City of Afton

PLANNING COMMISSION AGENDA

April 1, 2019
7:00 pm

1. **CALL TO ORDER -**

2. **PLEDGE OF ALLEGIANCE –**

3. **ROLL CALL -**
   a) Scott Patten
   b) Sally Doherty
   c) Kris Kopitzke (Chair)
   d) Jim Langan
   e) Roger Bowman
   f) Justin Sykora
   g) Christian Dawson
   h) Doug Parker

4. **APPROVAL OF AGENDA –**

5. **APPROVAL OF MINUTES –**
   A. March 4, 2019 Meeting Minutes

6. **REPORTS AND PRESENTATIONS –** None

7. **PUBLIC HEARINGS –**
   A. Gary Swanson Application for a Minor Subdivision and Variance at 5550 Neal Avenue

8. **NEW BUSINESS –** None

9. **OLD BUSINESS -**
   A. Election of Officers
   B. Review and Clarification of Elements of the PLCD Ordinance Language
   C. Pervious Pavers
   D. Planning Commission Dinner Gathering
   E. Update on City Council Actions – Council Highlights from the January 15, 2019 Council meeting - attached.

10. **ADJOURN –**

A quorum of the City Council or Other Commissions may be present to receive information.

CITY OF AFTON
DRAFT PLANNING COMMISSION MINUTES
March 4, 2019

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1. **CALL TO ORDER** – Sally Doherty called the meeting to order at 7:00 PM

2. **PLEDGE OF ALLEGIANCE** – was recited.

3. **OATHS OF OFFICE**
   Christian Dawson
   Doug Parker

4. **ROLL CALL** – Present: Sally Doherty, Christian Dawson, Doug Parker, Roger Bowman, Justin Sykora. A Quorum was present. Absent were Scott Patten & James Langan (excused).
   ALSO IN ATTENDANCE – City Council member Lucia Wroblewski, City Administrator Ron Moorse

5. **APPROVAL OF AGENDA** –
   The Election of officers will be deferred until next month
   Motion/Second Bowman/Sykora to approve the agenda for the March 4, 2019 Planning Commission meeting as amended. Passed 5-0.

6. **APPROVAL OF MINUTES** –
   A. February 4, 2019
   Motion/Second Bowman/Doherty to table approval of minutes of the February 4, 2019 Planning Commission meeting until April. Passed 5-0

7. **REPORTS AND PRESENTATIONS** - None

8. **PUBLIC HEARINGS** –
   A. **Kathy Bolton-Iverson Application for minor subdivision and variance** (taken out of order)
   Doherty opened the Public hearing at 8:08 PM
   Administrator Moorse provided a summary of the application which is for a minor subdivision at 3632 St. Croix Trail to divide the existing 1.033-acre parcel into two parcels of 22,500 sq. ft. each. The variance is to allow the existing garage to remain as it is located 17.8 feet from the new boundary line.
   Bowman asked why split the lot now instead of waiting until the shed is moved.
   Kevin Johnson, adjacent neighbor to the property questioned the long term plan and process
   No other public comments. The applicant was not present.
   Motion/Second Bowman/Sykora to close public hearing. Passed 5-0
   Public hearing closed at 8:18PM.
   Discussion
   Doherty and Bowman both questioned the sequence of events. Moorse replied he understood it to be to first renovate the existing house, move shed, then split property.
   Sykora asked if there were any historical issues with the shed?
   With the existing building straddling the new property line, the order of events was questioned by all. The lot would be non-conforming if building is moved.
   Motion/Second Sykora/Doherty to not recommend approval of subdivision due to the existing building on the lot line; and subdivision is not necessary to do renovation work at property. Passed 5-0

   Doherty noted that the variance request is no longer applicable with subdivision being denied, but would have been in approval of, as the 10' setback to rear property line would have been admissible.

   Motion/Second Bowman/Sykora to recommend denial of the variance request because it is no longer necessary with the subdivision being denied, and to indicate to City Council when the subdivision is

approved, the Planning Commission would look favorably on the variance; denial has to do with the process.
Doherty Friendly Amendment (accepted): The variance request does not pass the uniqueness test; it is brought on by the landowner.
Motion Vote: Passed 5-0.

B. Tim and Jacqueline Leba application for a variance for a driveway

Doherty opened the Public hearing at 7:09 PM
Administrator Moorse provided a summary of the application which is for a variance to the 300 foot driveway separation requirement to allow a driveway to serve one house on an 80-acre property east of Neal Avenue at 22nd Street. The variance is to enable the driveway to be located 215 feet from the nearest driveway on the same side of Neal Avenue vs. the required 300 foot separation. The subject 80-acre parcel has an existing driveway that serves the 40-acre parcel to the south through a private driveway easement. The proposed driveway would be separated by a distance of 215 feet from the existing private easement driveway.

Bowman asked about crossing 12 & 18% slopes. Moorse stated they can cross 12 % slopes. Land currently is owned by Landucci and will be sold contingent to driveway.
Mara Clark, owns property to east of parcel. Asked if this lays the foundation for future development or does it eliminate that possibility?
Moorse replied it does not lay the foundation for a PLCD.
Motion/Second Parker/Dawson to close public hearing. Passed 5-0
Public hearing closed at 7:17 PM.
Discussion
Parker asked about the history of the property.
Todd Erickson, Engineer, explained that the property is owned by a developer who and decided to sell it as one parcel rather than develop.
Bowman asked about the 40 acres in back and if there is other access (no, it is landlocked)
Doherty asked about PID numbers, are there 3? (yes, 3). It is important for this to become one PID with the county, as it is in our ordinances that parcels need to be combined if they don't meet requirements for frontage or lot size. Landlocked parcels should be combined.
Parker asked about shared driveways (Moorse replied that the current ordinance doesn't allow for shared driveways.)
Doherty stated that the use fits well with the Comprehensive plan. The other use that was considered was a PLCD and they decided this was better fit. This is the most logical place for placement of driveway. It would require the condition of a turnaround. What would width of driveway be? (Erickson will follow city recommendations.)
Moorse replied that the ordinance states a maximum width of 22' (ord. 12-84).
Doherty suggested adding a condition that "the driveway to meet all requirements of Ordinance 12-84."
Erickson stated the driveway would be a farm access for now, the rest would be completed when they build the house.
Doherty suggested adding a condition "prior to beginning construction of home a turnaround will be built".

Motion/Second Bowman/Dawson To recommend approval to the City Council of the Tim and Jacqueline Leba Application for a variance for a driveway to serve the 80-acre property located east of Neal Avenue at 22nd Street with PID#s 17.028.20.21.0002, 17.028.20.12.0001 and 17.028.2013.0004, with findings and conditions below.

Findings

1. **The subject property, as well as the surrounding properties, is zoned Ag**
2. **The proposed driveway would be separated from the nearest driveway on the same side of Neal Avenue by 215 feet, vs. the required separation distance of 300 feet**

3. **A property can have more than one driveway, subject to approval by the Zoning Administrator**
4. **The proposal would enable one house on 80 acres of property.**
5. **The proposed house is planned to be located approximately 2500 feet east of Neal Avenue, and would be difficult or impossible to see from Neal Avenue**
6. **The proposed driveway is approximately 2,500 feet in length**

Conditions

1. **Prior to construction of the house, a turnaround, meeting the requirements of Sec. 12-84. E., shall be provided at the end of the driveway to enable public safety vehicles to turn around to exit the property**
2. **Prior to driveway construction, the three parcels that make up the 80- acre property shall be combined into a single PID.**
3. **A driveway permit is required and the driveway shall meet all residential driveway standards of Sec. 12-84, and shall be subject to review and approval by the City.**
4. **The driveway is subject to a permit from the Valley Branch Watershed District, the approval of which shall be obtained**
5. **The driveway is subject to an access permit from Washington County, the approval of which shall be obtained**

Motion Vote: Passed 5-0.

C. Gary Narducci application for a variance at 3475 Neal Ave S

Doherty opened the public hearing at 7:36 PM

Administrator Moorse provided a summary of application which is for a variance to the front yard setback and a Conditional Use Permit to enable the construction of a 1,480 sq. ft. accessory building at 3475 Neal Avenue. The subject property has a limited buildable area, due to steep topography on the north, northwest and east portions of the property. The existing house, which was approved to replace an older house in 2004, is nonconforming in relation to the front yard setback, due to the steep topography to the east. The front yard setback of the house is approximately 120 feet vs. the required 150 feet. The planned accessory building is proposed to have a front yard setback of 126 feet vs. the required 150 feet. Similar to the existing house, the setback variance is due to steep slopes to the east.

Sykora asked about the location of a secondary septic site. (Moorse does not currently have)

Parker asked about conservancy overlay district and what that means. (Moorse explained there are no additional regulations, but that is an alert that there are sensitive features here. They are staying away from trees and erosion area).

No additional comments were received

Motion/Second Sykora/Bowman to close public hearing. Passed 5-0.

Public hearing closed at 7:47 PM

Parker asked how driveway is getting to the building and if there is room to turn around (there is room to turn around in existing driveway)

Bowman asked about the impact of roof run-off onto the steep slope over the years.

Sykora stated that runoff could be managed, would require long-term erosion control

Sykora feels it meets all the conditions for a variance. Would like to see a finding or condition relating to the secondary septic location and would add condition of long-term erosion control.

Doherty clarified that the variance is for a front yard setback of 126' from center line of road; CUP is for 11' setback from a 18% slope.

Doherty stated two additional conditions: It shall be confirmed that a suitable secondary septic location is not disrupted by the placement of the building; and an erosion control plan should include runoff at the time of construction and also long term.

Motion/Second <u>Doherty/Bowman</u> to recommend approval of the Gary Narducci application for a variance to the front yard setback to enable the construction of an accessory building at 3475 Neal Avenue with findings and conditions listed:

<u>Findings</u>

1. **The subject property is located in the Ag zone, as are the surrounding properties.**
2. **While the subject parcel is 8 acres in size, it is a long, narrow parcel with a lot width of 264 feet vs. the required 300 feet**
3. **The subject property has limited buildable area, due to steep topography on the north, northwest and east portions of the property and the septic system located southeast of the house**
4. **The existing house is nonconforming in relation to the front yard setback, due to the steep topography to the east. The front yard setback is 120 feet vs. the required 150 feet.**
5. **The planned accessory building is proposed to have a front yard setback of 126 feet vs. the required 150 feet**
6. **The northeast corner of the proposed building is located as close as 11 feet from the crest of an 18% slope.**
7. **The applicant has provided an erosion control plan that includes the elements required by the City Engineer, including silt fencing between the proposed building and the crest of the slope and the protection and revegetation of disturbed soils near the crest of the slope.**

<u>Conditions</u>

1. **The erosion control plan shall deal with construction runoff, and the long term impact of water runoff, and shall be reviewed and approved by the City Engineer.**
2. **A performance bond or Letter of Credit, equal to 125% of the total cost of the erosion control plan shall be provided for a period of two (2) years beginning at the time of completion to ensure the applicant adheres to the erosion control, landscaping and revegetation plan.**
3. **The secondary septic system site shall not be disrupted by placement of the building.**

Motion vote: Passed 5-0

Motion/Second <u>Sykora/Dawson</u> to recommend approval of the Gary Narducci application for a Conditional Use Permit to enable the construction of an accessory building at 3475 Neal Avenue, with findings, and conditions as listed above. Passed 5-0

9. NEW BUSINESS -

A. Pervious Pavers and Impervious coverage regulations

At the February 19, 2019 Council meeting, Mayor Palmquist requested, and the Council agreed, that the topic of how pervious pavers are treated in relation to the City's impervious coverage requirements, particularly in the Village Historic Site District, be referred to the Planning Commission for review and recommendations. Pervious pavers are currently treated as impervious coverage. A main reason for this is the concern that pervious pavers will not be properly maintained and, over time, will become impervious.

Motion/Second <u>Bowman/Sykora</u> to recommend that the council not make a change at this time, the science is imperfect, standards have not been defined.

Sykora stated that over time, in this climate, pervious will become impervious. Long term maintenance and enforcement are problematic.

