Frequently Asked Questions
Related to the Oxbow, Hickson and Bakke Levee Alternative

Q1: Why has the position on a ring-levee changed? The feasibility study recommended buy-outs for areas with staging depths greater than three feet.

A1: Several factors and changes have contributed to the development of a ring levee concept for the communities of Oxbow, Hickson and Bakke, including: (1) The City of Oxbow, through a resolution dated January 19, 2011, took the position that if homes need to be purchased and removed for mitigation, the entire community needs to be offered the same buyout options. As the project has evolved, it has become apparent that the position of the City of Oxbow is changing; a partial buyout of the community and construction of a ring levee could be an option. Local resolutions are taken into consideration as part of the Corps process. (2) The three-foot and greater criteria for buy-outs in the feasibility study was used to guide cost estimates and plan development. (3) Input from the public, local leaders, state leaders and others after the September 13 Post-Feasibility Public Meetings included strong interest in further development of options to save the Oxbow area from buy-outs. Based on these factors, the Diversion Authority approached the Corps about a ring levee concept and together the concept was advanced for consideration.

Q2: What is the height of the proposed ring levee around the Oxbow area?

A2: The majority of the proposed ring levee would have a top elevation of approximately 926 feet above sea level (NAVD1988 datum) and range in height from 9 to12 feet based on existing ground conditions and the proposed alignment. The reach crossing the golf course would be higher.

Q3: Will the proposed ring levee require removal of any structures?

A3: The proposed ring levee would require removal of approximately 40 structures on the east side of Oxbow and near the existing drainage along the west edge of Bakke. The structures would need to be removed to allow for proper construction of the proposed ring levee. Soil stability and proximity of the proposed ring levee to the Red River are key considerations in selecting a suitable alignment.

Q4: Will the proposed ring levee surround Oxbow, Hickson and Bakke?

A4: This is yet to be determined, and a decision may be made, in part, based on the wishes of the communities. The original ring levee alignment concept included surrounding all three communities. In addition, the proposed alignment may provide space for relocating the existing structures in east Oxbow and Bakke that would need to be removed for construction of the levee. The expansion area is proposed to be south of the existing Oxbow boundary. The goal is to keep all three communities intact and maintain pre-levee community conditions.

Q5: Will the proposed ring-levee be safe?

A5: Yes - The proposed ring levee would be constructed following the rigorous design, operation, inspection and maintenance criteria established by the US Army Corps of Engineers and FEMA.

These are the same standards that will be used for the embankments associated with the FM Diversion Project and other ring levees in the Red River Valley.

Q6: What level of flood risk reduction will be provided by the proposed ring-levee?

A6: The proposed ring levee would be designed and constructed with four (4) feet of overbuild (freeboard), which is in excess of the 500-year flood level. This will have the largest level of risk reduction of any community in the Red River Basin. For comparison purposes, the 2009 flood experienced by the Fargo-Moorhead area was a 50-year event. The flood experienced by Grand Forks in 1997 was a 250-year event.

Q7: What level of event would cause overtopping of the proposed ring levee?

A7: The top of the proposed ring levee would be similar to the top elevation of the southern embankment. It would take an extremely large event, well in excess of a 500-year event, to cause an overtopping.

Q8: Will the communities inside the ring-levee be able to grow?

A8: The proposed ring levee alignment provides space for relocating the existing homes in east Oxbow and potentially Bakke that would be removed for construction of the levee. The proposed alignment also includes an undeveloped area between Hickson and Bakke, however no additional areas are being planned for inclusion at this time.

Q9: Is it possible to add new lots within the ring-levee to accommodate the lots needed for construction of the ring-levee? Is it possible to add additional lots beyond those needed for the ring-levee?

A9: This would likely be subject to negotiation between the City of Oxbow, USACE and local sponsors. Relocation of new lots to replace lots that were bought out is an option that can be pursued.

Q10: Will the proposed ring levee impact the Kindred school district?

A10: If a ring levee is chosen for the three communities many of the homes would remain intact and within the school district.

Q11: How will access be provided to the communities inside the proposed ring levee?

A11: Highway 81 would be raised to provide access over the proposed ring levee. Other access provisions will be evaluated during the design phase.

Q12: Will access be provided during flood events? Would northbound Highway 81 close?

A12: The proposed alignment would include raising Highways 81 and 18 to allow access to I-29 in up to a 500 year event. Similar to the situation today there will be no northern access on Hwy 81..

Q13: Will an evacuation plan be developed?

A13: Yes, a Flood Warning and Emergency Evacuation Plan (FWEEP) will be developed. The evacuation route would likely take evacuees to Interstate29 via Highways 81 and 18.

Q14: How will elevated roads be constructed? How will safety on the elevated roads be incorporated?

A14: The proposed grade raises to Cass County Highways 18 and 81, along with Interstate 29 in the upstream staging area were consistent with those proposed during feasibility. The edge of driving lane elevations for the grade raises were set at the 100-year staging elevation with the project in operation. For Interstate 29, the proposed road section consists of a 38-foot wide roadway section and 6:1 side-slopes. For Highways 18 and 81, the proposed road section consists of a 32-foot wide pavement section and 4:1 side-slopes. Highway design standards for safety zones and line of sight requirements would be taken into consideration. The proposed grade raises will need to be evaluated more during final design.

Q15: If a ring levee is built, homes in the path of the levee would have to be purchased. Will other homeowners within the newly ringed-in community also be offered buyouts or are they on their own? What if we don't want to live behind/inside the proposed ring levee?

A15: If the levee option is ultimately decided to be the best option moving forward, acquisitions of property in fee title would be limited to those properties directly impacted by the levee footprint or those properties that would remain in the staging area. The remaining properties within the ring levee would be provided flood risk reduction benefits and would not require a buyout according to USACE policy.

