

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

Legend

Lift Stations

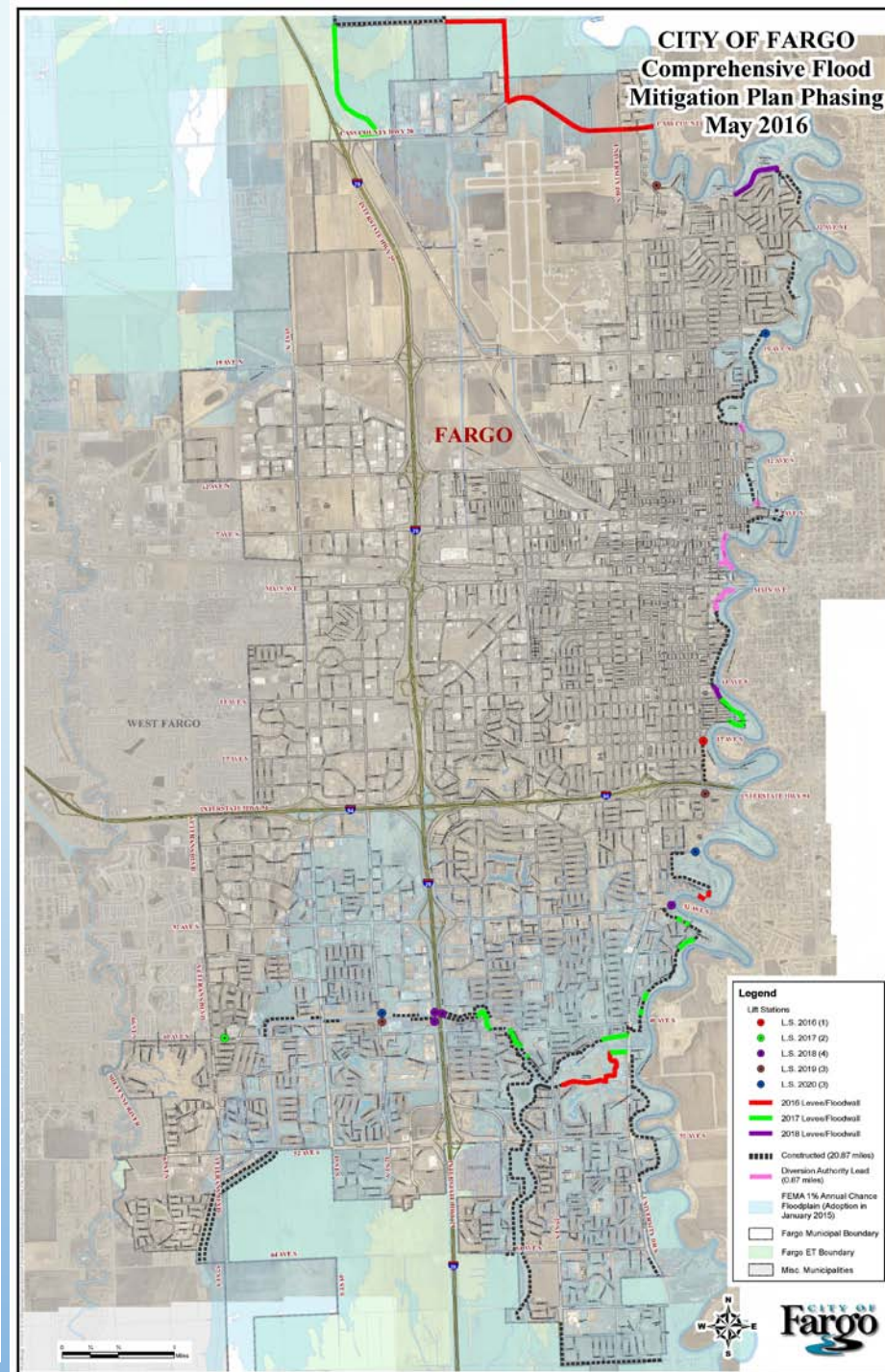
- L.S. 2016 (1)
- L.S. 2017 (2)
- L.S. 2018 (4)
- L.S. 2019 (3)
- L.S. 2020 (3)

- 2016 Levee/Floodwall
- 2017 Levee/Floodwall
- 2018 Levee/Floodwall

- Constructed (20.87 miles)
- Diversion Authority Lead (0.87 miles)

FEMA 1% Annual Chance Floodplain (Adoption in January 2015)

- Fargo Municipal Boundary
- Fargo ET Boundary
- Misc. Municipalities



CITY OF FARGO - COMPREHENSIVE FLOOD MITIGATION PLAN PHASING TIER 1 & 2
UPDATED 4/7/2016

2016

Reach		Location	Project Description	Construction Cost Estimate	10% Contingency	ROW Cost Estimate	Utilities	Agreements	Consultant Cost (15% of Const Cost)	E&A (16% of Construction Cost)	Project Cost Estimate
21	FM-15-B1	Rose Creek Golf Course Ph 1	Levee, Golf Course Restoration	\$2,478,197	\$247,820	\$0	\$520,000	\$497,000	\$607,900	\$396,512	\$4,747,428
xx	FM-15-A1	Southwood Ph 1 w/ Demo	Levee	\$357,000	\$35,700	\$385,000	\$450,000	\$0	\$0	\$57,120	\$1,284,820
xx	FM-16-A1	Northside Protection	Levee Ph 1 (east)	\$4,100,000	\$410,000	\$750,000	\$400,000	\$0	\$485,000	\$656,000	\$6,801,000
14	FM-15-J1	Belmont Addition - Ph 1	Lift Station	\$1,500,000	\$150,000	\$0	\$100,000	\$0	\$375,000	\$270,000	\$2,295,000
14	N/A	Belmont Addition (12 homes)	Home Acquisition	\$0	\$0	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000
18 & 19	N/A	Harwood, Hackberry, River Drives (13 homes)	Home Acquisition	\$0	\$0	\$14,446,000	\$0	\$0	\$0	\$0	\$14,446,000
21	N/A	Kinzler (1 Home)	Home Acquisition	\$0	\$0	\$850,000	\$0	\$0	\$0	\$0	\$850,000
23	N/A	Oakcreek & Copperfield	Home Acquisition	\$0	\$0	\$4,470,000	\$0	\$0	\$0	\$0	\$4,470,000
25 & 26	N/A	Prairie Rose Area & Mistwood Phase 3 (Remaining Areas)	Home Acquisition	\$0	\$0	\$1,250,000	\$0	\$0	\$0	\$0	\$1,250,000
20	N/A	Rosewood Addition (Remaining Areas)	Home Acquisition	\$0	\$0	\$1,930,000	\$0	\$0	\$0	\$0	\$1,930,000
23	HD-16-XX	Oakcreek & Copperfield (5 Homes)	Demolition	\$300,000	\$30,000	\$0	\$0	\$0	\$0	\$48,000	\$378,000
25 & 26	HD-16-XX	Prairie Rose Addition (4 Homes)	Demolition	\$200,000	\$20,000	\$0	\$0	\$0	\$0	\$32,000	\$252,000
21	HD-16-XX	Kinzler (1 Home)	Demolition	\$60,000	\$6,000	\$0	\$0	\$0	\$0	\$9,600	\$75,600
xx	FM-15-A2	Southwood Ph 2	Levee	\$327,000	\$32,700	\$0	\$0	\$0	\$0	\$52,320	\$412,020
20	HD-16-XX	Rosewood Addition (2 Homes)	Demolition	\$120,000	\$12,000	\$0	\$0	\$0	\$0	\$19,200	\$151,200
N/A		Non-Scheduled Buyouts	Home Acquisition	\$0	\$0	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000

2016 Project Cost Totals -- \$9,442,197 \$944,220 \$32,081,000 \$1,467,900 \$1,540,752 \$47,343,068

Reach		Location	Project Description	Construction Cost Estimate	10% Contingency	ROW Cost Estimate	Utilities	Agreements	Consultant Cost (15% of Const Cost)	E&A (16% of Construction Cost)	Project Cost Estimate
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2017

xx	FM-16-A2	Northside Protection	Levee (west) & L.S. PH (2 & 3)	\$4,300,000	\$430,000	\$500,000	\$200,000	\$0	\$725,000	\$688,000	\$6,843,000
18 & 19	HD-16-XX	Harwood/Hackberry/River Drives (13 Homes)	Demolition	\$780,000	\$78,000	\$0	\$0	\$0	\$0	\$124,800	\$982,800
20	FM-15-K1	Rosewood Addition (Remaining Areas)	Levee	\$3,000,000	\$300,000	\$0	\$20,000	\$0	\$366,035	\$480,000	\$4,166,035
25 & 26	FM-14-63	Prairie Rose Area & Mistwood Phase 3 (Remaining Areas)	Levee & Floodwall	\$1,200,000	\$120,000	\$0	\$0	\$0	\$200,000	\$192,000	\$1,712,000
23	FM-14-13	Oakcreek & Copperfield	Earth Levee, Gateways	\$1,000,000	\$100,000	\$0	\$0	\$0	\$180,000	\$160,000	\$1,440,000
21	FM-15-B2	Rose Creek Golf Course/Kinzler Area Ph 2	Levee/gateway	\$1,200,000	\$120,000	\$20,000	\$200,000	\$0	\$250,000	\$192,000	\$1,982,000
18 & 19	FM-15-F2	Harwood, Hackberry, River Drives (Remaining Areas)	Levee	\$1,500,000	\$150,000	\$0	\$0	\$0	\$285,000	\$240,000	\$2,175,000
14	HD-16-XX	Belmont Area (12 Homes)	Demolition	\$1,200,000	\$120,000	\$0	\$0	\$0	\$0	\$192,000	\$1,512,000
14	FM-15-J2	Belmont Addition Ph 2	Levee	\$2,700,000	\$270,000	\$0	\$300,000	\$0	\$575,000	\$486,000	\$4,031,000