Parker stated that typically the pavers require 2x per year maintenance or cleaning to achieve 80% pervious rate. Better to have more conservative position

Bowman suggested a CUP could be granted on a case by case basis to exceed requirements
Parker asked if allowed, where does it end?
Moorse stated that other cities will put a limit on, such as percent of total.
Doherty asked if other stakeholders have a definition (State? DNR? Watershed?)
Moorse will gather other city ordinances
Doherty stated that we should gather more facts
Bowman stated that we need a measurable definition for permeable
Sykora stated he would like feedback and information
Bowman withdraw motion (Sykora accepted) Motion Withdrawn
Research and come back next month

B. Election of Officers
Tabled until April

10. OLD BUSINESS –

A. Review and clarification of elements of the PLCD ordinance language
Group 1 elements
a. Clarify that open space outlots in a PLCD are allowed to be created as outlots
Language in PLCD varies from the ordinance
Bowman asked why no cul-de-sac outlots? Moorse replied that had to do with future development concerns on the cul-de-sac.
Recommend clarifying to read to "Allow unless the outlot is under conservation easement"

b. Clarify that a PLCD requires a CUP rather than an Administrative Permit
All agreed to change language to "CUP" (appears to be a typo)

c. Clarify maximum density allowed in a PLCD
3 per quarter-quarter section or 4 per quarter-quarter
Sykora stated it should be total of property, not by quarter-quarter as it can take away from neighboring property.
Doherty stated the zoning ordinance doesn't mention quarter-quarter; also question on how to count
Parker stated it should be based around what is buildable, and what exists
Doherty stated it cannot be solved tonight; but everyone should think through language options

Elements d,e, and f will be looked at next month

B. Update on City Council actions
Council member Wroblewski provided a summary of the February City Council meeting.

11. ADJOURN
Motion/Second <u>Sykora/Dawson</u> To adjourn. Passed 5-0

Meeting adjourned at 9:30 PM

Respectfully submitted by:

_____
Julie Yoho, City Clerk

DRAFT

To be approved on April 1, 2019 as (check one): Presented: _____ or Amended: _____

DRAFT

City of Afton
3033 St. Croix Trl, P.O. Box 219
Afton, MN 55001

Planning Commission Memo

Meeting: April 1, 2019

To: Chair Kopitzke and members of the Planning Commission

From: Ron Moorse, City Administrator

Date: March 27, 2019

Re: Gary Swanson Application for a Minor Subdivision and Variance at 5550 Neal Avenue

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Minor Subdivision

The applicant owns an 80 acre parcel at 5468 Neal Avenue that includes a house and accessory buildings, and an adjacent 1-acre parcel to the south on which are located a number of accessory buildings. The applicant also owns the 79 acre parcel at 5550 Neal Avenue, on which are also located a house and multiple accessory buildings. The applicant operates a farm using all three parcels. The applicant has applied for a minor subdivision at 5550 Neal Avenue to divide a 5-acre parcel, that includes a house and 3 accessory buildings, from the existing 79-acre parcel. The proposed 5-acre parcel has 300 feet of frontage on Neal Avenue and has direct access to Neal Avenue.

Existing Accessory Buildings

The applicant has removed a number of agricultural buildings from the79 acre parcel, and will remove an existing pole barn that is located on the proposed southern lot line of the 5-acre parcel. This leaves two accessory buildings with a total of approximately 2,200 sq. ft. While the zoning code limits the number of accessory buildings on a 5-acre lot to a maximum of two with a total square footage of 2,000 sq. ft., the code also exempts agricultural buildings that are existing at the time of a subdivision from the limits on maximum square footage and total number of accessory buildings. (See Sec. 12-187. paragraph 5 below.) This code language allows the two accessory buildings to remain on the 5-acre parcel.

Sec. 12-187. Types of accessory buildings

5. Existing agricultural buildings at the time of a subdivision are exempt from the limits on the maximum square footage and on the total number of accessory buildings imposed by Subsection (B) of this section. Any additions to or expansions of accessory buildings shall thereafter be subject to requirements of this section with the existing agricultural buildings being included in both the square footage and building number calculations.

Combining of Three Parcels

To address a number of issues that arose as part of the review of the subdivision application, the applicant has agreed to combine the three parcels under common ownership into one parcel. The three parcels are the 80 acre parcel at 5468 Neal Avenue, the 1 acre parcel immediately south of the 5468 Neal Avenue parcel and the 74 acre parcel that remains after the 5 acre parcel is subdivided from the 79 acre parcel at 5550 Neal Avenue. The subdivision then would be a lot line rearrangement that results in an overall reduction in the number of parcels from three parcels to two parcels.

Variance

As indicated above, there are currently several existing accessory buildings located on and adjacent to the proposed 5-acre lot. Two of the buildings are located south of the proposed 5-acre lot. One of those buildings is located 59.8 feet from the south side property line of the proposed 5-acre lot. Because the building is greater than 1500 sq. ft., the required setback is 100 feet vs. the 50 foot setback for buildings less than 1500 sq. ft.. The variance is to allow the existing agricultural building to remain for use as part of the farm operation on the remaining large parcel.

Drainage and Utility Easements

The City Engineer has indicated that 10 foot wide drainage and utility easements are required along the perimeter of the 5-acre parcel. The dedication of drainage and utility easements as required by the City Engineer should be a condition of approval.

Findings

The following are recommended findings. The Planning Commission may revise or add findings.

1. The subject property is located in the Ag zone, as are the surrounding properties.
2. The Ag zone allows single-family residential use with a 5-acre minimum lot size
3. The applicant owns the 80-acre parcel at 5468 Neal Avenue immediately north of 5550 Neal Avenue
4. There are a house and 3 accessory buildings on the area proposed as a 5-acre lot, one of which does not meet the side yard setback requirement
5. The applicant has agreed to remove the accessory building on the 5-acre lot that does not meet the side yard setback requirement
6. The total square footage of the two accessory buildings to remain on the 5-acre lot is 2,200
7. While the zoning code limits the number of accessory buildings on a 5-acre lot to a maximum of two with a total square footage of 2,000 sq. ft., Sec. 12-187 of the code also exempts agricultural buildings that are existing at the time of a subdivision from the limits on maximum square footage and total number of accessory buildings.
8. There is an existing agricultural building greater than 1500 sq. ft., located south of the proposed 5-acre lot, that would be located 59.8 feet from the proposed south side yard property line vs. the required 100 feet. The building is proposed to remain for use as part of the farm operation on the remaining large parcel.
9. The applicant has agreed to combine the three parcels under common ownership into one parcel, which would result in an overall reduction in the number of parcels from three to two.
10. The proposed 5-acre lot meets the requirements of 300 feet of frontage on a public road and direct access to the public road.

Conditions

If the Planning Commission recommends approval of the subdivision application, it is recommended that the following conditions be placed on the approval, as well as additional conditions the Planning Commission may include.

1. Easements as required by the City Engineer shall be granted
2. The three lots under common ownership shall be combined at the time the subdivision is recorded.
3. The applicant shall remove the pole barn located on the 5-acre lot near the south property line prior to the recording of the subdivision

Planning Commission Direction Requested:

Motion regarding the Gary Swanson application for a subdivision and variance at 5550 Neal Avenue, with findings, and conditions if desired.

RECEIVED
MAR 11 2019
CITY OF AFTON

Z19-10

CITY OF AFTON
MINOR SUBDIVISION PERMIT APPLICATION

Owner	Address	City	State	Zip	Phone
Gary L. Swanson	5468 Neal Avenue South	Afton	MN	55001	(651) 230-4598

Applicant (if different than owner)	Address	City	State	Zip	Phone

Project Address			
5550 Neal Avenue South	**AFTON**	**MN**	**55001**

Zoning Classification	Existing Use of Property	PID# or Legal Description
Agricultural	Agricultural	31.028.20.42.0001

Description of Request
To Split a 5.00 acres parcel from a 78.18 acres parcel

By signing this application, the applicant agrees to pay all expenses incurred by the City of Afton. In connection with this request, your signature constitutes permission for a representative of the City of Afton to enter your property, during business hours, to evaluate this request. This may involve minor excavating or soil borings. If you would like to be present during this evaluation, please contact the City.

Gary Swanson — 3-11-19

Signature of Owner/Applicant — Date

Make checks payable to **City of Afton:**

FEES:		**Escrow:**			
Minor Subdivision	$250.00	Minor Subdivision	$1,500.00	TOTAL:	$1,750.00
				DATE PAID:	3-11-19
				CHECK #:	7896
				RECVD. BY:	[illegible]

ATTACH COPY OF DEED OR PROOF OF OWNERSHIP TO APPLICATION

RECEIVED

MAR 11 2019

CITY OF AFTON

Z19-11

CITY OF AFTON
VARIANCE APPLICATION
(Reference Sections: 12-55, 12-77, 12-328 12-835, 12-1020, 12-1266, 12-1955, 12-2228)

Owner	Address	City	State	Zip	Phone
GARY LYLE SWANSON LORI ANN SWANSON	5468 Neal Ave S	Afton	Mn	55001	651-230-4598
Applicant (if different than owner)	**Address**	**City**	**State**	**Zip**	**Phone**

Project Address: 5550 NEAL AVE S — AFTON MN 55001

Zoning Classification	Existing Use of Property	PID# or Legal Description
Ag	Ag	31.028.20.42.0001

Please list the section(s) of the code from which the variance(s) are requested.

Description of Request: Side lot distance variance for a structure over 1500 ft² less then 100' ft from side lot line 2700 ft² ~~68'~~ 60'

By signing this application, the applicant agrees to pay all expenses incurred by the City of Afton. In connection with this request, your signature constitutes permission for a representative of the City of Afton to enter your property, during business hours, to evaluate this request. This may involve minor excavating or soil borings. If you would like to be present during this evaluation, please contact the City.

Gary Swanson — 3-11-19

Signature ~~of Owner~~/Applicant — Date

Make checks payable to: **City of Afton**

If multiple variances are necessary from the applicant only **one** fee is required. However, the deposit fee must be multiplied by the number of variances sought.

FEES:		**ESCROWS:**
Variance	$250	$600
Renewal/Extension	$250	$350

TOTAL: $850

DATE PAID: 3-11-19

CHECK #: 7897

RECVD BY: [illegible]

Z:\central files 1\FORMS\Variance Forms\Application.DOC

City of Afton, Minnesota **[VARIANCE QUESTIONAIRE]**

Applicant(s): GARY + LORI SWANSON
Phone: 651-230-4598
Mailing Address: 5468 NEAL AVE S
Property Address for variance: 5550 NEAL AVE S

Variance request description: side lot line distance 60' vs. 100'

City Ordinance Section number(s), that variance is requested for:

Answer the following questions to the best of your ability - based on the criteria found in section 12-77 of Afton's Code (Land Use, Appeals and Variances). Completing this questionnaire will help the Planning Commission and the City of Afton evaluate your application in light of the requirements of Afton's Variance Ordinance. It does not guarantee that your variance request will be approved. If needed use a separate page.

Background: This questionnaire is designed to help you and the City of Afton determine whether a variance should be granted. Please consult with the City Administrator who can help you with your variance application and explain the Variance Ordinance to you. The City Administrator will work with you to ensure that the variance you request is the minimum variance required to provide the same rights commonly enjoyed by other properties in the same zoning district. Because of special provisions for certain types of construction, the City Administrator will also determine whether the property is in the Flood Plain District. There are also special provisions for earth-sheltered construction.

Criteria #1 *The requested use, must be a reasonable use in order to receive a variance.* **Applicant -** Please explain why the proposed use which requires a variance is a reasonable use for this property?
existing structures on property

Criteria #2 *Exceptional or extraordinary circumstances apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size, shape, topography, or other circumstances over which the property owner, since enactment of this Ordinance, have had no control.* **Applicant -** What exceptional or extraordinary circumstances related to the property do not apply generally to other properties in the same zone or vicinity? Extraordinary circumstances would include lot size, irregular lot shape or topography. Are there other circumstances over which you, as the property owner, have no control?

Explain? was an existing home stead with multiple structures

Criteria #3 *That literal interpretation of the provisions of this Ordinance would deprive the applicant of rights commonly enjoyed by other properties in the same district under the terms of this Ordinance.* **Applicant** - How does the literal interpretation of the provisions of the Afton ordinance (from which you are requesting a variance) deprive you of rights commonly enjoyed by other properties in the same zoning district? Explain: _____

Criteria #4 *The special conditions or circumstances do not result from actions of the applicant.* **Applicant** - How did these exceptional circumstances related to the property come about? Did actions by you create these circumstances? Explain: Existing structures

Criteria #5 *That granting the variance requested will not confer on the applicant any special privilege that is denied by this Ordinance to owners of other lands, structures, or buildings in the same district.* **Applicant** - Will the granting of the requested variance confer on you, the applicant, any special privilege that is denied by this ordinance to owners of other lands, structures, or buildings in the same zoning district? Explain: _____

Criteria #6 *The variance requested is the minimum variance which would alleviate the hardship.* **Applicant** - Is the variance you are requesting the minimum variance which would alleviate the practical difficulty or hardship for your property? Explain: _____

Criteria #7 *The variance would not be materially detrimental to the purposes of this Ordinance, or to property in the same zone.* **Applicant (Optional)** - Will the variance be materially detrimental to the purposes of this Ordinance, or to property in the same zone? How would the use of the property, if allowed by the variance, affect other properties in the vicinity?
Explain: _____

Criteria #8 *Economic conditions or circumstances alone shall not be considered in the granting of a variance request if a reasonable use of the property exists under the terms of the ordinance.* **Applicant** - Is the requested variance for economic reasons?
Explain: _____

Criteria #9 *In the Flood Plain District, no variance shall be granted which permits a lower degree of flood protection than the Regulatory Flood Protection Elevation for the particular area or permits standards lower than those required by state law.* **Applicant (optional), PC** - Is the property in a Flood Plain District? ☐ Yes ☒ No

Criteria #10 *Variances shall be granted for earth-sheltered construction by state statutes when in harmony with this Ordinance.* **Applicant** - Is the variance for earth-sheltered construction? ☐ Yes ☒ No

ADDITIONAL CRITERIA THAT MAY BE CONSIDERED BY THE PLANNING COMMISSION (PC) AND/OR CITY COUNCIL(CC)- Applicant responses to criteria #11 and criteria #12 are optional.

