

Flood

Mitigation Actions

1. Apply to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS).
2. Apex Engineering has been contracted to conduct a preliminary investigation into solutions to reduce urban flooding in south Bismarck in the Expressway and South 12th Street areas. (current mitigation activity)
3. Continue Watershed master planning and updating as an on-going mitigation activity conducted jointly by Engineering, Public Works, and Community Development.
4. Develop an Emergency Action Plan for Jackman Coulee Dam #2. (Tom O'Leary Golf Course)
5. Conduct maintenance activities at Jackman Coulee Dam #2 (Tom O'Leary Golf Course) as recommended by the State Water Commission and/or annual inspections conducted by Bismarck Public Works.
6. Maintain existing flood protective measures to minimize vulnerability as a result of ice jams as well as 100-year and 500-year flood events. Note: Refers to maps (Figures 1 thru 5) within "existing mitigation"

Public Education Topics:

7. Coordinate and/or support NFIP flood insurance promotional efforts including the availability of flood insurance for community residents and businesses.
8. Conduct Flood Mitigation and Preparedness Public Education efforts for local citizens and businesses.

Vulnerability Summary

1. Although flood protective measures including levee structures are in place to protect south Bismarck, those protective measures are not certified by FEMA. There are also required response actions to fill gaps. Properties, population, and infrastructure within the 100 Year and 500 Year flood plains remain vulnerable to those flood events.
2. Vehicles and occupants may inadvertently enter a flooded underpass at the 7th Street or 9th Street location following an urban flooding event. There is pumping capability at the 7th Street underpass location. The 9th street location is drained via gravity flow.
3. Vulnerabilities regarding lack of access following an urban flood event include:
 - Airport and Skyway Village
 - 12th Street (from University Drive to Bismarck Expressway)
 - Bismarck Expressway from 7th to 12th Street
 - South 3rd Street – from Arbor Avenue to Bismarck Expressway
 - Broadway Avenue – from 12th to 14th Street
 - Washington Street and Bowen Avenue
 - 2nd Street and Arbor Avenue
4. Waste Water Treatment Plant operations are affected by the elevation of the river (ie: 500 year flood event or ice jam). Pumping may be required for effluent discharge depending on the river elevation.
5. The South Fire Station is vulnerable to urban flooding (street access).
6. There are an estimated 18 properties at risk should there be a 0.5 PMP flood event or 0.5 PMP flood event with a multiple breach relating to Jackson Coulee Dam #1 and #2 (Tom O'Leary Golf Course).

Pre-Existing Mitigation: Flood

Existing Protective Measures (post 2011 Flood Event Mitigation Activities)

Also see applicable maps (figures 1 through 5) following this table

1. The Tavis Road flood gate control structure and pumping station have been installed and are operational. Closing the flood gate control structure prevents flood waters from back-flowing into and elevating the drainage ditch level. Additionally, the pumping station establishes the capability of reducing the drainage ditch level to maximize its storage capacity and minimize the potential for flash flood impacts.
2. The floodgate at Washington Street takes properties east of Washington Street out of the 100-Year floodplain. This structure was repaired following the 2011 flood and is fully operational.
3. The grade of Tavis Road has been raised to a flood stage of 20 feet.
4. Following the 2011 flood event, the City of Bismarck installed flood gates on stormwater outfalls.
5. The pumping capability at #8 is permanent. The other locations require response action to set up temporary pumping. See applicable map - Figure 5.
6. A new control gate was also installed on Whisper Drive to prevent flood waters from within Whispering Bay from flooding east into the Traynor Drive area south of Mills Avenue.
7. Additional ice jam protection measures were installed in 2012 by Burleigh County.
8. In 2013, the City of Bismarck began the construction of the Riverwood Drive and Mills Ave reconstruction projects. These projects included grade raises of the existing roadways to a flood stage of 20-feet. Riverwood Drive was completed from Expressway Ave to the north entrance of Southport Loop. The grade raise portion of Mills Avenue was completed and paved in 2014. The project included several control structures with sluice gates located on the storm water outfalls and a control structure on the Mills Avenue causeway. The new sluice gates and control structure are in operation and ready to be manually closed during a flood event.

