CITY OF Fargo

PLANNING AND DEVELOPMENT
200 Third Street North
Fargo, North Dakota 58102
Phone: (701) 241-1474
Fax: (701) 241-1526
E-Mail: planning@cityoffargo.com
www.cityoffargo.com

MEMORANDUM

TO: Board of Adjustment
FROM: Aaron Nelson, Planner AN
DATE: January 18, 2017
RE: Board of Adjustment Meeting

The next meeting of the Board of Adjustment will be held on Tuesday, January 24, at 9:00 a.m. in the City Commission Room at Fargo City Hall. If you are not able to attend, please contact staff at 241-1474 or planning@cityoffargo.com. Thank you.

BOARD OF ADJUSTMENT
Tuesday, January 24, 2017 9:00 a.m.
City Commission Room
AGENDA

1. Approve Minutes of December 22, 2016 Meeting

2. New Business
   a) Variance Request – 510 4 Street South
      Request for a variance of Article 21-06 of the Municipal Code. The requested variance is to allow the opening of a proposed building to be approximately 8.9 feet lower, the fill around the building to be 8.9 feet lower, and the fill 15 feet away from the building to be 8.6 feet lower, than would otherwise be required by the City's Floodproofing Code.

4. Other Business

5. Adjournment

Board of Adjustment meetings are broadcast live on cable channel TV Fargo 56 and can be seen live by video stream on www.cityoffargo.com/streaming. They are rebroadcast each Tuesday at 9:00 a.m. for one month following the meeting.

People with disabilities who plan to attend the meeting and need special accommodations should contact the Planning Office at 241-1474 or TDD at 241-8258. Please contact us at least 48 hours before the meeting to give our staff adequate time to make arrangements.

EQUAL HOUSING OPPORTUNITY

BOARD OF ADJUSTMENT
MINUTES

Regular Meeting: Thursday: December 22, 2016

The Regular Meeting of the Board of Adjustment of the City of Fargo, North Dakota, was held in the City Commission Room at City Hall at 9:00 o'clock a.m., Thursday, December 22, 2016.

The Members present or absent were as follows:

Present: Deb Wendel-Daub, Matthew Boreen, Russell Ford-Dunker, Michael Love, Mark Lundberg

Also present: Commissioner Grindberg

Absent: Mike Mitchell

Chair Wendel-Daub called the meeting to order.

Item 1: Approval of Minutes: Regular Meeting of November 22, 2016
Member Love moved the minutes of the November 22, 2016 Board of Adjustment meeting be approved. Second by Member Lundberg. All Members present voted aye and the motion was declared carried.

Item 2: Approve Order of Agenda
Chair Wendel-Daub noted that Item 2b is being continued.

Member Lundberg moved the Order of Agenda be approved as presented. Second by Member Love. All Members present voted aye and the motion was declared carried.

Before proceeding with Item 2a, Chair Wendel-Daub asked for clarification on the number of affirmative votes required for a super-majority to approve this application. City Attorney Erik Johnson explained the State of North Dakota's statutory provisions requires a concurring vote of four Board Members to approve this application.

Member Love declared a conflict of interest on Item 2a. Mr. Love stated he is employed by the applicant, Houston Engineering, Inc.

Chair Wendel-Daub explained that for a variance to be approved four affirmative votes are required. She stated with only four out of the five Board Members present eligible to vote, the applicant does have the option to continue this item. Applicant representative Brian Pattengale stated he would like the meeting to proceed.

Item 3: New Business

a) Variance Request – 303 11th Street North: Request for a variance of Article 21-06 of the Municipal Code. The requested variance is to allow the lowest opening of the proposed building to be approximately 0.9 feet lower, and the fill around the building to be 0.7 feet lower, than would otherwise be required by the City's Floodproofing Code: DENIED

Planning Administrator Nicole Crutchfield presented the staff report, providing an introduction to this type of variance request involving the City's Floodproofing Code. She explained the administration of the Floodproofing Code is done by the Inspections and Engineering Departments, whose staff will be presenting their recommendations and information on the technical aspects of this request. Ms. Crutchfield referred to the criteria used during Planning staff's analysis of the request and their recommendation for approval with the following condition: The applicant agreeing to a waiver of liability against the City and with the Facility's organization administering an emergency response plan.

Inspections Administrator Bruce Taralson presented his department's review of the request and their recommendation that the applicant finish the ground level of the structure using floodproof construction, and that the engineer of the applicant verify it to be of floodproof construction.

Stormwater Division Engineer Jody Bertrand shared concerns on the placement of a mechanical room in a lower area that could be prone to flooding in relation to FEMA requirements.

Applicant Brian Pattengale, Houston Engineering, Inc., spoke on behalf of the application and addressed how they plan to accommodate staff's concern regarding the location of a mechanical room.

Board discussion continued regarding concerns on the accessibility of emergency vehicles, and the request for removal of the proposed flood gates.

City Engineer April Walker spoke about the importance of providing a floodproof foundation when constructing a new building or updating an existing structure, to provide the City with needed protection should a flooding event happen in the future.

Member Lundberg moved the findings and recommendations of staff be denied, and denial be recommended for the requested variance to allow the lowest opening of the proposed building to be approximately 0.9 feet lower, and the fill around the building to be 0.7 feet lower, as it does not comply with the City's Floodproofing Code. Second by Member Ford-Dunker. On call of the roll Members Boreen, Lundberg, Ford-Dunker, and Wendel-Daub voted aye. Member Love abstained from voting. Absent and not voting: Member Mitchell. The motion was declared carried.

b) Variance Request – 510 4th Street South: Request for a variance of Article 21-06 of the Municipal Code. The requested variance is to allow the opening of a proposed building to be approximately 18.9 feet lower, the fill around the building to be 18.9 feet lower, and the fill 15 feet away from the building to be 20.6 feet lower, than would otherwise be required by the City's Floodproofing Code: CONTINUED TO JANUARY 24, 2017

Item 4: Other Business

a. 2017 Meeting Dates

Planner Aaron Nelson presented this calendar which was included in the packet.

Item 5: Adjournment:

Member Love moved to adjourn the meeting at 10:00 a.m. Second by Member Ford-Dunker. All Members present voted aye and the motion was declared carried.

CITY OF FARGO - Board of Adjustment
Variance Staff Report

Item No: 2a	**Date:** December 19, 2016 January 17, 2017
Address: 510 4th Street South	
Legal: Lot 1, Block 1, St. John's Addition	
Owner(s)/Applicants: Prairie St. John's / Tom Eide	
Reason For Request: To construct a new building with a lower earth fill elevation around the building, lower fill 15 feet from the building, and lower lowest opening than would otherwise be required by the City's Floodproofing Code.	
Zoning: MR-3: Multi-Dwelling Residential	

Floodproofing Code Standards		Proposed Structure	
Elevations:		**Elevations:**	
Lowest opening:	41-foot WSEIA plus 1.2' or FEMA BFE plus 2.0'	**Lowest opening:** 41-foot WSEIA **minus 18.9** **Revised request** 41-foot WSEIA **minus 8.9'**	
Fill around building:	41-foot WSEIA plus 0.7' or FEMA BFE plus 1.5'	**Fill around building:** 41-foot WSEIA **minus 18.9'** **Revised request** 41-foot WSEIA **minus 8.9'**	
Fill 15' from building:	At or above FEMA BFE	**Fill 15' from building:** BFE minus **8.6'**	

Background:
The applicant would like to construction a new building which would have a lower lowest opening, lower fill around building, and lower fill 15 feet from the building that would otherwise be required by the City's Floodproofing Code. The property is located at 510 4th Street South and is below the FEMA base flood elevation (BFE) and within the 41-foot water surface elevation inundation area (WSEIA). At this location, the BFE is at an elevation of 901.6 feet MSL and the 41-foot WSEIA is at an elevation of 902.7 feet MSL. For construction within the BFE, the Floodproofing Code requires that the lowest opening in a building be at or above the 41-foot WSEIA (902.7') plus an additional 1.2 feet (903.9'). In addition, the fill around the building is required to be at or above the 41-foot WSEIA (902.7') plus an additional 0.7 feet (903.4') and the fill within 15 feet of the building must be at or above the BFE (901.6'). The site is not in the floodway.

The applicant has proposed two alternate locations for the new building on this site---one closer to 6th Avenue South and one further north, located in what is now the parking lot of the existing healthcare facility. These are depicted on the conceptual site plan included in this packet. The applicant does not plan to meet the required elevation for the lowest opening. The applicant does not wish to elevate the earth fill around the building or within 15 feet of the building to the required heights, due to the large amount of fill that this would require. Accordingly, the applicant is requesting a variance in order to allow the building to be constructed without the lowest opening, fill around the building, and fill within 15 feet of the building being elevated to the heights required by the City's Floodproofing Code.

The rationale behind the development of the City's 41-foot WSEIA is in anticipation for future increases to the FEMA Special Flood Hazard Area (1% annual chance/100-year flood plain). While mapping flood elevations as part of the FM Diversion Feasibility Study, it was found by the Army Corps of Engineers that the hydrology used by FEMA to establish the Special Flood Hazard Area was obsolete. It was based on a study that did not include in the period of record for the Red River events after 1979. It is the practice of FEMA to review communities every 5 years to determine if a new map is warranted. Based on information contained in the FM Diversion Feasibility Study of Fargo which accounts for recent flood events, including the flood of record in 2009, the information on updated hydrology and hydraulics is readily available and FEMA will have cause to remap Fargo. When this update occurs, it is anticipated FEMA will raise the

elevation of the Special Flood Hazard Area, resulting in additional areas of the City being located within this flood plain and subject to additional flood insurance requirements or increases. As such, the purpose of the 41-foot WSEIA is to prevent non-floodproof construction within areas that will potentially be located within Special Flood Hazard Area in the future. It should also be noted that the state rules require elevation on fill to the BFE +1 feet. In an attempt to keep new construction compliant with this state requirement into the future, the City requires the additional 1.2 feet.

Another caveat of floodproofing and protection has to do with localized flooding versus flooding from the Red River. Many areas of the City are at risk of flooding due to the stormwater infrastructure not being able to handle significant rainfall events. In this aspect the City's floodproofing requirements and policies are intended for emergency protection from both the Red River and from overland flooding or stormsewer overflows.

The applicant provides critical behavioral health services to the community. The applicant intends to construct a new healthcare facility at their existing location, which would replace the existing facility. The existing facility would be torn down once the new facility is completed and operational. The site is located behind (on the dry side) of the 4th Street levee, a city-certified and maintained levee.

The applicant has provided responses to the findings in Section 21-0603(G)(5)(a-k) in order to support his request for the variance. (See application included in this packet). These responses are noted in the "Staff Analysis" section below.

As indicated by the applicant's responses to these findings, he makes the case to support his variance request based on two points:

1. The site is not in the floodway and is protected from flooding and from both receiving and causing collateral damage to life and property related to flooding by a city-certified and maintained levee.

2. Prairie St. John's provides critical behavioral health services to the community. A major component of the community served by Prairie St. John's is located in the city's core neighborhoods, to which the current location is conveniently accessible. To relocate to an area of the city removed from the core neighborhoods would diminish Prairie St. John's ability to serve on of its major components of the community. Additionally, the applicant believes that relocating a facility that serves behavioral health and substance abuse conditions will likely face resistance from businesses or residents in a new area if the facility were to relocate.

December 22, 2016 Board of Adjustment Meeting
At the December 22, 2016 Board of Adjustment meeting, this case was continued at the request of the applicant to the January 24, 2017 Board of Adjustment meeting. No action was taken at the December 22 meeting.

Activity Since the December 22, 2016 Board of Adjustment Meeting
Since the December 22, 2016 Board of Adjustment meeting, the applicant has again met with city staff to evaluate the project. The applicant has decided to focus on the proposed building location along 6th Avenue South as the preferred option. The applicant has stated that this option places the new building on the highest elevation on this site (Lot 1, Block 1, St. John's Addition), which is 895 feet. This raises the lowest opening to an elevation that is 8.9 feet below the required elevation of the 41-foot WSEIA + 1.2 feet. Thus, the applicant's request for a variance from the flood ordinance is now 8.9 feet, not the previously requested 18.9 feet.

The applicant has also stated:

- The proposed first floor /lowest opening level is more than 11 feet above the model run by the city's Engineering Department for a 100-year gravity-blocked hypothetical event.

- No basement is planned for the proposed facility

- Building planning will strongly consider locating critical building services, such as electrical and mechanical, above the designated elevation for flood protection

- An emergency response plan is developed in the event evacuation is required.

The applicant's updated letter and site plans are attached.

This additional information from the applicant has not changed the comments of the city's Engineering and Inspections departments, though these departments do recognize the reduced amount of variance being requested. These comments are attached.

Criteria for Approval:
The Floodproofing Code was enacted by reference within Article 21-06 (Flood Plain Management) of the Fargo Municipal Code. Appeals from Article 21-06 are heard and decided upon by the Board of Adjustment as outlined within Section 21-0603 of the Municipal Code.

§21-0603.G.5 of the Municipal Code states that, *In determining appeals or requests for variances, the board of adjustment shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:*

a. The danger that materials may be swept onto other lands to the injury of others;
b. The danger to life and property due to flooding or erosion damage;
c. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners;
d. The importance of the services provided by the proposed facility to the community;
e. The necessity to the facility of a waterfront location, where applicable;
f. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
g. The compatibility of the proposed use with the existing and anticipated development;
h. The relationship of the proposed use to the comprehensive plan and floodplain management program or that area;
i. The safety of access to the property in times of flood for ordinary and emergency vehicles;
j. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,
k. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, streets and bridges.

§21-0603.H.1 of the Municipal Code includes additional considerations for variances:

1. Variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base level, providing items (a-k) in subsection (G)(5) above have been fully considered. As the lot size increases beyond the one-half acre, the technical justifications required for issuing the variance increases.
2. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or any state or local inventory or register of historic places without regard to the procedures set forth in the remainder of this section.

3. *Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.*
4. *Variances shall be issued only upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.*
5. *Variances shall be issued only upon:*
    a. *A showing of good and sufficient cause;*
    b. *A determination that failure to grant the variance would result in exceptional hardship to the applicant; and*
    c. *A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.*
6. *Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk from the reduced lowest floor elevation.*

Staff Analysis: The response to items 21-0603(G)(5)(a-k) below were provided by the applicant and reviewed by staff:

a. The danger that materials may be swept onto other lands to the injury of others;
Staff has no data to suggest that the proposed variance would cause an increased danger of materials being swept onto other lands to the injury of others. This property is already protected by a city-certified and maintained levee and the existing facility is already located at this location. The organization is attempting to update their facility to still serve the city at this location

b. The danger to life and property due to flooding or erosion damage;
Staff has no data to suggest that the proposed variance would cause an increased danger due to flooding or erosion damage. This property is already protected by a city-certified and maintained levee. By building a new facility at the same location, there is not an increase in danger.

c. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners;
Staff has no data regarding the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner. This property is already protected by a city-certified and maintained levee. In the event of FEMA remapping, the existing facility is at a similar risk as the abutting properties at this location.

d. The importance of the services provided by the proposed facility to the community;
Prairie St. John's provides critical behavioral health services to the community. Prairie St. John's is the only provider for some child and adolescent services for behavioral health and the largest provider in the state. The location of this facility in the downtown area is important. Initial construction costs are minimized by staying at their current location.

e. The necessity to the facility of a waterfront location, where applicable;
The facility is not on the waterfront. It is separated from the river by a city-certified and maintained levee.

f. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
Maintaining the current location for Prairie St. John's allows that facility to be readily available to support the core city of Fargo with important human and social services. Relocating a facility that serves

behavioral health and substance abuse conditions will likely face resistance from businesses or residents in a new area if the facility were to relocate.

g. The compatibility of the proposed use with the existing and anticipated development;
The proposed use, a health care facility, is a conditionally permitted use in the MR-3 zone. The applicant has applied for a conditional use permit (CUP) to allow this development. The CUP is a separate process from the variance request and is heard by the Planning Commission. The proposed use continues an existing use—health care facility—established in 1926, before the current zoning was in effect.

h. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;
This lot has not been suggested as a flood buy-out lot and is protected by a certified and maintained levee. The floodplain management is related to the City's floodproofing policies as part of the 41' WSEIA elevation requirements.

i. The safety of access to the property in times of flood for ordinary and emergency vehicles;
Access may be questionable as servicing roadways would be inundated by a stormwater-related flood event. However, a new facility would not compromise the City's effort to keep 4th Street open in times of an emergency. In addition, if the abutting street is inundated it would require a larger emergency management response on behalf of the facility and the city.

j. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,
Staff has no data onto expected flood waters and effects on wave action and its affect at the site. This site is already protected by a city-certified and maintained levee. The localized flooding, if occurring would impact the geographical area within this contour ring (Island Park bowl).

k. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, streets and bridges.
Rebuilding at this site does not affect the governmental services that are impacted during times of emergency.

Since this is a variance request to Article 21-06 (Flood Plain Management) related to floodproof construction, the Zoning Administrator defers to the Building Official/Flood Plain Administrator as well as the City Engineer for current and future floodplain management. The above analysis is presented on behalf of the Department of Planning and Development in regard to the effects of the applicability of the ordinances and policies in place as reviewed against the application at hand. Please note that the Engineering Department has provided comments on this application; these comments are included in this packet.