Criteria #11 *Variances shall only be permitted when they are in harmony with the general purposes and intent of the ordinance.* **Applicant (Optional), PC** - Is the requested variance in harmony with the Afton ordinances and code? How will this variance if granted (and the proposed use of the property allowed) affect the essential character of the area?

Explain: _____

_____

Criteria #12 *Variances shall only be permitted when they are in harmony with the general purposes and intent of the Afton Comprehensive Plan.* **Applicant (Optional), PC** - Is the requested variance in harmony with the Afton comprehensive plan?

Explain: _____

_____

Washington County

Department of Property Records and Taxpayer Services

14949 62nd Street North - PO Box 6
Stillwater, MN 55082-0006
(651) 430-6175
www.co.washington.mn.us

PROPOSED TAXES 2019

THIS IS NOT A BILL - DO NOT PAY

TAXPAYER(S):
GARY L SWANSON REV TRS & LORI A SWANSON REV TRS
5550 NEAL AVE S
AFTON MN 55001-9612

01000630

PROPERTY INFORMATION:

PIN: 31.028.20.42.0001

Property Address:
5550 NEAL AVE S
AFTON MN 55001

Property Description:
Section 31 Township 028 Range 020 N1/2-SE1/4 EXCEPT:PT NE1/4-NE1/4 BEG AT NE COR OF SD NE1/4-SE1/4 THN N89DEG56'15"W (BRG BASED ON WACO CORD SYS S ZONE) ALG N LN OF SD NE1/4-SE1/4 DIST 412.5FT (25 RODS) THN S00DEG03'45"W AT RT ANG TO SD N LN OF NE1/4- SE1/4 DIST OF 105FT THN S89DEG56'15"

Step 1 — VALUES AND CLASSIFICATION

Taxes Payable Year	2018	2019
Estimated Market Value	1,332,900	1,342,900
Homestead Exclusion		
Other Exclusion/Deferral	479,000	479,000
Taxable Market Value	853,900	863,900
Class	Ag Hstd Frac. Ag Non-Hstd Res Non-Hstd	Ag Hstd Frac. Ag Non-Hstd Res Non-Hstd

Step 2 — PROPOSED TAX

Property Taxes before credits	$8,179.04
School building bond credit	$290.00
Agricultural market value credit	$771.04
Other credits	$0.00
Property Taxes after credits	$7,118.00

Step 3 — PROPERTY TAX STATEMENT

Coming in March, 2019

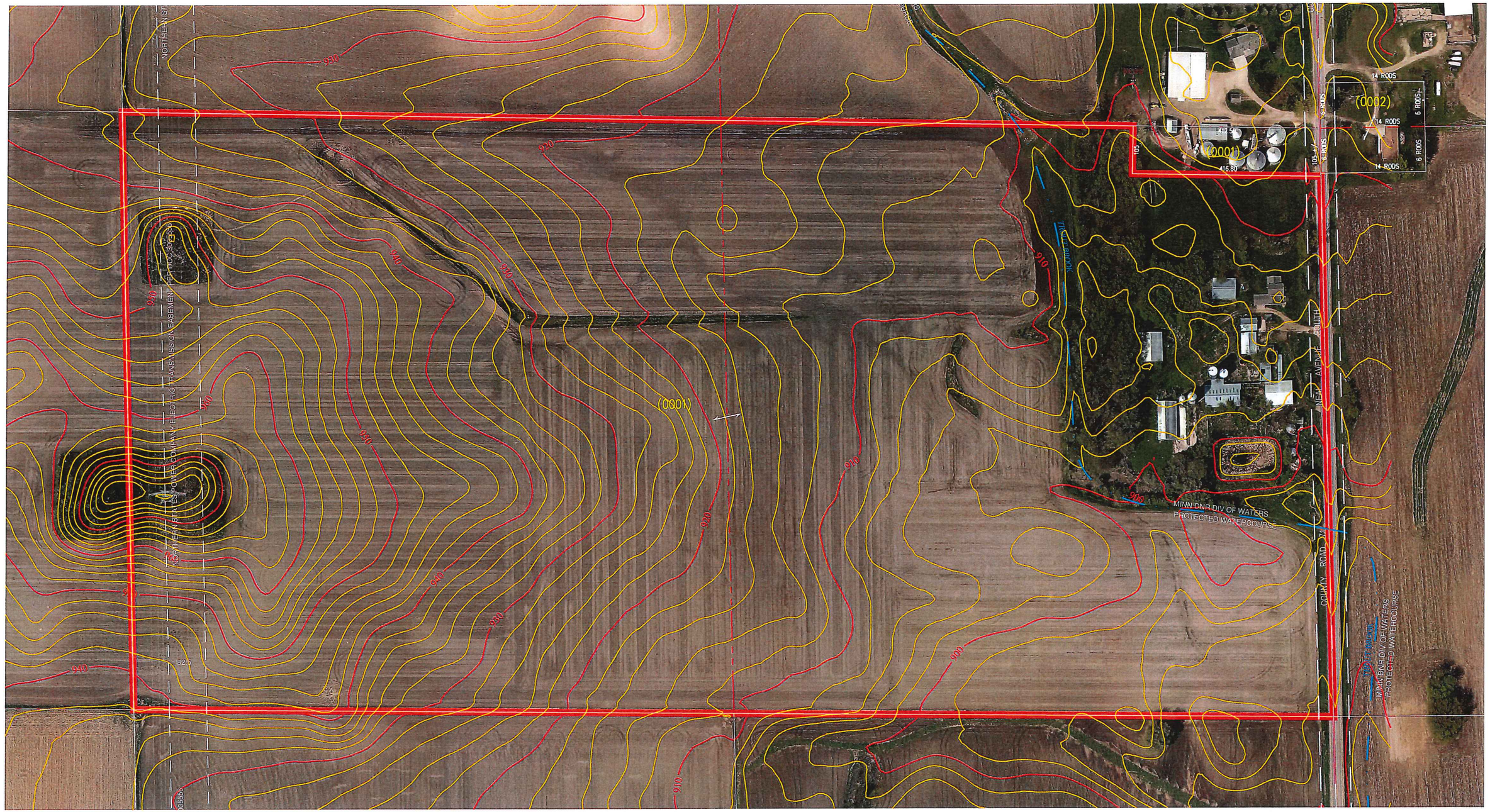
The time to provide feedback on PROPOSED LEVIES is NOW

It is too late to appeal your value without going to Tax Court

Proposed Property Taxes and Meetings by Jurisdiction for Your Property

Contact Information	Meeting Information		Actual 2018	Proposed 2019	% Chg
State General Tax	No Public Meeting		$0.00	$0.00	
WASHINGTON COUNTY 14949 62ND ST N PO BOX 6 STILLWATER MN 55082 651-430-6175 www.co.washington.mn.us	DECEMBER 4, 2018 6:00 PM COUNTY BOARDROOM GOVERNMENT CENTER		$1,798.67	$1,806.29	
CITY OF AFTON PO BOX 219 AFTON MN 55001 651-436-5090 www.ci.afton.mn.us	DECEMBER 18, 2018 7:00 PM CITY HALL 3033 ST CROIX TRL S		$1,908.13	$1,989.84	
ISD 833 SOUTH WASHINGTON 7362 E POINT DOUGLAS RD S COTTAGE GROVE MN 55016 651-425-6300 www.sowashco.org	DECEMBER 13, 2018 6:30 PM DISTRICT SERVICE CENTER 7362 E POINT DOUGLAS RD S	Voter approved levies Other Local Levies	$2,066.39 $937.72	$2,109.06 $1,014.08	
Metro Special Taxing Districts 390 ROBERT ST N SAINT PAUL MN 55101 651-602-1738 www.metrocouncil.org	DECEMBER 12, 2018 6:00 PM METROPOLITAN COUNCIL CHAMBERS 390 ROBERT ST N		$74.28	$64.57	
Other Special Taxing Districts	No Public Meeting		$135.33	$134.16	
Tax Increment Tax	No Public Meeting		$0.00	$0.00	
Fiscal Disparity Tax	No Public Meeting		$0.00	$0.00	
TOTAL Excluding Special Assessments			$ 6,920.52	$ 7,118.00	2.9%

$17.00



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Plotted March 4, 2019 at 10:16 a.m. by SURVPUB

Washington County

PUBLIC WORKS DEPARTMENT
SURVEY DIVISION

11660 Myeron Road North
Stillwater, Minnesota 55082
(651) 430-4300
publicworks@co.washington.mn.us
www.co.washington.mn.us/surveyor

CONTOUR LEGEND

- 10 FOOT INTERVAL CONTOUR
- 2 FOOT INTERVAL CONTOUR

Contours are provided courtesy of the Minnesota Department of Natural Resources (DNR). The Minnesota DNR makes no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. The Minnesota DNR assumes no responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

LEGEND

- DNR PROTECTED WATERS
- DNR PROTECTED WETLAND
- DNR PROTECTED WATERCOURSE
- MUNICIPAL BOUNDARY
- PARK BOUNDARY

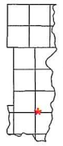
NORTH

SCALE: 1 inch = 210 feet

SECTION-TOWNSHIP-RANGE INDEX

2502821	3002820	2902820
3602821	3102820	3202820
0102721	0602720	0502720

COUNTY VICINITY MAP



* = LOCATION OF THIS MAP

SECTION VICINITY MAP

22	21	12	11
NW		NE	
23	24	13	14
32	31	42 *	41
SW		SE	
33	34	43	44

PROPERTY IDENTIFICATION NUMBER FORMAT (GEOCODE)

SECTION NUMBER	TOWNSHIP NUMBER	RANGE NUMBER	QUARTER QUARTER	SPECIFIC PARCEL
##	###	##	##	####

(0001) = LAST FOUR DIGITS OF PROPERTY IDENTIFICATION NUMBER

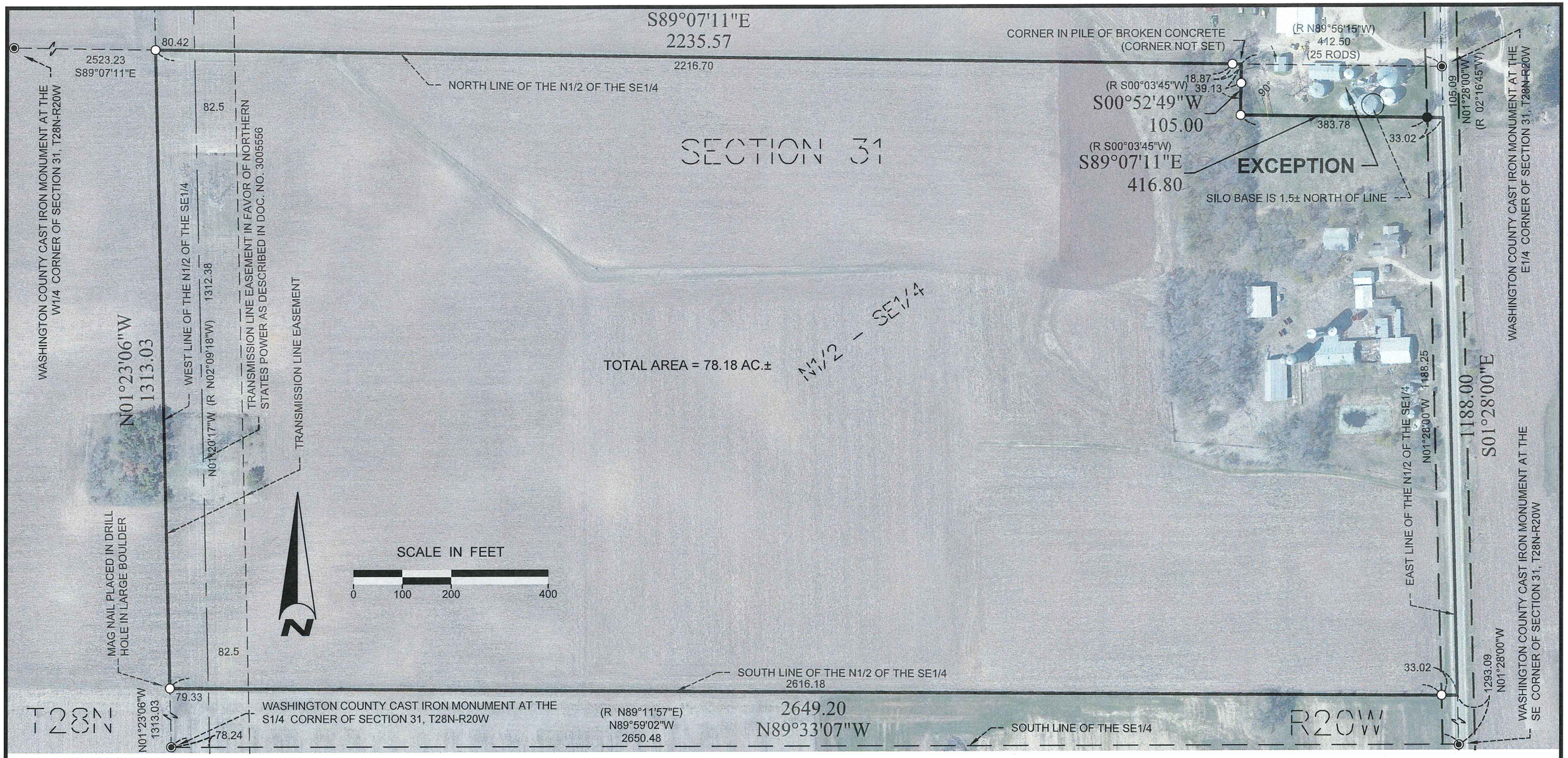
THIS DRAWING IS THE RESULT OF A COMPILATION AND REPRODUCTION OF LAND RECORDS AS THEY APPEAR IN VARIOUS WASHINGTON COUNTY OFFICES. WASHINGTON COUNTY IS NOT RESPONSIBLE FOR ANY INACCURACIES.