River Gage Locations: See map on right.

9. A new river gaging station has been installed by the USGS to collect river elevation data for both open water and ice covered periods on the Missouri River. The USGS installed the stage gage near Fort Lincoln on the west side of the river: [USGS 06349070, Missouri River below Mandan, ND](#). This gage will provide timely stage information for South Bismarck.

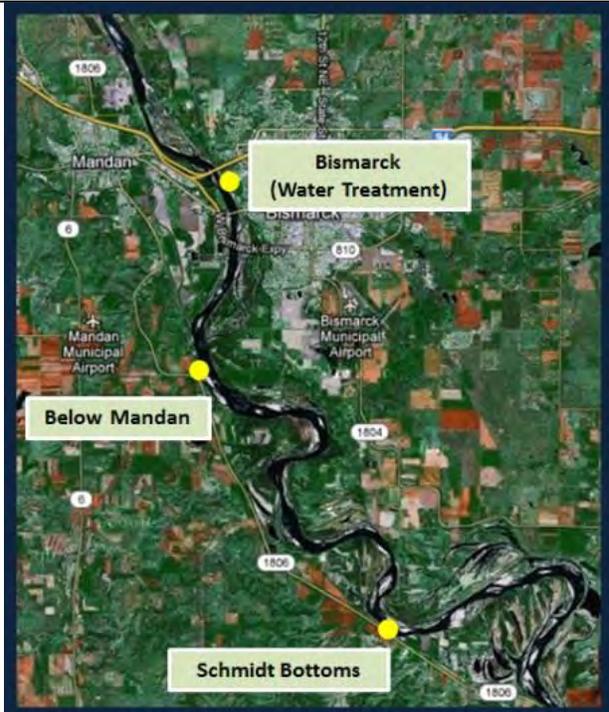


Figure 2
2014 Ice Jam Protective Measures

- High Ground
- - - Contingency Levee
- - - Line of Protection to be Determined
- Completed berm with protection to 16 ft
- Grade Raises
- City of Bismarck Corporate Limits

