

# JEFFERSON COUNTY DRAINAGE DISTRICT NO. 6

## “CONCRETE CHANNELS CONDITION ASSESMENT”



NOVEMBER 10, 2020

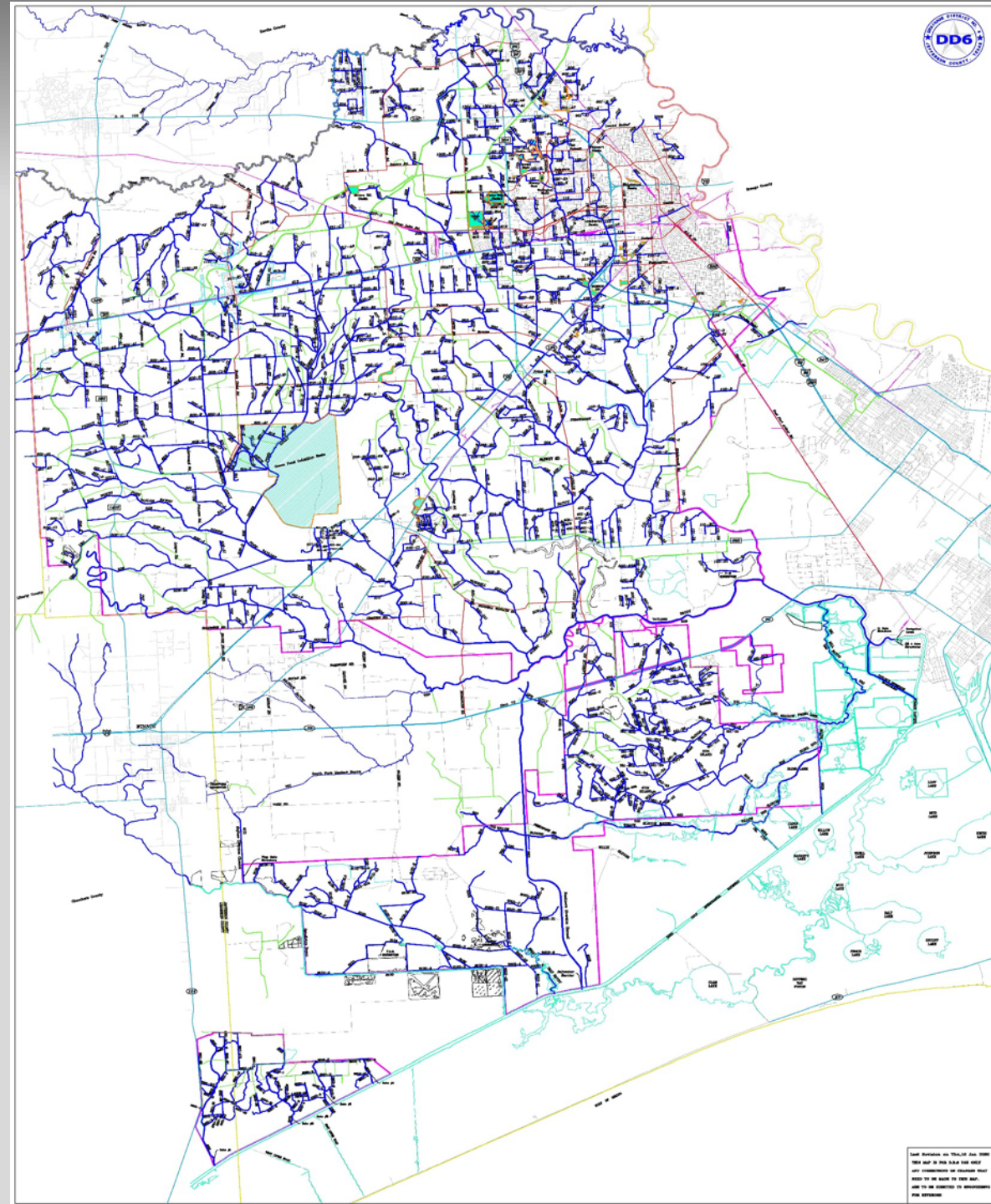


PRESENTED BY: *CHACE MANN*  
PROJECT MANAGER



# ASSETS

- 1,070 MILES OF NUMBERED CHANNELS
  - 696 MILES CURRENT/EXISTING ROW (65%)
  - 374 MILES FUTURE ROW (35%)
- OVER 34 MILES OF CONCRETE-LINED CHANNELS



# CHALLENGES

- AGING INFRASTRUCTURE
- LIMITED ACCESS AND ROW
- UNSTABLE SOIL
- REPAIR COST OF CONCRETE CHANNELS COMPARED TO EARTHEN CHANNELS