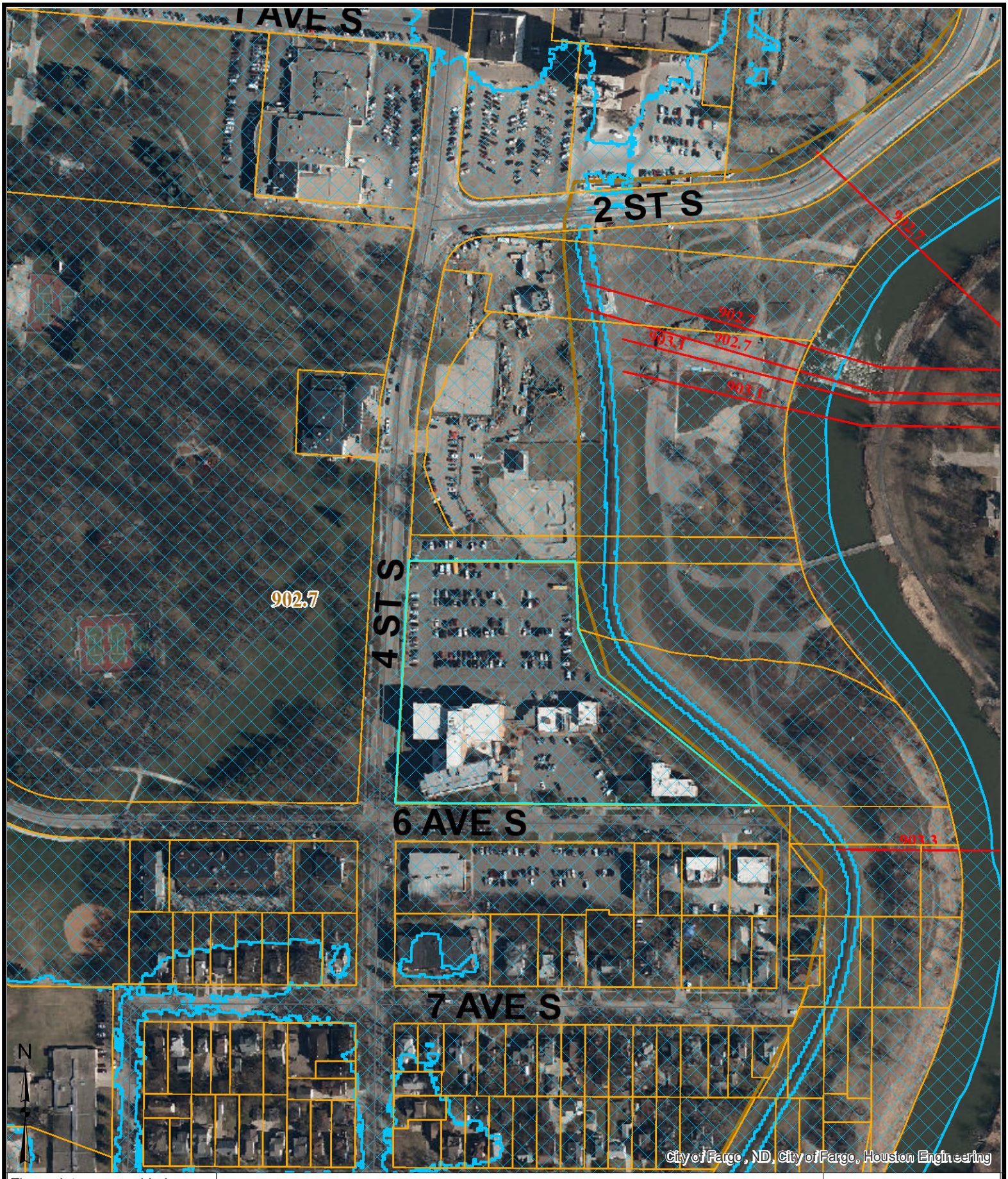
Staff further recommends that any grant of a variance should be conditioned upon the applicant agreeing to a waiver of liability against the City and with the facility's organization administrating an emergency response plan. If the variance is granted, then staff would suggest that the Engineering staff work with the City Attorney's Office to draft an acknowledgment form that would outline the owner's decision and personal risk to not follow the City's floodproof construction requirements. The purpose of this document would be to provide additional protection to the City from unforeseen issues that may arise as a result of the variance.

The presentation of this application presents an opportunity for the policy review related to this unique geographical location abutting the river for an important community facility. Several policy discussions are

encountered by staff when considering the application at this location and as such, the Board and staff are invited to bring further elements for discussion as part of the public hearing.

Staff Recommendation: "To accept the findings of staff and approve the requested variance on the basis that the review considerations of Section 21-0603 have been satisfied with the following condition:

1. The applicant agreeing to a waiver of liability against the City and with the facility's organization administering an emergency response plan"



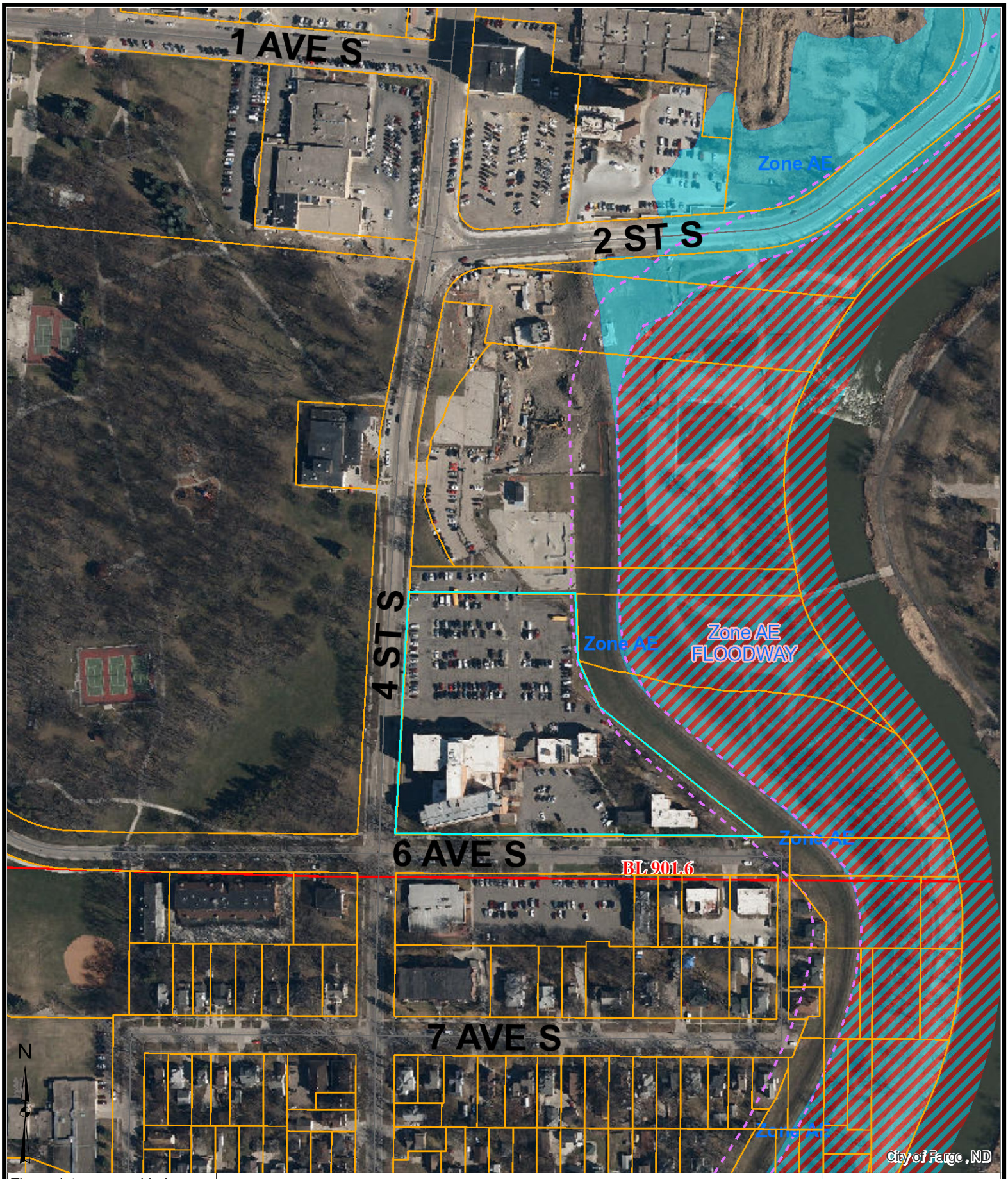
These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose.

41' WSEIA

1:4,514	12/13/2016 9:27:06 AM

This map is not a substitute for accurate field surveys or for locating actual property lines and any adjacent features.

CITY OF Fargo



These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose.

BFE

1:4,514	12/13/2016 9:27:48 AM

This map is not a substitute for accurate field surveys or for locating actual property lines and any adjacent features.

CITY OF Fargo

CITY OF Fargo

2014 Contour Elevations

510 4th Street South

0 150 300 Feet

N

CITY OF FARGO ENGINEERING COMMENTS:

Variance Request related to the 41' Water Surface Elevation Inundation Area (WSEIA)

510 4th Street South

The position of the Engineering Department would be for the denial of the requested variance for multiple reasons. The first being that the area adjacent to the proposed improvement has had previous storm water inundation throughout the Park property which is located directly to the north during several previous rainfall events. A preliminary storm sewer modeling effort is presently being compiled to determine if the change in the storm sewer pipe sizing and layout and lift station improvements presently under construction along 4th Street S., would be able to control and handle future significant rainfall events without localized flooding occurring while operating in a gravity flow scenario. Once the modeling is completed an evaluation of the water surface elevation (height) and anticipated water velocities can be investigated in regards to public safety and possible access issues.

The variance states in multiple sections this area is protected by an existing levee and is therefore safe from flooding. The term of "Reasonably Safe "from flooding may be the term which should be used but, the chance for failure is ever present for any flood protection measure installed. With a portion of a newly constructed levee and lift station piping systems recently installed, it should be noted these measures have not been tested through a real event. With the requested depth of 18 feet below the WSEIA, if a breach or failure were to occur, the first two floor of the proposed structure would be inundation with water if constructed at that elevation.

If this variance would be approved the Engineering Department would request two items be seriously considered during the design process of the building. The first would be the possibility of the first floor being for underground parking and not for residences and office space. This would allow for possibly the first 12 feet below the WSEIA to not be impacted if flooding was to occur from either a river or a significant internal rainfall event. The second item would be that engineering could be involved in determining an elevation based on the storm sewer modeling being performed and using that information to evaluate if a slight elevation change would decrease the probability of possible rainfall damage by setting a minimum building elevation (occupied space if underground parking implemented).

If this variance is approved, engineering would like to reiterate the second paragraph under section K which describes the applicant's agreement that a waiver of liability would be implemented for the City and internal staff. The City attorney would need to develop this document prior to approval and issuance of a permit.

Upon inspection the MDZS and the LDZS setback lines location, they are not affected by this proposed improvement.

With this facility being a patient based business, though unlikely, if flooding from any source would occur it may make movement of those individuals difficult if continuous access is not evaluated during the design. If the proposed building footprint is an increased area from the existing structure, the size difference should be evaluated to determine if other properties are impacted by a possible increased flood stage through a storm sewer modeling effort.

The completion of the Fargo Diversion will change the way that flooding events are managed in the future but the reliance on it at this time for approving to construct in this location may be premature.

Item e. identifies this property was previously built prior to a known threat of river flooding. The threat can't be ignored at this time as it is a known decision parameter.

CITY OF FARGO INSPECTIONS DEPARTMENT COMMENTS

Variance request related to the 41' Water Surface Elevation Inundation Area (WSEIA)

510 4th Street South

I do not have enough information to make an opinion on this variance due to no plans provided, but will give my opinion as of today. I believe this project variance should be granted, and probably with stipulations. My reasons and stipulations for granting are:

1. I will agree with everything that the Engineering Department has stated. I formulate my opinion on all facts and taking into account what is best for the City of Fargo and the Owner. To have this Owner move out of the city for any reason would not be good.
2. The Owner and architect have stated that they will provide us with elevations for their project. I will want to see the degree of difference of elevations that the Owner can provide to see the difference between what is required and what they can achieve. I believe they can get closer than they think to the 41' + 1.2'.
3. I agree with the applicant that to move the facility would not be the best for the Owner or the City of Fargo. They have worked hard to provide the services they do at the location they are currently at and they have been at this location for a long time. A move would be detrimental to them and to the City of Fargo if they move outside the City of Fargo. I do not think a flood policy should force an Owner who has existing property to move if they have the property to do what they want to do. This might be the worst case of elevation ever allowed, but variances are allowed, with reason. Every situation is different, so I do not worry about giving a for or against for any one variance as each one will have different circumstances.
4. If the variance is approved, we must require the new building to be at or above the elevation of the grade of the existing building. We must require a minimum elevation.
5. Will new project have a larger footprint that previous building(s)? Design could be done so it does not. That would make the change of affecting flooding similar to the existing situation.
6. We could require floodable construction to the 41' elevation. We are talking about the 41' only and not FEMA, and there is option even in FEMA to construct with floodable materials. That would mean concrete, steel, foam types of construction to 41' + 1.2' and is possible.
7. I have no comments in regard to overland flooding or storm sewer flooding as that is beyond my scope of review. That will be determined by Engineering Department.

Comments to staff report:

1. The variance staff report states 'Elevations: Lowest opening: 18.9 feet below WSEAI'. I do not believe that is correct and is more like 10.9' below.
2. Addressing two comments on staff report, Background:
    a. Item #1. Should be addressed by engineering department.
    b. Item #2. I agree.
3. Addressing Staff analysis
    a. I agree.
    b. I agree. The danger to life and property should not be increased.
    c. I agree. The susceptibility of a new facility and its contents to flood damage should nto be increased.
    d. I agree.
    e. NA.

f. I agree.
g. Must be per Planning Department.
h. This question can only be answered by the Planning and Engineering Departments.
i. I do not believe the facility will be any less safe than the existing facility in a flood emergency.
j. This question can only be answered by the Engineering Department.
k. I do not believe the costs of providing services to the facility during or after flood emergencies will be any more or less than the existing facility.

That is my opinion on the flood variance for the St Johns project.

Bruce Taralson . CBO . Administrator . City of Fargo- Inspections
p: 701/476-4147 . f: 701/476-6779 . e: btaralson@cityoffargo.com

PLANNING AND DEVELOPMENT
200 Third Street North
Fargo, North Dakota 58102
Phone: (701) 241-1474
Fax: (701) 241-1526
E-Mail: planning@cityoffargo.com
www.cityoffargo.com

VARIANCES (§20-0914)

The Board of Adjustment is authorized to grant variances from the zoning district dimensional standards and off-street parking and loading standards of the Land Development Code (LDC) that will not be contrary to the public interest or the spirit of the LDC, where owing to special conditions, a literal enforcement of the provisions of this LDC would result in unnecessary physical (not economic) hardship to the property owner.

Variance Application Process

1) The application and a nonrefundable fee of $185 are due at the time of submittal
2) Notice of the Public Hearing is mailed to property owners within 300 feet of the proposed site at least 15 days prior to the Hearing and published once a week for two consecutive weeks in the newspaper.
3) The City Planner reviews your case, develops a staff report and prepares a recommendation to the Board of Adjustment based on the Criteria for Approval, below.
4) Board of Adjustment meetings are scheduled as needed.

Criteria for Approval

A variance may be granted by the Board of Adjustment upon an affirmative finding that all of the following conditions exist.

a. The requested variance arises from conditions that are unique to the subject property, that are not ordinarily found in the same zoning district and that are not a result of the owner's intentional action;

b. The granting of the permit for the variance will not adversely affect the rights of adjacent property owners or residents;

c. The strict application of the applicable standards will constitute an unnecessary physical hardship (not economic hardship) because the property cannot be used for an otherwise allowed use without coming into conflict with applicable site development standards;

d. The variance desired will not adversely affect the public health, safety or general welfare; and;

e. The variance is the minimum variance that will overcome the hardship.

Acknowledgement – I hereby acknowledge that I have familiarized myself with the rules and regulations to the preparation of this submittal and that the foregoing information is true and complete to the best of my knowledge. I, the undersigned, do hereby petition the Board of Adjustment of the City of Fargo, North Dakota, to take such action as may be required by law of the City of Fargo to grant a variance pursuant to Section 20-0914 of the Land Development Code of the City of Fargo.

Owner (*Signature*): D.E.L CFO Date: 11.30.16

Note: *A nonrefundable filing fee of $185.00 must be accompanied with the application at time of submittal.*

Office Use Only

Date Filed: 11-30-16 Planning Contact: _____ Nonrefundable Fee $185.00: ck.# 577019203

Prairie St. John's
510 4th Street South
Fargo, ND 58103

APPLICATION FOR VARIANCE

The Board of Adjustment is authorized to grant variances from the zoning district dimensional standards and off-street parking and loading standards of the Land Development Code (LDC) that will not be contrary to the public interest or the spirit of the LDC, where owing to special conditions, a literal enforcement of the provisions of this LDC would result in **unnecessary physical (not economic) hardship** to the property owner.