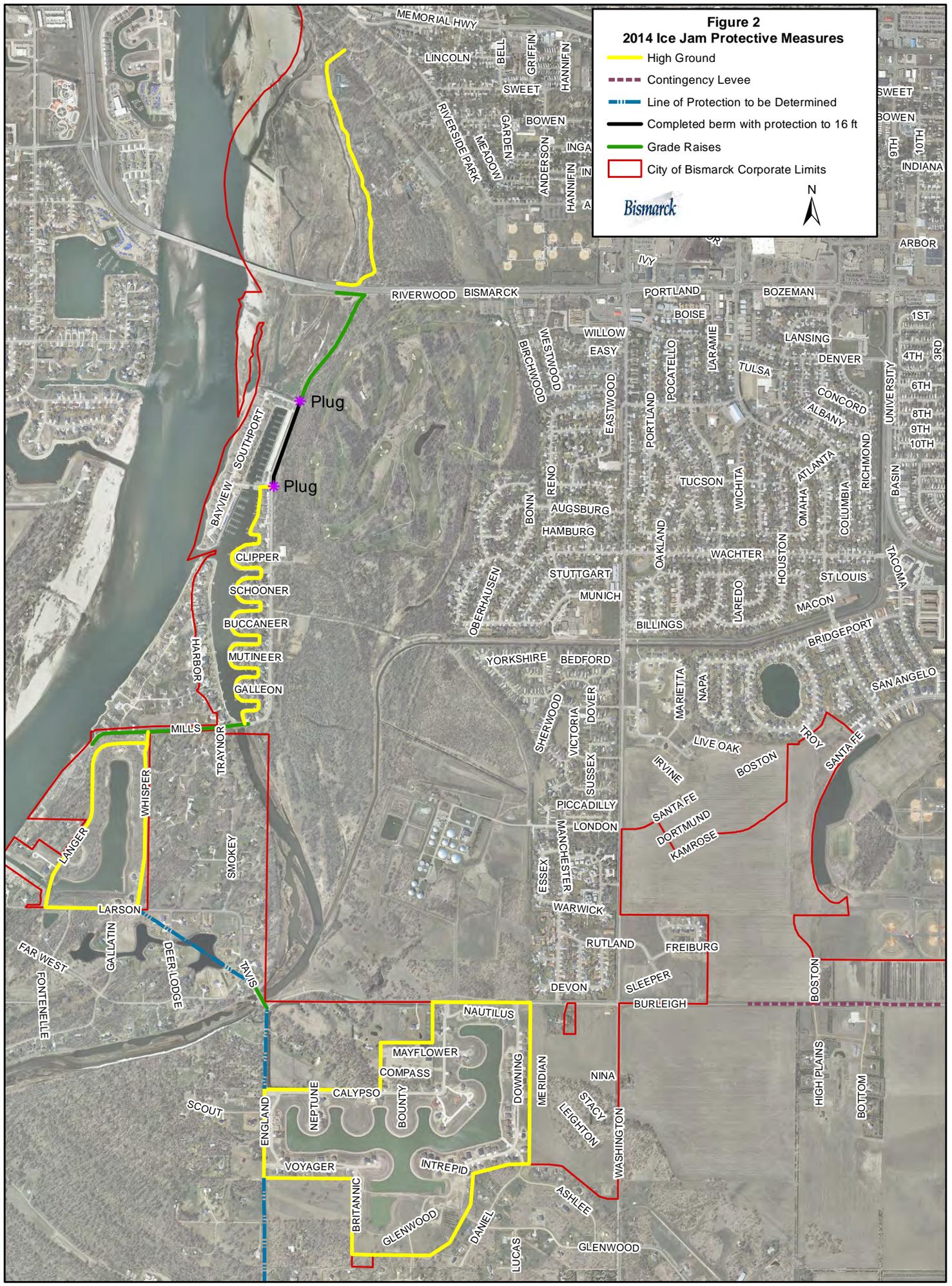


Figure 3
2014 Stage 16-Foot Protective Measures

- High Ground
- Completed berm with protection to 16 ft
- Grade Raises
- Line of Protection to be Determined
- City of Bismarck Corporate Limits