PROPERTY LINES AS SHOWN ARE FOR REFERENCE PURPOSES AND MAY NOT REPRESENT ACTUAL LOCATIONS.

MAP LAST UPDATED: December 15, 2017

NO ADDITIONAL CHANGES HAVE BEEN REPORTED TO DATE

DATE OF CONTOURS: November, 2011 DATE OF PHOTOGRAPHY: April, 2017



LEGAL DESCRIPTION

The North One-Half of the Southeast Quarter (N1/2 of SE1/4) of Section Thirty-one (31), Township Twenty-eight (28) North, Range Twenty (20) West, **EXCEPT** that part thereof described as follows: Beginning at the Northeast corner of the Southeast Quarter; thence North 89 degrees 56 minutes 15 seconds West, (bearings based on the Washington County Coordinate System, South Zone) along the north line of the Northeast Quarter of the Southeast Quarter, a distance of 412.50 feet (25 rods); thence South 00 degrees 03 minutes 45 seconds West, at a right angle to said north line of the Northeast Quarter of the Southeast Quarter a distance of 105.00 feet; thence south 89 degrees 56 minutes 15 seconds East, parallel with said north line of the Northeast Quarter of the Southeast Quarter a distance of 416.80 feet, more or less, to its intersection with the East line of said Northeast Quarter of the Southeast Quarter; thence North 02 degrees 16 minutes 45 seconds West a distance of 105.00 feet, more or less, to the point of beginning.

Total area of this parcel is 78.18 acres, more or less.

Subject to Neal Avenue South along the easterly line thereof. Also, subject to a transmission line easement along the westerly line thereof as described in Document No. 3005556, as recorded in the Office of the County Recorder, Washington County, Minnesota.

LEGEND

○	DENOTES 1/2 INCH IRON PIPE MONUMENT SET AND MARKED WITH A PLASTIC CAP INSCRIBED "RLS 9294."	ORIENTATION OF THIS BEARING SYSTEM IS THE WASHINGTON COUNTY COORDINATE SYSTEM, NAD83.
●	DENOTES 1/2 INCH IRON PIPE MONUMENT FOUND.	AERIAL PHOTOGRAPHY SHOWN HEREON WAS OBTAINED FROM THE MINNESOTA GEOSPACIAL WEB SITE AND IS BASED ON SPRING 2013 FLIGHTS.
◉	DENOTES WASHINGTON COUNTY CAST IRON MONUMENT.	
R	DENOTES RECORD DIMENSION	

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1			

I HEREBY CERTIFY THAT THIS SURVEY, PLAN, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

JOHN F. DWYER
DATE: 12/15/2017 LICENSE # 9294

DESIGN BY JFD
DRAWN BY DLD

DWYER & ASSOCIATES, INC.
Land Surveyors
P.O. BOX 233
HASTINGS, MN 55033
(651) 398-7808

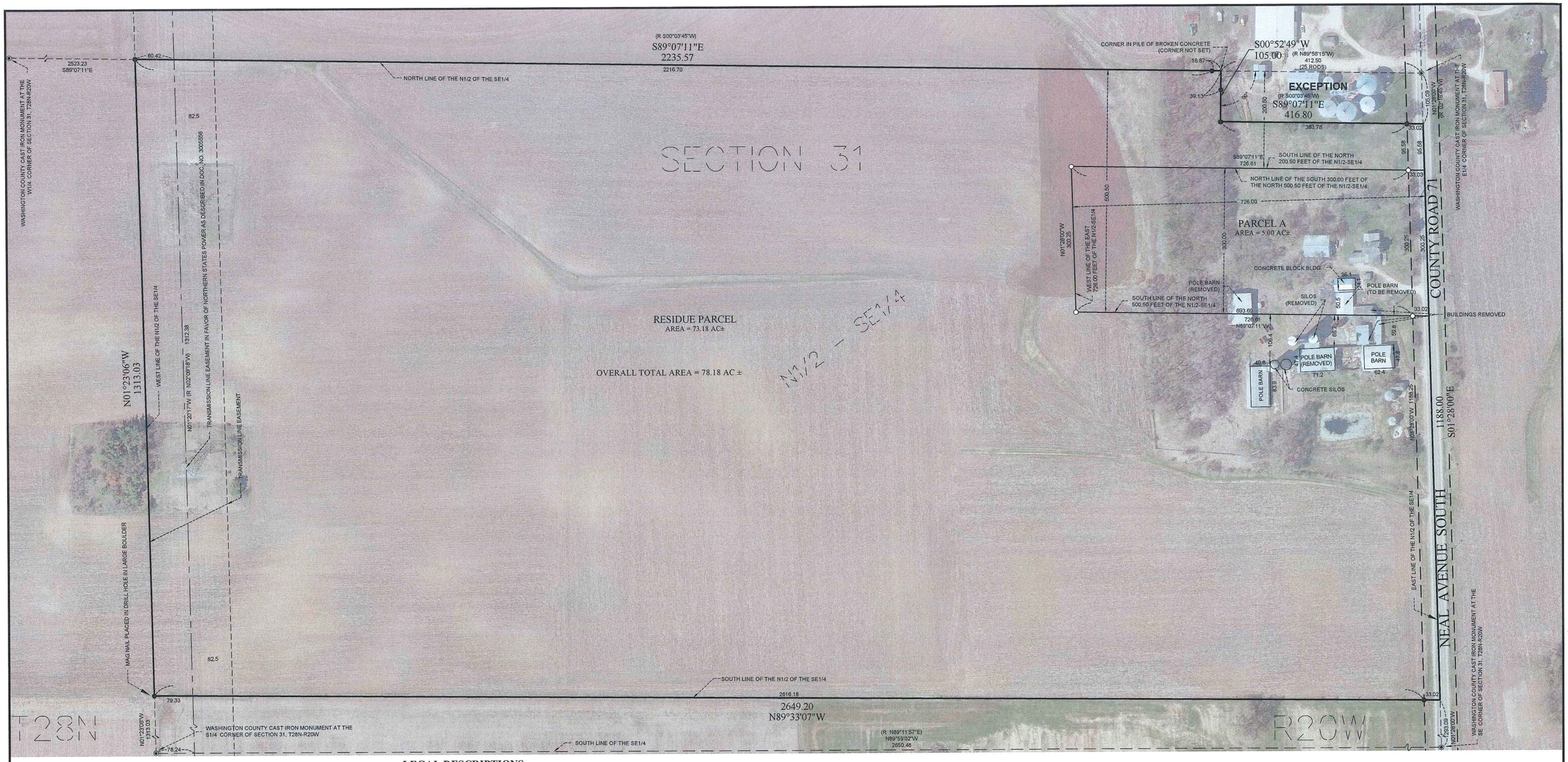
WALLACE A. NELSON
13496 - 60TH STREET SOUTH
AFTON, MN 55001

BOUNDARY SURVEY
5550 NEAL AVENUE SOUTH
AFTON, MN 5501

CERTIFICATE OF SURVEY

SHEET 01 OF 01 SHEETS

Plot Date: 12/15/2017
Drawing Name: X:\017_Dwyer\075_Nelson_Afton\05_CAD_Nelson\Nelson.dwg
Xrefs:



LEGAL DESCRIPTIONS

ORIGINAL PARCEL

(eCRV number: 843950)
The North One-Half of the Southeast Quarter (N1/2 of SE1/4) of Section Thirty-one (31), Township Twenty-eight (28) North, Range Twenty (20) West,

EXCEPT that part thereof described as follows: Beginning at the Northeast corner of the Southeast Quarter; thence North 89 degrees 56 minutes 15 seconds West, (bearings based on the Washington County Coordinate System, South Zone) along the north line of the Northeast Quarter of the Southeast Quarter, a distance of 412.50 feet (25 rods); thence South 00 degrees 03 minutes 45 seconds West, at a right angle to said north line of the Northeast Quarter of the Southeast Quarter a distance of 105.00 feet; thence South 89 degrees 56 minutes 15 seconds East, parallel with said north line of the Northeast Quarter of the Southeast Quarter a distance of 416.80 feet, more or less, to its intersection with the East line of said Northeast Quarter of the Southeast Quarter; thence North 02 degrees 16 minutes 45 seconds West a distance of 105.00 feet, more or less, to the point of beginning.

Total area of this parcel is 78.18 acres, more or less.

Subject to Neal Avenue South along the easterly line thereof. Also, subject to a transmission line easement along the westerly line thereof as described in Document No. 3005556, as recorded in the Office of the County Recorder, Washington County, Minnesota.

PARCEL A

The South 300.00 feet of the North 500.50 feet of the East 726.00 feet of the North One-Half of the Southeast Quarter of Section 31, Township 28 North, Range 20 West, Washington County, Minnesota, containing 5.00 acres, more or less.

Subject to Neal Avenue South along the easterly line thereof.

SCALE IN FEET
0 50 100 200

LEGEND

- ○ DENOTES 1/2 INCH IRON PIPE MONUMENT SET AND MARKED WITH A PLASTIC CAP INSCRIBED "DUPAY/RLS 17252."
- ● DENOTES 1/2 INCH IRON PIPE MONUMENT FOUND AND MARKED WITH A PLASTIC CAP INSCRIBED "RLS 9294" (J. DWYER), UNLESS SHOWN OTHERWISE.
- ◉ DENOTES WASHINGTON COUNTY CAST IRON MONUMENT.
- R DENOTES RECORD DIMENSION

ORIENTATION OF THIS BEARING SYSTEM IS THE WASHINGTON COUNTY COORDINATE SYSTEM, NAD83, 1986 ADJUSTMENT.

AERIAL PHOTOGRAPHY SHOWN HEREON WAS OBTAINED FROM THE MINNESOTA GEOSPACIAL WEB SITE AND IS BASED ON SPRING 2013 FLIGHTS.

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1			

I HEREBY CERTIFY THAT THIS SURVEY, PLAN, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

DAVID L. DUPAY
DATE: 01/XX/2019 LICENSE # 17252

DESIGN BY DLD DRAWN BY DLD

BDI PROJECT NO. 0117-075-S

BEARTOOTH DESIGN, INC.
10048 HONEYSUCKLE AVENUE NORTH
BROOKLYN PARK, MN 55443-1584
(651) 436-1787 davedupay@comcast.net

GARY L. & LORI A. SWANSON
5468 NEAL AVENUE SOUTH
AFTON, MN 55001

BOUNDARY SURVEY
FOR MINOR SUBDIVISION

CERTIFICATE OF SURVEY

SHEET 01 OF 01 SHEETS

Plot Date: 03/05/2019
Drawing name: X:\0170_Swanson_Afton\08_CAD_Swanson\Swanson.dwg
Xrefs:

City of Afton
3033 St. Croix Trl, P.O. Box 219
Afton, MN 55001

Planning Commission Memo

Meeting: April 1, 2019

To: Chair Kopitzke and members of the Planning Commission

From: Ron Moorse, City Administrator

Date: March 27, 2019

Re: Election of Officers

Background

The ordinance setting out the purpose and operation of the Planning Commission calls for an annual election of officers. The offices and current incumbents are as follows:

Chair: Kris Kopitzke
Vice-Chair: Sally Doherty
Secretary: Scott Patten

The election process includes the nomination of members and a vote regarding those nominated, for each position.

