CITY OF FARGO
COMPREHENSIVE FLOOD MITIGATION PLAN PHASING

MAY 23, 2016
PHASING PLAN
2016-2020

• TOTAL PHASED PLAN CONTAINS $104M

• FOCUS IS ON HARD TO PROTECT AREAS

• AVOIDS REMOVAL OF HOMES TO PROVIDE FREEBOARD FOR CERTIFICATION

• AVOIDS PROJECTS THAT MIGHT BE DIFFICULT TO PERMIT
## CITY OF FARGO - COMPREHENSIVE FLOOD MITIGATION PLAN PHASING TIER 1 & 2
### UPDATED 4/7/2016

<table>
<thead>
<tr>
<th>Reach</th>
<th>Location</th>
<th>Project Description</th>
<th>Construction Cost Estimate</th>
<th>10% Contingency</th>
<th>ROW Cost Estimate</th>
<th>Utilities</th>
<th>Agreement(s)</th>
<th>Consultant Cost (15% of Const Cost)</th>
<th>E&amp;A (16% of Construction Cost)</th>
<th>Project Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>FM-15-81</td>
<td>Rose Creek Golf Course Ph 1</td>
<td>Levee, Golf Course Restoration</td>
<td>$2,787,187</td>
<td>$247,820</td>
<td>$0</td>
<td>$520,000</td>
<td>$497,000</td>
<td>$507,800</td>
<td>$396,512</td>
</tr>
<tr>
<td>xx</td>
<td>FM-15-41</td>
<td>Southwood Ph 1 w/ Demo</td>
<td>Levee</td>
<td>$357,000</td>
<td>$31,700</td>
<td>$585,000</td>
<td>$450,000</td>
<td>$0</td>
<td>$0</td>
<td>$57,220</td>
</tr>
<tr>
<td>xx</td>
<td>FM-16-41</td>
<td>Northside Protection</td>
<td>Levee Ph 1 (next)</td>
<td>$4,100,000</td>
<td>$410,000</td>
<td>$760,000</td>
<td>$400,000</td>
<td>$0</td>
<td>$0</td>
<td>$485,000</td>
</tr>
<tr>
<td>14</td>
<td>FM-15-21</td>
<td>Belmont Addition - Ph 1</td>
<td>Lift Station</td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$0</td>
<td>$200,000</td>
<td>$275,000</td>
<td>$270,000</td>
<td>$2,295,000</td>
</tr>
<tr>
<td>18 &amp; 19</td>
<td>N/A</td>
<td>Belmont Addition (12 homes)</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$6,300,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>18 &amp; 19</td>
<td>N/A</td>
<td>Haywood, Hazelberry, River Drives (13 homes)</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$14,446,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$14,446,000</td>
</tr>
<tr>
<td>21</td>
<td>N/A</td>
<td>Kinder (1 Home)</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$380,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$850,000</td>
</tr>
<tr>
<td>23</td>
<td>N/A</td>
<td>Oak Creek &amp; Cooperfield</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$4,470,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$4,470,000</td>
</tr>
<tr>
<td>25 &amp; 26</td>
<td>N/A</td>
<td>Prairie Rose Area &amp; Mistwood Phase 3 (Remaining Areas)</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$1,230,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$1,230,000</td>
</tr>
<tr>
<td>20</td>
<td>N/A</td>
<td>Rosewood Addition (Remaining Area)</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$1,930,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$1,930,000</td>
</tr>
<tr>
<td>23</td>
<td>HD-16-XX</td>
<td>Oak Creek &amp; Cooperfield (5 Homes)</td>
<td>Demolition</td>
<td>$100,000</td>
<td>$10,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$48,000</td>
</tr>
<tr>
<td>25 &amp; 26</td>
<td>HD-16-XX</td>
<td>Prairie Rose Addition (4 Homes)</td>
<td>Demolition</td>
<td>$200,000</td>
<td>$20,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$32,000</td>
</tr>
<tr>
<td>21</td>
<td>HD-16-XX</td>
<td>Kinder (1 Home)</td>
<td>Demolition</td>
<td>$60,000</td>
<td>$6,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$9,600</td>
</tr>
<tr>
<td>xx</td>
<td>FM-15-42</td>
<td>Southwood Ph 2</td>
<td>Levee</td>
<td>$327,000</td>
<td>$32,700</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$52,320</td>
</tr>
<tr>
<td>20</td>
<td>HD-16-XX</td>
<td>Rosewood Addition (2 Homes)</td>
<td>Demolition</td>
<td>$120,000</td>
<td>$12,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$19,200</td>
</tr>
<tr>
<td>N/A</td>
<td>Non-Scheduled Buyouts</td>
<td>Home Acquisition</td>
<td>$0</td>
<td>$0</td>
<td>$2,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$2,000,000</td>
</tr>
</tbody>
</table>