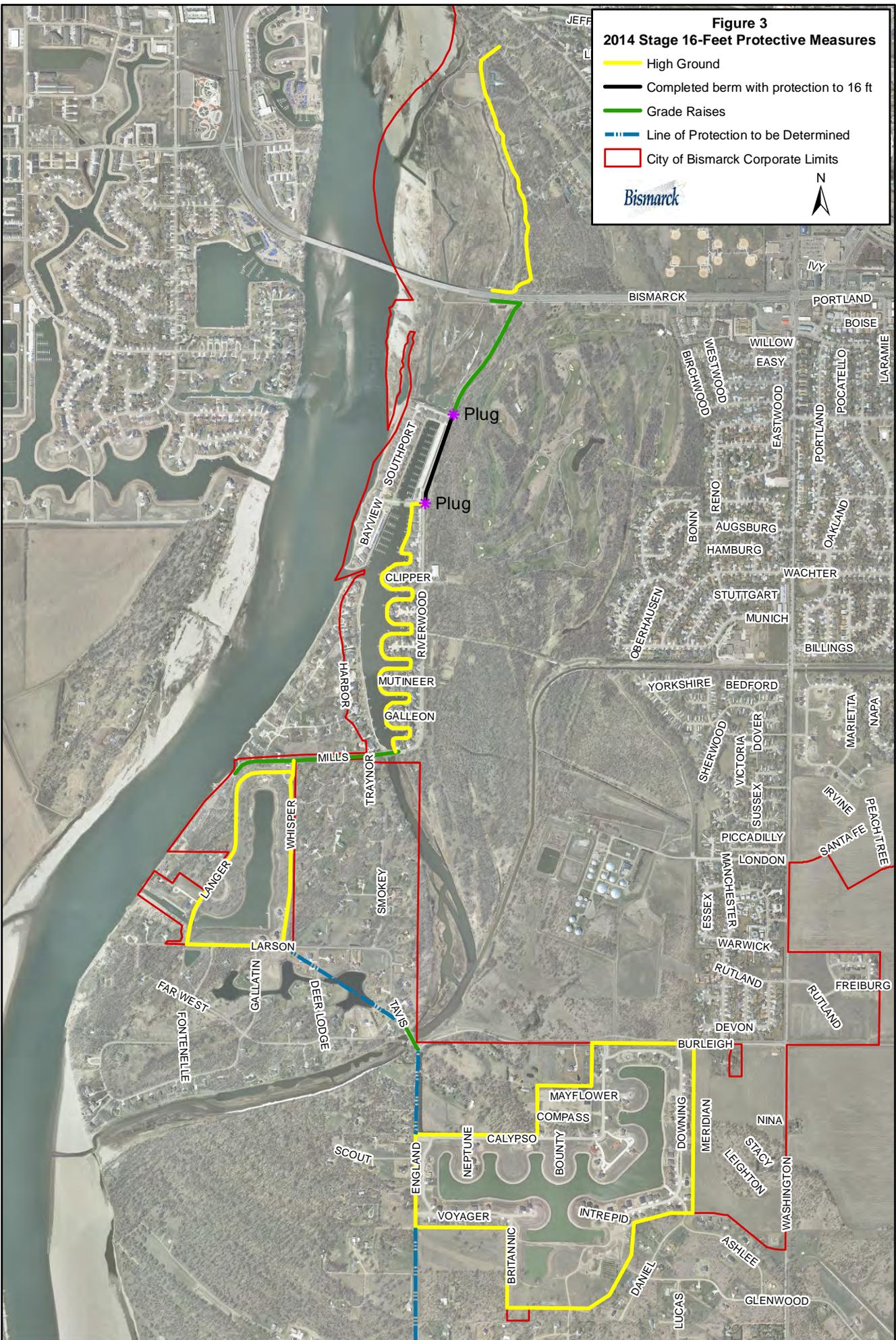
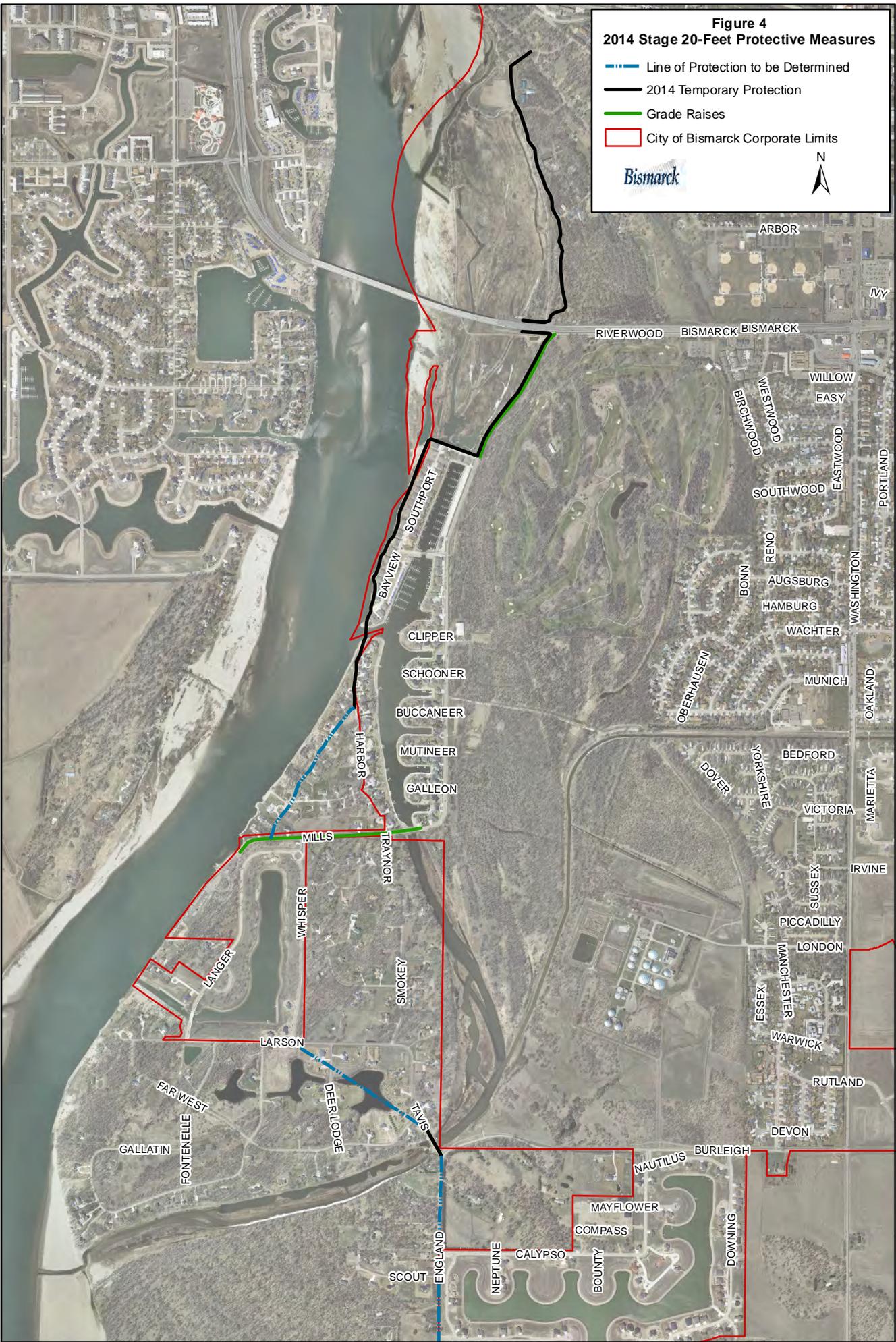