PLANNING COMMISSION ACTION REQUESTED:

Election of the following Officers:
Chair
Vice-Chair
Secretary

City of Afton
3033 St. Croix Trl, P.O. Box 219
Afton, MN 55001

Planning Commission Memo

Meeting: April 1, 2019

To: Chair Kopitzke and members of the Planning Commission

From: Ron Moorse, City Administrator

Date: February 25, 2019

Re: Review and Clarification of Elements of the Preservation and Land Conservation Development (PLCD) Ordinance

---

Three Groups of Ordinance Elements

The Planning Commission agreed that the City Administrator should divide the PLCD ordinance elements into three groups for the Commission's review, one group to be reviewed per meeting, and the elements of each group should have some logical relationship to each other. The first group is listed below. Items A, B, and C were reviewed at the March 4 Commission meeting. There were still questions remaining regarding how to calculate density in relation to 4 lots per qtr-qtr section. The Commission also added a new element for review, which is constraints on the open space parcel.

Review Group 1 – Administrative Elements and Cul de Sac Issues

A. Clarify that the open space outlots in a PLCD are allowed to be created as outlots
B. Clarify that a PLCD requires a Conditional Use Permit rather than an Administrative Permit
C. Clarify the maximum density allowed in a PLCD
    1. Clarify how to determine density when a portion of a qtr-qtr section extends beyond the PLCD
D. Clarify the definition of cul de sac
E. Clarify the maximum cul de sac length
F. Clarify the number of lots allowed on a cul de sac

Review Process

1. Review the Purpose of the Language of Each Ordinance Element
    a. Determine what appears to be the purpose of the language, i.e. what need or objective it is meant to address or accomplish
    b. Determine whether the purpose is still valid
    c. Determine whether the purpose should be clarified or revised to address concerns or desires of the Planning Commission
2. Determine whether the language of the ordinance element should be clarified or revised to better accomplish its identified purpose

Group 1 Elements

C. Clarify the maximum density allowed in a PLCD
    1. Clarify how to determine density when a portion of a qtr-qtr section extends beyond the PLCD

Sec. 12-2376. Density, Frontage on a Public Street and Length of Cul-de-sac requirements.

A. The average density over the proposed PLCD shall not exceed the maximum density permitted in the underlying zoning district.

Questions were raised regarding whether the maximum density allowed is 3 units per qtr-qtr section or 4 units per qtr-qtr section. The Comprehensive Plan, under the housing and land use policies, specifically indicates that with a PLCD the

maximum density is 4 units per qtr-qtr section, (see the language in bold below) but this language is not found anywhere in the zoning code. The zoning code should be revised to include this language.

The City of Afton establishes the following housing and land use policies:

1. *The City shall maintain the current densities for the following land use classifications:*
   a. *Agricultural– 3 dwelling units per quarter-quarter section.*
   b. *Preserve Agricultural Preserves - 0 or 1 dwelling unit per quarter-quarter section.*
   c. ***Agricultural with a Preservation and Land Conservation Development and a minimum of 80 acres– 4 dwelling units per quarter-quarter section***

Determination of density when a portion of a qtr-qtr section extends beyond the PLCD

One way to calculate density for a PLCD is to simply add up the number of qtr-qtr sections (including portions of qtr-qtr sections) and multiply by 4. However, this could affect the subdividability of the portions of qtr-qtr sections that are outside of the PLCD. The Ag zone zoning regulations provide that, in order to independently subdivide a parcel in a qtr-qtr section, the parcel must be a minimum of 30 acres. If less than 30 acres, the owner of the other subdividable parcel in the qtr-qtr section must be a co-applicant on the subdivision application. (See Sec. 12-140 below below)

Sec. 12-140. Agricultural (A) zoning district.[1]

A. *Permitted uses and structures.* The following uses shall be permitted:

1. Single Family Residential housing at a total density of three dwelling units per quarter/quarter section provided that: ~~a density of one dwelling unit per 10 acres provided that: (Total Acreage / 10 = allowed density) All numbers shall be rounded down~~.
   a. The quarter/quarter section is under common ownership when the parcels are created, or one of two parcels in a quarter/quarter section exceeds 30 acres, or all of the property owners in a quarter/quarter section make application for and sign an approved plat creating the third parcel;

D. Clarify the definition of cul de sac

During the review of the Afton Creek Preserve PLCD application, there was discussion regarding the definition of a cul de sac and regarding the prohibition of a variance to the number of lots on a cul de sac. The definition of cul de sac is as follows:

Sec. 12-1256 Definitions

Cul-de-sac means a street or portion of a street with one vehicular entrance/outlet leading directly to a through street, and having one turnaround at a single termination.

The key element of the cul de sac definition is that one end of the cul de sac needs to outlet directly to a through street, vs. outletting to another cul de sac. This is a unique definition, in that most cities allow a cul de sac to outlet to another cul de sac, rather than to a through street. The purpose of this definition appears to be two-fold. One purpose is to limit the overall length of a cul de sac street in relation to its outlet at a public road. This limits the probability that some sort of obstruction along the cul de sac street could prevent access to homes on the cul de sac. Another purpose of the definition appears to be limiting the number of lots on a cul de sac. While this was of particular concern when a PLCD-type ordinance could allow lots of less than an acre in size, the 5-acre minimum lot size serves to substantially limit the number of lots on a cul de sac. The Planning Commission may want to provide a recommendation regarding the cul de sac definition.

E. Clarify the maximum cul de sac length
   1. Sec. 12-2376. Density, Frontage on a Public Street and Length of Cul-de-Sac requirements

[1] Code 1982, § 301.610, Ordinance 7-2006, 8/15/2006

B. The maximum length of cul-de-sacs may be exceeded to accommodate curvilinear streets and other design elements that tend to preserve the rural character or other resources within the PLCD.

2. Sec. 12-1379. Cul de sac Streets
B. A cul-de-sac street shall not exceed 1,320 feet in length and shall serve no more than nine lots.

During the consideration of the Afton Creek Preserve PLCD, there were differing interpretations regarding whether the language in Sec. 12-2376, by association, also would allow a proportional additional number of lots on a longer cul-de-sac. This should be clarified.

F. Clarify the number of lots allowed on a cul de sac

The following is the ordinance language regarding the length of cul de sacs and the number of lots allowed on a cul de sac. While a variance may be granted for the length of a cul de sac, a variance may not be granted for more than nine lots on a cul de sac. This language raises the question of whether the prohibition against allowing more than nine lots on a cul de sac was based on safety and access considerations or on density considerations or both.

Sec. 12-1379. Cul-de-sac streets.
A. The City Council may permit cul-de-sac streets, after Planning Commission review, by reason of unfavorable land forms or the irregular shape of the land from which the subdivision is being made and a normal street pattern cannot be established. The City Council may also permit cul-de-sac streets to minimize the impacts of the subdivision or proposed street on existing neighborhoods. These impacts may include increased traffic volume or speed, privacy or security of existing neighborhoods and preservation of natural resources or features.
B. ***A cul-de-sac street shall not exceed 1,320 feet in length and shall serve no more than nine lots.*** *Every lot platted on a cul-de-sac street shall have frontage and access on the cul-de-sac street and shall be included in the nine lot limit.* ***A variance may be granted on the length limitation only when it is clearly demonstrated that the length greater than 1,320 feet is necessary for reasons of unfavorable land topography. No variance shall be granted which would allow more than nine lots to be created on a cul-de-sac street.***

<u>Planning Commission Direction Requested:</u>
Motion regarding the review and clarification of elements of the Preservation and Land Conservation Development (PLCD) Ordinance

City of Afton
3033 St. Croix Trl, P.O. Box 219
Afton, MN 55001

Planning Commission Memo

Meeting: April 1, 2019

To: Chair Kopitzke and members of the Planning Commission

From: Ron Moorse, City Administrator

Date: March 27, 2019

Re: Pervious Pavers and Impervious Coverage Regulations

At the February 19, 2019 Council meeting, Mayor Palmquist requested, and the Council agreed, that the topic of how pervious pavers are treated in relation to the City's impervious coverage requirements, particularly in the Village Historic Site District, be referred to the Planning Commission for review and recommendations. Pervious pavers are currently treated as impervious coverage. A main reason for this is the concern that pervious pavers will not be properly maintained and, over time, will become impervious. At its March 4 meeting, the Planning Commission had a short discussion regarding pervious pavers and requested additional information from staff including the following:

- Examples of ordinances from other cities regarding how they treat pervious pavers in terms of impervious coverage limitations
- Definitions of pervious and impervious
- Other options for pervious surfaces other than pervious pavers

In response to the Planning Commission's request, attached are the following materials:

- Impervious coverage and pervious paver information from other cities
- Pervious paver maintenance information
- Standards for pervious paving systems (which includes pervious pavers as well as porous pavement)

Impervious Coverage and Pervious Paver Information from other Cities

City of Orono

Pervious paver means concrete, asphalt or similar blocks with holes of some kind that allow water to go through the surface into a specialized aggregate base—consistent of an open-graded aggregate—and into the soils below.

Pervious *surface* means naturally occurring groundcover or a variety of types of pavement, pavers and other devices that provide stormwater infiltration while serving as a structural surface.

Sec. 78-1684. - Standard hardcover exclusions.

Landscaping with permeable lining shall not be considered hardcover. Additionally, the following hardcover items shall be excluded from hardcover calculations:

(1)

Roads, trails, sidewalks, utilities and other hardcover encroachments intended for the public's benefit;

(2)

Hardcover encroachments created by improvements on adjacent property not owned by the subject landowner;

a.

In such cases of encroachment, the square footage of all encroaching hardcover shall not be added to the overall hardcover counting against the subject lot;

b.

The land area upon which the encroachment rests shall count towards the overall lot area for the subject lot.

(3)

Retaining walls;

(4)

Handicapped ramps with a pervious surface below; and

(5)

The first 100 square feet of pervious paver patios/walkways or the first 100 square feet of deck with a minimum one-fourth-inch spacing between boards and a pervious surface below the decking.

Hardcover means a hard surface that prevents or retards entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Hardcover shall include but not be limited to the following: all building footprints, driveways, sidewalks, stepping stones, retaining walls, patios, courts (sport, tennis, etc.), decks, pools, areas used for the extended outdoor storage of vehicles or equipment, and all other similar features or surfaces as determined by the city engineer or city planner.

City of Minnetrista

Lot coverage means the area of the lot occupied by impervious material, including but not limited to, decks with one-fourth inch spacing or less; decks with surface underneath that is impervious; concrete or paver patios; bituminous patios; rocks with plastic liner; courts (sport and tennis); sand boxes with liners; roofs; structures; paved driveways; driveway surfaces (crushed bituminous, concrete, gravel, pavers, or other rock); landscape beds with linings; and concrete or paver sidewalks. Exceptions include the following topics: wood decks with one-fourth inch spacing or more with pervious material underneath the deck, wood chip sidewalks; retaining walls; and swimming pools, excluding any and all necessary aprons, provided that an engineered rain garden is installed. The specifications, size and location of the rain garden will be subject to the review and approval of the City Engineer. Pavers that are specifically engineered to be pervious will receive a 50 percent exemption from any hardcover/impervious surface lot coverage calculation, subject to the review and approval of the City Engineer. Pavers will not be incorporated into the impervious lot coverage calculations for projects on properties with existing homes so long as they are completed no later than May 1, 2010. At that time, pavers will be incorporated into the impervious lot coverage calculations.

City of Shorewood

IMPERVIOUS SURFACE. An artificial or natural surface through which water, air or roots cannot penetrate.

City of Scandia

Impervious Surface. A constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.

Where directed by the City and based on site suitability, the developer or applicant shall consider reducing the need for stormwater controls and Best Management Practices (BMP's) by minimizing impervious surface and incorporating the use of natural topography. The following design options should be considered, consistent with the zoning and subdivision requirements:

1. Preserving natural vegetation;

2. Preserving and utilizing natural upland swales, depressions and storage areas in the post development conditions to the degree that they can convey, store, filter and retain stormwater runoff before discharge without becoming a public nuisance or hazard. Preservation requires that no grading or other construction activity occur in these areas;

3. Installing semi-permeable/permeable or porous paving;

Below are definitions provided in an American Planning Association document entitled *A Planner's Dictionary* (2004).

Impervious Surface:

(Lake County, Ill.) Any hard-surfaced, man-made area that does not readily absorb or retain water, including but not limited to building roofs, parking and driveway areas, graveled areas, sidewalks, and paved recreation areas.