2017 Project Cost Totals -- \$24,927,000 \$2,092,700 \$1,370,000 \$3,306,900 \$3,402,320 \$24,843,835

2018

N/A	FM-15-L1	Edgewood - Golf Course Ave	Levee & Floodwall	\$3,500,000	\$350,000	\$650,000	\$100,000	\$0	\$481,900	\$560,000	\$5,641,900
14	FM-15-J2	Belmont Addition Ph 3	Levee/Wall - Intake Modifications	\$3,000,000	\$300,000	\$0	\$300,000	\$0	\$600,000	\$540,000	\$4,440,000
N/A	NN-18-XX	Lift Station Improvements/Modifications	Lift Station/Levee	\$3,500,000	\$350,000	\$700,000	\$250,000	\$0	\$600,000	\$560,000	\$5,960,000
N/A	FM-18-XX	Lift Stations, Storm Sewer Improvements/Modifications	Various	\$2,000,000	\$0	\$0	\$0	\$0	\$0	\$0	\$2,000,000

2018 Project Cost Totals -- \$13,250,000 \$1,125,000 \$1,350,000 \$1,966,900 \$1,860,000 \$18,041,900

2019

N/A	NN-19-XX	Lift Stations Improvements/Modifications	Lift Station/Levee	\$3,500,000	\$350,000	\$700,000	\$250,000	\$0	\$600,000	\$560,000	\$5,960,000
N/A	FM-19-XX	Storm Sewer Improvements/Modifications/Studies	Various	\$2,000,000	\$0	\$0	\$0	\$0	\$0	\$0	\$2,000,000

2019 Project Cost Totals -- \$5,500,000 \$350,000 \$700,000 \$600,000 \$560,000 \$7,960,000

2020

N/A	NN-20-XX	Lift Stations Improvements/Modifications	Lift Station/Levee	\$3,500,000	\$350,000	\$700,000	\$250,000	\$0	\$600,000	\$560,000	\$5,960,000
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2020 Project Cost Totals -- \$3,500,000 \$350,000 \$700,000 \$600,000 \$560,000 \$5,960,000

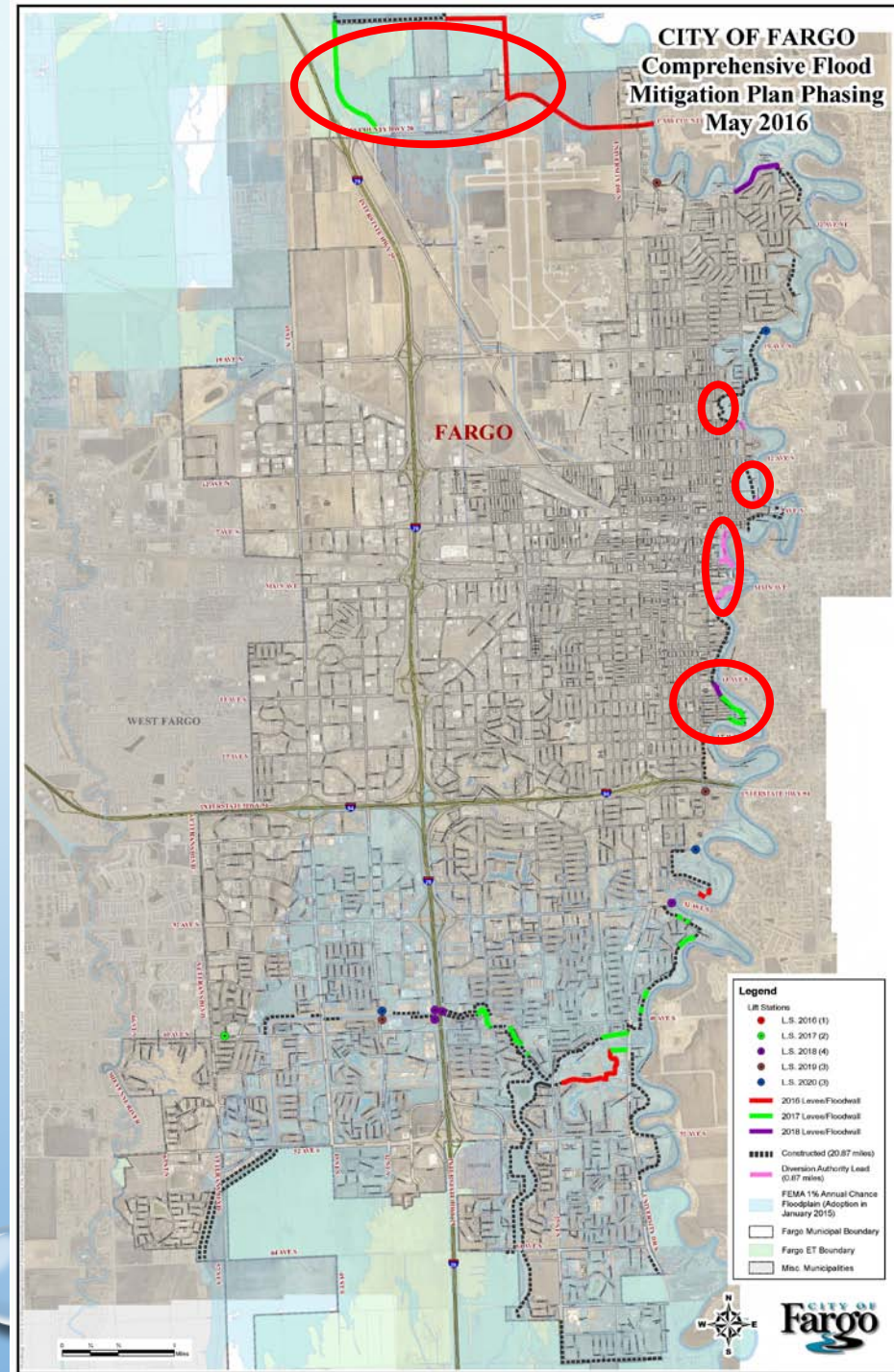
Tier 1 & 2 Needs

\$104,148,803

PHASING PLAN 2016-2020

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

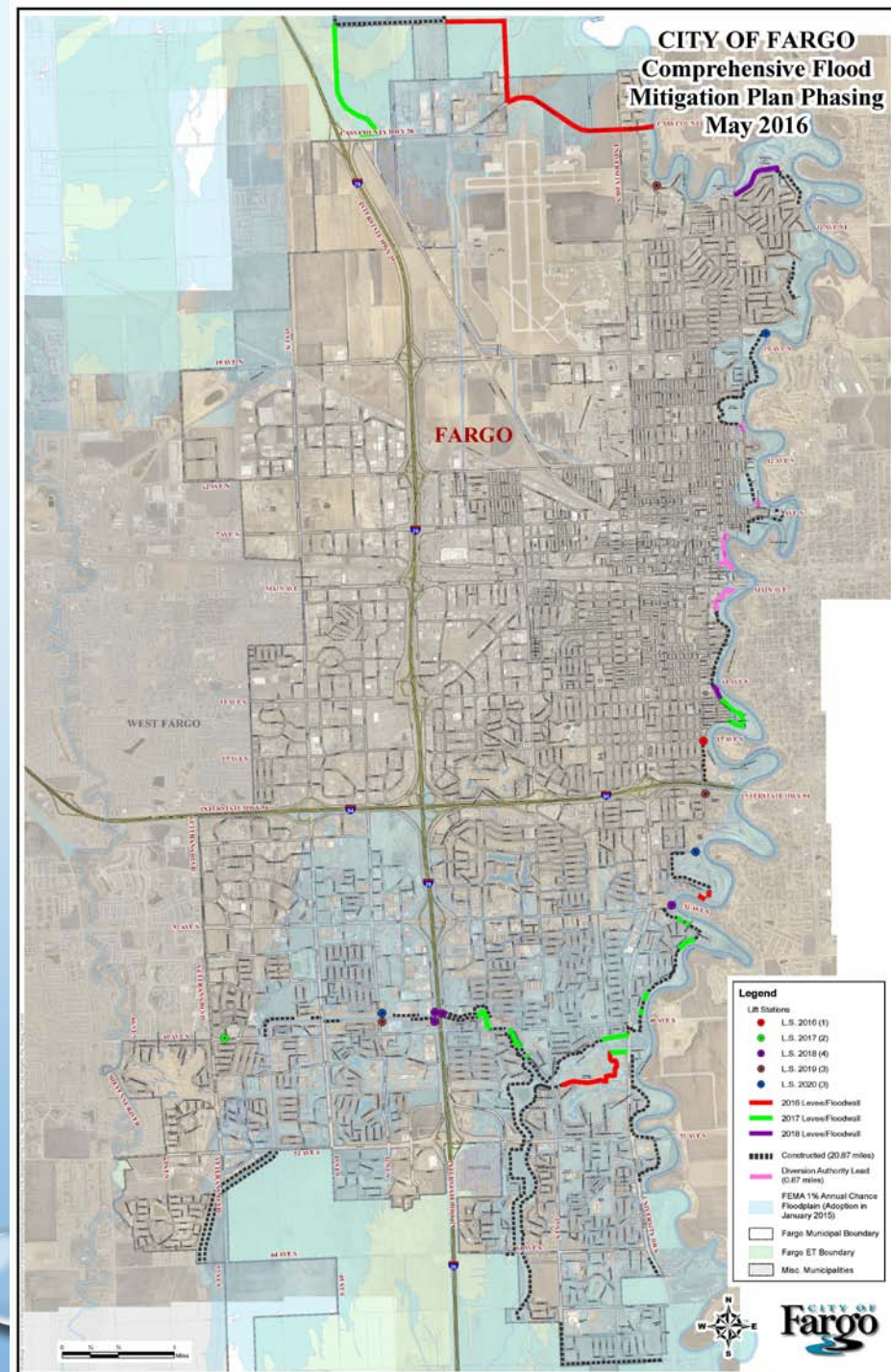
- EL ZAGAL –SHRINERS BUILDING & 6 HOMES ALONG OAK STREET
 - PROJECT COMPLETION – 2016, LOMR IN PLACE – END OF 2017
- MICKELSON – THIS WILL BE A COMBINATION OF APARTMENTS AND SINGLE FAMILY HOMES ALONG OAK STREET AND THE CONDOS AT THE END OF ELM STREET. TOTAL PRIMARY STRUCTURE COUNT 21.
 - PROJECT COMPLETION – 2016, LOMR IN PLACE – END OF 2017
- CASS COUNTY 20 AREA –SOUTH OF WASTEWATER LAGOONS BETWEEN 25TH ST N & 129.
 - 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:

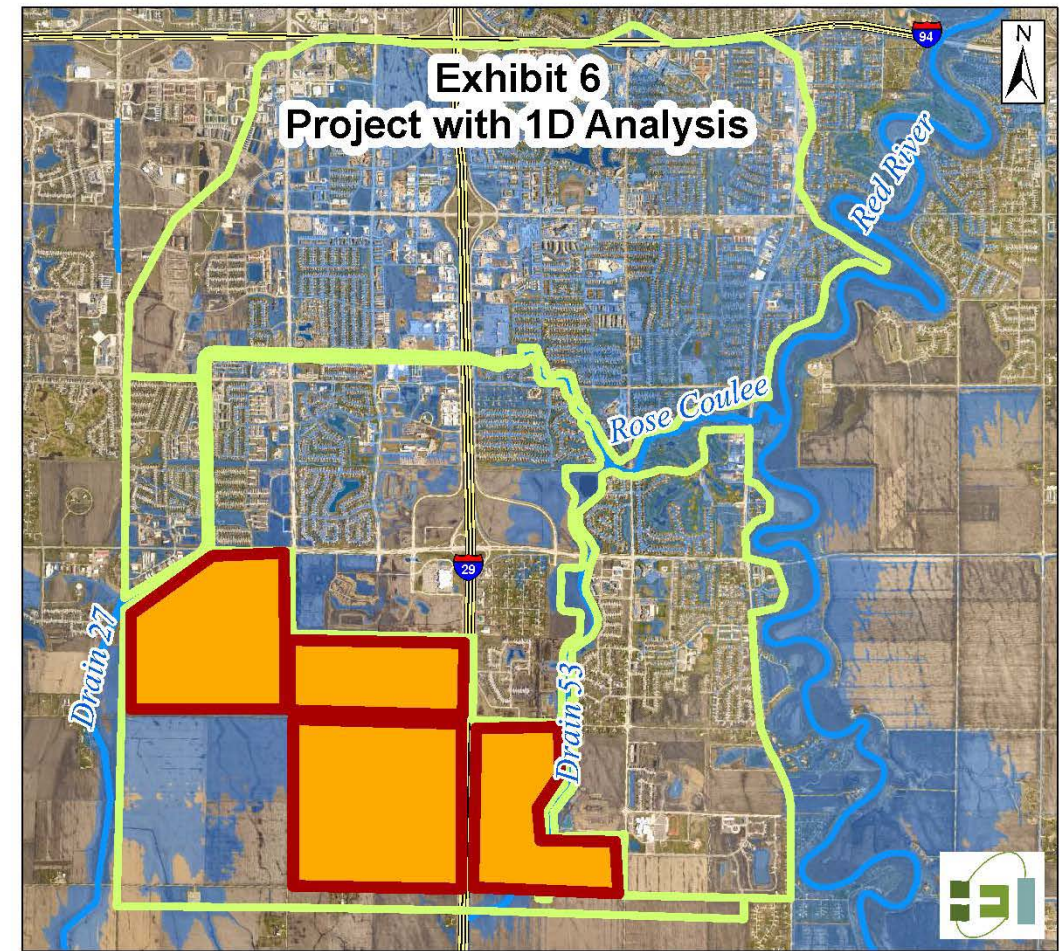
**MOVE TO APPROVE THE IMPLEMENTATION OF THE 5-YEAR PRIORITIZED
COMPREHENSIVE PLAN AND DIRECT STAFF TO CONTINUE TO PURSUE ALL
NECESSARY PROPERTY THROUGH APPRAISALS AND NEGOTIATIONS.**



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



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

Construction =	\$150M
Land =	\$30M
Total =	\$180M

Previous
Evaluation

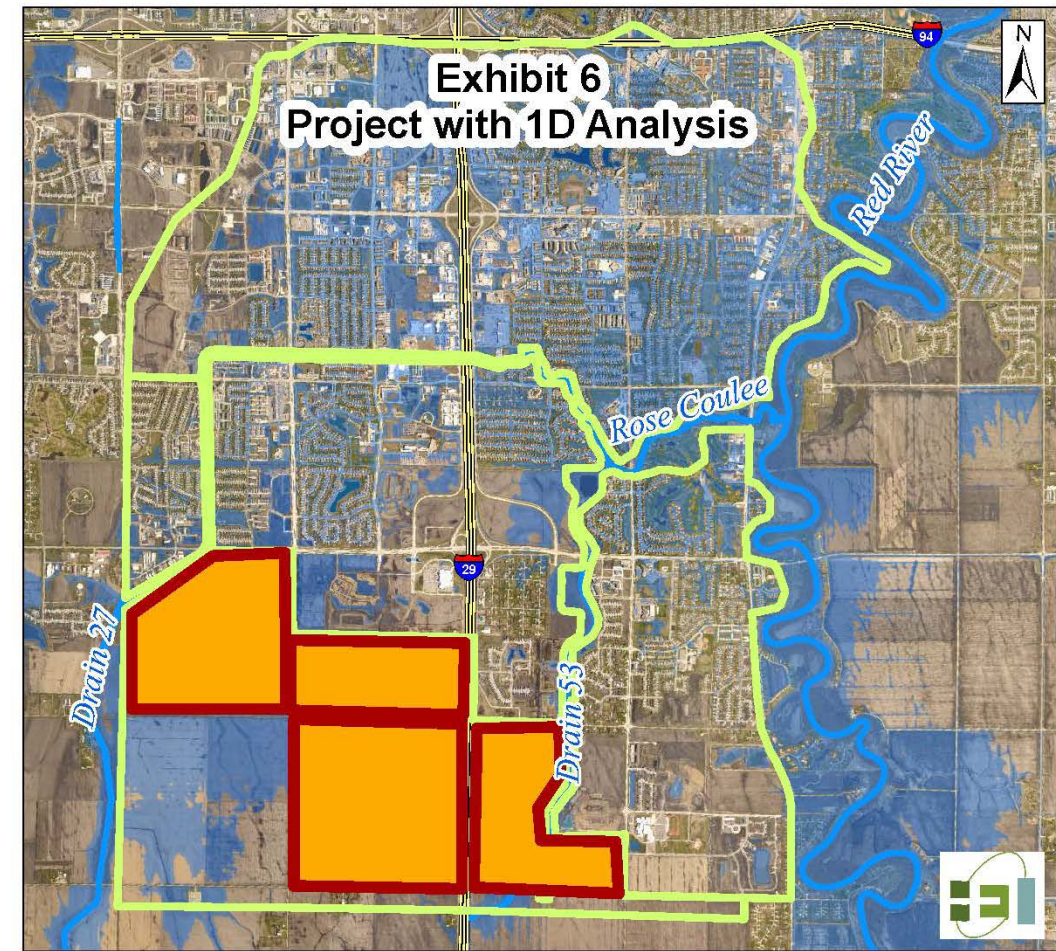
PHASING PLAN 2016-2020

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.