Property Owner Information:	
Name (printed):	Prairie St. John's
Address:	510 4th Street South, Fargo, ND 58103
Primary Phone:	701.476.7200
Alternative Phone:	
Fax:	701.280.5787
Email:	

Representation Information: *(if applicable)*	
Name (printed):	Tom Eide
Address:	510 4th Street South, Fargo, ND 58103
Primary Phone:	701.476.7888
Alternative Phone:	701.371.3299
Fax:	701.280.5787
Email:	tom.eide@uhsinc.com

Location of property requesting a variance:	
Address:	510 4th Street South, Fargo, ND 58103
Zoning District:	MR-3
Legal Description:	Parcel 01-2550-00010-000

Proposed Variance Information:

What Land Development Code Standard are you seeking a variance? (e.g. setback, lot coverage, height)

Flood Proof Construction Requirements

Please describe difference between the standard and the proposed (e.g. The standard is 10 ft. and my project would propose a 7' setback).

Land elevation /proposed floor elevation is below the prescriptive Base Flood Elevation.

Please explain your project, describing why you are requesting a variance and why you believe a variance is justified. Along with your project description, please include a site plan/diagram with dimensions. (Attach additional pages, if needed.)

Flood Protection is afforded to the site by the city-certified and maintained levee providing protection to the prescriptive Base Flood Elevation.

Criteria for Approval:

Please explain how your requested variance meets the following five criteria for approval, pursuant to Section 20-0914 of the Land Development Code: (Attach additional pages, if needed.)

1) The requested variance arises from conditions that are unique to the subject property, that are not ordinarily found in the same zoning district and that are not a result of the owner's intentional action;

The property (and adjacent properties) are protected by the city-certified and maintained levee.

2) The granting of the permit for the variance will not adversely affect the rights of adjacent property owners or residents;

The use of the property is not changing from its current use.

3) The strict application of the applicable standards will constitute an unnecessary physical hardship (not economic hardship) because the property cannot be used for an otherwise allowed use without coming into conflict with applicable site development standards;

The property would not be able to be developed in any manner, and therefore would be not be in keeping with other adjacent properties afforded protection by the city-certified and maintained levee.

4) The variance desired will not adversely affect the public health, safety or general welfare; and

The use of the property is not changing from its current use.

5) The variance is the minimum variance that will overcome the hardship.

Protections are provided by the city-certified and maintained levee.

SHULTZ+ASSOCIATES
ARCHITECTS

612 1/2 Main Avenue
Fargo, ND 58103

January 13, 2017

Mr. Donald Kress, Senior Planner
City of Fargo, Department Planning and Development
200 North 3rd Street
Fargo, ND 58102

Re: Prairie St. John's – 510 4th Street South
Request for Variance – Building Elevation Requirement / City of Fargo Floodproofing Code

Dear Mr. Kress,
We have appreciated the opportunity for additional meetings with City staff regarding consideration of the above-referenced variance coming before the Board of Adjustment. On the basis of that feedback, the proposal for construction of a new facility on the site has been revised and refined as outlined herein.

Variance regarding flood proofing requirements – specifically flood elevation
Prairie St. Johns/UHS is of the understanding that the levee and other public flood prevention measures are in the place to protect the adjacent land from the impacts of river flood events. The site is on the dry side of that levee, and the site is of an elevation where meeting the 41' WSEIA +1.2' flood protection requirement cannot be met while providing access to the building. This situation is not unique to this site at required flood protection level. We understand that the calculated 41' WSEIA is elevation 902.7', for required floor/opening elevation of 903.9'.
The new facility has not been designed at this time, pending the outcome of this variance. The footprint illustrated is based on a prototype floor plan for other behavioral health facilities in the UHS system. The new facility will be constructed and occupied prior to the removal of the existing facility.

Flood Mitigation Provisions
The following design and operational considerations are proposed to minimize the flood risk on the current site with significant improvements over the existing facilities.

- The proposed siting of the new building places it on the highest elevation of the site, and raises the first floor / lowest opening level as high as adjacent elevations permit. The proposed elevation is 895'. This is 7.7' below the SWEIA, or 8.9' below the required elevation.

- The proposed first floor/lowest opening level is more than eleven feet (11') above a model run by Engineering for a 100 Year Blocked-Gravity Hypothetical Event, that could occur on from a storm event. Model indicates flooding to 883.7'.

- The new facility will have a floor elevation ten feet (10') above the current lowest opening of the current facility. No basement space is planned.

PHONE (701) 476-0714 FAX (701) 476-0709 www.TheArchitectFirm.com

- Building planning will strongly consider locating critical building services (Electrical and Mechanical and the like) above the designated elevation flood protection elevation, to minimize recovery time in the event of a catastrophic failure of the levee system.

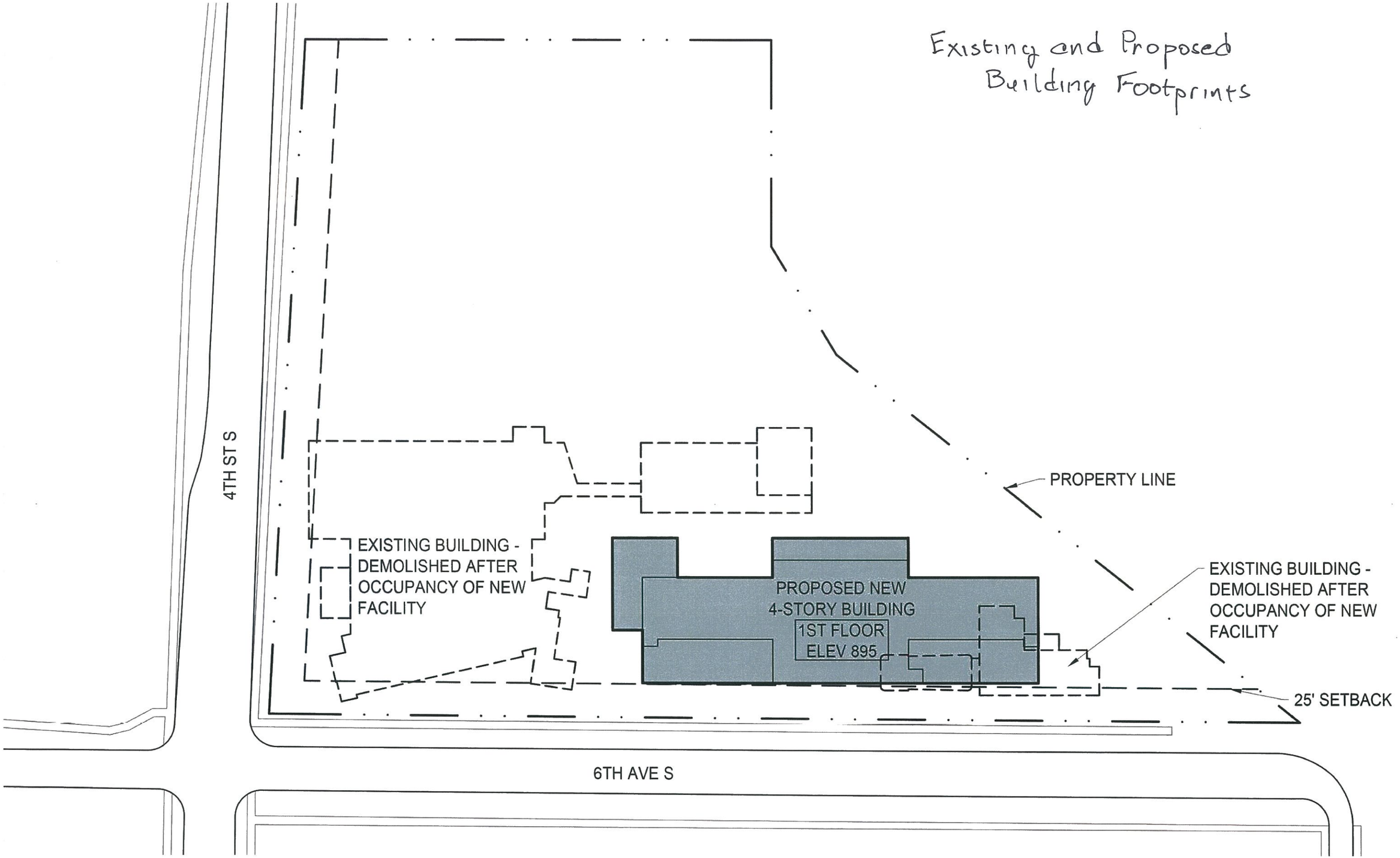
- An emergency response plan will be developed in the event evacuation is required. Patients are ambulatory, or potentially in a wheel chair. Patients are not connected to electronic devices, IVs or related equipment. Evacuation of the facility is by standard vehicular transportation – vans, buses and the like. Prairie St. John's evacuated the hospital in 2009 in this manner, as the result of storm event flood.

Thank you for the opportunity to present the updated variance proposal. Prairie St. John's has a strong rationale for continuing to service the behavioral health needs of the community by improving facilities on their current site in downtown Fargo. We look forward to reviewing staff recommendations, and for the opportunity to present this proposal to the Board of Adjustment.

Sincerely,

David R. Shultz, AIA
Shultz + Associates Architects

Existing and Proposed
Building Footprints



Existing Rec'd 13 Jan 17

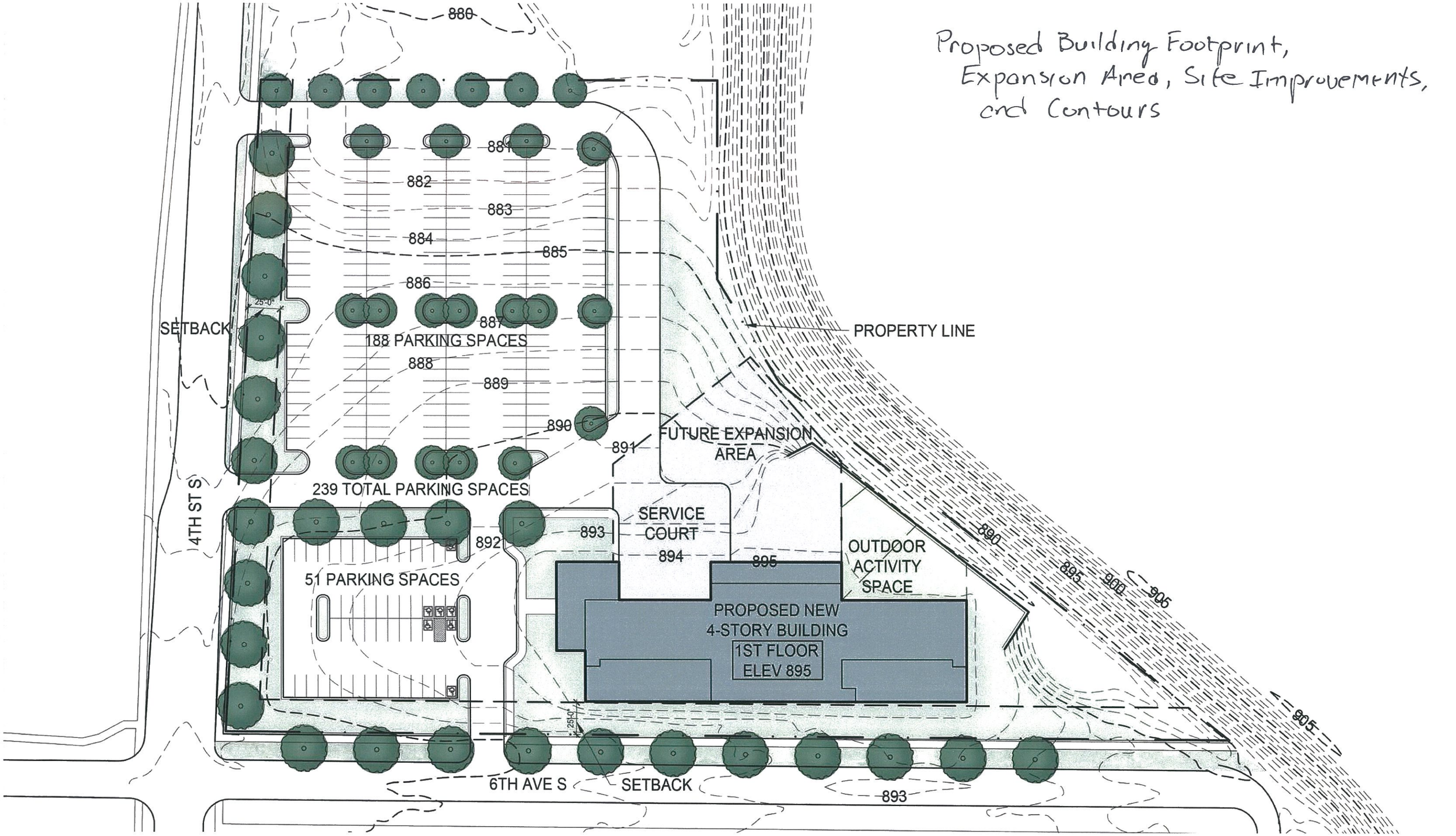
SHULTZ·ASSOCIATES ARCHITECTS

PRAIRIE ST. JOHN'S

0' 17.5' 35' 70' 140'

Prairie St. Johns
Proposed Site Redevelopment
Original Site January 10, 2017

Proposed Building Footprint,
Expansion Area, Site Improvements,
and Contours



Rec'd 13 Jan 17

SHULTZ-ASSOCIATES ARCHITECTS

PRAIRIE ST. JOHN'S

0' 17.5' 35' 70' 140'

Prairie St. Johns
Proposed Site Redevelopment
January 10, 2017

PRAIRIE ST. JOHN'S™

November 30, 2016

City of Fargo – Planning and Development
c/o Mr. Donald Kress, Senior Planner
200 3rd Street North
Fargo, ND 58102

Re: Prairie St. John's Campus Redevelopment
Request for Variance – Minimum Flood Elevation

Dear Board of Adjustment,
Prairies St. Johns is exploring options for facility redevelopment on their site located 510 4th Street South. More specifically, current planning calls for the replacement of the primary facility constructed in 1926 and substantially expanded in 1954, with a wholly new facility. Remaining on the current site is beneficial from a service delivery perspective, and has been favorably discussed by City leadership.

The site is protected by a City-certified and maintained levee. The elevation of the site on the protected side of the levee is below the prescriptive allowable flood elevation pursuant to the Land Development Code. This Application for Variance is requesting that the building elevation for the new construction be allowed to be below the prescriptive elevation as the levee provides the protections necessary for this site as well as much of the downtown area.

Prairie St. Johns is very early in the planning process. Construction of a new facility will be completed before removal of the existing structures for operational purposes. Therefore, the proposed site plan indicates two potential building sites. Upon verification that the site is buildable by approval of the proposed variance, Prairie St. Johns will move into more detailed planning which will include finalizing the site selection.

Specific to the Variance for Flood Protection, we submit the following responses to the Criteria in the LDC:

21-0603

Telephone
701.476.7200

510 4th Street South
Fargo, ND 58103

www.prairie-stjohns.com

G. 5. In determining appeals or requests for variances, the board of adjustment shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:

a. The danger that materials may be swept onto other lands to the injury of others;

Already protected by city-certified and maintained levee

b. The danger to life and property due to flooding or erosion damage;

Already protected by city-certified and maintained levee

c. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners;

Already protected by city-certified and maintained levee

d. The importance of the services provided by the proposed facility to the community;

Prairie St. Johns provides critical behavioral health services to the community. We are the only provider for some child and adolescent services for behavioral health and the largest provider in the state.

e. The necessity to the facility of a waterfront location, where applicable;

The facility was established in the location before the flood threat was known, and is protected by the city-certified and maintained levee.

f. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

Maintaining the current location for Prairie St. John's allows us to be readily available to support the core city of Fargo. Relocating a facility that serves behavioral health and substance abuse conditions will likely face resistance from businesses or residents in a new area if we were to relocate.

g. The compatibility of the proposed use with the existing and anticipated development

The proposed facility continues an existing, established use.

h. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

The comprehensive plan does not specifically address either this location or this use. This lot has not been suggested as a flood buyout lot.

i. The safety of access to the property in times of flood for ordinary and emergency vehicles;

The City's goal is to keep 4th Street open; the new facility would not compromise that effort.

j. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,

Already protected by city-certified and maintained levee

k. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, streets and bridges

Already protected by city-certified and maintained levee

Conditions for variances—

1. Variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base level, providing items (a-k) in subsection (G)(5) above have been fully considered. As the lot size increases beyond the one-half acre, the technical justifications required for issuing the variance increases.

The lot is larger than one-half acre

2. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of

Historic Places or any state or local inventory or register of historic places without regard to the procedures set forth in the remainder of this section.

Not applicable; this is new construction.

3. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

   The proposed facility is not within the actual floodway.

4. Variances shall be issued only upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

   The flood hazard is not impacted by the proposed variance as the property is protected by the city-certified and maintained levee.