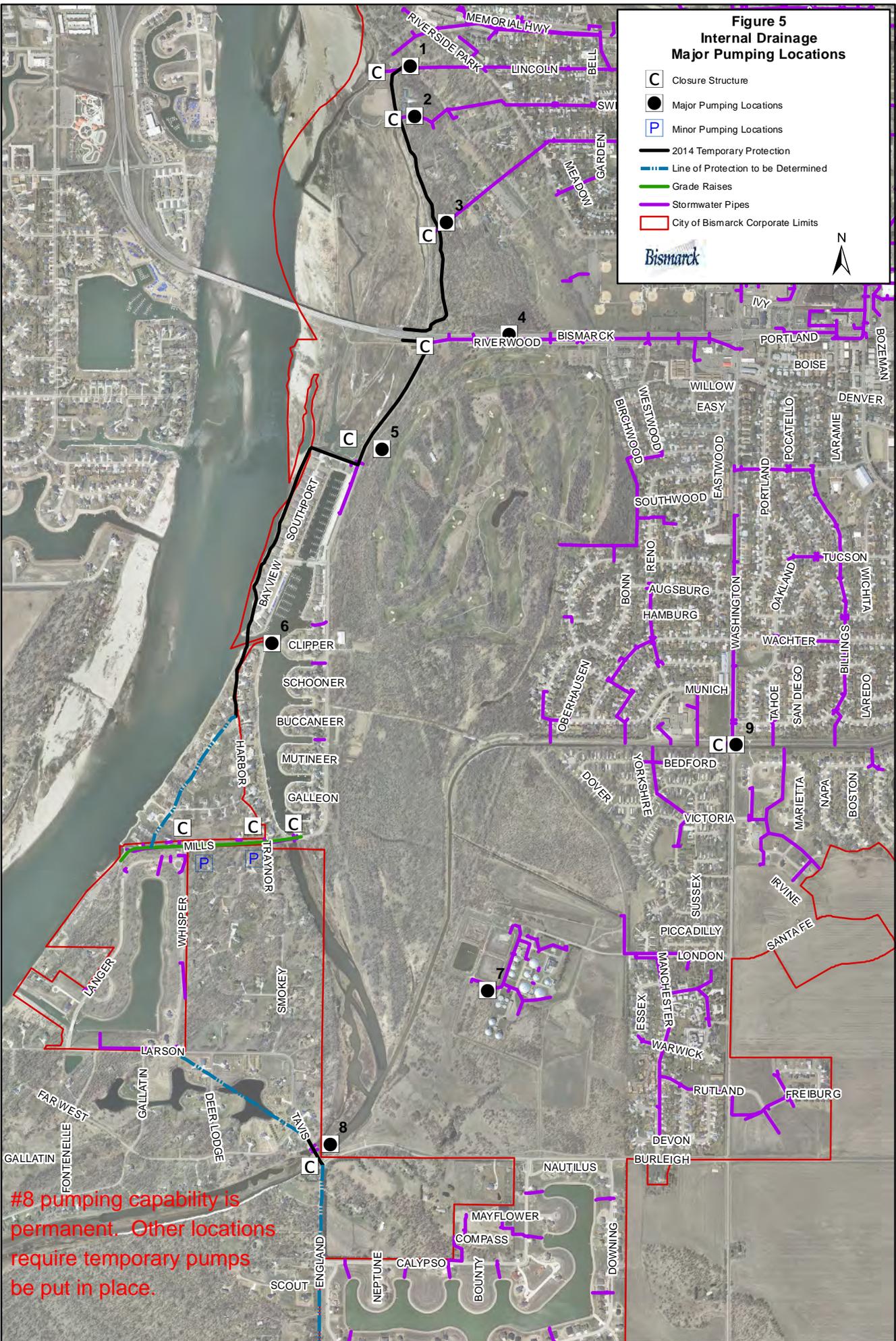
Figure 4
2014 Stage 20-Foot Protective Measures