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

Construction = \$150M
Land = \$30M
Total = \$180M

Previous
Evaluation

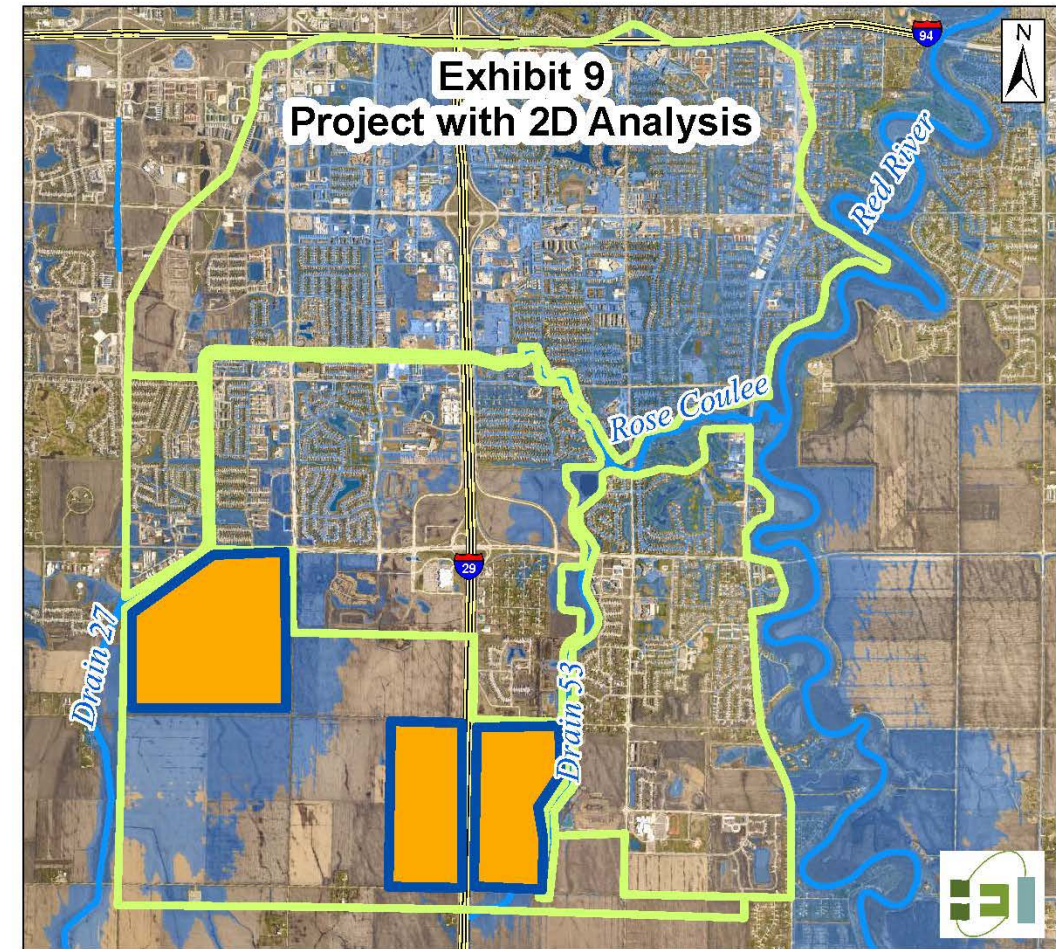
PHASING PLAN 2016-2020

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



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

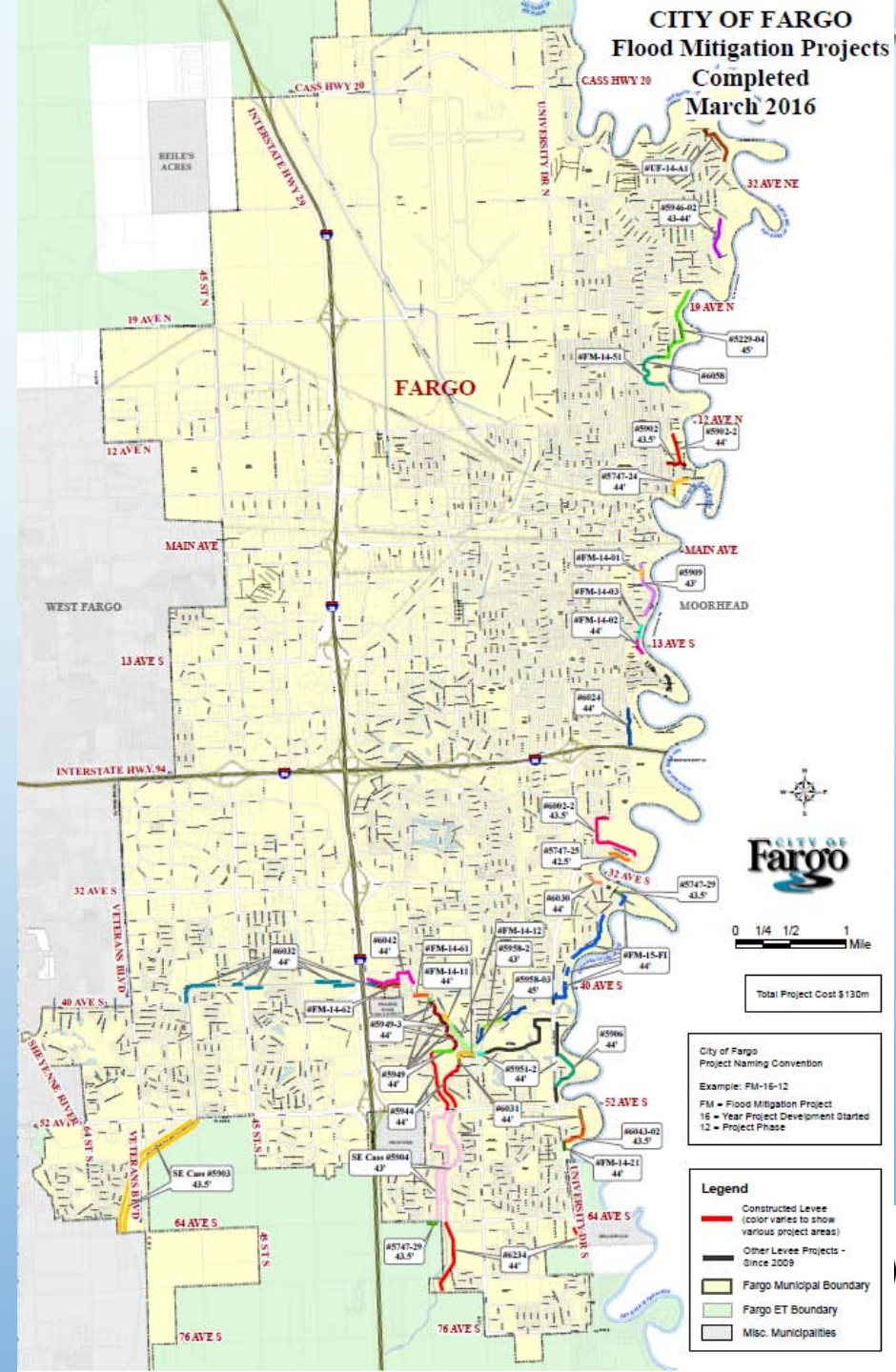
Construction =	\$100M
Land =	\$16M
Total =	\$116M

**Current
Evaluation**

APRIL 11 PRESENTATION FOLLOWS

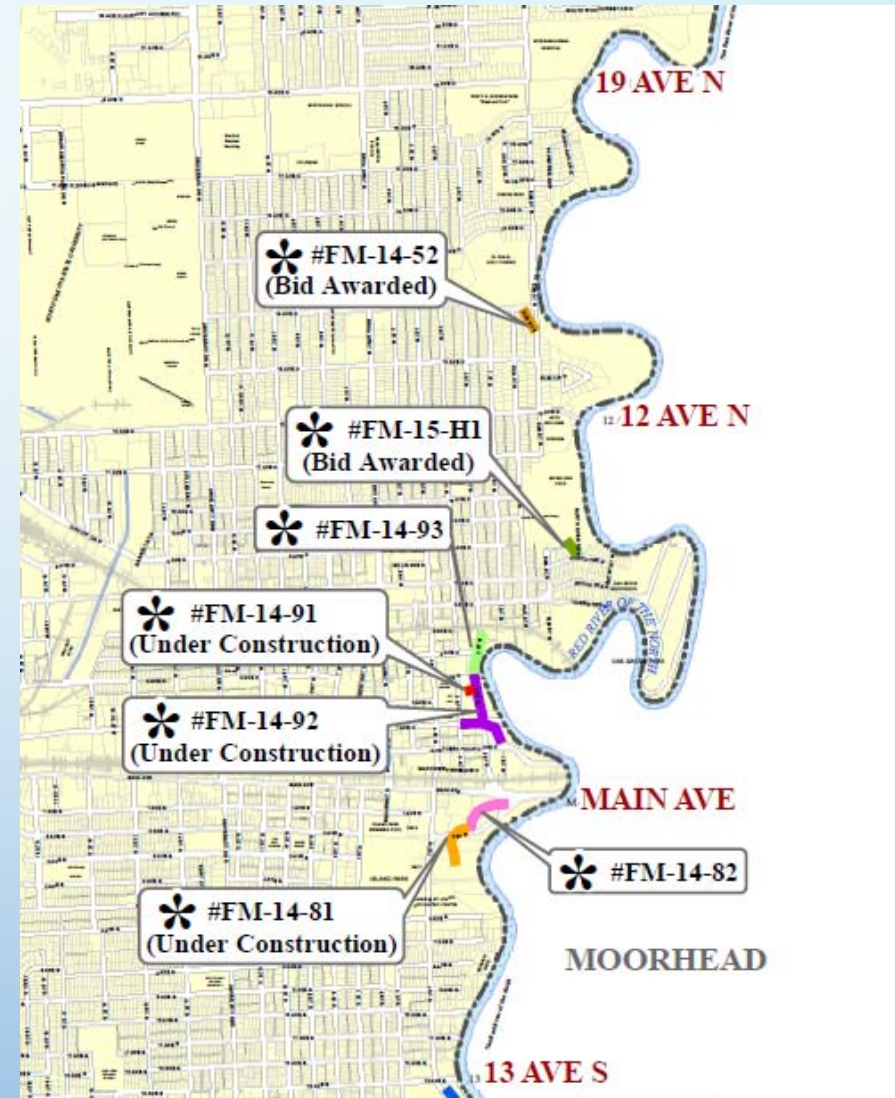
COMPLETED PROJECTS (SINCE 2009)