5. Variances shall be issued only upon:
   a. A showing of good and sufficient cause;

      Items G(5)(a-k) and H(1-4) have been satisfied.

   b. A determination that failure to grant the variance would result in exceptional hardship to the applicant;

      i. Failure to grant the variance would make the existing facility and the site undevelopable, and would not be congruent with other properties also afforded protection by the city-certified and maintained levee.

   c. A determination that the granting of a variance will not result in increased flood heights,

      Already on the protected side of a certified levee; the City is responsible for the levee.

   additional threats to public safety,

      No; proposed facility continues an existing use.

   extraordinary public expense,

      No; project is privately constructed.

create nuisances,

No, the proposed facility continues an existing use.

cause fraud on or victimization of the public,

No, the proposed facility continues an existing use.

or conflict with existing local laws or ordinances..

The project site is otherwise compatible with the LDC for the proposed project. Already on the protected side of a certified levee; the City is responsible for the levee.

The Criteria for Approval is provided on the Variance Application

Prairie St. Johns is eager to continue to provide critical behavioral health services to the community. Redevelopment of the existing campus will permit the expansion of services to meet the growing need, and enhance the development of Fargo's vibrant downtown core.

Thank you for your consideration.

Sincerely,

Tom Eide, CFO
Prairie St. Johns`

ARTICLE 21-06 - FLOOD PLAIN MANAGEMENT

21-0601. - Definitions.

1. "Area of jurisdiction" shall mean the area within the corporate limits of the city, the area which is served by the city of Fargo utilities, and any area in which the city has statutory planning and zoning authority.
2. "Area of special flood hazard" means the land in the floodplain within a community subject to a 1% or greater chance of flooding in any given year.
3. "Base flood" means the flood having a 1% chance of being equaled of exceeded in any given year.
4. "Development" means any man-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations located within the area of special flood hazard.
5. "Elevation" shall mean height, above mean sea level, measured in feet.
6. "FEMA" shall mean the Federal Emergency Management Agency.
7. "Flood" or "flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas from:
    a. The overflow of inland waters and/or
    b. The unusual and rapid accumulation or runoff of surface waters from any source.
8. "FIRM" means the Flood Insurance Rate Map which is the official map on which FEMA has delineated both the areas of special flood hazard and the risk premium zones applicable to the community.
9. "Flood Insurance Study" means the official report provided by FEMA that includes flood profiles, the Flood Boundary - Floodway Map, and the water surface elevation of the base flood.
10. "Floodproofing" means any combination of structural and nonstructural additions, changes or adjustments to properties and structures which reduce or eliminate flood damage to lands, water and sanitary facilities, structures and contents of buildings.
11. "Floodproofing Code" means the revised Floodproofing Code of the City of Fargo, North Dakota, as prepared by Moore Engineering, Inc., and dated December 9, 1975, as clarified by the Floodproofing Construction Requirements, together with illustrative exhibits, adopted by the city effective as of the date of adoption of this ordinance.
12. "Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than 0.75 feet.
13. "Lowest floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.
14. "Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. This term also includes park trailers, travel trailers and other similar vehicles placed on a site for greater than 180 consecutive days.
15. "Manufactured home park" or "subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale and shall include mobile home parks as defined in § 25-2401 of the Fargo Municipal Code.

16. "New construction" means structures for which the start of construction occurred on or after the effective date of this ordinance.

17. "Start of construction" means the date the building permit was issued for any construction or substantial improvement, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

18. "Structure" means a walled and roofed building or manufactured home that is principally above ground.

19. "Substantial improvement" means any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure either:

    a. Before the improvement or repair is started, or

    b. If the structure has been damaged and is being restored, before the damage occurred. For the purpose of this definition, substantial improvement is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

The term "substantial improvement" does not include:

    a. Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure living conditions, or

    b. Any alteration of a structure listed on the National Register of Historic Places or a state or local inventory or register of historic places.

20. "Variance" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

Source: 2325 (1987), 2939 (1998), 4956 (2014).

21-0602. - General Provisions.

A. Applicability—This ordinance shall apply to all areas of special flood hazard within the area of jurisdiction of the city.

B. Identification of affected area—The areas of special flood hazard identified by FEMA in the most recent Flood Insurance Study for the City of Fargo, North Dakota, with the accompanying FIRM is hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study and FIRM are on file at the office of the city engineer in Fargo, North Dakota.

C. Compliance—No structure or land shall hereafter be constructed, located, extended, converted or altered without full compliance with the terms of this ordinance and other applicable regulations.

D. Abrogation and greater restrictions—This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

E. Interpretation—In the interpretation and application of this ordinance, all provisions shall be:

    1. Considered as minimum requirements;

2. Liberally construed in favor of the governing body; and,

3. Deemed neither to limit nor repeal any other powers granted under state statutes.

F. Warning and disclaimer of liability—The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazard or uses permitted within such area will be free from flooding or flood damages. This ordinance shall not create liability on the part of the city of Fargo, any officer or employee thereof, or FEMA for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

Source: 2325 (1987), 2706 (1994), 4956 (2014).

21-0603. - Administration.

A. Development—Permit required—A building permit shall be obtained before construction or development begins within any area of special flood hazard. Application for such building permit shall be made on forms furnished by the building inspector and shall include, but not be limited to, the following:

1. Plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question;

2. Existing or proposed structures, fill, storage of materials, and drainage facilities;

3. Elevation of the lowest floor of all structures;

4. Elevation to which any structure has been floodproofed;

5. Certification by a registered professional engineer or architect that the floodproofing methods for any non-residential structure meet the floodproofing criteria in § 21-0604 of this article; and,

6. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

B. Building Inspector—The building inspector is hereby appointed to administer and implement this ordinance by granting or denying building permit applications in accordance with the provisions of this article. The duties of the building inspector shall include, but not be limited to, the following:

1. Review all applications for building permits to determine that the permit requirements of this ordinance have been satisfied.

2. Review all applications for building permits to determine that all necessary permits have been obtained from federal, state, or local governmental agencies from which prior approval is required.

3. Review all applications for building permits to determine if the proposed structure or development is located in the floodway. If located in the floodway, assure that the encroachment provisions of § 21-0604 are met.

C. Use of Other Data—When base flood elevation data has not been provided in accordance with § 21-0602 of this article, the building inspector shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from any federal, state or other source to establish criteria for requiring that new construction, substantial improvements, or other development in Zone A are constructed in accordance with § 21-0604 of this article.

D. Maintenance of information—

1. The building inspector shall obtain and record the elevation of the lowest floor of all new or substantially improved structures; and whether or not the structure contains a basement.

2. For all new or substantially improved floodproofed structures, the building inspector shall:

    a. Verify and record the actual elevation to which the structure has been floodproofed.

    b. Maintain the floodproofing certifications of registered professional engineers or architects as hereinabove provided.

    c. Maintain for public inspection, all records pertaining to the provisions of this ordinance.

E. Alteration of watercourses—

1. The building inspector shall notify adjacent communities and the North Dakota State Water Commission prior to any alteration or relocation of a watercourse, and submit evidence of such notification to FEMA.

2. Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood-carrying capacity is not diminished.

3. All buildings or structures in the Minimal Disturbance Zone Setback and the Limited Disturbance Zone Setback shall be erected, constructed, enlarged or altered in conformance with the Watercourse and Setback Restrictions and Exceptions as stated in Municipal Code §20-0508.

F. FIRM Boundaries—Interpretation—The building inspector shall interpret, when needed, the exact location of the boundaries of the areas of special flood hazards and shall make adjustments when necessary to resolve conflicts between mapped boundaries and actual field conditions. The person contesting the location of any boundary shall be given a reasonable opportunity to appeal the interpretation of the building inspector as hereinafter provided.

G. Appeals—Variances—

1. The board of adjustment shall hear and decide appeals from decisions or determinations made by the building inspector in the enforcement or administration of this article.

2. The board of adjustment shall consider requests for variances from the requirements of this ordinance.

3. Any person aggrieved by the decision of the board of adjustment may appeal such decision to the board of city commissioners of the city of Fargo.

4. Any person aggrieved by the decision of the board of city commissioners may appeal such decision to the North Dakota district court, pursuant to law.

5. In determining appeals or requests for variances, the board of adjustment shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:

    a. The danger that materials may be swept onto other lands to the injury of others;

    b. The danger to life and property due to flooding or erosion damage;

    c. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners;

    d. The importance of the services provided by the proposed facility to the community;

    e. The necessity to the facility of a waterfront location, where applicable;

    f. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

    g. The compatibility of the proposed use with the existing and anticipated development;

h. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;

i. The safety of access to the property in times of flood for ordinary and emergency vehicles;

j. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,

k. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, streets and bridges.

6. Upon consideration of the foregoing factors and the purpose of this article, the board of adjustment may attach such conditions to the granting of variances as it may deem appropriate and necessary to effectuate the intent of this article.

7. The building inspector shall maintain the records of all appeal actions, including technical information, and report any variances to FEMA.

H. Conditions for variances—

1. Variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base level, providing items (a-k) in subsection (G)(5) above have been fully considered. As the lot size increases beyond the one-half acre, the technical justifications required for issuing the variance increases.

2. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or any state or local inventory or register of historic places without regard to the procedures set forth in the remainder of this section.

3. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

4. Variances shall be issued only upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

5. Variances shall be issued only upon:

a. A showing of good and sufficient cause;

b. A determination that failure to grant the variance would result in exceptional hardship to the applicant; and

c. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

6. Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk from the reduced lowest floor elevation.

Source: 2325 (1987), 2408 (1988), 2939 (1998), 4956 (2014).

21-0604. - Provisions for flood hazard reduction.

A. General standards—In all areas of special flood hazard, the following standards shall apply:

1. Anchoring

a. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure and shall be capable of resisting the hydrostatic and hydrodynamic loads.

b. All manufactured homes which are placed or substantially improved must be elevated and anchored to resist flotation, collapse or lateral movement and shall be capable of resisting the hydrostatic and hydrodynamic loads. Methods of anchoring shall include, but are not limited to, the following:

i. Over-the-top ties shall be provided at each of the four corners of the manufactured home, with two additional ties per side at intermediate locations, provided that manufactured homes less than 50 feet long shall have one additional tie per side.

ii. Frame ties shall be provided at each corner of the home with five additional ties per side at intermediate points, provided that manufactured homes less than 50 feet long shall have four additional ties per side;

iii. All components of the anchoring system shall be capable of carrying a force of 4,800 pounds.

Any additions to a manufactured home shall be similarly anchored.

2. Construction materials and methods

a. All new construction and substantial improvements shall be constructed with materials which are resistant to flood damage.

b. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

c. All new construction and substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

3. Utilities

a. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

b. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.

c. On-site waste disposal systems shall be located to avoid impairment or contamination during flooding.

4. Subdivisions

a. All proposed subdivisions shall be consistent with the need to minimize flood damage.

b. All subdivisions shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

c. All subdivisions shall have adequate drainage provided to reduce exposure to flood damage.

d. Base flood elevation data shall be provided for proposed subdivisions and other development proposals which contain at least 50 lots or five acres (whichever is less).

5. Specific standards—In all areas of special flood hazard where base flood elevation data has been provided as set forth in § 21-0602 or 21-0603, the following provisions are required:

a. New construction and substantial improvement of any structure shall:

i. Conform to structural and technical provisions set forth in the floodproofing code.

ii. Be constructed in accordance with the Floodproofing Construction Requirements, on file in the Inspections Office of the city of Fargo, North Dakota. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design methods of construction are in accordance with accepted standards of practice.

iii. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. Fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

- A minimum of two openings having a total net area of not less than one square inch per square foot of enclosed area subject to flooding shall be provided;
- The bottom of all openings shall be no higher than one foot above grade.
- Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

6. Manufactured homes—Manufactured homes which are placed or substantially improved shall be set on a permanent foundation and shall be elevated so that the lowest floor is at or above the base flood elevation and is securely anchored as hereinabove provided.

7. Floodways—The following provisions shall apply to any development or construction in the floodway:

a. Any development or construction is prohibited unless a registered professional engineer certifies that such development or construction shall not result in any increase in flood levels during the occurrence of the base flood discharge.

b. All new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of this section.

Source: 2325 (1987), 2939 (1998), 4956 (2014).

Floodproof Construction Requirements

CITY OF FARGO BUILDING
INSPECTION DIVISION
Updated April 2015

The State of North Dakota requires that you call *1-800-795-0555* at least two business days before you dig.

This handout does not address any covenants or easements assigned to the property, nor does it relieve you of code compliance with items which may not have been included from the International Codes.

REQUIREMENTS TO OBTAIN A BUILDING PERMIT FOR FLOODPROOF CONSTRUCTION

ALL PLANS MUST BE DRAWN TO SCALE

1. Floodproofing Certification Form from a State of North Dakota registered professional engineer. Required before Permit issuance.
2. Plot plan showing existing elevations of property.
3. Plot plan showing exact location of new building or addition and existing buildings.
4. Floor plan(s) of new building(s).
5. Elevation views of two sides of the building. Elevation plans must show grade.
6. Foundation wall sections showing required construction details per City flood proof specifications. (See enclosed details.)
7. Foundation plans showing drain tile location and footings.

THE FOLLOWING ITEMS ARE INCLUDED IN THIS PACKET

A. Typical Floodproofing Construction Requirements Exhibits

B. Foundation and basement wall structural details from *Floodproof Basement Structural Design Requirements Report*, created by KLJ, created December 17, 2014 and revised April 9, 2015.

C. **For informational purposes only – I**nspection log for foundation. Actual log is completed electronically and done by City of Fargo Inspection Department.

D. FEMA Residential Floodproofing Certificate.

E. FEMA Non-Residential Floodproofing Certificate.

A CERTIFICATE OF OCCUPANCY WILL BE REQUIRED BEFORE BUILDING OCCUPANCY

CITY OF FARGO POLICY STATEMENT FOR FLOODPROOFING ELEVATION REQUIREMENTS

Referenced to the following:

Fargo Municipal Code Article 21-06 (Flood Plain Management)
Floodproofing Code of the City of Fargo, North Dakota, prepared by Moore Engineering, Inc., Revised December 9, 1975

Applicable to the following:

This Policy Statement shall regulate development within City of Fargo City Limits and Extra Territorial Areas. The specific areas governed, by this policy are the FEMA 1% annual chance floodplain and the 41-foot water surface elevation inundation area.

I. All Structures

All structures, including but not limited to, residential, commercial, and industrial construction within the city limits and extra territorial areas shall meet the following requirements:

A. Floodway Setback
All structures must be set back 100' from floodway line

B. Watercourse Setbacks
All provisions of the Minimum and Limited Disturbance Setbacks zones as identified under City Municipal Code §20-0508 shall be met.

C. Primary Flood Protection Line
1. All properties adjacent to a river, drainage ditch or other flooding source, as determined by the City Engineer, must include a primary flood protection line.
2. Primary flood protection line elevation shall be FEMA Base Flood Elevation (BFE) plus 4.0'.
3. Primary flood protection line must be constructed throughout a proposed development (not on a lot by lot baisis) prior to issuance of any building permits.
    a. Plats approved by City Commission prior to March 4, 2014 may have a primary flood protection line constructed on a lot by lot basis. Protection line must be completed at the time of issuance of occupancy certificate.
4. Primary flood protection line shall be constructed according to the City of Fargo Standard Specifications, Section 3600.

D. Letter of Map Revisions (LOMR)
The City of Fargo encourages construction outside of the FEMA Special Flood Hazard Area (SFHA) and requires removal from the SFHA by Letter of Map Revision (LOMR) via fill or ring dike.
1. All fill placement shall follow the current City of Fargo Standard Specifications, Section 3600.
2. No more than five feet (5') of fill may be placed for buildings in areas removed from FEMA SFHA by LOMR
    a. Fill in excess of five feet may be permitted, provided the fill is Engineered fill designed by a State of North Dakota registered professional engineer and the design plan is provided to the City in advance of construction.
3. All structures constructed within LOMR areas must meet all floodproofing codes.

E. Infrastructure Elevations

1. All streets are to be constructed to a minimum of FEMA BFE minus 0.5' at the low point (Back of Curb to be at FEMA BFE)
2. All sanitary sewer facilities, including private sewer connection manholes, cleanouts, etc. must be protected to an elevation equal to the FEMA BFE. Protection measures include sealing and/or elevating.
3. Storm sewer system shall be protected by infrastructure designed to be at or above an elevation of FEMA BFE plus 5.0'

F. Certifications

1. Elevation Certificates are required for all flood proofed structures.
2. Elevation Certificates for existing non flood proofed structures may be required if the structure is located in the FEMA SFHA.
3. Pre- Construction Floodproof Certification Form from FEMA is required for floodproof foundations, and must be provided to the City at the time the Building Permit is requested.

II. Single Family and Multi-Family Residential Structures Within 41-foot Water Surface Elevation Inundation Area (WSEIA) (See Exhibit A)

All construction within the 41-foot WSEIA as determined by the City Engineer shall meet all floodproofing codes, in addition to the following elevation and fill requirements:

A. Elevations

• *Lowest opening including area walls	Equal to 41-foot WSEIA plus 1.2' Or equal to FEMA BFE plus 2.0'
• *Fill around building	Equal to 41-foot WSEIA plus 0.7' Or equal to FEMA BFE plus 1.5'
• Fill 15' away from buildings	At or above FEMA BFE

* Highest elevation of the two shall govern required minimum elevations

B. All underground parking must meet floodproofing codes, including the above specified elevation and fill requirements.

C. Elevations of detached, non-primary, slab on grade structures located on single and multi family lots shall have the elevation of the finished floor to be at or above the FEMA BFE plus 1.0'.