(**King County, Wash.)** Any nonvertical surface artificially covered or hardened so as to prevent or impede the percolation of water into the soil mantle, including but not limited to roof tops excepting eaves, swimming pools, paved or graveled roads, and walkways or parking areas and excluding landscaping, surface water retention/detention facilities, access easements serving neighboring property, and driveways to the extent that they extend beyond the street setback due to location within an access panhandle or due to the application of [county] requirements to site features over which the applicant has no control.

(Traverse City, Mich.) Any material that substantially reduces or prevents the infiltration of stormwater into previously undeveloped land. "Impervious area" shall include graveled driveways and parking areas. (Sandy, Ore.) A surface consisting of asphalt, concrete, roofing material, brick, paving block, plastic, or other similar material which does not readily absorb water. (Bayfield County, Wisc.) Any material which prevents, impedes, or slows infiltration or absorption of storm water directly into the ground at the rate of absorption of vegetation-bearing soils, including building, asphalt, concrete, gravel, and other surfaces.

Pervious Surface:

(New Castle County, Del.) A surface that presents an opportunity for precipitation to infiltrate into the ground.

(Temple Terrace, Fla.) Any surface which allows a minimum of 90 percent precipitation from any source to infiltrate directly into the ground. (Dewey Beach, Del.) Area maintained in its natural condition, or covered by a material that permits infiltration or percolation of water into the ground.

(Huntington, Ind.) Any material that permits full or partial absorption of storm water into previously unimproved land.

PAVE DRAIN®

STORMWATER'S ARCH ENEMY

MAINTENANCE MANUAL

The PaveDrain® System is a one of a kind paving surface that takes all of the positive attributes of traditional paving surfaces and puts them together into one single permeable paving surface.

FLEXIBLE PERMEABLE PAVING SURFACE

- Open joint concept between the blocks. No costly re-filling of the joints with sand, rock or harmful tar sealant.

MAINTENANCE QUESTIONS & ANSWERS

- The PaveDrain Vac Head - Safe, economical & effective.
- Vacuum Trucks - Minimal manual labor.
- SALT & SNOW PLOWING RECOMMENDATIONS.
- Sealing of the PaveDrain System.

REPLACEABLE UNITS

- Minimal labor with minimal equipment = Quick & cheap repairs.

Questions & Answers

Q: How often should the PaveDrain System be completely cleaned or maintained?

A: This will depend on the project. Following the initial installation, the PaveDrain System should be checked monthly to assess the amount of infiltration still occurring. Ideally, the visual inspection should occur during a rain event. A residential or urban street setting with a significant amount of debris may need to be checked more frequently in order to properly determine an appropriate maintenance schedule.

The TWO BEST maintenance options to clean the PaveDrain System are to use either the PaveDrain VAC Head or an Elgin Whirlwind or Megawind vacuum truck.

The PaveDrain VAC Heads are available from local distribution.
https://www.pavedrain.com/sales-distribution/

A video of the PaveDrain VAC Head in action is available online.
http://www.youtube.com/watch?v=I2U-4xsy3wo

Unlike other permeable systems, even if maintenance is not regularly carried out, the PaveDrain System can be back in working order with the use of the VAC Head or Elgin Whirlwind or Megawind Vacuum Trucks.

Combination Sewer Truck with 1,500 gallon water tank

Q: How do I know when to clean the PaveDrain System?

A: The PaveDrain® system is unlike any other permeable system. The PaveDrain system can "tell" you when it needs maintenance even when it is NOT raining. A simple visual inspection can be accomplished by walking on it and determining if the joints are filled with debris.

1. Visual inspection to see if the joints between the PaveDrain Blocks are filled with debris (see photo 1 & 2 below).

NOTE: If you have a 5,000 square foot installation and if 50% (approx. 2,500 SF) of the joints between the PaveDrain blocks are filled with debris. It is time to schedule a cleaning.

Photo 1 – PaveDrain needs to be maintained

Photo 2 – PaveDrain following maintenance

2. Inserting a ruler between the joints of the PaveDrain system can help determine the depth of debris between the PaveDrain blocks.

NOTE: A PaveDrain block is 5.65" thick. If the ruler only goes down 2" in 50% of the area covered with the PaveDrain System. It is time for a cleaning. Checking various spots within a PaveDrain installation is always recommended.

New Jersey Stormwater Best Management Practices Manual

February 2004

CHAPTER 9.7

Standard for Pervious Paving Systems

Definition

Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers.

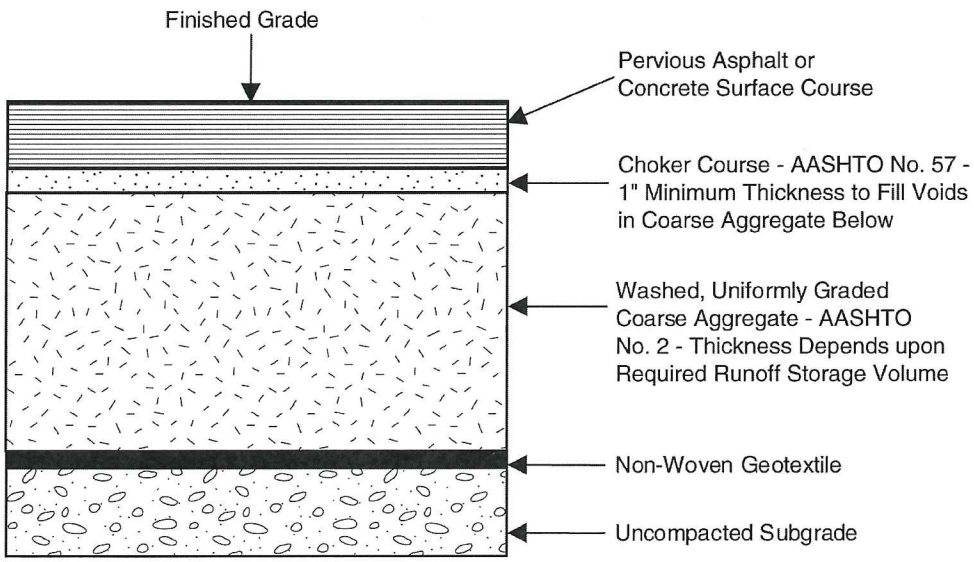
Pervious paving systems are divided into three general types. Each type depends primarily upon the nature of the pervious paving surface course and the presence or absence of a runoff storage bed beneath the surface course. These three types are summarized in Table 9.7-1 and discussed below. Porous paving and permeable paver with storage bed systems treat the stormwater quality design storm runoff through storage and infiltration. Therefore, these systems have adopted TSS removal rates similar to infiltration structures. The adopted TSS removal rate for each type of pervious paving system is presented in Table 9.7-1.

Table 9.7-1: Types of Pervious Paving Systems

Type of Paving System	General Description of Paving System	Adopted TSS Removal Rate
Porous paving	Porous asphalt or concrete paving constructed over runoff storage bed of uniformly graded broken stone	80%
Permeable pavers with storage bed	Impervious concrete pavers with surface voids constructed over runoff storage bed of uniformly graded broken stone	80%
Permeable pavers without storage bed	Impervious concrete pavers with surface voids constructed over structural bed of sand and crushed stone	Volume reduction only

Porous paving systems consist of a porous asphalt or concrete surface course placed over a bed of uniformly graded broken stone. The broken stone bed is placed on an uncompacted earthen subgrade and is used to temporarily store the runoff that moves vertically through the porous asphalt or concrete into the bed. The high rate of infiltration through the porous paving is achieved through the elimination of the finer aggregates that are typically used in conventional paving. The remaining aggregates are bound together with an asphalt or Portland cement binder. The lack of the finer aggregate sizes creates voids in the normally dense paving that allow runoff occurring on the paving to move vertically through the paving and into the void spaces of the broken stone storage bed below. From there, the stored runoff then infiltrates over time into the uncompacted subgrade soils similar to an Infiltration Basin. The depth of the bed, which also provides structural support to the porous surface course, depends upon the volume and rate of rainfall that the porous paving system has been designed to store and infiltrate and the void ratio of the broken stone. A typical detail of a porous paving system is shown in Figure 9.7-1.

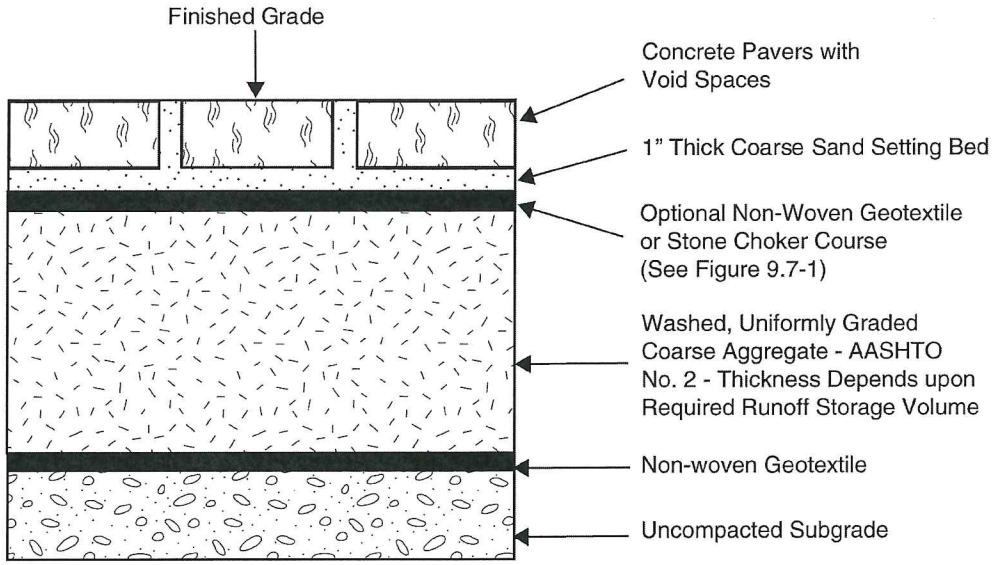
Figure 9.7-1: Porous Paving Details



Source: Cahill Associates.

A permeable paver with storage bed system also has a subsurface storage bed and functions in a similar manner to a porous paving system. However, instead of a continuous porous asphalt or concrete surface course, the system's surface consists of impervious concrete blocks known as pavers that either have void spaces cast into their surfaces or interlock in such a way as to create such void spaces. These void spaces allow runoff from the impervious paver surface to collect and move vertically past the individual pavers into the broken stone storage bed below. Similar to a porous paving system, the runoff stored in the broken stone storage bed, which also provides structural support to the pavers, then infiltrates over time into the uncompacted subgrade soils. A typical detail of a permeable paver with storage bed system is shown in Figure 9.7-2.

Figure 9.7-2: Permeable Pavers with Storage Base

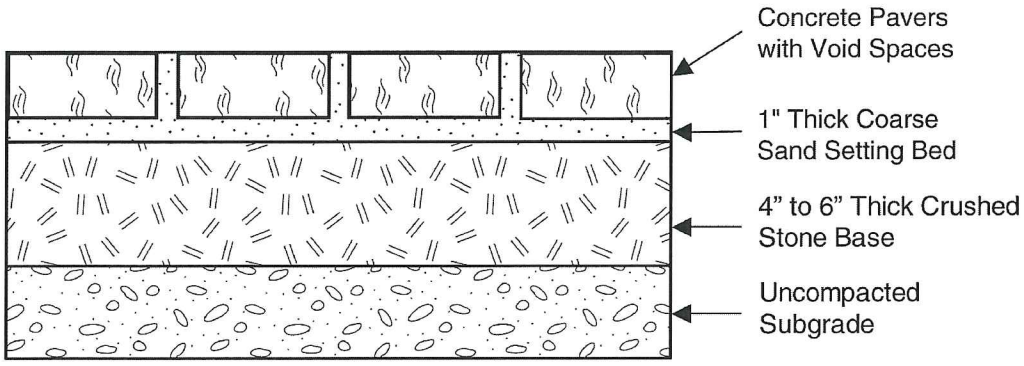


It is important to note that both a porous paving system and a permeable paver with storage bed system function in the same manner as any other infiltration-based BMP such as an infiltration basin or dry well. That is, the fundamental means of runoff quantity control is into and through the subgrade soils below the BMP. Therefore, in terms of runoff quantity control, the porous paving or permeable paver surface course acts solely as a conveyance measure that delivers the surface course runoff to the subgrade soils. In addition, the broken stone storage bed serves only to temporarily store the runoff transmitted through the surface course. For these reasons, the design and use of porous paving and permeable paver with storage bed systems are generally subject to the same design, operation, and maintenance requirements of all other infiltration-based BMPs. Details of these requirements are presented in *Design Criteria* below.

In addition to runoff volume control, porous paving and permeable paver with storage bed systems also provide stormwater quality control through the infiltration process when designed to store and infiltrate the stormwater quality design storm runoff volume. This is again similar to other infiltration-based BMPs such as infiltration basins. In addition, the porous or permeable paver surface course in such systems can be considered to provide pretreatment of the runoff to their respective subsurface storage beds.