- OVER 18 MILES CONSTRUCTED
- *47 MILES OF EMERGENCY LEVEES CONSTRUCTED BY THE CITY IN 2009
- 187 BUYOUTS \approx \$60M
- PROJECT COST \approx \$130M
- REDUCES REQUIRED SANDBAGS FOR A 2009 EVENT BY APPROXIMATELY 4.5 MILLION
- 50% OF THE COMPREHENSIVE PLAN COMPLETED



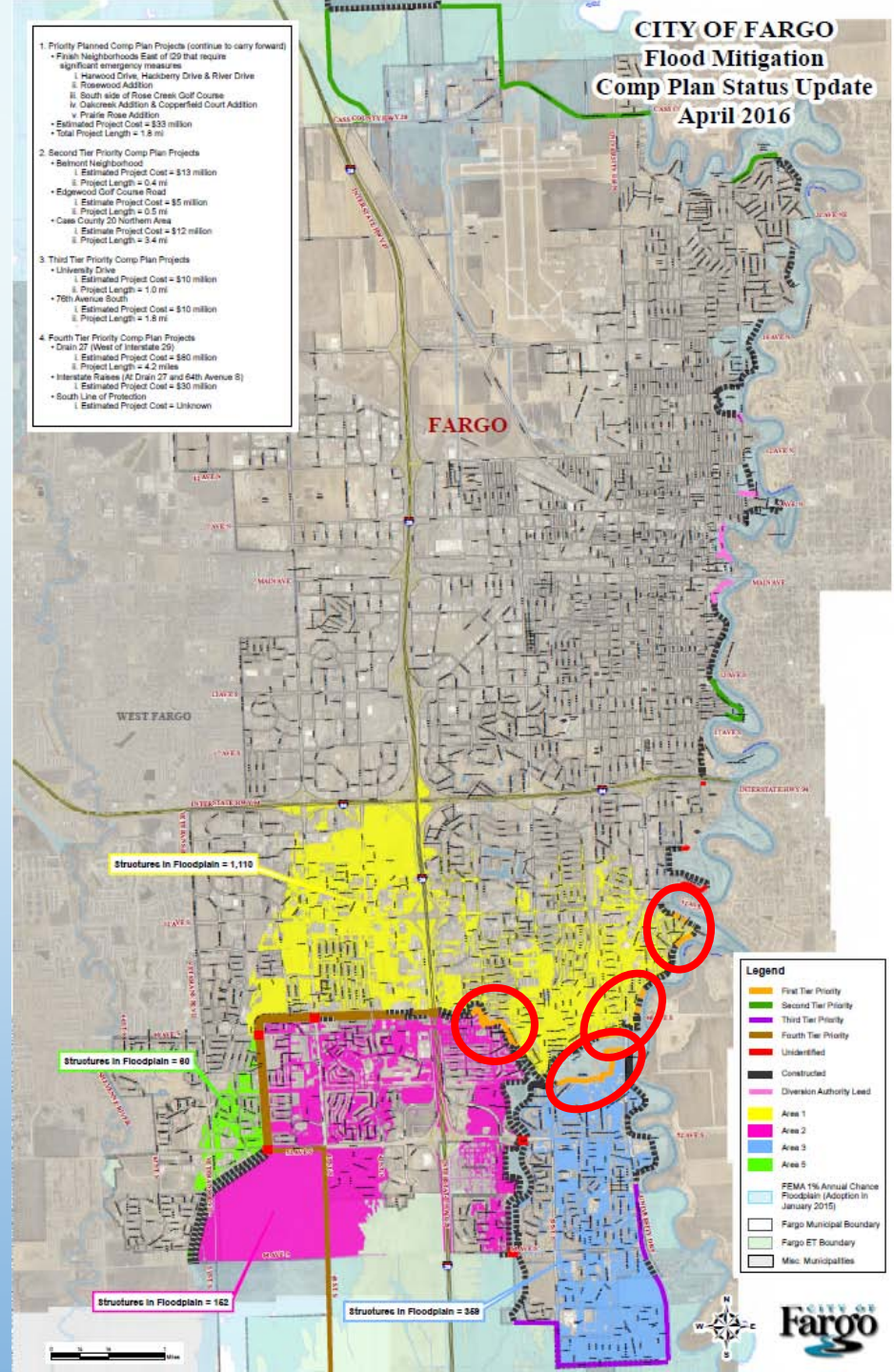
IN-TOWN DIVERSION AUTHORITY PROJECTS

- 9 PROJECTS UNDER CONSTRUCTION FOR 2016
- TOTAL LENGTH APPROXIMATELY 0.8 MILES
- CONSTRUCTION COST \approx \$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 \approx \$33M
- TOTAL LENGTH \approx 1.8 MILES