### 2016 Project Cost Totals
- **$9,442,197** for land
- **$944,220** for engineering
- **$32,081,000** for construction
- **$1,467,900** for consultant
- **$1,543,752** for E&A
- **$47,343,068** total

---

*Note: All costs are in USD.*
<table>
<thead>
<tr>
<th>Year</th>
<th>Project Area</th>
<th>Description</th>
<th>Construction Cost Estimate</th>
<th>10% Contingency</th>
<th>RDW Cost Estimate</th>
<th>Utilities</th>
<th>Agreement</th>
<th>Consultant Cost (15% of Const Cost)</th>
<th>E&amp;B (16% of Construction Cost)</th>
<th>Project Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>xx</td>
<td>Northside Protection</td>
<td>Levee (west) &amp; L.S. Ph (2 &amp; 3)</td>
<td>$4,100,000</td>
<td>$140,000</td>
<td>$500,000</td>
<td>$200,000</td>
<td>$0</td>
<td>$725,000</td>
<td>$688,000</td>
</tr>
<tr>
<td>18 &amp; 19</td>
<td>HO-16-XK</td>
<td>Harwood/Haddarby/River Drives (12 Homes)</td>
<td>Demolition</td>
<td>$780,000</td>
<td>$78,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$124,800</td>
</tr>
<tr>
<td>20</td>
<td>FM-15-E1</td>
<td>Roswold Addition (Remaining Areas)</td>
<td>Levee</td>
<td>$3,000,000</td>
<td>$300,000</td>
<td>$0</td>
<td>$20,000</td>
<td>$0</td>
<td>$366,035</td>
<td>$480,000</td>
</tr>
<tr>
<td>25 &amp; 26</td>
<td>FM-14-E3</td>
<td>Prairie Rose Area &amp; Mathwood Phase 3 (Remaining Areas)</td>
<td>Levee &amp; Floodwall</td>
<td>$1,200,000</td>
<td>$120,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$200,000</td>
<td>$192,000</td>
</tr>
<tr>
<td>23</td>
<td>FM-11-13</td>
<td>Oak Creek &amp; Copperfield</td>
<td>Earth: Levee, Gatewalls</td>
<td>$1,000,000</td>
<td>$100,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$180,000</td>
<td>$160,000</td>
</tr>
<tr>
<td>21</td>
<td>FM-15-E2</td>
<td>Rose Creek Golf Course/Kinder Area Ph 2</td>
<td>Levee/gatewall</td>
<td>$1,200,000</td>
<td>$120,000</td>
<td>$20,000</td>
<td>$200,000</td>
<td>$0</td>
<td>$250,000</td>
<td>$192,000</td>
</tr>
<tr>
<td>18 &amp; 19</td>
<td>HO-16-XK</td>
<td>Harmon, Haddarby, River Drives (Remaining Areas)</td>
<td>Levee</td>
<td>$1,500,000</td>
<td>$150,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$285,000</td>
<td>$240,000</td>
</tr>
<tr>
<td>14</td>
<td>HO-16-XO</td>
<td>Belmont Area (12 Homes)</td>
<td>Demolition</td>
<td>$1,200,000</td>
<td>$120,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$182,000</td>
</tr>
<tr>
<td>14</td>
<td>FM-15-I0</td>
<td>Belmont Addition Ph 2</td>
<td>Levee</td>
<td>$2,700,000</td>
<td>$270,000</td>
<td>$0</td>
<td>$300,000</td>
<td>$0</td>
<td>$375,000</td>
<td>$480,000</td>
</tr>
<tr>
<td>2017 Project Cost Totals</td>
<td></td>
<td></td>
<td></td>
<td>$24,077,000</td>
<td>$2,092,700</td>
<td>$1,370,000</td>
<td>$3,306,900</td>
<td>$1,402,320</td>
<td>$24,843,835</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>N/A</td>
<td>Edgewood - Golf Course Ave</td>
<td>Levee &amp; Floodwall</td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$650,000</td>
<td>$100,000</td>
<td>$0</td>
<td>$481,000</td>
<td>$560,000</td>
</tr>
<tr>
<td>14</td>
<td>FM-15-I2</td>
<td>Belmont Addition Ph 3</td>
<td>Levee/Wall - Intake Modifications</td>
<td>$3,000,000</td>
<td>$300,000</td>
<td>$0</td>
<td>$300,000</td>
<td>$0</td>
<td>$600,000</td>
<td>$560,000</td>
</tr>
<tr>
<td>N/A</td>
<td>NN-18-XI</td>
<td>Lift Station Improvements/Modifications</td>
<td>Lift Stations/Levee</td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$700,000</td>
<td>$250,000</td>
<td>$0</td>
<td>$600,000</td>
<td>$560,000</td>
</tr>
<tr>
<td>N/A</td>
<td>FM-18-XO</td>
<td>Lift Stations, Storm Sewer Improvements/Modifications</td>
<td>Various</td>
<td>$2,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>2018 Project Cost Totals</td>
<td></td>
<td></td>
<td></td>
<td>$13,750,000</td>
<td>$1,125,000</td>
<td>$1,350,000</td>
<td>$1,966,900</td>
<td>$1,860,000</td>
<td>$18,041,900</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>N/A</td>
<td>Lift Stations Improvements/Modifications</td>
<td>Lift Stations/Levee</td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$700,000</td>
<td>$250,000</td>
<td>$0</td>
<td>$600,000</td>
<td>$560,000</td>
</tr>
<tr>
<td>N/A</td>
<td>FM-19-XE</td>
<td>Storm Sewer Improvements/Modifications/Studies</td>
<td>Various</td>
<td>$2,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>2019 Project Cost Totals</td>
<td></td>
<td></td>
<td></td>
<td>$5,500,000</td>
<td>$350,000</td>
<td>$700,000</td>
<td>$600,000</td>
<td>$560,000</td>
<td>$7,960,000</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>N/A</td>
<td>Lift Stations Improvements/Modifications</td>
<td>Lift Stations/Levee</td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$700,000</td>
<td>$250,000</td>
<td>$0</td>
<td>$600,000</td>
<td>$560,000</td>
</tr>
<tr>
<td>2020 Project Cost Totals</td>
<td></td>
<td></td>
<td></td>
<td>$3,500,000</td>
<td>$350,000</td>
<td>$700,000</td>
<td>$600,000</td>
<td>$560,000</td>
<td>$5,960,000</td>
<td></td>
</tr>
</tbody>
</table>