III. Single Family and Multi Family Residential Structures Outside the 41- foot WSEIA

A. Elevations

Lowest opening including area walls	Equal to 41-foot WSEIA plus 1.2'
Fill around building	Equal to 41-foot WSEIA plus 0.7'

B. Foundations — No special requirements

IV. All Structures (Excluding Residential) Within the FEMA 1% Annual Chance Floodplain (See Exhibit A)

All construction within the FEMA 1% annual chance floodplain as determined by the City Engineer shall meet all floodproofing codes, in addition to the following elevation and fill requirements:

A. Elevations

• *Lowest opening including area walls	Equal to 41-foot WSEIA plus 1.2' Or equal to FEMA BFE plus 2.0'
• *Fill around building	Equal to 41-foot WSEIA plus 0.7' Or equal to FEMA BFE plus 1.5'
• Fill 15' away from buildings	At or above FEMA BFE

* Highest elevation of the two shall govern required minimum elevations

B. All underground parking must meet floodproofing codes including specified elevation and fill requirements.

C. Structures within a contemplated LOMR area with a proposed depressed loading dock will be allowed to have the loading dock area below the specified adjacent ground elevations if the building is a slab on grade with the lowest finished floor elevation of the structure at the WSEIA plus 1.2'.

V. All Structures (Excluding Residential) Outside of the FEMA 1% annual chance floodplain (See Exhibit B)

A. Elevations

Lowest opening including area walls	Equal to 41-foot WSEIA plus 1.2'
Fill around building	Equal to 41-foot WSEIA plus 0.7'

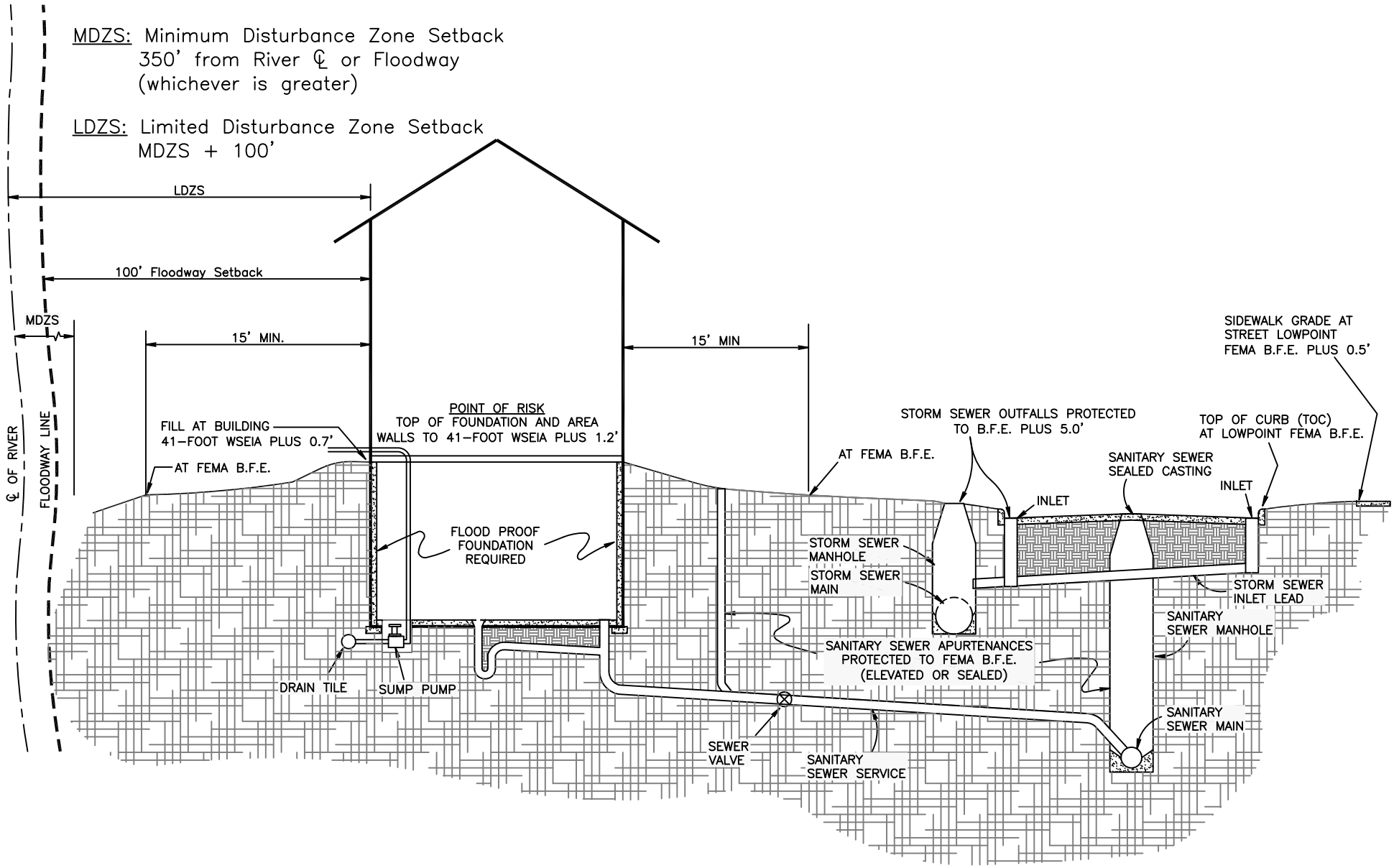
B. Foundations

Setback dimensions are determined by the FEMA 1% annual chance floodplain polygon edges.

1. If building within 25-feet of the FEMA 1% chance floodplain, all construction must conform to all floodproof codes.
2. If building within 50-feet of the FEMA 1% chance floodplain, standard concrete foundations are required, floodproof construction is recommended.
3. If building is more than 50-feet from the FEMA 1% chance floodplain, there are no special requirements although floodproof construction is recommended.

APPENDIX A

TYPICAL FLOODPROOFING CONSTRUCTION REQUIREMENTS EXHIBITS



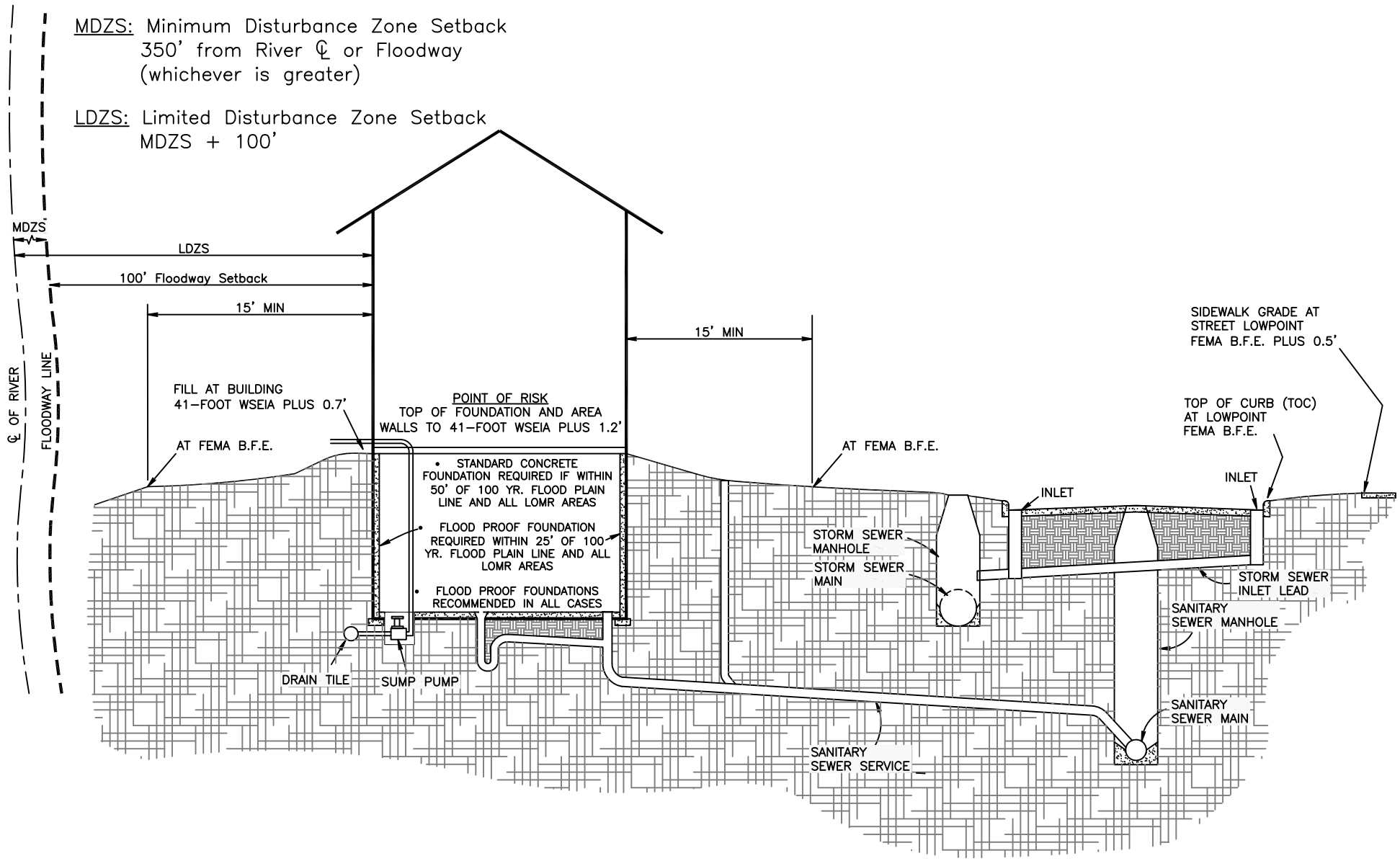
Single Family & Multi Family Residential Structures
within the 41.1 foot Water Surface Elevation Inundation Area

Non Residential Structures
within the FEMA 1% Annual Chance Floodplain

Scale: NTS

Flood Proofing Construction Requirements Exhibit "A"

CITY OF Fargo
Engineering Dept.
2/26/2014
T:\Engineering\Flood\Flood Proofing Code\Exhibits_KJR rev2.dwg



Non Residential Structures
within 50' of the FEMA 1% Annual Chance Floodplain

Scale: NTS

Flood Proofing Construction Requirements Exhibit "B"

CITY OF Fargo
Engineering Dept.
2/26/2014
T:\Engineering\Flood\Flood Proofing Code\Exhibits_KJR rev2.dwg

APPENDIX B

FLOODPROOF BASEMENT STRUCTURAL REQUIREMENTS REPORT

Prepared for:

City of Fargo
Engineering Department
200 3rd Street North
Fargo, ND 58102

Prepared by:

KLJ
728 East Beaton Drive
Suite 101
West Fargo, ND 58078

December 17, 2014
Revision 1: April 9, 2015

Structural Design Requirements

Floodproofed Basements in Fargo, ND

Structural Design Requirements

Floodproofed Basements in Fargo, ND

Prepared for:

City of Fargo
Engineering Department
200 3rd Street North
Fargo, ND 58102

Prepared by:

KLJ
728 East Beaton Drive, Suite 101
West Fargo, ND

December 17, 2014

Revision 1: April 9, 2015

TABLE OF CONTENTS

I. Executive Summary

KLJ and Braun Intertec (Braun) were asked to review the structural requirements of the City of Fargo's existing Floodproofing Code as they relate to current industry practices and design codes. The existing code has performed well under flooding conditions since its inception and has been tested multiple times including major floods of 1997 and 2009. However, the structural requirements have changed very little since it was first created in 1975. The recommendations included herein are based on industry standards and current building code requirements.

II. Analysis

Upon review of documents used to develop previous floodproofing codes, it was determined more information should be gathered related to the soils in the Fargo area and how they affect the structural design requirements for floodproofing basements. Braun prepared a geotechnical evaluation for this report which included a seepage analysis and recommendations for lateral earth pressures. Conclusions drawn from the geotechnical evaluation where used to develop the structural design requirements included herein.

A. Seepage Analysis

Braun was asked to perform a seepage analysis on the soils in the Fargo, North Dakota area. The results of their findings are included in Appendix A of this report. A summary of Braun's findings are as follows:

1) Based on discussions with the Fargo-Moorhead Home Builder's Association, foundations on most lots are currently being built on fairly shallow excavations. For the Fargo area, the soils at this depth are a part of the Sherack formation. The fill material brought in to build up the sites is also typically from this formation.

2) The soils in the Sherack formation are typically impervious, but some silt lenses are known to exist. The silt lenses can be troublesome as water can travel through them.

3) Laboratory testing was performed to determine the hydraulic conductivity of the soils in the Fargo area. Hydraulic conductivity is a measurement used to describe the flow of water through the soil. The tests indicate the soils in the Sherack formation have a hydraulic conductivity of 1E-4 foot per day vertically. Observation of local construction projects indicates the horizontal conductivity of 1E-3 foot per day. These numbers indicate the soils in the Fargo area are impermeable and water does not travel well through the Sherack. It should be noted, however, these values reflect well compacted material, and realistic values for backfill against homes would be "1 to 2 orders of magnitude faster."

4) Groundwater elevations vary throughout the year between five to ten feet below grade. Interviews with local homeowners indicated that bi-level basements (four feet below grade) had sump pumps that ran only during wet seasons and full depth basement sump pumps ran year round.

5) A seepage analysis concluded that basements with a 15 foot setback to the BFE (base flood elevation) would not infiltrate a house foundation for several months for a basement that is nine feet below grade. It was noted that if flood waters were allowed to reach the home during the peak flood the soil could become saturated causing hydrostatic pressures to be of concern. A peak flood was assumed to last "several days to 2 weeks before receding."

B. Lateral Earth Pressures

Braun recommends using an active equivalent fluid pressure of 65 pounds per cubic foot (PCF) per foot depth for soils in the Sherack formation to design basement walls. In order for this assumption to be accurate, the following criteria must be met:

1) Basements should have a flexible diaphragm and adequate subsurface drainage for this assumption to be accurate.

2) A wood floor and subfloor above the basement is considered a flexible diaphragm.

3) Adequate surface drainage must be provided around the perimeter of the home. If silt lenses or sand are found in excavations, the excavations should be over-excavated by at least ten feet horizontally from the basement walls and backfilled with fat clay soils, similar to that of the Sherack formation.

4) If flood water comes in contact with the house or backfill or if the drain tile/sump pump fails, considerations should be made to flood the basement to minimize structural damage due to hydrostatic pressures.

C. Structural Design Requirements

KLJ performed an analysis on basement wall construction for full depth basements and bi-level basements in Fargo based on the design parameters provided by Braun and design requirements detailed in the U.S. Army Corps of Engineers *Flood Proofing Regulations, EP 1165-2-314*. A summary of the analysis is included in the following sections.

DESIGN CODES:

Analysis of basement wall construction shall comply with the following building codes:

1) 2012 International Building Code (2012 IBC)

2) 2012 International Residential Code (2012 IRC)

3) American Concrete Institute 318-11: Building Code and Commentary (ACI 318-11)

4) 2012 National Design Specification (2012 NDS) for Wood Construction

STRUCTURAL LOADS:

1) Hydrostatic loads on the structure need not be considered with a 15 foot setback to the BFE. Under these conditions, Braun's seepage analysis determined it would take several months to saturate the soil adjacent to the basement walls. Given that peak floods only last about two weeks and homes are being constructed with a subsurface drainage system, the probability is very low that flood waters would reach foundation walls.

2) Hydrodynamic loads on the structure do not need to be considered. As per the *Flood Insurance Study* booklet prepared by FEMA for Cass County, North Dakota (effective January 16, 2015), the mean velocity of the Red River varies between 0.8 and 2.5 feet per second. The U.S. Army Corps of Engineers *Flood Proofing Regulations, EP 1165-2-314* states hydrodynamic loads need only be considered with velocities of five feet per second or greater.

3) Impact loads do not need to be considered as the probability that flood water elevations would exceed the ground elevation adjacent to the structure would be minimal.

4) Buoyancy is not a concern with flood and groundwater levels being maintained below the basement slab with a subsurface drainage system.

5) Basement walls and their connections shall be designed using an active equivalent lateral earth pressure of 65 PCF.

ANALYSIS:

KLJ completed a structural analysis on full height, bi-level and window well basement walls using the design codes and loads listed above. Tables and figures associated with the analysis are provided in Appendix B. A summary of the design procedure used to develop each table and figure is as follows:

1) Full height basement walls:

   a) Two reinforcing options are provided in Tables 1A and 1B.

      i) Case A includes provisions for 2-way slab action in the concrete walls to minimize the connection requirements at the top of the wall.

      ii) Case B also accounts for 2-way action in the concrete walls and allows for maximum spacing between walls perpendicular (i.e. jogs) to the foundation wall. Minimum reinforcing is based on the worst case between temperature and shrinkage steel or steel required to achieve moment capacity.

      iii) A detail of the reinforcing requirements is provided in Figure 1.

   b) The wall is required to be braced at the top where the trusses run parallel to the wall as per the requirements of Table 1B. An approved bracing detail is provided in Figure 5.