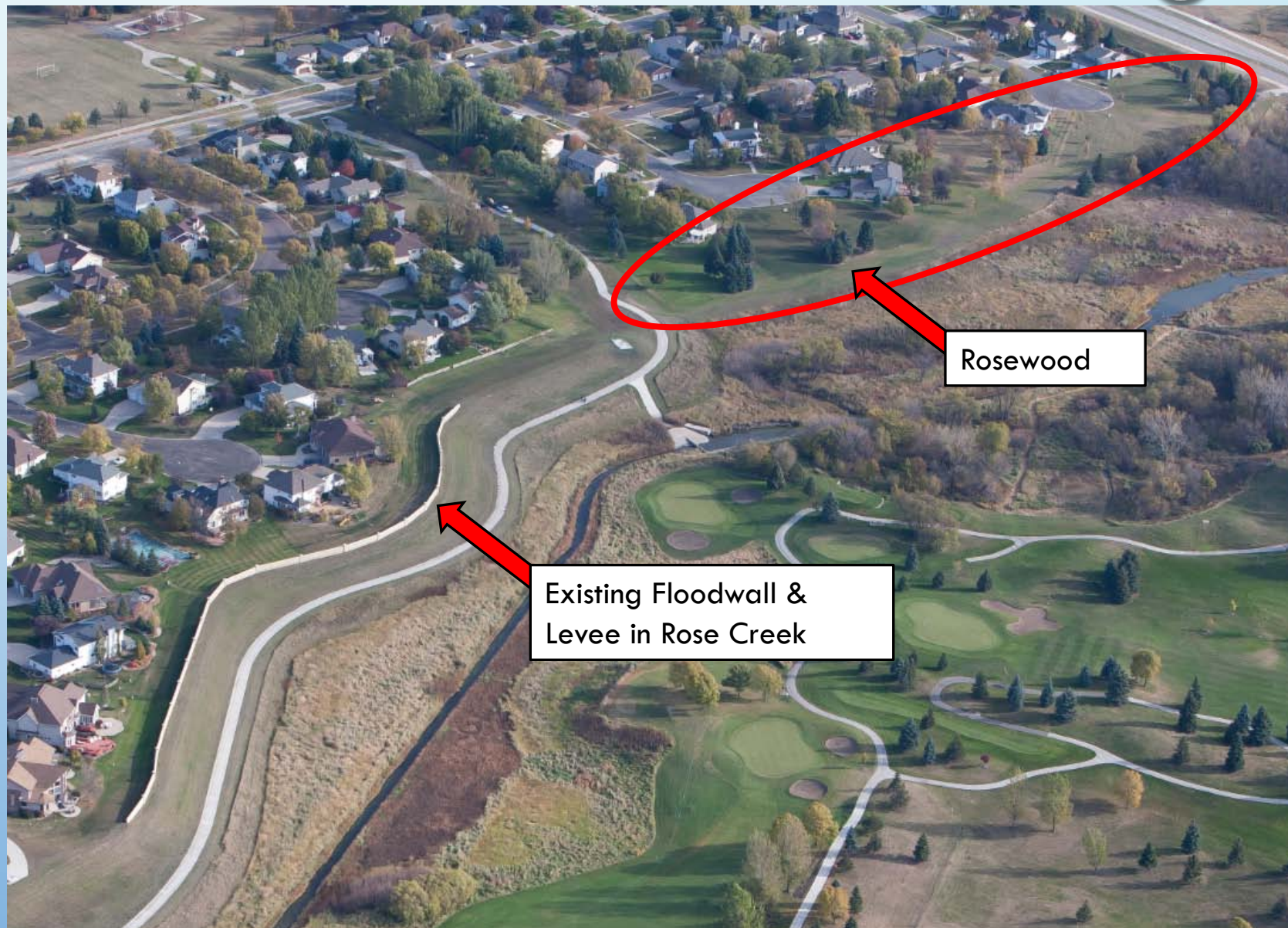
TIER 1 PLANNED COMP PLAN PROJECTS

Harwood, Hackberry &
River Drives



TIER 1 PLANNED COMP PLAN PROJECTS

Rosewood

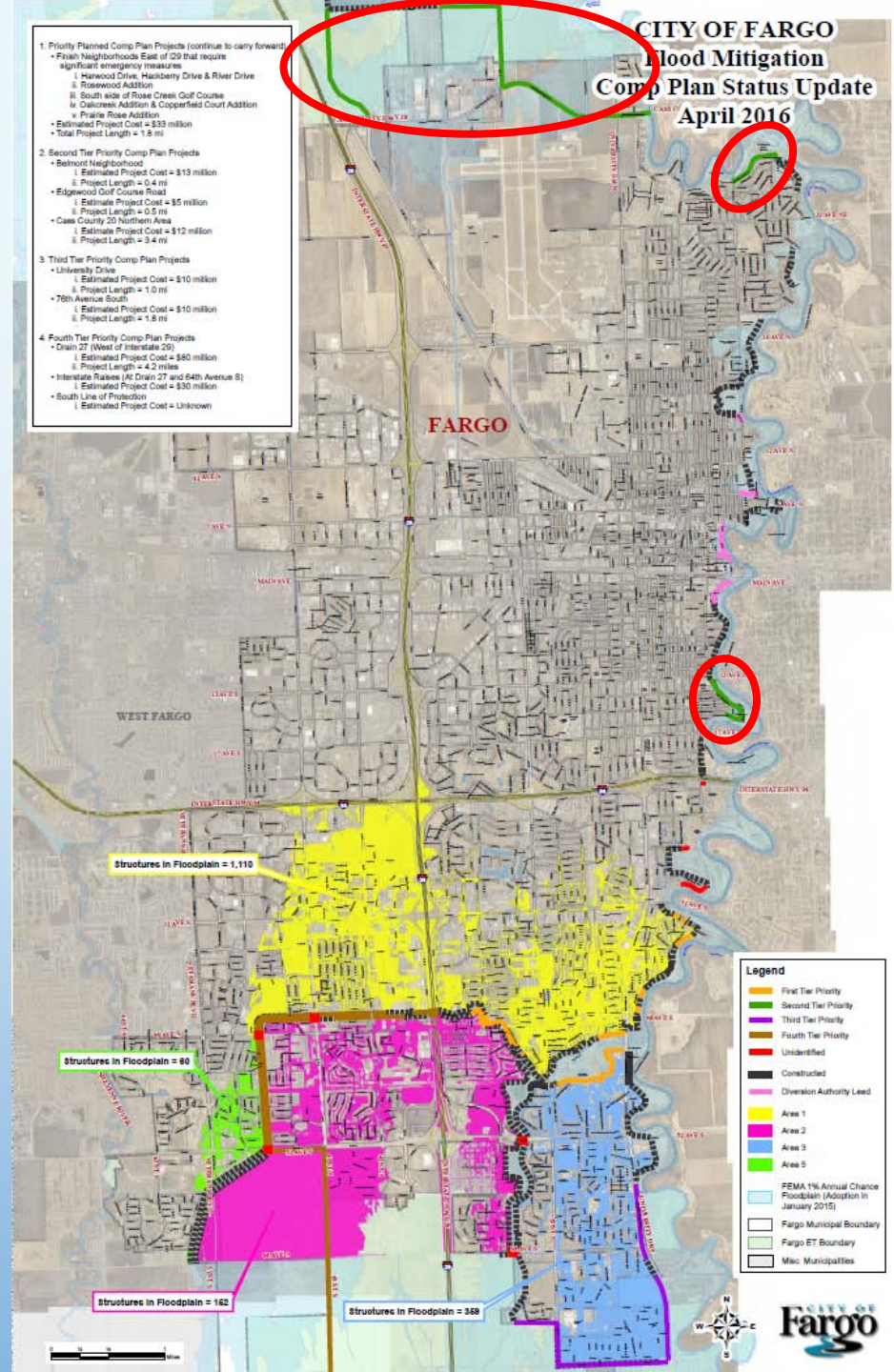


Rosewood

Existing Floodwall &
Levee in Rose Creek

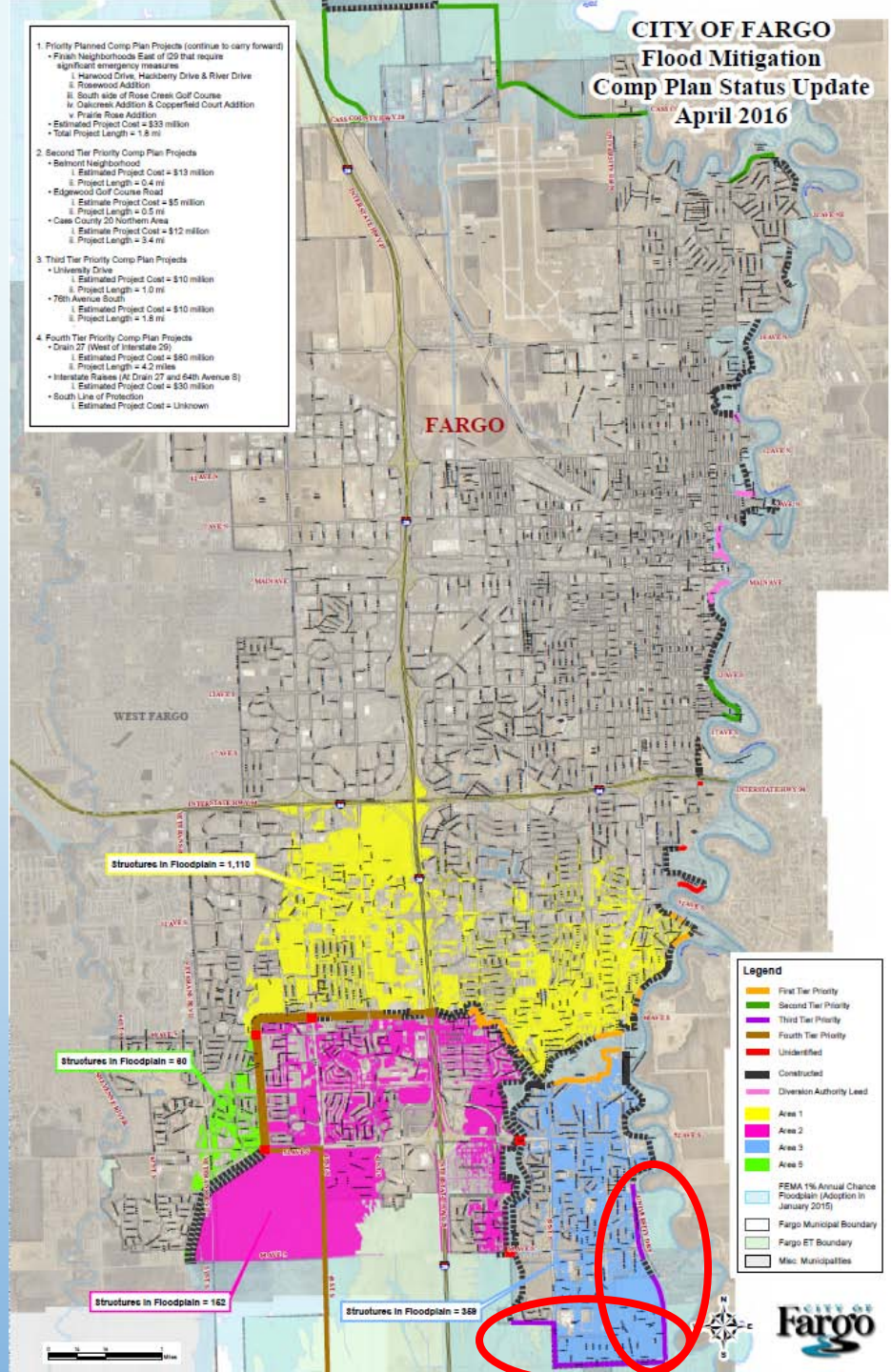
2ND TIER PRIORITY COMP PLAN PROJECTS

- 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



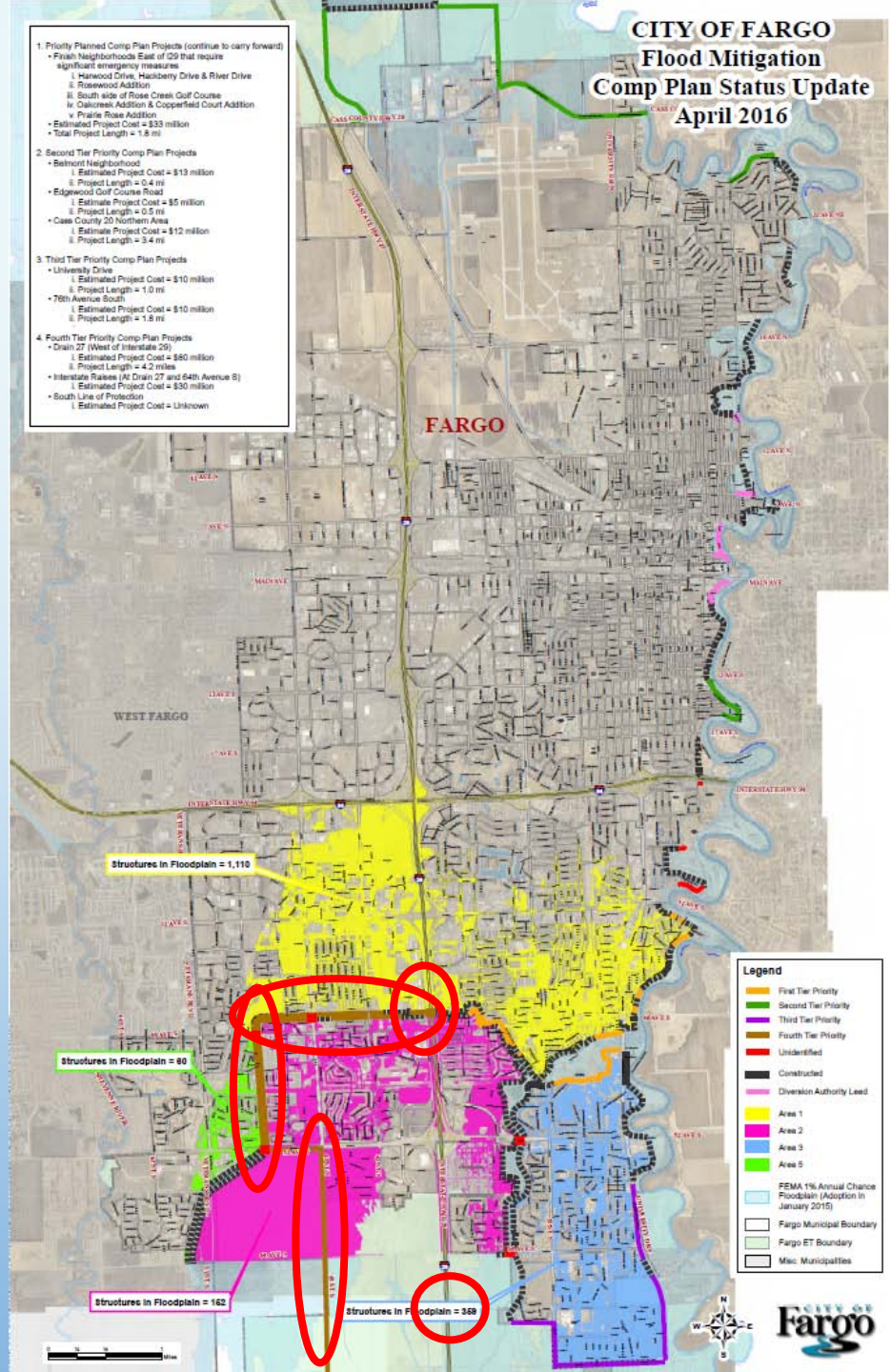
3RD TIER PRIORITY COMP PLAN PROJECTS

- UNIVERSITY DRIVE
 - EST. PROJECT COST ≈ \$10M
 - LENGTH ≈ 1.0 MILES
 - SCHEDULED FOR 2017
- 76TH AVE. S (E OF DRAIN 53)
 - EST. PROJECT COST ≈ \$10M
 - LENGTH ≈ 1.8 MILES
 - UNSCHEDULED



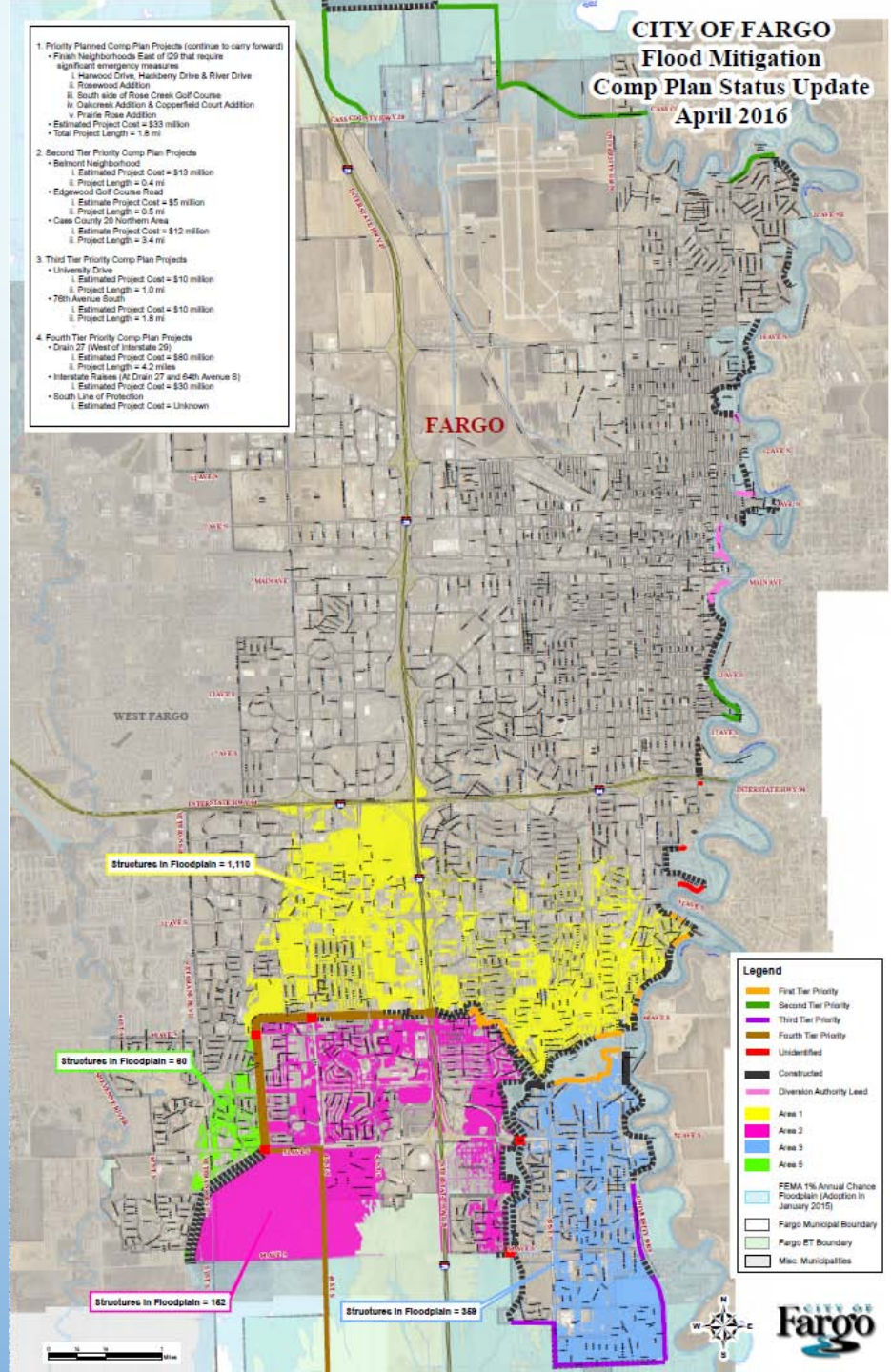
4TH TIER PRIORITY COMP PLAN PROJECTS

- 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 ≈ ??




SUMMARY

- 1ST TIER PROJECTS
 - EST. PROJECT COST \approx \$33M
 - ABLE TO PERMIT
- 2ND TIER PROJECTS
 - EST. PROJECT COST \approx \$71M
 - POTENTIALLY ABLE TO PERMIT
- 3RD TIER PROJECTS
 - EST. PROJECT COST \approx \$20M
 - MITIGATION TO PERMIT
- 4TH TIER PROJECTS
 - EST. PROJECT COST \approx \$80 M
 - SOUTH LINE COST – UNKNOWN
 - MITIGATION TO PERMIT



ND LEVEE CONSTRUCTION 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.

 **APPLICATION/NOTIFICATION TO CONSTRUCT OR MODIFY A DAM, DIKE, RING DIKE OR OTHER WATER RESOURCE FACILITY**
OFFICE OF THE STATE ENGINEER
REGULATORY DIVISION
SPN 51695 (2/15)

STATE WATER COMMISSION
USE ONLY

No. _____
(SWC USE ONLY)

I, the undersigned, do hereby submit the following information to the Office of the State Engineer for determination and use as a filing of information required under North Dakota Century Code §61-04-02 or as an application to construct or modify a facility under North Dakota Century Code §61-16.1-38.

A. General Information
This Application/Notification Must Include A Map From An Actual Survey, Aerial Photo Or Topographic Map. The Size Of The Map Shall Be 8 1/2" By 11 Inches. The Map Shall Have A North Arrow And Approximate Scale. If, In The Opinion Of The State Engineer, The Map Does Not Contain Information To Properly Evaluate The Project, It Will Be Returned.