Tier 1 & 2 Needs: $104,148,803
PHASING PLAN
2016-2020

CERTIFICATION FROM 39.3’ (CURRENT ADOPTED) FLOODPLAIN WITH PHASED PLAN WILL BE LIMITED TO THE FOLLOWING AREAS:

• EL ZAGAL – SHRINERS BUILDING & 6 HOMES ALONG OAK STREET
  • PROJECT COMPLETION – 2016, LOMR IN PLACE – END OF 2017

  • PROJECT COMPLETION – 2016, LOMR IN PLACE – END OF 2017

• CASS COUNTY 20 AREA – SOUTH OF WASTEWATER LAGOONS BETWEEN 25TH ST N & I29.
  • PROJECT COMPLETION – 2017, LOMR IN PLACE – END OF 2018

• DOWNTOWN AREA – POTENTIAL FOR CURRENT CITY HALL, OLD HOWARD JOHNSON SITE, MID-AMERICA, CASS PLAZA, MEPS, ETC.
  • PROJECT COMPLETION – 2016 (90%) BUT ADDITIONAL NEEDED FOR THE MAIN AVENUE CLOSURE AND LS, WHICH MAY BE 2017 & 2018, LOMR IN PLACE – 2018?

• BELMONT, IN DESIGN, POTENTIAL FOR UP TO 15 PRIMARY STRUCTURES
  • UNDEFINED DUE TO UNCERTAINTY OF BUYOUTS.
PHASING PLAN
2016-2020

RECOMMENDED MOTION:

MOVE TO APPROVE THE IMPLEMENTATION OF THE 5-YEAR PRIORITIZED COMPREHENSIVE PLAN AND DIRECT STAFF TO CONTINUE TO PURSUE ALL NECESSARY PROPERTY THROUGH APPRAISALS AND NEGOTIATIONS.
ADDITIONAL INFORMATION FOLLOWS.
PHASING PLAN 2016-2020