-  Line of Protection to be Determined
-  2014 Temporary Protection
-  Grade Raises
-  City of Bismarck Corporate Limits



**Figure 5
Internal Drainage
Major Pumping Locations**

- C** Closure Structure
- Major Pumping Locations
- P** Minor Pumping Locations
- 2014 Temporary Protection
- Line of Protection to be Determined
- Grade Raises
- Stormwater Pipes
- City of Bismarck Corporate Limits



#8 pumping capability is permanent. Other locations require temporary pumps be put in place.

Pre-Existing Mitigation Continued: Flood

10. The Bismarck 100-Year and 500-Year Floodplain Maps (Flood Insurance Rate Map) are both updated as of 2014.
11. Bismarck is a participating community in the National Flood Insurance Program. (CID#380149). Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives, which are: New buildings must be protected from flooding damages that occur as a result of the 100-year flood, and new development must not cause an increase in flood damages to other property.
12. **Floodplain Ordinance:** The floodplain ordinance is contained with the Bismarck Zoning Ordinance – Title 14. The purpose of the regulations set forth by the floodplain ordinance (14-04-19) is to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions. A “Floodplain Administrator” is designated by the City of Bismarck to administer the City’s floodplain regulations. More information: <http://nd-bismarck.civicplus.com/DocumentCenter/Home/View/1962>
13. Floodplain management is addressed through our Floodplain Administrator and Community Development via regular planning meetings where storm water management and floodplain issues are addressed.
14. As part of the 2014 Growth Management Plan, the future land use plan (FLUP) identifies an urban service area boundary (USAB). The USAB identifies the area within which the City of Bismarck can reasonably provide municipal infrastructure services (water, stormwater, sanitary sewer and transportation). As a secondary benefit, maintaining infrastructure development within the USAB helps to limit potential impact to the City of Bismarck following any future flood events.
15. **Stormwater Management Program – Mitigation Capabilities:** Bismarck has a Stormwater Management Program implemented jointly by Community Development, Engineering, and Public Works and a Stormwater Program Coordinator within the Public Works Department. Mitigation capabilities of the Stormwater Management program are identified through Community Development via City Ordinance Title 14.1 (Zoning Ordinance). The city has authority to regulate and enforce stormwater management requirements to promote health, safety, and welfare of the people and property within Bismarck and its extraterritorial jurisdiction. The requirements, permitting and detailed review process are in place to mitigate the impacts of development and land disturbance, protect natural resources, maintain water quality, and minimize stormwater runoff, erosion, and urban flooding issues. More Information: <http://www.bismarck.org/index.aspx?nid=138>
16. Flood Insurance Study: The special flood hazard areas are identified by the Federal Emergency Management Agency (FEMA) in a scientific and engineering report titled "The Flood Insurance Study for Burleigh County, North Dakota and Incorporated Areas", dated July 19, 2005, with an accompanying flood insurance rate map (FIRM), and as subsequently updated by any Letter of Map Amendment (LOMA), Letter of Map Revision (LOMR) and/or Letter of Map Revision Based on Fill (LOMR(f)) issued by the Federal Emergency Management Agency (FEMA). The Flood Insurance Study (FIS) is on file in the office of the Floodplain Administrator. Special flood hazard areas may also be designated in a storm water management plan prepared for a development, plat or watershed. Flood Insurance Study and Flood Insurance Rate Maps are available via State Water Commission: <http://www.swc.nd.gov/4dlink9/4dcgi/GetContentRecord/PB-1976>
17. The National Weather Service issues warnings, watches, and advisories for flooding.