The Proposed Facility Is A

<input type="checkbox"/> Dam (Complete Sections A, C & F)	<input type="checkbox"/> Pond, Lagoon, or Dugout (Complete Sections A, B & F)
<input type="checkbox"/> Dike (Complete Sections A, D & F)	<input type="checkbox"/> Diversion Ditch (Complete Sections A, B & F)
<input type="checkbox"/> Ring Dike (Complete Sections A, D & F)	<input type="checkbox"/> Other (Complete Sections A, B & F)
<input type="checkbox"/> Wetland Restoration (Complete Sections A, C, E & F)	

Is This Application/Notification For Modification Of An Existing Structure? ☐ Yes ☐ No

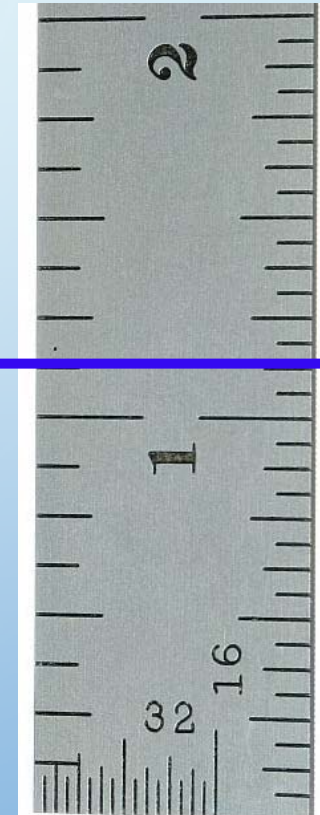
If So, What Year Was Existing Structure Constructed? _____ By Whom? _____

Project Will Be Located In Which Water Resource District _____

Legal Description	1/4	1/4	Section	Township	Range
(Optional) Latitude	Longitude				

Waterway On Which Project Will Be Located _____

0.1 ft = 1.2 inches



IMPACTS – AREAS 1 - 4

Impacts from Current Flood Protection

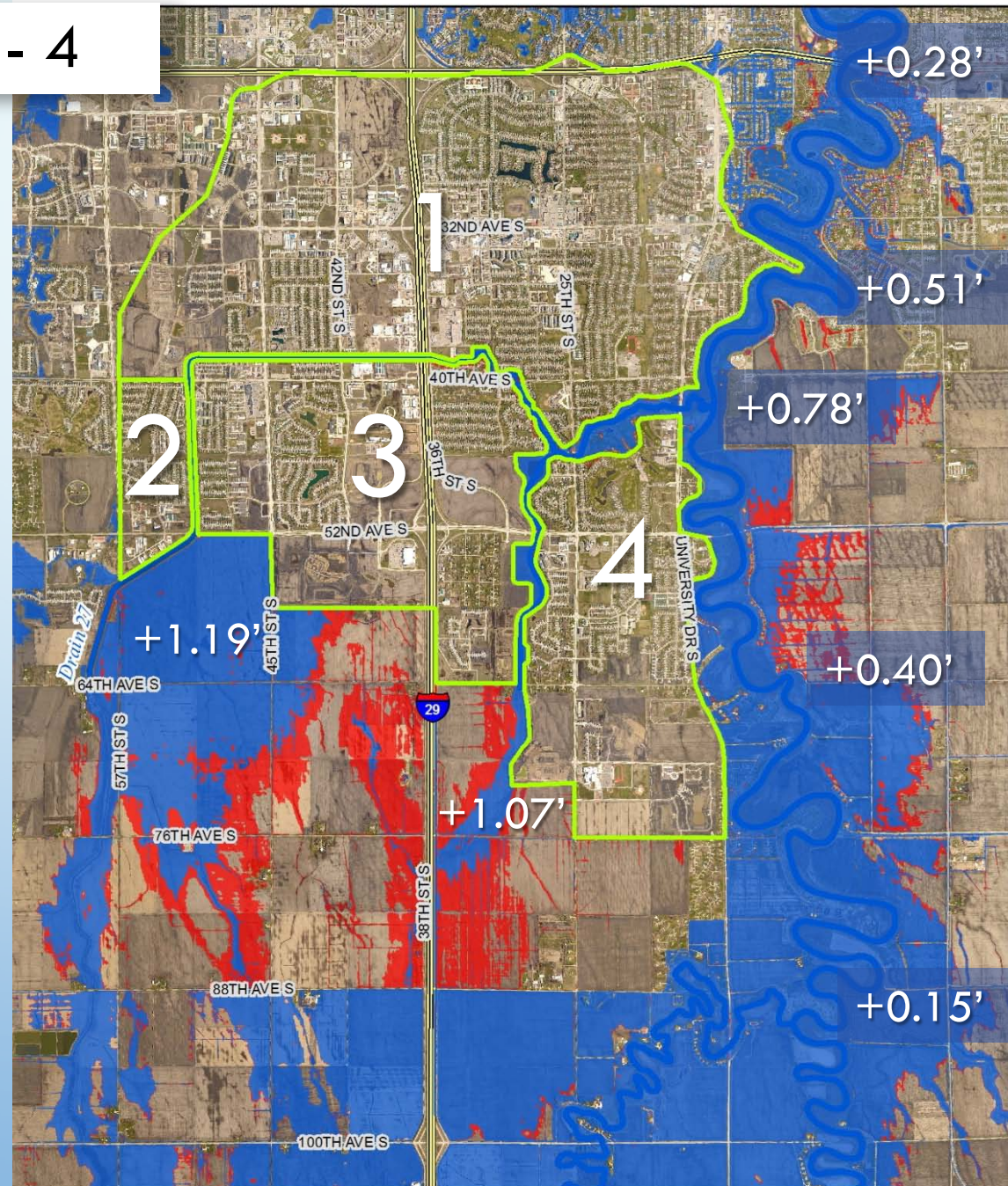
Area 1 = 3,100 ac-ft

Area 2 = 100 ac-ft

Area 3 = 1,000 ac-ft

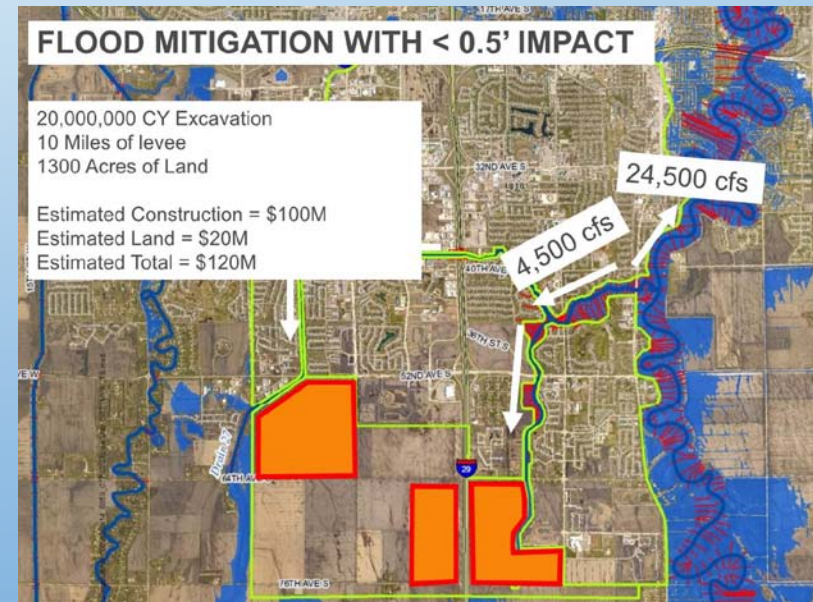
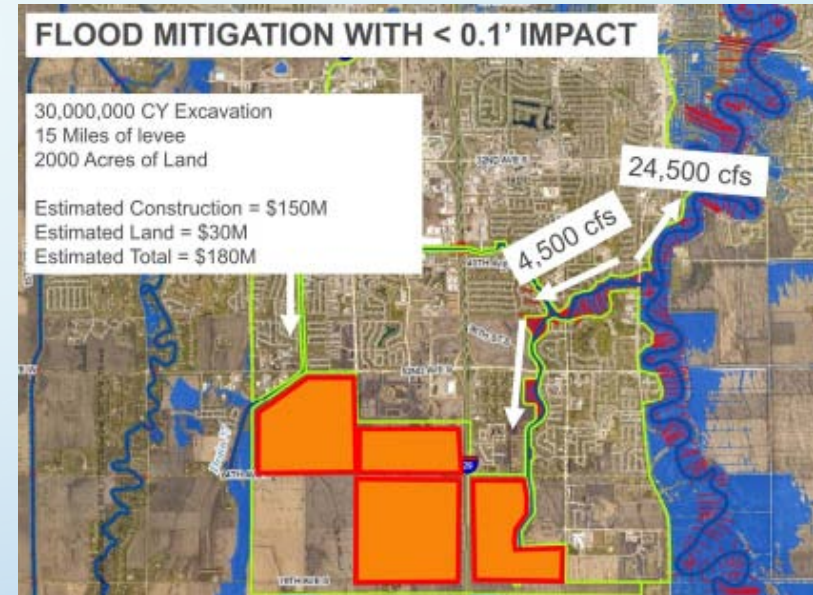
Area 4 = 800 ac-ft

Total = 5,000 ac-ft



MITIGATION/EASEMENT

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- 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