Q16: Who will maintain the proposed ring levee?

A16: The operation and maintenance (O&M) requirements (including costs for O&M) associated with the ring levee would be the responsibility of the non-Federal sponsors (i.e., the entity that signs the Project Partnership Agreement (PPA) with the Corps for the overall Diversion project. In this case, those entities would likely be Fargo, Moorhead and the Diversion Authority). USACE and FEMA criteria will apply to operation, maintenance and inspection of the ring levee. Annual inspections will be conducted to ensure the condition of the levees.

Q17: Will properties inside the proposed ring levee be required to have flood insurance?

A17: The levee will be designed and constructed in accordance with the highest levee standards, including those required by FEMA for levee certification. Structures protected by a "FEMA Certified" levee are not required to purchase flood insurance, although voluntary purchase of flood insurance is encouraged.

Q18: Will the plan include internal drainage?

A18: Yes, per Army Corps of Engineers criteria, the internal drainage plan would likely include a retention pond, gate structure(s), and pump station(s) sized to accommodate rain/precipitation events inside the ring-levee.

Q19: Would infrastructure that is necessary for a community to survive a flood such as: drainage, pumps, dual electrical feeds and sewer backup be included in this ring dike plan? Will a siren alert system be provided in case of emergency?

A19: The design of the levee would meet all Corps and FEMA standards and would include all necessary infrastructure upgrades which would include a number of items, such as internal drainage and pumps. A technical team would work out those details with the local community. Emergency

notification systems would be implemented as part of the levee design if determined to be necessary by the Corps and the local community.

Q20: How will the design mitigate for failure of the storm sewer gates and internal drainage features?

A20: As is necessary with most flood damage reduction projects, penetrations through levees at stormwater outfalls will be necessary, but will be kept to a minimum. Any penetrations through the ring-levee would be designed with redundancy and systems to prevent failure, in accordance with the robust USACE design standards. Temporary plugging of storm water pipes would no longer be part of the floodfight. A typical outfall would include a gate well which would contain positive closure system and a secondary closure. The positive closure would likely be by a sluice gate while the redundant closure would likely be stop logs to employ if the gates are inoperable. Details of the internal drainage plan and stormwater outfalls would be finalized during design.

Q21: How fast could a failure of the levee occur? If a failure occurs, will the communities be inundated immediately?

A21: The levees will be professionally designed and constructed, and failure except for extreme flood events which lead to overtopping is highly unlikely. For extreme events, the evacuation plan will have been implemented prior to an event which could potentially cause overtopping. In addition, generally there would be leading indicators that a problem was occurring which would give emergency responders some time to sound emergency warnings and take additional measures to prevent the failure. During flood events the system would be heavily monitored, day and night. A potential inundation would likely not be immediate.

Q22: If the residents of Oxbow/Hickson/Bakke agree to consider a levee, what does that mean for the alignment decision, and going forward? Does an agreement to consider a ring levee commit the area to a levee or deprive residents of the right to opt for a full buyout?

A22: A commitment to consider a levee would result in development of the many details that would need to be worked out in the future. This would not eliminate the possibility of a full buyout. The full determination would be made through the Corps NEPA process and by the Diversion Authority.

Q23: The Oxbow Clubhouse and a number of holes on the course are lost to a levee. What is the replacement process in a situation like this? What gets rebuilt and to what standard?

A23: Generally, the federal acquisition rules adhered to by the Corps of Engineers require replacement or buyout of the facilities with equivalent facilities, and would be part of the negotiation process with the relocation specialist assigned to the particular property.

Q24: After a flood event recedes, what should the community expect in terms of debris, dead fish, etc.?

A24: The community could expect a similar situation as they see today when the rural areas are flooded. It is important to remember the frequency of operation and that the proposed project will only operate at a 10% (10-year) event or greater.

Q25: What is the Corps preference with regard to a levee or buyout and why?

A25: The Corps has indicated that the current recommended path forward would be a buyout of structures with more than three feet in total depth as described in the FEIS. Removal of flood prone structures from the floodplain using non-structural alternatives such as buyouts is a very beneficial, long term floodplain management strategy. However, the Corps is giving consideration the ring levee option in lieu of using non-structural alternatives.

Q26: What are the water levels and the duration of the event for the following flood scenarios?

A26: See table.

Return Frequency	Existing Conditions		With proposed Project VE13-A + Inlet Gates + In-Town Levees	
	Water Level at Hwy 81 north of Oxbow	Duration of WSEL above 914'	Water Level at Hwy 81 north of Oxbow	Duration of Staging (WSEL above 914')
10-year	909.44	0 days	909.52	0 days
50-year (approx 2009)	914.90	4 days	921.46	9 days
100-year	915.72	5.5 days	922.06	10.5 days
500-year	917.29	8.5 days	922.09	9.5 days
Note: 914' is the average natural ground elevation at the reporting location				

Q27: What will be the side-slope of the proposed ring-levee ratio?

A27: The technical details associated with the ring levee will need to be developed, but it is anticipated that slopes of 5:1 on both the inside and outside would be adequate to meet all design standards.

Q28: How will the levee system be constructed? What are the options for prevention of water erosion? What is the likelihood of a failure to the levee system?

A28: The levee would be constructed in accordance with the US Army Corps of Engineers (USACE) levee design standards. Typically this involves keying in the levee, compacting clay material, and protecting the levee with turf or rock. Analyses related to water velocity and wind/wave action would be required to determine what measures would be necessary to prevent erosion. Most levees in the Red River Valley do not require any erosion prevention measures above establishment of grass.