Additional completed and on-going flood mitigation (pre-existing).

18. Apex Engineering has been contracted (year 2014) to conduct a preliminary investigation into solutions to reduce urban flooding in south Bismarck in the Expressway and South 12th Street area.
19. The 7th Street underpasses has permanent pumping capability to address urban flooding events. The 9th Street location relies on gravity flow.
20. The Jackman Coulee Dam #2 (within Tom O’Leary Golf Course), is inspected by the State Water Commission every 4 years and inspected by Bismarck Public Works annually.

21. Commitment to Stormwater Management :

Throughout its existence Bismarck has devoted considerable resources to ensuring the safe and adequate discharge of stormwater within the community.

A number of diversified watersheds within and adjacent to our city, such as the Apple Creek watershed, the Hay Creek watershed, the Jackman Coulee watershed, and the Tyler Coulee watershed, has resulted in the need for a proper stormwater management planning to minimize the potential for damages to already developed downstream properties as development and growth continued. Early solutions to stormwater issues tended to deal mainly with accommodating runoff volume and provided little else as far as erosion control or water quality. Stream channelization was viewed as an acceptable solution. For a more complete listing of the stormwater projects completed in Bismarck over the years, please consult the City of Bismarck Stormwater Management Plan, dated April 1, 1997.

Since the passage and adoption of the City of Bismarck Stormwater Management Ordinance in 1997 with an implementation date of January 1, 1998, increased emphasis has been placed on requiring developers to properly control stormwater runoff from their property so that post development runoff is equal to, or less than, predevelopment runoff. This has typically been accomplished through an extensive network of detention ponds, some of a local nature meaning the pond detains runoff from a limited area, and some of a regional nature where the pond collects runoff from a larger area involving multiple property owners and neighborhoods.

Working collectively with developers and grant monies obtained from federal, state, and local sources, recent projects have resulted in stormwater systems that more closely resemble natural stream streambeds and ponds. Recreational trails have been constructed adjacent to and within some stormwater areas. For example, the restoration of the Hay Creek Greenway, complete with a shared use path, now serves as an asset to our community and has generated appreciative comments from our citizens.

Stormwater management, both nationwide and in Bismarck, is a much more complex matter than it was even a half century ago. Through continued proper planning, design, construction, operation and maintenance, our stormwater resources can provide safe, reliable protection for our community and residents for years to come.

National Flood Insurance Program Compliance

(NFIP Compliance)

Bismarck is a participating community in the National Flood Insurance Program. (CID#380149). Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives, which are: New buildings must be protected from flooding damages that occur as a result of the 100-year flood, and new development must not cause an increase in flood damages to other property.