2) Bi-level basement design was based on a cantilevered concrete foundation wall. Reinforcing requirements are provided in Table 2 and a detail of the wall construction is provided in Figure 2.

3) Window well walls were designed to span horizontally. Reinforcing requirements are included in Table 3. A detail of the wall construction is provided in Figure 3.

4) Reinforcing requirements at wall corners and openings are provided in Figures 4A and 4B respectively.

D. Dampproofing

Dampproofing is required on the exterior surface of all basement walls and below all basement slabs. The dampproofing shall be continuous from the top of the soil to the top of the footing. The following recommendations meet the U.S. Army Corps of Engineers *Flood Proofing Regulations, EP 1165-2-314* Type B and the City of Fargo Flood Proofing Code (1975) Type D dampproofing. Dampproofing shall be required to be substantially impermeable but may pass water vapor and seep slightly during flooding.

1) Foundation wall: Foundation dampproofing shall meet the requirements of Section R406.1 of the 2012 IRC. In addition, the dampproofing shall have a minimum Class II perm rating.
2) Under slab: The under slab vapor retarder shall consist of a 10 mil polyethylene with a minimum Class II perm rating.

III. Conclusions

An active equivalent lateral earth pressure of 65 PCF shall be used as the basis of design for floodproofing basement structures. Tables and figures are provided in Appendix B to assist with construction of the wall construction types presented herein. The following conditions must be met to comply with the design recommendations included in this report:

1) Basement shall be constructed as per Exhibit A in the City of Fargo's *Floodproof Construction Requirements*.

2) Drain tile or other approved subsurface drainage be provided around interior and exterior basement perimeter and tied into an appropriately sized sump pit with a functioning sump pump.

3) The basement shall be dampproofed with the products included in this report (or approved equivalents).

4) In the event overtopping is eminent or the sump pump fails and is not able to be reinstated in a timely manner, it is recommended the basements be filled with clean water to minimize structural damage as a result of hydrostatic pressure and uplift.

Appendix A

Geotechnical Reports

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
526 10th Street NE, Suite 300
P.O. Box 485
West Fargo, ND 58078

Phone: 701.232.8701
Fax: 701.232.7817
Web: braunintertec.com

November 24, 2014 Project B14-07345

Cassie McNames, PE
KLJ, Inc.
728 East Beaton Drive, Suite 101
West Fargo, ND 58078

Re: Geotechnical Evaluation Letter
City of Fargo Project #MS-14-71
Floodproof Basement Structural Review
Fargo, North Dakota

Dear Ms. McNames:

This Geotechnical Evaluation Letter addresses geotechnical aspects of the City of Fargo's Floodproof Basement Structural Review.

Background

We understand the original design of the City of Fargo's floodproof basement was completed in 1975 and at that time the City was able to receive a basement exception from FEMA. As part of the current FEMA floodplain remapping process, the City is required to renew their basement exception with FEMA. As part of this renewal we understand KLJ is assisting the City with a structural analysis of the standard basement wall detail. The City requested that you engage a geotechnical engineer to provide recommendations for soil parameters to be used in design of the wall as well as a seepage analysis to estimate the timeframe for full saturation of soil adjacent a basement wall.

Information Reviewed

In preparation of this letter, we reviewed a number of documents and resources. These documents and resources are listed below along with some of the key takeaways we considered from each.

- August 27, 1974 letter from Soil Exploration Company to Ulteig Engineers, Inc. Re: Soil Pressures in the Fargo-Moorhead Area.
    - Design walls to withstand an equivalent fluid pressure of 120 pcf.
    - Install a drain tile system at the perimeter and below the floor to control uplift.
    - Backfill utility connection trenches with well compacted clayey soil to prevent easy flow nets for infiltrating water.
    - All sites should be checked by a knowledgeable individual to determine that there is not an unusual uniform silt condition present or pervious fill.
- February 24, 1975 letter from Soil Exploration Company to Ulteig Engineers, Inc. Re: Basement Soil Pressures in the Fargo-Moorhead Area.
    - Ulteig and SEC discussed several homes that were completely surrounded by floodwater for 2 weeks (although overland flow did not reach the basement walls). The homes were

not designed for a maximum soil pressure [120 pcf] and the basement walls were not affected by horizontal soil pressure.
    - A design of less than the maximum soil pressure should provide for construction detail that will insure the maximum stress will not occur.
    - A lesser design soil pressure value was not stated, but it was stated that a "solution within reasonable economic means can be obtained" if freestanding water will not be adjacent the walls, surrounding soils are cohesive and relatively impervious, a drain tile system is in place to collect seepage, easy flow channels to the structure be prevented, utility trenches should be backfilled with cohesive soils and well compacted, gravel fill under driveways and so forth should be kept above flood levels, adequate surface drainage must be maintained away from the structure, and down spouts and local runoff cannot allow ponding adjacent walls.
    - The homeowner should be informed that his basement is not designed to withstand full hydrostatic pressure and he should understand the necessity of maintaining the drain tile system and that if the system fails or if flood waters make approximate contact with the basement walls, the basement should be flooded.
- City of Fargo Code of Ordinances, Article 21-0102, Section 1610.1
    - Exception to International Building Code: Foundation walls extending not more than 9 feet below grade and laterally supported at the top by flexible diaphragms shall be permitted to be designed for active pressure.
- Home Builders Association meeting on October 15, 2014
    - Currently on LOMR lots, excavations to bottom of foundation level are typically about 1 to 3 feet below natural ground and the remainder of the pad is built up from there.

Discussion

Soils

The soils in the City of Fargo were deposited by Glacial Lake Agassiz and are rather consistent across the City. The soils within the typical basement depth of not more than 9 feet consist of what is known as the Sherack formation. As they exist in the upper 9 feet, materials from this formation are most often used as basement wall backfill and from our experience they are also most often used as fill on LOMR lots.

The Sherack formation consists of fat clay that is rather impervious, but is sometimes stratified with silt or sand seams and layers that will increase its hydraulic conductivity. The Sherack formation most often weighs about 115 pcf in its normal, wet condition. Numerous shear strength tests we have performed on material from the Sherack formation indicate that if well compacted it will have a typical internal friction angle of about 25 degrees. Since house pad excavations are relatively small in size, they limit the size of compaction equipment and the overall effectiveness of compaction effort. To account for this we have assumed the internal friction angle for wall design of about 2/3 this value, or 16 degrees. This assumption should not relieve the contractor from the need for compaction of the backfill.

The conductivity of the Sherack formation averages approximately 1E-4 ft/day vertically (as determined from our laboratory testing) and 1E-3 ft/day horizontally (as determined through the in-situ monitoring of pore water pressure dissipation on local embankment construction projects). The conductivity of backfill is highly variable and dependent on material type, placement and level of compaction. Well compacted backfill would likely have conductivity values similar to those stated for the Sherack formation, while poorly compacted backfill is likely 1 to 2 orders of magnitude faster.

Groundwater
Measured groundwater depths typically vary across the City with location and season, but we have found that most often groundwater is encountered within about 5 to 10 feet of the ground surface seasonally. With regards to sump pump operation, we interviewed 12 homeowners across the City with variability in location, age of home, and depth of basement. The responses were very consistent in that homeowners with split level structures, or 4-foot deep basements, had sump pumps that ran only during rainy periods and homeowners with full basements had sump pumps that ran outside of rainy periods and several stated year round. These interview results would support the groundwater measurements we have observed within 5 to 10 feet of the ground surface.

Analysis

We performed a seepage analysis using a finite element program called SEEP/W from GeoStudio. The analysis was performed for a home with soil conditions typical of the Fargo area. We assumed that the basement is 9 feet below the ground surface and that flood waters would not be closer than 15 feet from the basement wall. The 15-foot distance was selected as it is typically greater than the excavation width for a basement wall and it is also currently the requirement by the City of Fargo for the minimum distance from the BFE for flood proofing construction.

The analysis indicates that the flood waters would have to be in place for several months for water to infiltrate to the house foundation or even the normal backfill wedge against a house. Peak flood conditions in this area typically last several days to as much as about 2 weeks before receding. It should be noted that if flood water contacted a basement wall and covered the wall backfill, saturation of the backfill could occur within the normal timeframe of peak flood conditions.

Recommendations

For design of basement walls we recommend using an active equivalent fluid pressure of 65 pcf per foot of depth (this value does not include a factor of safety). This value assumes the soil conditions noted in the *Discussion* above, and that the wall has a flexible diaphragm, and also assumes that the house has a functioning drain tile system. Many basements are constructed above the groundwater, but even those that are below the groundwater (estimated at 1 to 2 feet maximum seasonally) can experience drawdown of the groundwater below the active pressure zone on the wall if a properly functioning drain tile system is in place.

To use this value we further recommend that grades within 10 feet horizontal of the perimeter of the house should be sloped down and away from the structure at a minimum gradient of 5 percent to prevent ponding, and all roof run-off should be collected by gutters and routed to drains with long downspouts, which are diverted to areas more than 5 to 10 feet from the structure.

If basement excavations encounter layers of sand or silt, the excavations should be constructed so that they extend at least 10 feet away from the basement walls, and the entire excavation should be backfilled with fat clay soils typical of the area to lessen seepage through the sand/silt layer towards the structure.

As noted by Soil Engineering Company, we agree that if flood water comes in contact with the house or wall backfill, or if the drain tile system fails during periods of flooding, the homeowner should consider flooding the basement to limit structural damage to the basement wall.

Remarks

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

If you have any questions about this Letter, please contact Nate McKinney or Sean Swartz at 701.232.8701.

Sincerely,

BRAUN INTERTEC CORPORATION

Sean S. Swartz, PE
Principal Engineer

Professional Certification:
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

REGISTERED PROFESSIONAL ENGINEER
NATHAN
McKINNEY
PE-6735
DATE 11/24/14
NORTH DAKOTA

Nathan L. McKinney, PE
Principal – Senior Engineer
Registration Number: PE-6735
November 24, 2014

BRAUN INTERTEC

Appendix B

Tables and Figures

Table 1A: Minimum Reinforcement Requirements for Floodproofed Basement Walls - Full Height Walls (65 pcf)

Case A: Allows for minimum anchorage at the top of the wall

Case B: Allows for maximum spacing between perpendicular walls

Wall Height (ft)	Case	Wall Thickness (in)	Vertical Reinforcing	Horizontal Reinforcing	Maximum Horizontal Distance between Perpendicular Foundation Walls (ft)[7]	Dowel Spacing (ft)
7.5	A	8	# 4 @ 24 " o.c.	# 4 @ 18 " o.c. # 5 @ 28 " o.c. # 6 @ 40 " o.c.	7.5	4'-0" o.c.
		10		# 4 @ 12 " o.c. # 5 @ 18 " o.c. # 6 @ 28 " o.c.		
		12		# 4 @ 9 " o.c. # 5 @ 15 " o.c. # 6 @ 21 " o.c.		
	B	8	# 4 @ 22 " o.c. # 5 @ 30 " o.c. # 6 @ 44 " o.c.	# 4 @ 24 " o.c.	15	1'-10" o.c.
		10	# 4 @ 24 " o.c. # 5 @ 36 " o.c. # 6 @ 52 " o.c.			
		12	# 4 @ 18 " o.c. # 5 @ 28 " o.c. # 6 @ 38 " o.c.			
8	A	8	# 4 @ 24 " o.c.	# 4 @ 18 " o.c. # 5 @ 28 " o.c. # 6 @ 40 " o.c.	8	2'-0" o.c.
		10		# 4 @ 12 " o.c. # 5 @ 18 " o.c. # 6 @ 28 " o.c.		
		12		# 4 @ 9 " o.c. # 5 @ 15 " o.c. # 6 @ 21 " o.c.		
	B	8	# 4 @ 18 " o.c. # 5 @ 26 " o.c. # 6 @ 40 " o.c.	# 4 @ 24 " o.c.	16	1'-6" o.c.
		10	# 4 @ 24 " o.c. # 5 @ 36 " o.c. # 6 @ 52 " o.c.			
		12	# 4 @ 18 " o.c. # 5 @ 28 " o.c. # 6 @ 38 " o.c.			
9	A	8	# 4 @ 24 " o.c.	# 4 @ 14 " o.c. # 5 @ 22 " o.c. # 6 @ 28 " o.c.	9	2'-0" o.c.
		10		# 4 @ 12 " o.c. # 5 @ 18 " o.c. # 6 @ 28 " o.c.		
		12		# 4 @ 9 " o.c. # 5 @ 15 " o.c. # 6 @ 21 " o.c.		
	B	8	# 4 @ 12 " o.c. # 5 @ 18 " o.c. # 6 @ 26 " o.c.	# 4 @ 24 " o.c.	18	1'-0" o.c.
		10	# 4 @ 16 " o.c. # 5 @ 24 " o.c. # 6 @ 36 " o.c.			
		12	# 4 @ 18 " o.c. # 5 @ 28 " o.c. # 6 @ 38 " o.c.			

Notes:

1. Chart is based on an active soil pressure of 65 pounds per cubic foot (pcf).
2. Reinforcing steel shall be ASTM A615 with a yield stress, F_y, of 60,000 pounds per square inch (psi).
3. Vertical reinforcing bars shall be placed between 1-1/2 and 2-1/2 inches from the inside face of the wall.
4. Minimum concrete stregnth, f'_c, shall be 3,000 pounds per square inch (psi).
5. Maximum height of soil against foundation walls is 6 inches below top of wall.
6. Backfill shall not be placed until first floor framing and sheathing is installed and fastened or adequately braced and the concrete floor slab is in place or the wall is adequately braced.
7. Minimum length of perpendicular wall or "jog" shall be 2 feet. Perpendicular wall shall be the same thickness and reinforcing as wall it supports, and may be up to 1'-0" less in height than foundation wall. Perpendicular walls must be placed on minimum 1'-8" strip footing placed integral with foundation wall footing. Window wells are considered to be a perpendicular wall.
8. Refer to Table 1B for connection requirements at the top of the wall.
9. Refer to Figure 1 for basement wall detail.
10. Refer to Figure 4A for reinforcing at wall corners.
11. Refer to Figure 4B for reinforcing at openings in walls.
12. Refer to Figure 5 for wall bracing at foundation walls parallel to floor trusses.

Table 1B: Minimum Connection Requirements for Floodproofed Basement Walls - Full Height Walls (65 pcf)

Case A: Allows for minimum anchorage at the top of the wall

Case B: Allows for maximum spacing between perpendicular walls

Wall Height (ft)	Case	Sill Plate	Optional Top Plate Nailing Pattern	Anchor Bolt	Connection @ Truss	Bracing @ Walls Parallel to Trusses[11]	
						Max. Spacing	Conn. to Sill Plate
7.5	A	2-2x	16d @ 6 " o.c.	1/2" ϕ @ 20 " o.c.	A34 @ ea. Truss	4'-0"	2-A35 Clips
				5/8" ϕ @ 26 " o.c.			
				3/4" ϕ @ 32 " o.c.			
	B	2-2x	16d @ 3 " o.c.	1/2" ϕ @ 11 " o.c.	2-A35 @ ea. Truss	2'-2"	2-A35 Clips
				5/8" ϕ @ 14 " o.c.			
				3/4" ϕ @ 18 " o.c.			
8	A	2-2x	16d @ 5 " o.c.	1/2" ϕ @ 18 " o.c.	A35 @ ea. Truss	3'-6"	2-A35 Clips
				5/8" ϕ @ 24 " o.c.			
				3/4" ϕ @ 30 " o.c.			
	B	2-2x	16d @ 3 " o.c.	1/2" ϕ @ 9 " o.c.	2-A35 @ ea. Truss	1'-10"	2-A35 Clips
				5/8" ϕ @ 12 " o.c.			
				3/4" ϕ @ 15 " o.c.			
9	A	2-2x	16d @ 4 " o.c.	1/2" ϕ @ 14 " o.c.	A35 @ ea. Truss	2'-9"	2-A35 Clips
				5/8" ϕ @ 18 " o.c.			
				3/4" ϕ @ 22 " o.c.			
	B	2-2x	16d @ 2 " o.c.	1/2" ϕ @ 8 " o.c.	2-A35 @ ea. Truss	1'-6"	2-A35 Clips
				5/8" ϕ @ 10 " o.c.			
				3/4" ϕ @ 12 " o.c.			

Notes:

1. Chart is based on an active soil pressure of 65 pounds per cubic foot (pcf).
2. Anchor bolts shall be ASTM F1554 Grade 36.
3. Minimum clear distance between bolt and edge of concrete shall be no less than 2 inches.
4. Minimum concrete stregnth, f'_c, shall be 3,000 pounds per square inch (psi).
5. Maximum height of soil against foundation walls is 6 inches below top of wall.
6. Backfill shall not be placed until first floor framing and sheathing is installed and fastened or adequately braced and the concrete floor slab is in place or the wall is adequately braced.
7. Refer to Table 1A for reinforcing requirements.
8. Refer to Figure 1 for basement wall detail.
9. Refer to Figure 4A for reinforcing at wall corners.
10. Refer to Figure 4B for reinforcing at openings in walls.
11. Refer to Figure 5 for wall bracing at foundation walls parallel to floor trusses.