• OPTIONS TO SECURE A PERMIT:
  • DECREASE THE STAGING TO .1’ OR LESS
    • REQUIRES CONSTRUCTION
    • FOOTPRINT IS CURRENTLY UNDETERMINED
    • POTENTIAL COST AS HIGH AS $180 M

• SECURE THE RIGHT TO FLOOD LAND
  • STAGE INCREASE COULD RESULT IN MINIMAL ECONOMIC IMPACT
  • STUDY & APPRAISALS WOULD BE NEEDED TO DEVELOP A DEPTH DAMAGE CURVE
  • MINIMUM PAYMENT PROGRAM WOULD NEED TO BE DEVELOPED REQUIRING TIME AND EXPENSE
  • MAY STILL NEED TO CONDEMN THE RIGHT TO FLOOD WITH ADDITIONAL APPRAISALS NECESSARY

• OPTIMIZED HYBRID OF ALTERNATIVES ABOVE

Previous Evaluation

30,000,000 CY Excavation
15 Miles of Levee
2,000 Acres of Land

Construction = $160M
Land = $30M
Total = $180M
STAFF IDENTIFIED A CONCERN REGARDING MITIGATION NECESSARY TO PERMIT PORTIONS OF THE COMPREHENSIVE PLAN.

EARLY ESTIMATES INDICATED A POTENTIAL COST OF $180 M TO OFFSET THE INCREASE IN WATER SURFACE ELEVATIONS

THIS WAS BASED ON A 1 DIMENSIONAL ANALYSIS

THE RESULTS APPEARED TO BE INACCURATELY SHOWING EFFICIENT FLOW IN THE EXISTING CONDITION MODEL THAT APPEARED TO BE EXAGGERATING THE IMPACTS.
PHASING PLAN
2016-2020

STAFF WAS DIRECTED TO UPDATE TO A 2 DIMENSIONAL ANALYSIS

THE RESULTS SHOW A REDUCTION IN IMPACTS THAT RESULTED IN A
POTENTIAL FOOTPRINT REDUCTION OF 45%

HOWEVER MITIGATION IS STILL NECESSARY AND LIKELY TO COST
$116M OR MORE.

FEMA Timeline

Current Evaluation

20,000,000 CY Excavation
10 Miles of Levee
1,100 Acres of Land

Construction = $100M
Land = $16M
Total = $116M
APRIL 11 PRESENTATION Follows
COMPLETED PROJECTS (SINCE 2009)

- OVER 18 MILES CONSTRUCTED
  - *47 MILES OF EMERGENCY LEVEES CONSTRUCTED BY THE CITY IN 2009

- 187 BUYOUTS ≈ $60M

- PROJECT COST ≈ $130M

- REDUCES REQUIRED SANDBAGS FOR A 2009 EVENT BY APPROXIMATELY 4.5 MILLION

- 50% OF THE COMPREHENSIVE PLAN COMPLETED
IN-TOWN DIVERSION AUTHORITY PROJECTS

• 9 PROJECTS UNDER CONSTRUCTION FOR 2016

• TOTAL LENGTH APPROXIMATELY 0.8 MILES

• CONSTRUCTION COST ≈ $60M
TIER 1 PLANNED COMP PLAN PROJECTS

- NEIGHBORHOODS EAST OF I29 THAT REQUIRE SIGNIFICANT EMERGENCY MEASURES
  - HARWOOD DRIVE, HACKBERRY DRIVE & RIVER DRIVE (0.5 MILES)
  - ROSEWOOD ADDITION (0.2 MILES) (SCHEDULED FOR 2016)
  - ROSE CREEK GOLF COURSE (0.7 MILES) (BID FOR 2016)
  - OAKCREEK & COPPERFIELD COURT ADDITIONS (0.2 MILES) (SCHEDULED FOR 2016)
  - PRAIRIE ROSE ADDITION (0.2 MILES) (SCHEDULED FOR 2016)

- EST. PROJECT COST $33M

- TOTAL LENGTH 1.8 MILES
TIER 1 PLANNED COMP PLAN PROJECTS

Harwood, Hackberry & River Drives
TIER 1 PLANNED COMP PLAN PROJECTS

Rosewood

Existing Floodwall & Levee in Rose Creek
2ND TIER PRIORITY COMP PLAN PROJECTS

• BELMONT NEIGHBORHOOD
  • EST. PROJECT COST ≈ $13M
  • LENGTH ≈ 0.4 MILES
  • SCHEDULED FOR 2016

• EDGEWOOD GOLF COURSE ROAD
  • EST. PROJECT COST ≈ $5M
  • LENGTH ≈ 0.5 MILES
  • SCHEDULED FOR 2017 (EDGEWOOD ESTATES)