Bismarck has procedures implemented to address and maintain NFIP compliance.

1. A floodplain ordinance has been adopted and remains in effect. The floodplain ordinance is contained with the Bismarck Zoning Ordinance – Title 14. The purpose of the regulations set forth by the floodplain ordinance (14-04-19) is to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions. A “Floodplain Administrator” is designated by the City of Bismarck to administer the City’s floodplain regulations.
More information: <http://nd-bismarck.civicplus.com/DocumentCenter/Home/View/1962>
See ordinance – next page.
2. Residents are provided information on flood hazards, floodplain map data, and availability of flood insurance.
3. An interactive floodplain map is available on the city’s website:
<http://bismarck.maps.arcgis.com/apps/PublicGallery/index.html?appid=1ace5bf2d2cf48ff8a4b72f9b25c4b07&group=30f58515bb0d4410bd71846a1c89521e>
4. Floodplain management is addressed through our Floodplain Administrator and Community Development via regular planning meetings where storm water management and floodplain issues are addressed.
5. Mitigation Actions highlighted below illustrate commitment to maintain NFIP compliance. These mitigation actions are also identified in Section 4: Mitigation Implementation Action Plan.
 - Apply to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS).
 - Coordinate and/or support NFIP flood insurance promotional efforts including the availability of flood insurance for community residents and businesses.
 - Conduct Flood Mitigation and Preparedness Public Education efforts for local citizens and businesses.
6. Additional actions supporting NFIP compliance are noted in within this plan section (ie: Flood Hazard mitigation actions and pre-existing mitigation)

National Flood Insurance Program (NFIP)

The Federal Disaster Protection Act of 1973 requires state and local governments to participate in the NFIP as a condition to the receipt of any federal loan or grant for construction projects in flood prone areas. Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives. The first objective is that new buildings must be protected at a 100-year flood level. The second objective is that new development must not cause an increase in flood damage to other property. In 2012, the Biggert-Waters Reform Act was signed and contains many reforms that will impact the NFIP moving forward. These changes include the phasing out of subsidies, new insurance policies to be issued at full-risk rates, and grandfathered rates being phased out over five years. Communities have been provided assistance through the North Dakota Floodplain Management Act of 1981 which directs the state engineer to aid local governments in reducing flood damages through sound floodplain management. The state legislature provided the state engineer with an appropriation to be used in assisting communities to obtain base flood (100-year) elevation data.

Floodplain Ordinance

NFIP Compliance Continued

Floodplain Ordinance: <http://nd-bismarck.civicplus.com/DocumentCenter/Home/View/1962>

14-04-19. FP Floodplain District. In any FP floodplain district, the following regulations shall apply:

1. Statement of purpose. It is the purpose of this section to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- a. To protect human life and health;
- b. To minimize expenditure of public money for costly flood control projects;
- c. To minimize the need for rescue and relief efforts associated with flooding, generally undertaken at the expense of the general public;
- d. To minimize prolonged business interruptions;
- e. To minimize damage to public facilities and utilities located in special flood hazard areas such as water and gas mains, electric, telephone, and sewer lines, streets, and bridges;
- f. To help maintain a stable tax base by providing for the use and development of special flood hazard areas so as to minimize future flood blight areas;
- g. To ensure that potential buyers are notified that property is located in a special flood hazard area;
- h. To ensure that those who occupy the special flood hazard areas assume responsibility for their actions; and
- i. To provide an increased level of protection in anticipation of future increases in the base flood elevation (BFE).

2. Methods of reducing flood losses. In order to accomplish its purposes, this section includes methods and provisions for:

- a. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion, flood water elevations or flow velocities;
- b. Requiring that uses vulnerable to flooding, including attendant utilities and facilities which serve such uses, be protected against flood damage at the time of initial construction;
- c. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or convey flood waters;
- d. Controlling filling, grading, dredging, and other development which may increase flood damage; and
- e. Preventing or regulating the construction of flood barriers or obstructions which will unnaturally divert flood waters or which may increase flood hazards in other areas.