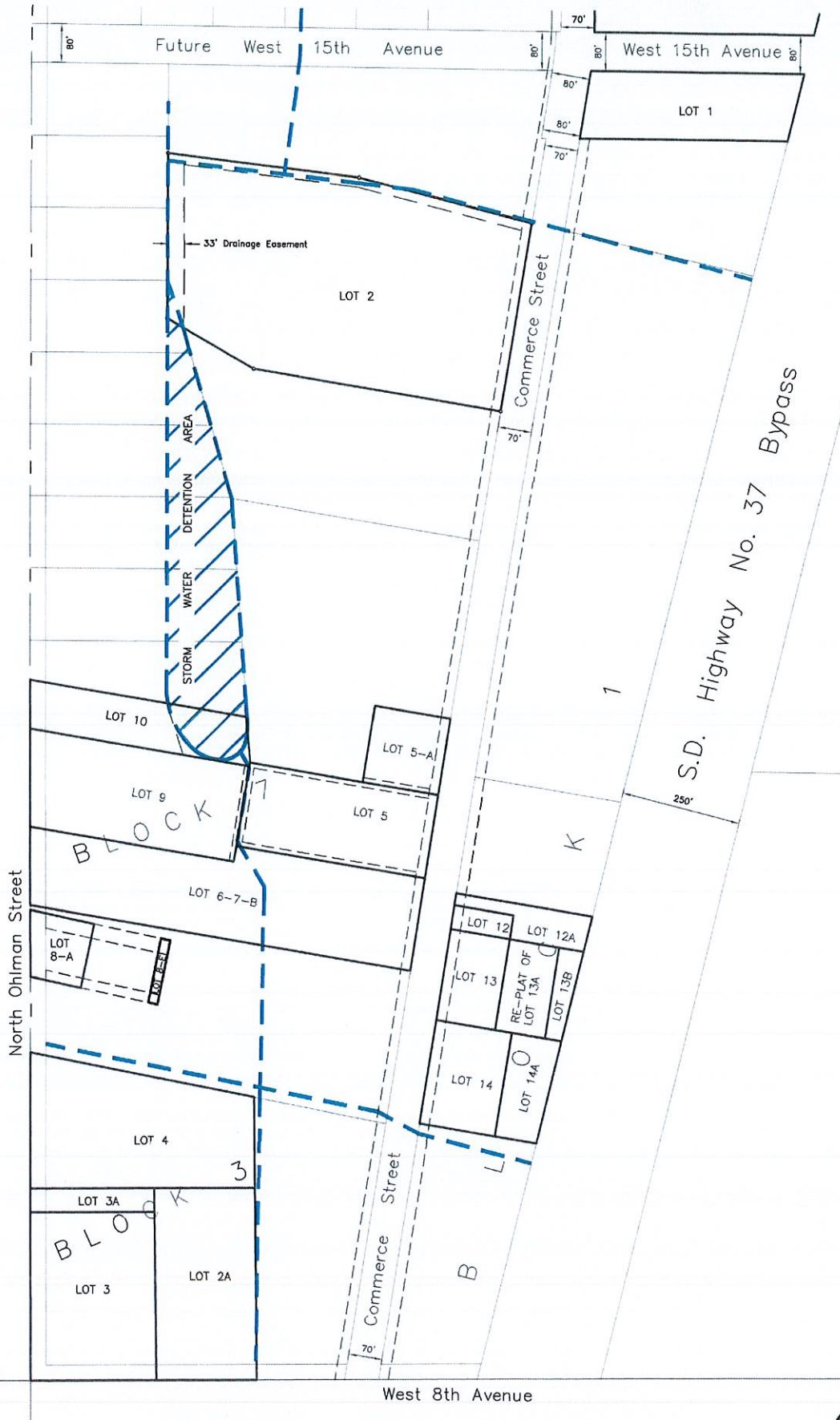


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BY: NAP

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