

Royal Oaks Neighborhood Meeting Project #FM-19-B January 16, 2020 5:30 PM

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### <u>Overview</u>

- Fargo-Moorhead Diversion Project Update
- In-Town Projects
- Royal Oaks Neighborhood
- Project Timeline
- Property Owner Comment
- Questions



# **FM Diversion**



# **Diversion Project** "Plan B"

- 100-year Flood Protection Minimum
  - Some features designed to PMF (Probable Maximum Flood) as required by State and Federal Dam Safety Requirements
- Diversion Channel
- Southern Embankment and Control Structures
- Temporary Staging of Flood Waters Upstream to Prevent Downstream Impacts
- In-town Levees
  - Additional levees needed to safely pass RS 37-feet during 100yr flood.



#### **Existing Conditions**

 100-year floodplain shown in blue



### With Project

- 100-year floodplain with project shown in blue
- Project also gives the ability to defend against a 500-year flood
  - Would require 18-20 miles of temporary clay and sandbag levees



# **In-Town Projects**

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## PROJECTS COMPLETED SINCE 2009

- Constructed over 22 miles
  - \*47 miles of emergency levees constructed by the City in 2009
- Project Cost ≈ \$295 million
- Reduces required sandbags by approximately 5 million
  - Needed over 6 million in 2009
- All completed projects are built to proper elevations to accommodate Plan B's proposed 37' flow thru town



## PROJECT ACQUISITIONS SINCE 2009

- 247 Properties Purchased
  - Over 380 since 1990
- At cost of over \$100 million
- Approximately 90 private property easements purchased



#### **REMAINING PROJECTS**

- 2016 Revised Comprehensive Plan Projects
  - Harwood, Hackberry & River Drives
    - 3 Acquisitions Remain
    - Levee Construction
  - Belmont Park
    - 3 Acquisitions Remain
    - Levee & Floodwall Construction
    - Water Intake Building Modifications
  - Drain 10/Airport Area
    - Levee Construction
    - Storm Sewer Lift Station Replacement
  - Storm Sewer Lift Stations Improvements







#### **REMAINING PROJECTS**

- Plan B Additional In-Town Projects
  - Riverwood Addition
    - Potential Acquisitions
    - Levee Construction
    - Storm Sewer Lift Station Replacement
  - Royal Oaks
    - Potential Acquisitions
    - Levee Construction
  - Woodcrest
    - Potential Acquisitions
    - Levee Construction
    - Storm Sewer Lift Station Replacement
  - Elm Circle
    - Potential Acquisitions
    - Levee Construction
  - Oak Grove
    - Potential Acquisitions
    - Levee Construction
  - Storm Sewer Lift Stations Improvements











# Royal Oaks



#### PLAN B - RIVER STAGE 37 FEET



#### **PROJECT OVERVIEW**



#### SOIL BORINGS



# SOIL BORING LOGS

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Geotechnical Evaluation FM-19-BO - Royal Oaks Royal Oaks Drive North					LOCATION: See attached sketch					Geotechnical Evaluation FM-19-BO - Royal Oaks Royal Oaks Drive North								LOCATION:	LOCATION: See attached sketch				
Fargo, North Dakota						LATITUDE: 46.92736			LONGITUDE: -96.78742		Fargo, North Dakota			kota	ota			LATITUDE:	46.	92736	LONGITUDE:	-96.78742	
DRILLER: K. Miller LOGGED BY: C. Lindeman						START DATE: 06/14/19		END DATE: 06/14/19		DRILLER:		К.	Miller	LOGGED B	Y:	C. Lindem	an	START DAT	E: (	06/14/19	END DATE:	06/14/19	
SURFACE ELEVATION:	896.	4 ft RIG	G: 7512	METHOD: 3 1	/4" HSA	SURFACING	G:	Grass	WEATHER:	Partly cloudy	SURFACE ELEVATION:	8	96.4 ft	RIG:	7512	METHOD	0: 3 1/4	" HSA	SURFACING	3:	Grass	WEATHER:	Partly cloudy
Elev./ Depth ft	Level	(Soil-AS	Description of Ma STM D2488 or 2487; 1110-1-2908	aterials Rock-USACE EM 3)	Sample	Blows (N-Value) Recovery	q <sub>p</sub> tsf	MC %	Tests or	Remarks	Elev./ Depth ft	Water Level	(	C Soil-ASTM	Description of D2488 or 248 1110-1-29	Materials 7; Rock-US 908)	SACE EM	Sample	Blows (N-Value) Recovery	q <sub>₽</sub> tsf	MC %	Tests or F	Remarks
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- 892.4 4.0 - 890.9		ORGAN TOPSO	IIC CLAY (OL), black IL)	, moist (BURIED	5-7	(8) 14" 3-5-8	35	33					$\langle \rangle$					35	(2) 18"	<0.5	71	DD=57 pcf WD=98 pcf	
- 5.5		FAT CL/ gray, mo	AY (CH), with Silt lens bist, stiff to medium ( <i>i</i>	ses, brown and ALLUVIUM)		(13) 10" 2-3-5	1.5	34					$\langle \rangle$						(1) 18"	<0.5	70		
-					10-7	(8) 16" 2-3-3	2.5	35										40-X	(1) 18"	<0.52	78		
-						(6) 16" 1-3-4 (7)	2.5	38	DD=81 pcf				$\langle \rangle$					45	0-0-2				
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-						18" TW 23"		39	LL=76, PL=27	7, PI=49			$\langle \rangle$						0-0-2				
_ 18.5 -		SILT (M moist, lo	L), with Clay lenses, bose (ALLUVIUM)	brown and gray,	20-	1-2-2 (4)		33	DD=79 pcf WD=110 pcf		- 845.4 - 51.0	//	///		END OF B	ORING			(2) 18"	0.5	64	Water not obse 49.5 feet of too ground at end	erved with bling in the of drilling.
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871 9					_	18"												_					
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1905389				Braun Interteo	Corporation				ST-0	01 page 1 of 2	B1905389					В	raun Intertec C	orporation				$\leq$	