• CASS COUNTY 20 AREA
  • EST. PROJECT ≈ $12M
  • LENGTH ≈ 3.4 MILES
  • SCHEDULED FOR 2016
3rd Tier Priority Comp Plan Projects

- University Drive
  - Estimated Project Cost: $10M
  - Length: 1.0 miles
  - Scheduled for 2017

- 76th Ave. S (E of Drain 53)
  - Estimated Project Cost: $10M
  - Length: 1.8 miles
  - Unscheduled
4TH TIER PRIORITY COMP PLAN PROJECTS

- DRAIN 27 (WEST OF I29)
  - EST. PROJECT COST ≈ $80M
  - LENGTH ≈ 4.2 MILES
  - SCHEDULED FOR 2016

- INTERSTATE RAISES
  - EST. PROJECT COST ≈ $30M
  - 1ST PHASE CROSSOVER CONSTRUCTION
    SCHEDULED FOR 2016
  - 2ND PHASE INTERSTATE RAISE
    SCHEDULED FOR 2017

- SOUTH LINE OF PROTECTION
  - EST. PROJECT COST ≈ ??
1ST TIER PROJECTS
- EST. PROJECT COST ≈ $33M
- ABLE TO PERMIT

2ND TIER PROJECTS
- EST. PROJECT COST ≈ $71M
- POTENTIALLY ABLE TO PERMIT

3RD TIER PROJECTS
- EST. PROJECT COST ≈ $20M
- MITIGATION TO PERMIT

4TH TIER PROJECTS
- EST. PROJECT COST ≈ $80M
- SOUTH LINE COST – UNKNOWN
- MITIGATION TO PERMIT
A FLOWAGE EASEMENT IS REQUIRED IF A PROJECT IMPOUNDS WATER ON LAND NOT OWNED BY APPLICANT.

STATE REQUIRING USE OF FUTURE 41' FLOW FOR A PERMIT

IMPACTS GREATER THAN 0.1 FOOT Requires A Property Right.
Impacts from Current Flood Protection

Area 1 = 3,100 ac-ft
Area 2 = 100 ac-ft
Area 3 = 1,000 ac-ft
Area 4 = 800 ac-ft
Total = 5,000 ac-ft
**MITIGATION/EASEMENT**

- **OPTIONS TO SECURE A PERMIT:**
  - DECREASE THE STAGING TO .1’ OR LESS
    - REQUIRES CONSTRUCTION
    - FOOTPRINT IS CURRENTLY UNDETERMINED
    - POTENTIAL COST AS HIGH AS $180 M
  - SECURE THE RIGHT TO FLOOD LAND
    - STAGE INCREASE COULD RESULT IN MINIMAL ECONOMIC IMPACT
    - STUDY & APPRAISALS WOULD BE NEEDED TO DEVELOP A DEPTH DAMAGE CURVE
    - MINIMUM PAYMENT PROGRAM WOULD NEED TO BE DEVELOPED REQUIRING TIME AND EXPENSE
    - MAY STILL NEED TO CONDEMN THE RIGHT TO FLOOD WITH ADDITIONAL APPRAISALS NECESSARY
  - OPTIMIZED HYBRID OF ALTERNATIVES ABOVE
FEMA TIMELINE

• FLOODPLAIN WAS ADOPTED IN JANUARY OF 2015.

• 4 YEARS UNTIL WE ARE FACING POTENTIAL REMAP
  • “IF I AM IN A COMMUNITY THAT WE COME BACK FIVE YEARS DOWN THE ROAD AND THEY ARE STILL TALKING ABOUT A PROJECT, I AM PROBABLY GOING TO CHANGE THE MAP THEN,” SAID FEDERAL EMERGENCY MANAGEMENT AGENCY’S (FEMA) DEPUTY ASSOCIATE ADMINISTRATOR FOR MITIGATION, ROY WRIGHT. (4/1/15)

• REMAP WOULD PLACE OVER 19,000 PROPERTIES INTO THE FLOODPLAIN INCLUDING MANY THAT THE COMP PLAN IS TEMPORARILY TRYING TO REMOVE.

• THE FM DIVERSION IS THE ONLY PLAN THAT REMOVES PROPERTY FROM THE 41’ FLOODPLAIN.
QUESTIONS