Permeable pavers without a storage bed is the third type of pervious paving system. As described by its name, this type of system does not have a broken stone runoff storage bed beneath it. Instead, the permeable pavers are placed on a generally thinner bed of sand and crushed stone that provides only structural support to the paver surface course and has no significant runoff storage volume. This lack of storage volume prevents the system from storing and infiltrating the relatively larger volumes of runoff typically achieved by a porous paving or permeable paver with storage bed system. However, because of the void spaces in the paver surface, a portion of the runoff from the pavers, albeit smaller than the storage bed systems, can still collect in the surface voids spaces and infiltrate through the sand and crushed stone bed and into the subgrade soils. A typical detail of a permeable paver without storage bed system is shown in Figure 9.7-3.

Figure 9.7-3: Permeable Paver without Storage Base



Purpose

In general, pervious paving systems are used to reduce runoff rates and volumes from paved, on-grade surfaces such as patios, walkways, driveways, fire lanes, and parking spaces. Pervious paving systems with runoff storage beds below them achieve these reductions through the delivery and storage of runoff and eventual infiltration into the subgrade soils. Through this infiltration process, these types of pervious paving systems also achieve stormwater quality treatment.

Porous paving and permeable paver with storage bed systems may also be used to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules. See *Recharge BMP Design Guidelines* in *Chapter 6: Groundwater Recharge* for a complete discussion of these requirements and the use of pervious paving and other groundwater recharge facilities to meet them.

Permeable pavers without storage bed systems also achieve reductions in runoff rates and volumes, primarily by generating less surface runoff than conventional paving. However, due to the lack of a runoff storage bed and significant runoff infiltration, these types of pervious paving systems achieve less runoff reductions than systems with storage beds. For similar reasons, they also do not provide any significant stormwater quality treatment. However, the reduction in runoff rates and volumes they do achieve may reduce the volume of stormwater quality design storm runoff to be treated by other, downstream stormwater management facilities.

Conditions Where Practice Applies

As noted above, porous paving and permeable pavers with storage bed systems function as infiltration facilities. As such, the use of such pervious paving systems is applicable only where their subgrade soils have the required permeability rates. Specific soil permeability requirements are presented below in *Design Criteria*.

Like other BMPs that rely on infiltration, porous paving and permeable pavers with storage bed systems are not appropriate for areas where high pollutant or sediment loading is anticipated due to the potential for groundwater contamination. Specifically, such systems must not be used in the following locations:

- Industrial and commercial areas where solvents and/or petroleum products are loaded, unloaded, stored, or applied or pesticides are loaded, unloaded, or stored.

- Areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the U.S. Environmental Protection Agency in the Code of Federal Regulations at 40 CFR 302.4.
- Areas where system use would be inconsistent with an NJDEP-approved remedial action work plan or landfill closure plan.
- Areas with high risks for spills of toxic materials such as gas stations and vehicle maintenance facilities.
- Areas where industrial stormwater runoff is exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing, or other industrial activities, that could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to raw materials, intermediate products, final products, waste materials, by-products, industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

In addition, as required by the Stormwater Management Rules, porous paving and permeable pavers with storage bed systems must not be used where their installation would create a significant risk for basement seepage or flooding, cause surficial flooding of groundwater, or interfere with the operation of subsurface sewage disposal systems and other subsurface structures. Such adverse impacts must be assessed and avoided by the design engineer.

Porous paving and permeable pavers with storage bed systems must be configured and located where their construction will not compact the soils below the system. In addition, such systems must not be placed into operation until the contributing drainage area is completely stabilized. System construction must either be delayed until such stabilization is achieved, or upstream runoff must be diverted around the system. Such diversions must continue until stabilization is achieved.

Due to the reduced shear strength of the surface course, all pervious paving systems are limited to areas of relatively infrequent use by light vehicles. This includes parking lot spaces and secondary aisles, single family residential driveways, sidewalks and walkways, golf cart paths, fire and emergency access lanes, and overflow parking areas. In general, they should not be used in high traffic areas such as roadways, multiple family and nonresidential driveways, and primary parking lot aisles or in any area subject to use by heavy vehicles and other equipment.

One pervious paving use strategy is to alternate areas with impervious and pervious paving. In these instances, conventional paving would be reserved for the heavily trafficked corridors. A wide variety of concrete and brick permeable paving systems are available. These can be combined with conventional and porous paving systems to achieve functional and aesthetically pleasing designs.

Finally, all three types of pervious paving systems must have a maintenance plan and, if privately owned, should be protected by easement, deed restriction, ordinance, or other legal measures that prevent its neglect, adverse alteration, and removal.

Design Criteria

The design criteria for pervious paving systems will depend upon the type of system to be used. Details of each system type are presented in Figures 9.7-1, 9.7-2, and 9.7-3 above. Design criteria for each type are presented below.

A. Storage Volume, Depth, and Duration

Porous paving and permeable paver with storage bed systems must be designed to treat the total runoff volume generated by the system's maximum design storm. This may be either the groundwater recharge or stormwater quality design storm depending upon the system's proposed use. Techniques to compute these volumes are discussed in *Chapter 6: Groundwater Recharge* and *Chapter 5: Computing Stormwater Runoff Rates and Volumes*. Such systems must also all fully drain this runoff volume within 72 hours. Runoff storage for greater times can render the systems ineffective and may result in anaerobic conditions and water quality problems. The bottom of these types of pervious paving systems must be at least 2 feet above seasonal high water table or bedrock. This distance must be measured from the bottom of the storage bed as shown in Figures 9.7-1 and 9.7-2. The system bottom must be as level as possible to uniformly distribute runoff infiltration over the subgrade soils.

As discussed in *Considerations* below, construction of all pervious paving systems must be done without compacting the system's subgrade soils. As such, all excavation must be performed by equipment placed outside the system's limits whenever possible. This requirement should be considered when designing the dimensions and total volume of a system's broken stone storage bed or crushed stone base.

It is important to note that the use of both porous paving and permeable pavers with storage bed systems is recommended in this manual only for the stormwater quality design storm and smaller storm events. Use of such systems for larger storm events and the requirements by which such systems are to be designed, constructed, and maintained should be reviewed and approved by all applicable reviewing agencies.

Since permeable paver without storage bed systems do not rely on significant runoff infiltration, they may be used for all frequency storm events.

B. Permeability Rates

The minimum design permeability rate of the soils below porous and permeable paving systems with storage beds will depend upon the pervious paving system's location and maximum design storm. The use of storage beds for stormwater quality control is feasible only where the soil is sufficiently permeable to allow a reasonable rate of infiltration. Therefore, porous paving and permeable paver with storage bed systems can be constructed only in areas with Hydrologic Soil Group A and B soils.

For porous paving and permeable paver with storage bed systems, the minimum design permeability rate of the subgrade soils below a system's runoff storage bed is 0.5 inches per hour. In addition, the design permeability rate of the soils must be sufficient to fully drain the system's maximum design storm runoff volume within 72 hours. This design permeability rate must be determined by field or laboratory testing. See *A. Soil Characteristics* in *Considerations* below for more information. Since the actual permeability rate may vary from test results and may also decrease over time due to soil bed consolidation or the accumulation of sediments removed from the treated stormwater, a factor of safety of two must be applied to the tested permeability rate to determine the design permeability rate. Therefore, if the tested permeability rate of the soils is 4 inches/hour, the design rate would be 2 inches/hour (i.e., 4 inches per hour/2). This design rate would then be used to compute the system's maximum design storm drain time.

Due to its role as a runoff conveyance measure to the storage bed below, the porous surface course of a porous paving system must have a minimum permeability rate at least twice the maximum intensity of the

system's design storm. In the case of systems designed for the stormwater quality design storm, this permeability rate would be 6.4 inches per hour (i.e., 2 X 3.2 inches per hour, which is the stormwater quality design storm's maximum intensity). Similarly, the minimum permeability of the material used to fill the void spaces of a permeable paver with storage bed system must also meet this requirement. However, since the void spaces in a permeable paver system comprise only a portion of the entire system surface, this minimum rate must be multiplied by the ratio of the entire system surface area to the area of the void spaces. Therefore, the void space material in a permeable paver with storage bed system comprised of 20 percent void space must have a minimum permeability of 2 X (1.0/0.2) or 10 times the maximum design storm intensity. For such systems designed for the stormwater quality design storm, this rate would be 3.2 X 10 or 32 inches per hour.

Since a permeable paver without storage bed system does not rely on significant runoff infiltration, its use does not require a minimum subgrade soil or void space material permeability rate. However, as described below, its ability to reduce runoff rates and volumes below those produced by conventional paving will depend upon both of these system characteristics.

To allow pervious paving surface courses to achieve their design permeability rates, the maximum surface course slope of all pervious paving systems is 5 percent.

C. Pretreatment

As with all other best management practices, pretreatment can extend the functional life and increase the pollutant removal capability of a pervious paving system that receives runoff from areas other than its own surface course. Pretreatment can reduce incoming velocities and capture coarser sediments, which will extend the life and reduce the required maintenance of the system. This is usually accomplished through the use of a vegetative filter immediately upstream of the pervious paving system. Steps can also be taken during the system's design to limit the amount of runoff from upstream areas that will flow to the system.

Runoff collected from parking lots, driveway, roads, and other on-grade surfaces that is conveyed directly to a porous paving or permeable paver storage bed without passing through the system's surface course must be pretreated in order to prevent the loss of storage volume and/or recharge capacity due to sedimentation and clogging. Such pretreatment must provide 80 percent removal of TSS for the system's maximum design storm runoff. This treatment can also be used to meet the site's overall TSS removal requirements.

This pretreatment requirement does not apply to roofs and other above-grade surfaces. However, roof gutter guards and/or sumps or traps (equipped with clean-outs) in the conduits to the system's storage bed should be included wherever practical to minimize the amount of sediment and other particulates that can enter the storage bed.

D. Computing Runoff Rates

In general, runoff to downstream areas from porous paving and permeable paver with storage bed systems will need to be computed under two circumstances. The first occurs when the capacity of the runoff storage bed is exceeded and the water level in the bed rises to the system's surface course. The second circumstance occurs when the intensity of precipitation exceeds the minimum permeability of the system's surface course. See *B. Permeability Rates* above for a discussion of these rates for each type of storage bed system. Once either or both of these circumstances occurs, the resultant system runoff rate to downstream areas for the remainder of the storm can be determined by subtracting the minimum system permeability rate from the rainfall rate. In the case of variable rate storm events such as the stormwater quality design storm or the NRCS Type III Storm, this must be done in a series of appropriate-length time increments over the remaining storm duration.

Runoff from permeable paver without storage bed systems must be computed for all storm events and can be performed by two methods. The first method is based upon a weighted average runoff coefficient (C) for the Rational or Modified Rational Methods or a weighted average Curve Number (CN) for the NRCS methodology. These values should be based upon the relative areas of the impervious pavers and pervious void spaces in the system's surface. The C or CN value for the paver area should be based upon an impervious surface, while the C or CN value for the void space should be based upon the type of material or surface cover in the void space and the Hydrologic Soil Group of the subgrade soil. In selecting this void space coefficient, all void spaces with vegetated covers should be assumed to be in poor hydrologic condition and all void spaces with bare soil or gravel fill should be based upon soil or gravel roadways.

The second method of computing runoff from permeable paver without storage bed systems considers the pavers to be unconnected impervious areas that drain onto the pervious void spaces. The resultant runoff from the system can then be based upon the unconnected impervious surface methods described in *Chapter 5*. In doing so, the criteria for selecting the appropriate CN for the void space must be based upon the criteria described in the preceding paragraph. In addition, it should be noted that the TR-55 method for unconnected impervious areas as described in *Chapter 5* cannot be used if the void space area is less than 70 percent of the total system area (i.e., the impervious portion of the entire system area exceeds 30 percent).