#### **SLOPE STABILITY ANALYSIS**

FM-19-B0 Royal Oaks (5+75 Cross Section) Braun Project No. B1905389 Fargo, North Dakota

Flood/Drawdown Conditions Stability (Effective Stress Analysis)



B1 - Flood/Drawdown Conditions Stability (Long-Term) B1905389 - Royal Oaks (5+75)\_including ST-03.gsz 01/15/2020

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#### SLOPE STABILITY ANALYSIS

Factor of Safety Results Table FM-19-BO - Royal Oaks

BRAUN	Sta 5+75 Existing C	Sta 5+75 Slope List	DHS-FEMA Minimum P.	requirement
End of Construction	1.5	1.6	1.3	
Long Term, Steady-State, No Flood*	1.2	1.3	1.2	
Flood Stage, Steady-State	1.5	1.5	1.4	
Drawdown	0.9	1.0	1.0-1.2	

\*Back Analysis conducted, residual parameters used



### **CROSS-SECTIONS**



#### NORTHEAST SECTION





### **CROSS-SECTIONS**



#### SOUTHEAST SECTION





# Path Forward

THE WILL AND MARKEN



#### **PROJECT TIMELINE**

- Soil Borings and Geotechnical Analysis Completed
- Preliminary Project Design Completed
- Public Informational Meeting (tonight)
- City Commission Informational Meeting (January 27, 2020 @ 12:00pm)
- Present to City Commission for Alignment Approval (February 2020)
- Acquisition (Winter/Spring 2020)
- Final Project Design (Winter/Spring 2020)
- ND State Water Commission Review (Spring/Summer 2020)
- Bidding of Construction Project (TBD)
- Anticipated Construction Begins (TBD)
- Substantial Construction Completion (TBD)
- Final Construction Completion (TBD)

# Questions

THE MANY





#### STANDARD LEVEE EXAMPLE



#### STANDARD LEVEE ALLOWABLE USE





# FM Diversion Project Status

- 2019-2021 Biennium Goals
  - Continue USACE construction and design (dark blue)
  - Continue Plan B In-Town flood protection
  - Acquire all lands for Diversion Channel by Spring-2020
  - Bid the P3 and lock-in the costs
  - Pursue and obtain long-term loans
  - Prepare funding request for 2021 legislative session



# Do you plan for past or future



Source: USGS river flow data from USGS Station

# Understanding the flood threat





# By the numbers: Flood Insurance

# **11,000** homes

impacted by future FEMA floodplain **\$3,000-**<br/>**\$5,000**<br/>per family

**~\$30** to **\$50** million

Average annual flood insurance premium per home

In total, annual flood insurance premiums

### More than 100-Year Protection Needed!

Red River Basin Commission Long-term Flood Solution Confirm

- 500-year protection recommended for large metro areas
- Only Winnipeg meets this recommendation
  - Red River Floodway
- Bigger floods have happened
  - Minot, Grand Forks
- FM Area Diversion Project provides
  - 100-year protection
  - Ability to fight larger floods



# **Evolution of Plan B**



#### September 2017

• Gov. Burgum and Gov. Dayton meet in Moorhead to discuss the flood protection



# Governor's Task force assembled

- Five meetings between Oct. and Dec. 2017
- Wide geographic representation

## **Technical Advisory Group**

- Diversion Authority, MDNR, USACE, and R/W JPA engineer
- Further analysis and iteration of unresolved issues from the Task Force

# **Policy Group**

- Leadership from the USACE, MDNR, Diversion Authority, and R/W JPA
- Held four meetings

# Task Force Consensus

- Utilize full Period of Record hydrology
  - 100-yr flood = 33,000 CFS
- Allow control of flood water flows through town to 37-feet during a 100-yr flood event
- New Western Tie-back Levee alignment in North Dakota
- Add an Eastern Tie-back Levee alignment in Minnesota
- Distributed storage is valuable for long-term risk management; however, it is not a component of the near-term Project that needs to provide 100-year flood protection for the F-M Metro