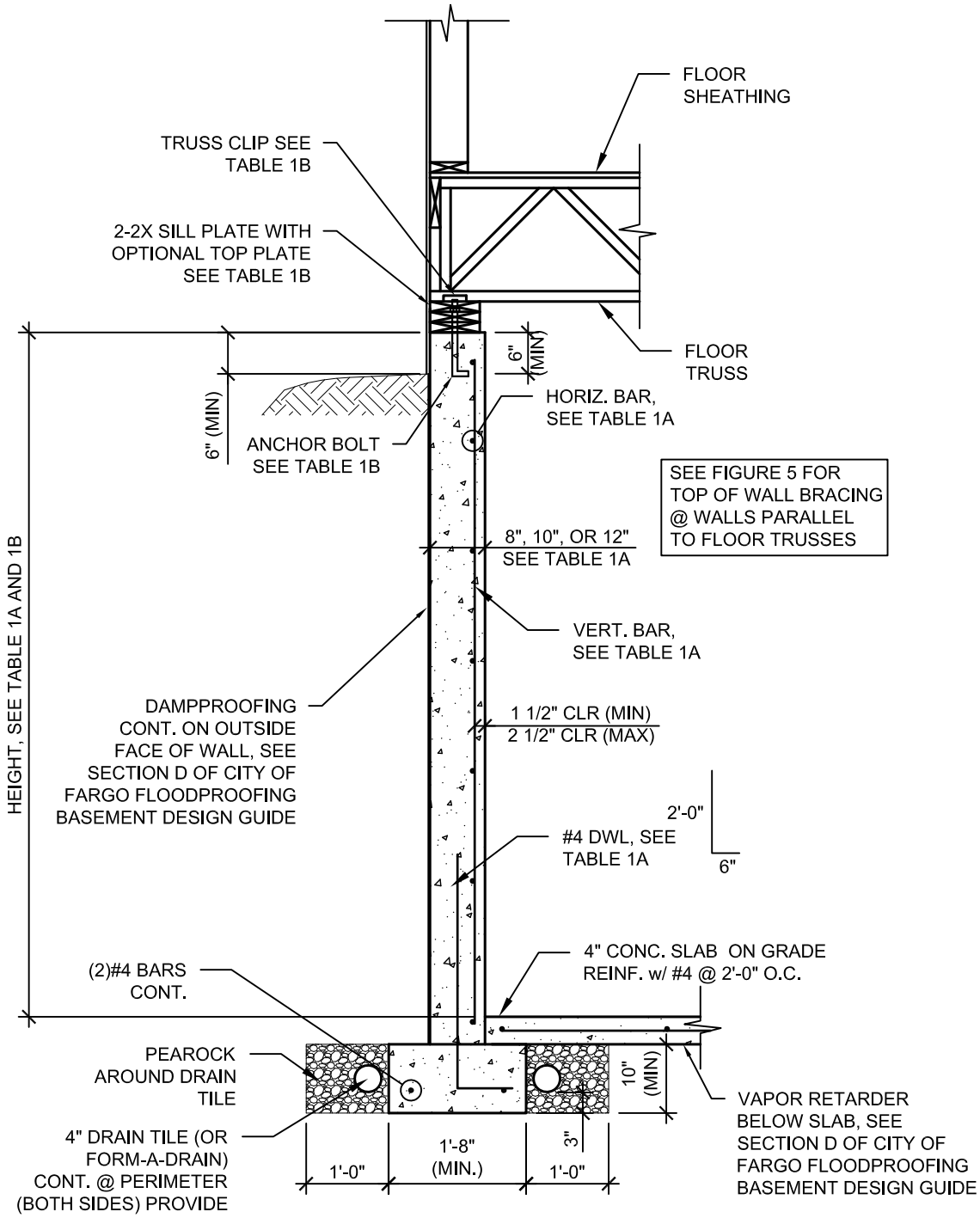


FIGURE 1: BASEMENT WALL SECTION

Table 2: Minimum Reinforcement for Floodproofed Basement Walls - Bi-Level Walls (65 pcf)

Wall Height, H (ft)	Wall Thickness (in)	Vertical Reinforcing	Horizontal Reinforcing
5 (max)	8	# 4 @ 18 " o.c.	# 4 @ 24 " o.c.
		# 5 @ 30 " o.c.	
		# 6 @ 40 " o.c.	
	10	# 4 @ 18 " o.c.	
		# 5 @ 26 " o.c.	
		# 6 @ 36 " o.c.	
	12	# 4 @ 12 " o.c.	
		# 5 @ 20 " o.c.	
		# 6 @ 28 " o.c.	

Notes:

1. Chart is based on an active soil pressure of 65 pounds per cubic foot (pcf).
2. Reinforcing steel shall be ASTM A615 with a yield stress, F_y, of 60,000 pounds per square inch (psi).
3. Vertical reinforcing bars shall be placed between 1-1/2 and 2-1/2 inches from the outside face of the wall.
4. Minimum concrete stregnth, f'_c, shall be 3,000 pounds per square inch (psi).
5. Maximum height of soil against foundation walls is 6 inches below top of wall.
6. Refer to Figure 2 for basement wall detail.
7. Refer to Figure 4A for reinforcing at wall corners.
8. Refer to Figure 4B for reinforcing at openings in walls.

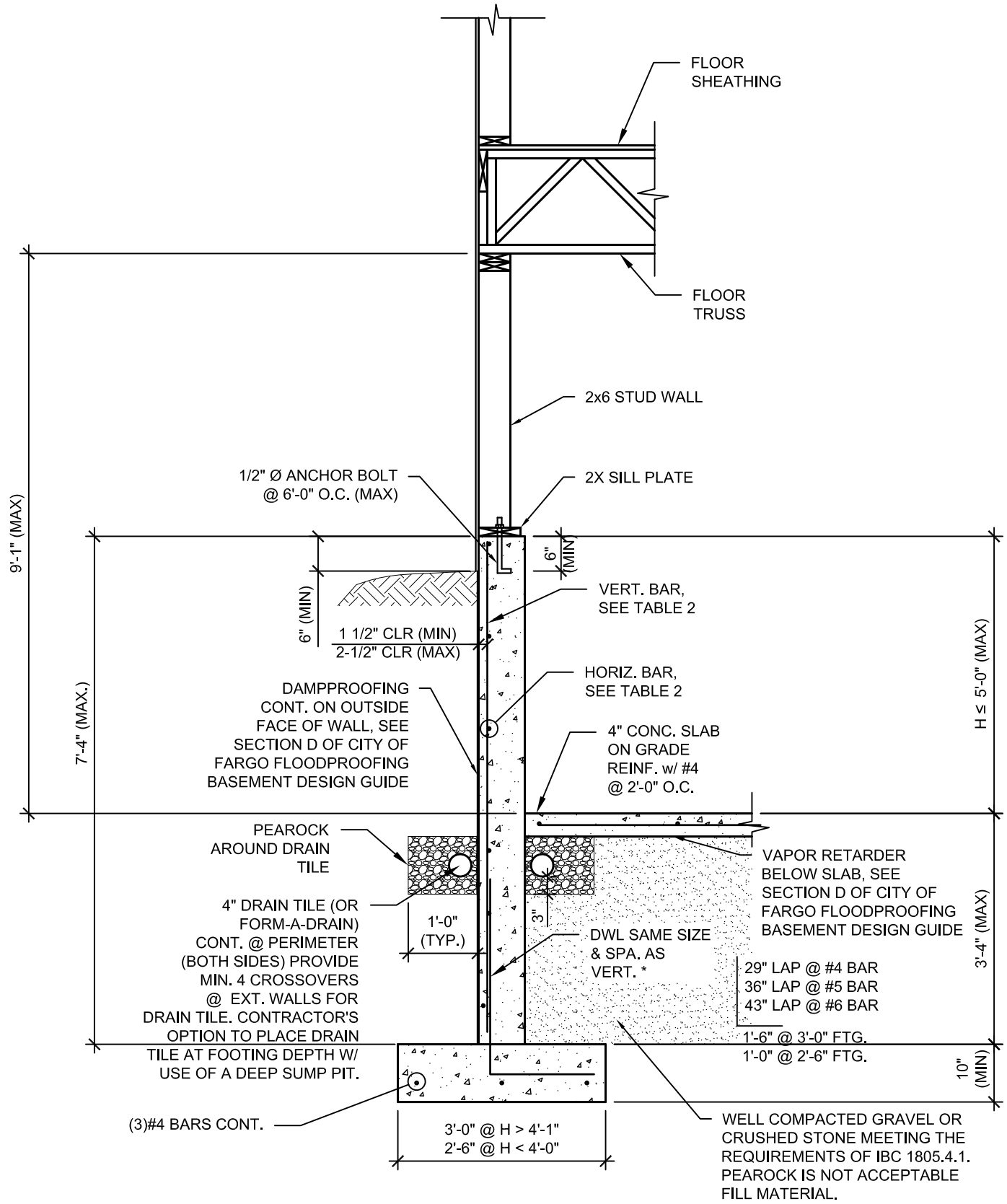


FIGURE 2: BI-LEVEL BASEMENT WALL SECTION

*NOTE: CONTRACTOR'S OPTION TO SUPPLY VERTICAL REINF. WITH HOOK INTO FOOTING AND OMIT DOWEL BAR.

Table 3: Minimum Reinforcement for Floodproofed Basement Walls - Window Well Walls (65 pcf)

Wall Height (ft)	Wall Thickness (in)	Horizontal Reinforcing	Vertical Reinforcing	Max. Horizontal Span between Perpendicular Foundation Walls (ft)[9]
7.5	6	# 4 @ 24 " o.c.	# 4 @ 24 " o.c.	4'-0"
		# 4 @ 18 " o.c.		5'-0"
		# 4 @ 12 " o.c.		6'-6"
	8	# 4 @ 18 " o.c.	# 4 @ 24 " o.c.	6'-0"
		# 4 @ 12 " o.c.		7'-6"
		# 4 @ 9 " o.c.		10'-0"
8	6	# 4 @ 24 " o.c.	# 4 @ 24 " o.c.	4'-0"
		# 4 @ 18 " o.c.		5'-0"
		# 4 @ 12 " o.c.		6'-6"
	8	# 4 @ 18 " o.c.	# 4 @ 24 " o.c.	6'-0"
		# 4 @ 12 " o.c.		7'-0"
		# 4 @ 9 " o.c.		9'-6"
9	6	# 4 @ 24 " o.c.	# 4 @ 24 " o.c.	3'-6"
		# 4 @ 18 " o.c.		5'-0"
		# 4 @ 12 " o.c.		6'-0"
	8	# 4 @ 18 " o.c.	# 4 @ 24 " o.c.	5'-6"
		# 4 @ 12 " o.c.		6'-6"
		# 4 @ 9 " o.c.		9'-0"

Notes:

1. Chart is based on an active soil pressure of 65 pounds per cubic foot (pcf).
2. Reinforcing steel shall be ASTM A615 with a yield stress, F_v, of 60,000 pounds per square inch (psi).
3. Vertical reinforcing bars shall be placed between 1-1/2 and 2-1/2 inches from the inside face of the
4. Minimum concrete stregnth,f'_c, shall be 3,000 pounds per square inch (psi).
5. Maximum height of soil against foundation walls is 6 inches below top of wall.
6. Refer to Figure 3 for basement wall detail.
7. Refer to Figure 4A for reinforcing at wall corners.
8. Refer to Figure 4B for reinforcing at openings in walls.
9. Minimum length of perpendicular wall shall be 2 feet. Perpendicular wall shall be the same thickness and reinforcing as wall it supports, and may be up to 1'-0" less in height than foundation wall. Perpendicular walls must be placed on minimum 1'-8" strip footing placed integral with foundation wall footing.

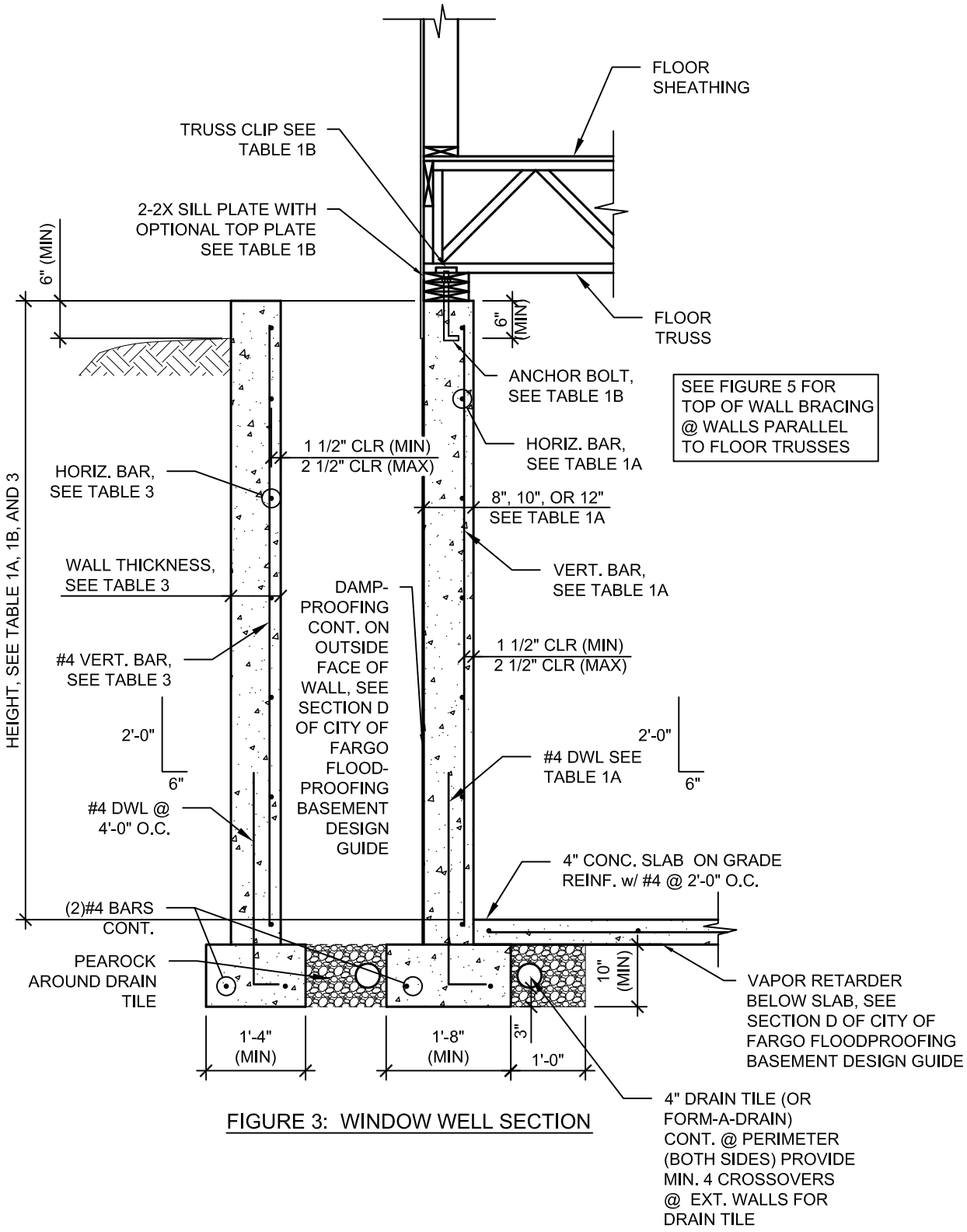
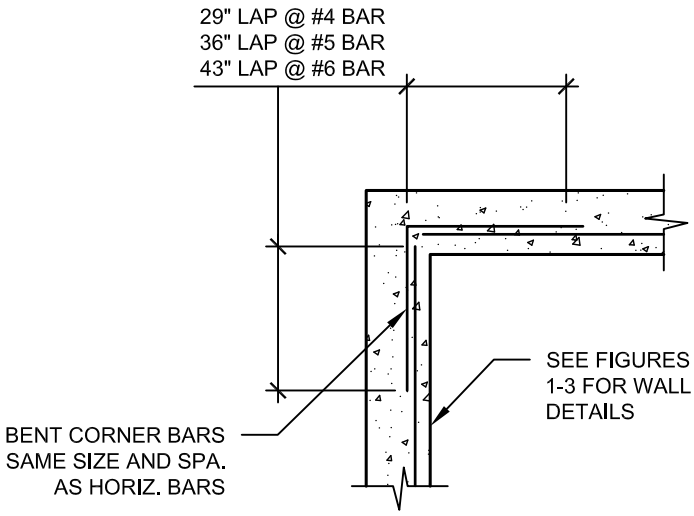