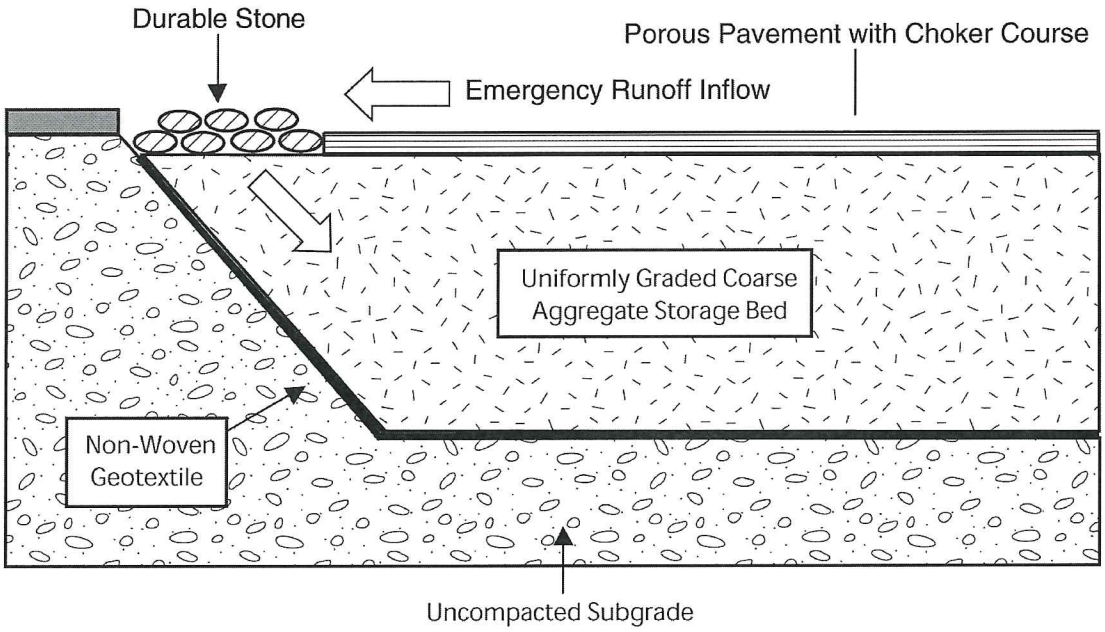
E. Overflows

All porous paving and permeable paver with storage bed systems must be able to safely convey system overflows to downstream drainage systems. The capacity of the overflow must be consistent with the remainder of the site's drainage system and sufficient to provide safe, stable discharge of stormwater in the event of an overflow. The downstream drainage system must have sufficient capacity to convey the overflow from the pervious paving system.

F. Emergency Inflows

All porous paving and permeable paver with storage bed systems must have measures that will allow runoff from the maximum design storm to enter the runoff storage bed in the event that the porous or permeable paver surface course becomes clogged or otherwise incapable of conveying the maximum design storm runoff to the bed. This may be accomplished in different ways, including surface drain inlets connected to a series of perforated pipes laid throughout the storage bed or by extending the storage bed beyond the edge of the surface course and connecting it to the surface as shown in Figure 9.7-4.

Figure 9.7-4: Example of Porous Paving Emergency Inflow



Note: Emergency inflow may also be provided by surface drain inlets and perforated pipes in the storage bed. See text for details.

Source: Cahill Associates.

G. System Components

The typical components of each type of pervious paving system are shown in Figures 9.7-1, 9.7-2 and 9.7-3. While variations are permissible based upon specific site conditions, the typical system components shown in these figures should be included in all system designs. This includes the sand and crushed stone base below a permeable paver without storage bed system shown in Figure 9.7-3. All such systems constructed without these components must be treated as conventional paved surfaces for the purpose of all runoff and pollutant load computations.

The recommended aggregate for porous asphalt and concrete paving systems are shown in Table 9.7-2. For porous asphalt systems, the recommended amount of asphalt binder is 5.75 to 6.00 percent by weight. Lower amounts of binder have resulted in inadequate surface course shear strength and durability. As shown in Figures 9.7-1 and 9.7-2, the runoff storage beds in both porous paving and permeable paver with storage bed systems should be clean washed, uniformly graded AASHTO No. 2 broken stone. It is particularly important that this stone be washed to keep stone dust and other fine particles that can clog the surface of the subgrade soils from entering the storage bed. The interface between the porous or permeable paver surface course and the storage bed stone should be leveled with a choker course of AASHTO No. 57 broken stone with a minimum thickness of 1 inch. Finally, as shown in Figures 9.7-1 and 9.7-2, the interface between the storage bed stone and the subgrade soil should be lined with a non-woven geotextile. Additional system details are shown in the figures.

Table 9.7-2 – Porous Asphalt Paving Mix

U.S. Standard Sieve Size	Percent Passing
1/2 inch	100%
3/8 inch	95%
#4	35%
#8	15%
#16	10%
#30	2%

Source: Cahill Associates

Maintenance

Effective pervious paving system performance requires regular and effective maintenance. *Chapter 8: Maintenance and Retrofit of Stormwater Management Measures* contains information and requirements for preparing a maintenance plan for stormwater management facilities, including pervious paving systems. Specific maintenance requirements for all system types are presented below. These requirements must be included in the system's maintenance plan.

General Maintenance

The surface course of all pervious paving systems must be inspected for cracking, subsidence, spalling, deterioration, erosion, and the growth of unwanted vegetation at least once a year. Remedial measures must be taken as soon as practical.

Care must be taken when removing snow from the pervious paving surface courses. Pervious paving surface courses can be damaged by snow plows or loader buckets that are set too low to the ground. This is particularly true at permeable paver systems where differential settlement of pavers has occurred. Sand, grit, or cinders should not be used on pervious paving surface courses for snow or ice control.

If mud or sediment is tracked onto the surface course of a pervious paving system, it must be removed as soon as possible. Removal should take place when the surface course is thoroughly dry. Disposal of debris, trash, sediment, and other waste matter removed from pervious paving surface courses should be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

B. Porous Paving Systems

The surface course of a porous paving system must be vacuum swept at least four times a year. This should be following by a high pressure hosing. All dislodged sediment and other particulate matter must be removed and properly disposed.

C. Permeable Paver Systems

Maintenance of permeable pavers should be consistent with the manufacturer's recommendations.

D. Vegetation

Mowing and/or trimming of turf grass used with permeable pavers must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. All vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the paver and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, pesticides and other means to assure optimum vegetation health should not compromise the intended purpose of a pervious paving system. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

E. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the pervious paving system's surface course. This normal drain time should then be used to evaluate the system's actual performance. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the various system components and groundwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system.

Considerations

Pervious paving systems can present some practical design problems, particularly those with subsurface runoff storage beds that rely on infiltration to discharge the stored runoff. When planning such systems, consideration should be given to soil characteristics, depth to the seasonal high groundwater table, sensitivity of the region, and runoff quality. Particular care must be taken when constructing all pervious paving systems in areas underlain by carbonate rocks known as Karst landscapes. See Appendix A10 of the Standards for Soil Erosion and Sediment Control in New Jersey for further guidance in Karst areas. Further considerations are presented below.

A. Soil Characteristics

Soils are perhaps the most important consideration for site suitability. In general, County Soil Surveys can be used to obtain necessary soil data for system planning purposes, the preliminary design of all pervious paving systems, and the final design of permeable paver without storage bed systems. However, for the final design and construction of porous paving and permeable paver with storage bed systems, soil tests are required at the exact location of a proposed system in order to confirm its ability to function properly without failure.

Such tests should include a determination of the textural classification and permeability of the subgrade soil at and below the bottom of the proposed system's storage bed. The recommended minimum depth for subgrade soil analysis is 5 feet below the bottom of the storage bed or to the groundwater table. Soil permeability testing can be conducted in accordance with the Standards for Individual Subsurface Sewage Disposal Systems at N.J.A.C. 7:9A. See *Design Criteria* above for further subgrade soil requirements.

In addition, the results of a system's soil testing should be compared with the County Soil Survey data used in the computation of development site runoff and the design of specific site BMPs, including the proposed pervious paving system, to ensure reasonable data consistency. If significant differences exist between the system's soil test results and the County Soil Survey data, additional development site soil tests are recommended to determine and evaluate the extent of the data inconsistency and the need for revised site runoff and BMP design computations. All significant inconsistencies should be discussed with the local Soil Conservation District prior to proceeding with such redesign to help ensure that the final site soil data is accurate.

B. Construction

Similar to other infiltration facilities, the construction of all pervious paver systems must follow certain procedures and sequences. Additional construction requirements are also required for specific systems due to their particular nature and components. Details are provided below.

1. All Pervious Paving Systems

For all pervious paving systems, protection of the subgrade soils from compaction by construction equipment and contamination and clogging by sediment are vital. Prior to its construction, the area to be used for the pervious paving system should be cordoned off to prevent construction equipment and stockpiled materials from compacting the subgrade soils. During system construction, precautions should be taken to prevent both subgrade soil compaction and sediment contamination. All excavation should be performed with the lightest practical excavation equipment. All excavation equipment should be placed outside the limits of the system's storage bed or base.

To help prevent subgrade soil contamination and clogging by sediment, system construction should be delayed until all other construction within in its drainage area is completed and the drainage area stabilized. This delayed construction emphasizes the need, as described above, to cordon off the system area to prevent compaction by construction equipment and material storage during other site construction activities. Similarly, use of a pervious paving system area as a sediment basin is strongly discouraged. Where unavoidable, excavation for the sediment basin should be a minimum of 2 feet above the final design elevation of the system's storage bed or base. Accumulated sediment can then be removed without disturbing the subgrade soils at the system's bottom, which should be established only after all construction within the system's drainage area is completed and the drainage area stabilized.

If system construction cannot be delayed until its drainage area is stabilized, diversion berms or other suitable measures should be placed around the system's perimeter during all phases of construction to divert all runoff and sediment away from the system. These diversion measures should not be removed until all construction within the system's drainage area is completed and the drainage area stabilized.

A preconstruction meeting should be held to review the specific construction requirements and restrictions of all pervious paving systems with the contractor.

2. Porous Paving Systems

Broken stone in runoff storage beds should be placed in lifts and compacted using plate compactors. A maximum loose lift thickness of 12 inches is recommended. In addition, the following construction requirements for porous asphalt paving systems are recommended by the USEPA:

- Paving temperature = 240° to 260° F.
- Minimum air temperature for paving = 50° F.
- Compact paving with one to two passes with 10-ton roller.
- No vehicular use for a minimum of two days after paving completed.

3. Permeable Paver Systems

Broken stone in runoff storage beds should be placed in lifts and compacted using plate compactors. A maximum loose lift thickness of 12 inches is recommended. In order to provide the runoff quantity and quality benefits described above in *Definition*, the subgrade soils below all permeable paver systems cannot be stabilized through compaction or with cement or other stabilizing agents that reduce the soils' permeability. All permeable paver systems constructed with such stabilization must be treated as conventional paved surfaces for the purpose of all runoff and pollutant load computations.

C. Runoff Quality

The quality of the runoff entering a porous paving or permeable paver with storage bed system is a primary consideration in determining whether such systems are advisable and, if so, in designing the systems themselves. The planning of such systems must consider which pollutants will be present in the runoff and whether these pollutants will degrade groundwater quality. Certain soils can have a limited capacity for the treatment of bacteria and the soluble forms of nitrogen, phosphorus, and other pollutants like road salts and pesticides. Such pollutants are either attenuated in the soil column or go directly to the water table. Unfortunately, the soils that normally have the highest and, therefore, most suitable permeability rates also have the least ability to treat such pollutants. As a result, pretreatment of soluble pollutants prior to entry into a pervious paving system's storage bed may be necessary in these soils. Pretreatment measures may include vegetated filter strips, bioretention systems (where the infiltration basin takes the place of the standard underdrain), and certain sand filters. Alternatively, the existing soil below the infiltration basin bottom may be augmented or replaced by soils with greater soluble pollutant removal rates.

Recommendations

A. Sensitivity of the Area

Since they rely on runoff infiltration, the planning of porous paving or permeable paver with storage bed systems should consider the geologic and ecological sensitivity of the proposed site. Sensitive areas include FW1 streams, areas near drinking water supply wells, and areas of high aquifer recharge. Such pervious paving systems should be sited at least 100 feet from a drinking water supply well. They should also be sited away from foundations to avoid seepage problems. Measures should be taken in areas of aquifer recharge to ensure good quality water is being infiltrated to protect groundwater supplies. Porous paving and permeable paver with storage bed systems should also be located away from septic systems to help prevent septic system failure and other adverse system interference.

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City of Afton
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Planning Commission Memo

Meeting: April 1, 2019

To: Chair Kopitzke and members of the Planning Commission

From: Ron Moorse, City Administrator

Date: March 27, 2019

Re: Planning Commission Dinner Gathering

At its February 4 meeting, the Planning Commission agreed to plan a dinner gathering for May 6, immediately preceding the regular Planning Commission meeting. The Commission may want to firm up plans for the gathering.

March 19, 2019 City Council Meeting Highlights

The Council:

- Viewed a presentation from the Valley Branch Watershed District.
- Approved the Kathy Bolton-Iverson application for minor subdivision and variance at 3632 St. Croix Trail.
- Approved the Tim and Jacqueline Leba application for a variance for a driveway east of Neal at 22nd St.
- Approved the Gary Narducci application for a variance and conditional use permit for construction of an accessory building at 3475 Neal Ave.
- Discussed flood preparations.
- Approved a memorandum of agreement with the Minnesota Land Trust regarding co-holding the conservation easement for the Afton Creek Preserve PLCD.
- Approved an upgrade to the audio/video equipment in the council chambers.
- Re-scheduled the River Road Neighborhood meeting for April 15.
- Appointed Valerie Stoehr to the Natural Resources and Groundwater Committee.