FIGURE 3: WINDOW WELL SECTION



OR

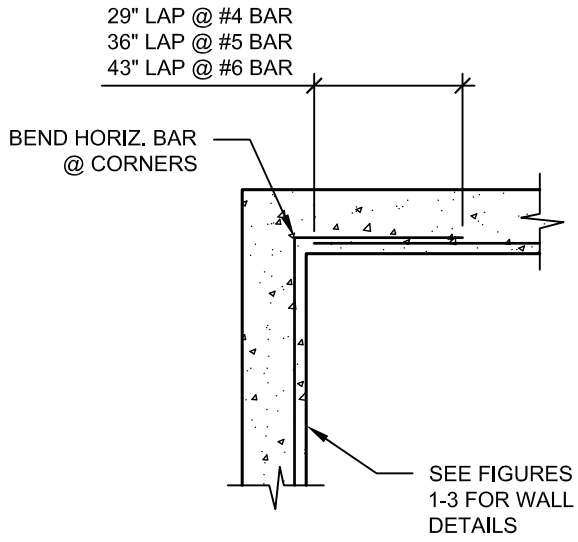


FIGURE 4A: TYP. CONC. WALL CORNER

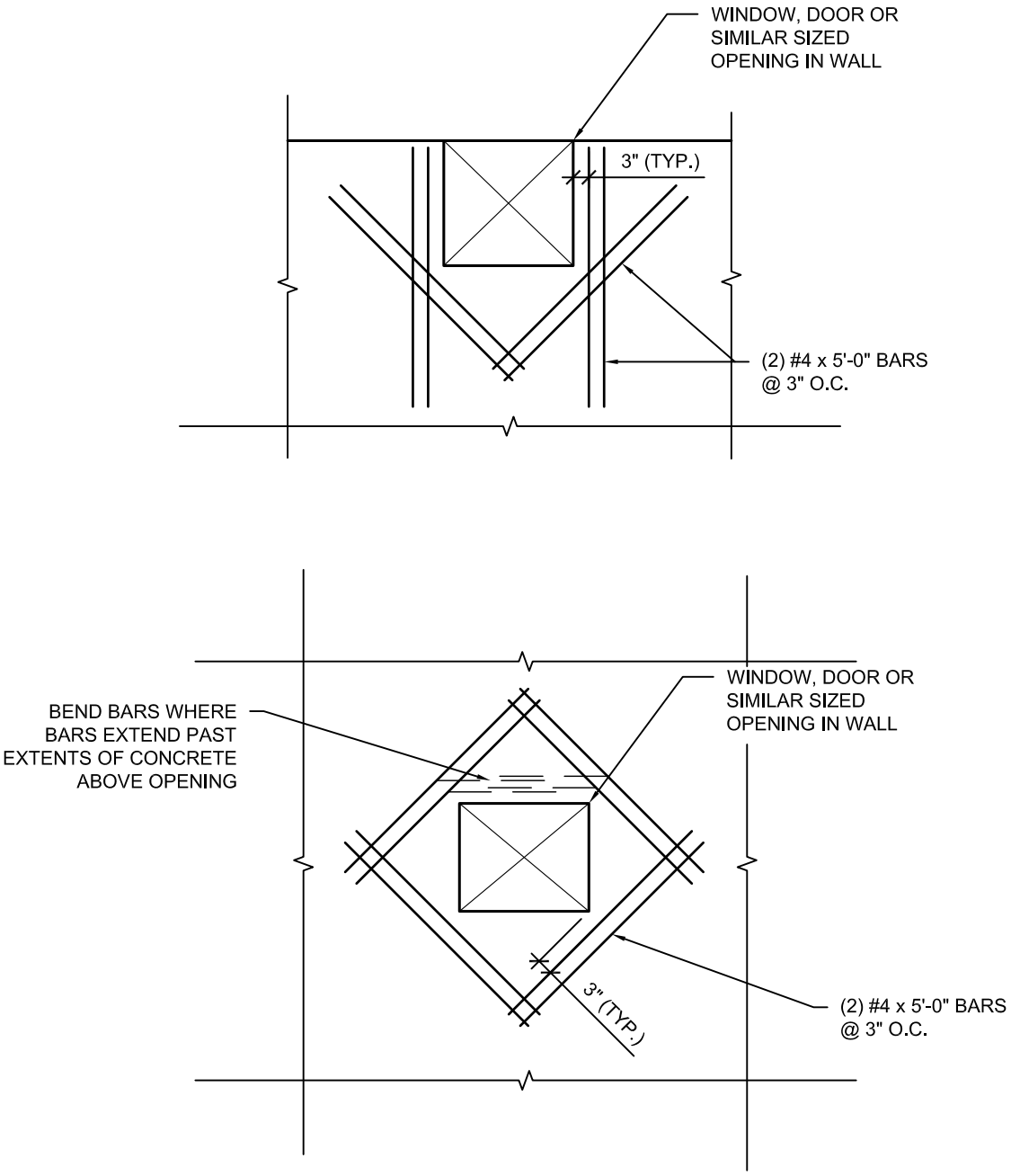
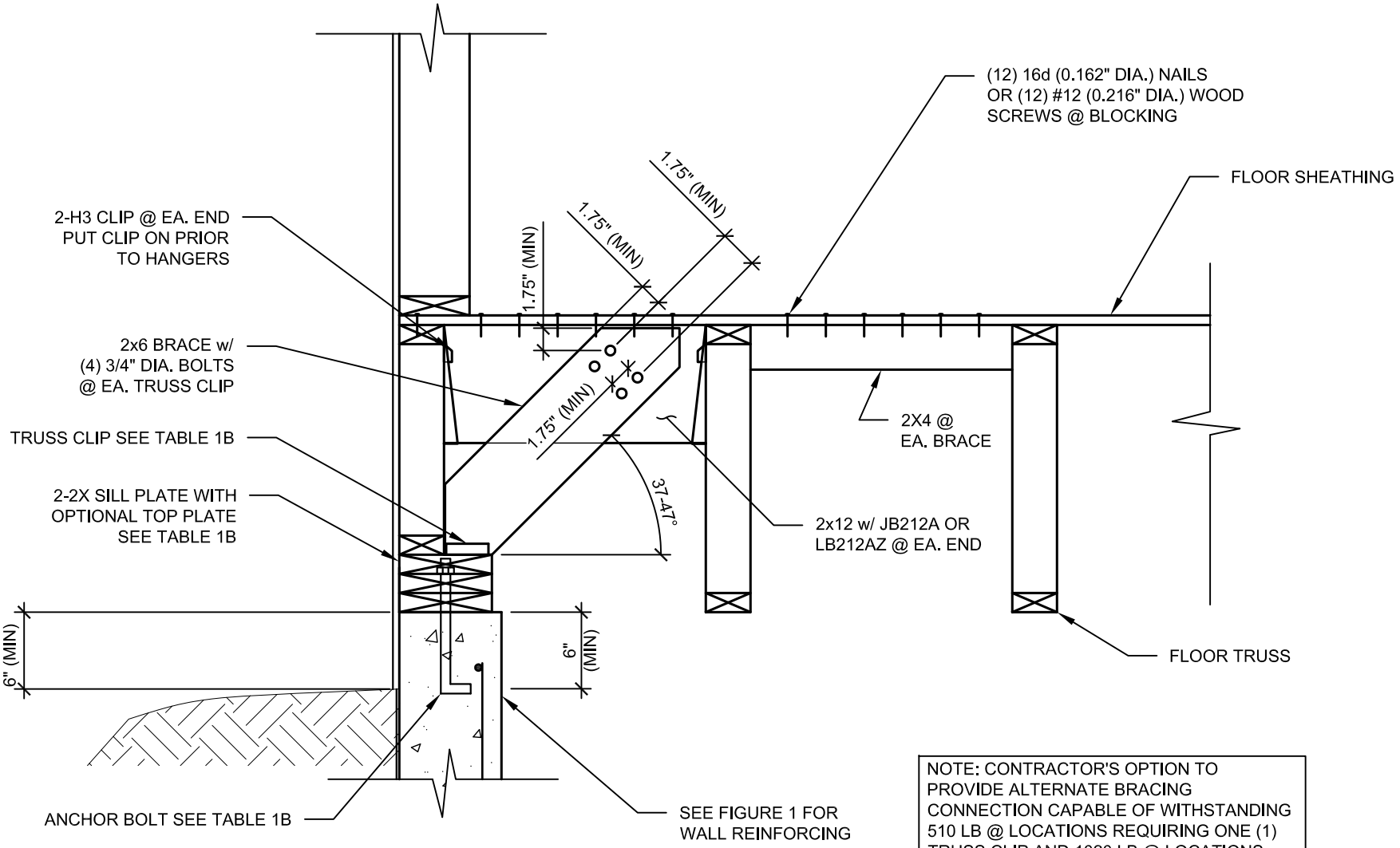


FIGURE 4B: REINFORCING @ WALL OPENINGS



NOTE: CONTRACTOR'S OPTION TO PROVIDE ALTERNATE BRACING CONNECTION CAPABLE OF WITHSTANDING 510 LB @ LOCATIONS REQUIRING ONE (1) TRUSS CLIP AND 1020 LB @ LOCATIONS REQUIRING TWO (2) TRUSS CLIPS. DESIGN MUST BE STAMPED AND SIGNED BY AN ENGINEER REGISTERED IN THE STATE OF NORTH DAKOTA.

FIGURE 5: PARALLEL WALL BRACING

APPENDIX C

INSPECTION LOG FOR FOUNDATIONs

Fargo Inspections

City of Fargo
200 Third Street North
701-241-1561 phone
701-476-6779 fax

FLOOD PROOFING INSPECTION CARD*

Owner: _____

Address:_____

100 Year Flood Elevation:_____ Flood Protection Elevation: _____

Elevation Certification "Flood Protection Elevation"

Point of Risk: _____

Inspector: _____ Date:_____

1. Footing Date:_____Inspector:_____
   Comments: _____
2. Foundation Date:_____Inspector:_____
   Comments: _____
3. Waterproofing Date:_____Inspector:_____
   Comments: _____
4. Drain Tile Date:_____Inspector:_____
   Comments: _____
5. Sewer Line Date:_____Inspector:_____
   Comments: _____
6. Sewer Valve Date:_____Inspector:_____
   Comments: _____
7. Concrete Floor Date:_____Inspector:_____
   Comments: _____

APPENDIX D

FEMA RESIDENTIAL

FLOODPROOFING CERTIFICATE

Department of Homeland Security
Federal Emergency Management Agency

RESIDENTIAL BASEMENT FLOODPROOFING CERTIFICATE

See Reverse Side for Paperwork Burden Disclosure Statement

O.M.B. No. 1660-0033
Expires August 31, 2013

For use ONLY in communities that have been granted an exception by FEMA to allow the construction of floodproofed residential basements in Special Flood Hazard Areas.

BUILDING OWNER'S NAME	**FOR INSURANCE COMPANY USE**
	Policy Number
BUILDING STREET ADDRESS *(Including Apt., Unit Number)*	Company NAIC Number
OTHER DESCRIPTION *(Lot and Block Numbers, etc.)*	
CITY / STATE / ZIP CODE	

SECTION I – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

provide the following from the FIRM and flood profile *(from Flood Insurance Study)*

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM	ZONE	BASE FLOOD ELEVATION (IN AO ZONES, USE DEPTH)	NAME OF FLOODING SOURCE(S) AFFECTING BUILDING

SECTION II – FLOODPROOFING INFORMATION *(By a Registered Professional Engineer or Architect)*

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of _____. ____feet.
(Elevation datum used must be the same as that on the FIRM.)

Elevation of the top of the basement floor is _____. ____feet.
(Note: The floodproofing design elevation must be at least one foot above the Base Flood Elevation [BFE])

SECTION III – CERTIFICATION *(By a Registered Professional Engineer or Architect)*

Residential Floodproofed Basement Construction Certification:

I certify that, based upon development and/or review of structural design specifications, and plans for construction, including consideration of the depth, velocity, and duration of flooding and the type and permeability of soils at the site, the design and methods of construction of the floodproofed basement to be used are in accordance with accepted standards of practice for meeting the following provisions:

- Basement area, together with attendant utilities and sanitary facilities, is watertight to the floodproofing design elevation with walls that are impermeable to the passage of water without human intervention; and
- Basement walls and floor are capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy resulting from flooding to the floodproofing design elevation; and have been designed so that minimal damage will occur from floods that exceed the floodproofing design elevation; and
- Building design, including the floodproofing design elevation, complies with community requirements.

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code Section 1001.

CERTIFIER'S NAME	LICENSE NUMBER *(or affix Seal)*	
TITLE	COMPANY NAME	
ADDRESS	CITY / STATE	ZIP
SIGNATURE	PHONE NO.	DATE

Copies of this certificate must be given to: 1) the community official; 2) the insurance agent; and 3) the building owner.

PAPERWORK BURDEN DISCLOSURE STATEMENT

Residential Basement Floodproofing Certificate

FEMA Form 086-0-24

Public reporting burden for this data collection is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting this Residential Basement Floodproofing Certificate. You are not required to respond to this collection of information unless a valid OM B control number is displayed in the upper right corner of this Residential Basement Floodproofing Certificate.

Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472, Paperwork Reduction Project (1660-0033) **NOTE: Do not send your completed form to this address.**

APPENDIX D

FEMA NON-RESIDENTIAL FLOODPROOFING CERTIFICATE

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

FLOODPROOFING CERTIFICATE
FOR NON-RESIDENTIAL STRUCTURES

OMB No. 1660-0008
Expiration Date: July 31, 2015

The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the Base Flood Elevation; however, a floodproofing design certification is required. This form is to be used for that certification. Floodproofing of a residential building does not alter a community's floodplain management elevation requirements or affect the insurance rating unless the community has been issued an exception by FEMA to allow floodproofed residential basements. The permitting of a floodproofed residential basement requires a separate certification specifying that the design complies with the local floodplain management ordinance.

BUILDING OWNER'S NAME

STREET ADDRESS (Including Apt., Unit, Suite, and/or Bldg. Number) OR P.O. ROUTE AND BOX NUMBER

OTHER DESCRIPTION (Lot and Block Numbers, etc.)

CITY STATE ZIP CODE

SECTION I – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM:

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (In AO Zones, Use Depth)

Indicate elevation datum used for Base Flood Elevation shown above: ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other/Source: _____

SECTION II – FLOODPROOFING INFORMATION (By a Registered Professional Engineer or Architect)

Elevations are based on: ☐ Construction Drawings ☐ Building Under Construction ☐ Finished Construction

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of _____ . _____ feet (In Puerto Rico only: _____ . _____ meters). ☐ NGVD 1929 ☐ NAVD 1988 ☐ Other/Source: _____
(Elevation datum used must be the same as that used for the Base Flood Elevation.)

Height of floodproofing on the building above the lowest adjacent grade is _____ feet (In Puerto Rico only: _____ meters).

For Unnumbered A Zones Only:

Highest adjacent (finished) grade next to the building (HAG) _____ . _____ feet (In Puerto Rico only: _____ . _____ meters)

☐ NGVD 1929 ☐ NAVD 1988 ☐ Other/Source: _____

(NOTE: For insurance rating purposes, the building's floodproofed design elevation must be at least 1 foot above the Base Flood Elevation to receive rating credit. If the building is floodproofed only to the Base Flood Elevation, then the building's insurance rating will result in a higher premium.)

SECTION III – CERTIFICATION (By a Registered Professional Engineer or Architect)

Non-Residential Floodproofed Construction Certification:

I certify that, based upon development and/or review of structural design, specifications, and plans for construction, the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

The structure, together with attendant utilities and sanitary facilities, is watertight to the floodproofed design elevation indicated above, with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFIER'S NAME LICENSE NUMBER (or Affix Seal)

TITLE COMPANY NAME

ADDRESS CITY STATE ZIP CODE

SIGNATURE DATE PHONE

Copies should be made of this Certificate for: 1) community official, 2) Insurance agent/company, and 3) building owner.

National Flood Insurance Program

FLOODPROOFING CERTIFICATE

FOR NON-RESIDENTIAL STRUCTURES

Paperwork Reduction Act Notice

General: This information is provided pursuant to Public Law 96-511 (the Paperwork Reduction Act of 1980, as amended), dated December 11, 1980, to allow the public to participate more fully and meaningfully in the Federal paperwork review process.

Authority: Public Law 96-511, amended; 44 U.S.C. 3507; and 5 CFR 1320.

Paperwork Burden Disclosure Notice: Public reporting burden for this data collection is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting this form. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0008). **NOTE: Do not send your completed form to this address.**

Privacy Act Statement

Authority: Title 44 CFR § 61.7 and 61.8.

Principal Purpose(s): This information is being collected for the primary purpose of estimate the risk premium rates necessary to provide flood insurance for new or substantially improved structures in designated Special Flood Hazard Areas.

Routine Use(s): The information on this form may be disclosed as generally permitted under 5 U.S.C. § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA-003 – National Flood Insurance Program Files System or Records Notice 73 Fed. Reg. 77747 (December 19, 2008); DHS/FEMA/NFIP/LOMA-1 – National Flood Insurance Program (NFIP) Letter of Map Amendment (LOMA) System of Records Notice 71 Fed. Reg. 7990 (February 15, 2006); and upon written request, written consent, by agreement, or as required by law.

Disclosure: The disclosure of information on this form is voluntary; however, failure to provide the information requested may result in the inability to obtain flood insurance through the National Flood Insurance Program or may be subject to higher premium rates for flood insurance. Information will only be released as permitted by law.