# INITIAL SCOPE

- VISUALLY INSPECT THE DISTRICT'S CONCRETE LINED CHANNELS
- DOCUMENT THE TYPE AND EXTENT OF ALL DEFICIENCIES
- CAPTURE PICTURES OF CHANNEL DEFICIENCIES WITH GPS ENABLED CAMERA
- CREATE GIS COMPATIBLE DATABASE OF ALL REPAIR LOCATIONS
- DETERMINE APPROPRIATE REPAIR METHOD FOR EACH LOCATION WITH ASSISTANCE FROM JCDD6 PERSONNEL
- DEVELOP COST MODELS FOR DEFICIENCY REPAIRS AND CHANNEL REPLACEMENT
- ASSIGN A CHANNEL CONDITION INDEX (CCI) BASED ON THE COST OF ADDRESSING THE DEFICIENCY COMPARED TO THE OVERALL VALUE OF THE CHANNEL

# PROGRAM BENEFITS

## DATABASE OF ALL DEFICIENCIES

- DEFICIENCY DESCRIPTION AND DIGITAL PHOTO REFERENCED TO GIS AERIAL MAP
- CATALOGUED BY CHANNEL AND WATERSHED
- COMPREHENSIVE INVENTORY FOR ASSESSMENT AND PLANNING
- MAINTAINS PROGRESS HISTORY OF COMPLETED REPAIRS
- VALUABLE RESOURCE FOR FUTURE MAINTENANCE COST PROJECTIONS

# DEFICIENCY REPORTS

- DETAILED REPORT FOR EACH LOCATION
  - DIGITAL PHOTOGRAPH
  - GPS COORDINATES
  - DEFICIENCY DESCRIPTION
  - MEASUREMENTS
  - CORRECTIVE ACTION
  - REPAIR PRIORITY & DIFFICULTY
  - COST ESTIMATE

Jefferson County DD6  
6550 Walden Road  
Beaumont, TX 77707

## Deficiency Detail Report

Report Date: 8/18/2020  
Huitt-Zollars, Inc.  
10350 Richmond Ave Ste 300, Houston, TX 77042

100A-20200528HZ010



### DEFICIENCY DETAILS

MAJOR CLASS	
J Concrete Side Lining	
LATITUDE	LONGITUDE
30.0755207	-94.13975123
DESCRIPTION	
B Collapsed	
PRIORITY	
[ 2 ] Potentially Critical	
DIFFICULTY	
[ 4 ] Tough	
CORRECTION	
X Repair Failed Area	
QUANTITY	
NOTE	
Concrete Side Lining; Collapsed L: 20' W:20'	
SURVEYOR	
DM	
LAST UPDATE	
5/28/2020	

34768 H:\proj\HCFCD\_GIS\Allimages\100A-20200528HZ010.JPG  
Image Found and Displayed

### R312300.01 - JCDD6 Inspection, Plan Sheet

Description	Unit	Quantity	Price	Extension
Concrete Channel Lining, 6"	S.Y.	920	\$95.00	\$87,400.00
Concrete Channel Lining, 8"	S.Y.	250	\$105.00	\$26,250.00
Concrete Channel Lining, 10"	S.Y.	60	\$140.00	\$8,400.00
Rem. & Dis. of Channel Lining	S.Y.	1200	\$30.00	\$36,000.00
Excavation & Fill (On-Site)	C.Y.	120	\$20.00	\$2,400.00
			Sub Total:	\$160,450.00
			Construction Costs 30%	\$48,135.00
			Soft Cost 50%	\$104,292.50
			<b>Total Estimated Cost:</b>	<b>\$312,877.50</b>

# PRIORITIZATION OF REPAIRS

- REPAIR PRIORITY ASSIGNED TO EACH DEFICIENCY
  - **PRIORITY 1** – CURRENTLY CRITICAL (IMMEDIATE) - CONDITIONS THAT REQUIRE IMMEDIATE ACTION TO CORRECT A CITED SAFETY HAZARD, STOP ACCELERATED DETERIORATION OR RETURN A FACILITY TO INTENDED OPERATION
  - **PRIORITY 2** – POTENTIALLY CRITICAL (ONE YEAR) - CONDITIONS THAT IF NOT CORRECTED EXPEDITIOUSLY WILL BECOME CRITICAL WITHIN ONE YEAR
  - **PRIORITY 3** – NECESSARY (YEARS 2-5) - CONDITIONS THAT REQUIRE APPROPRIATE ATTENTION TO PREVENT FURTHER DETERIORATION IF REPAIRS ARE DEFERRED ANY LONGER
  - **PRIORITY 4** – RECOMMENDED (YEARS 6-10) - CONDITIONS THAT REQUIRE MONITORING. NO MAINTENANCE REQUIRED AT THIS TIME.

# CHANNEL CONDITION INDEX (CCI)

- RATIO OF THE COST TO REPAIR DEFICIENCIES DIVIDED BY THE REPLACEMENT COST OF THE CHANNEL

EXAMPLE :

- COST TO REPAIR DEFICIENCIES = \$ 150,000
  - REPLACEMENT COST OF THE CHANNEL = \$ 1,000,000
  - $CCI = 150,000/1,000,000 = 0.15$  OR 15%
- THE CCI IS USED TO COMPARE THE RELATIVE CONDITIONS OF CHANNELS TO ONE ANOTHER.

# LIFE CYCLE OF CHANNEL COMPONENTS

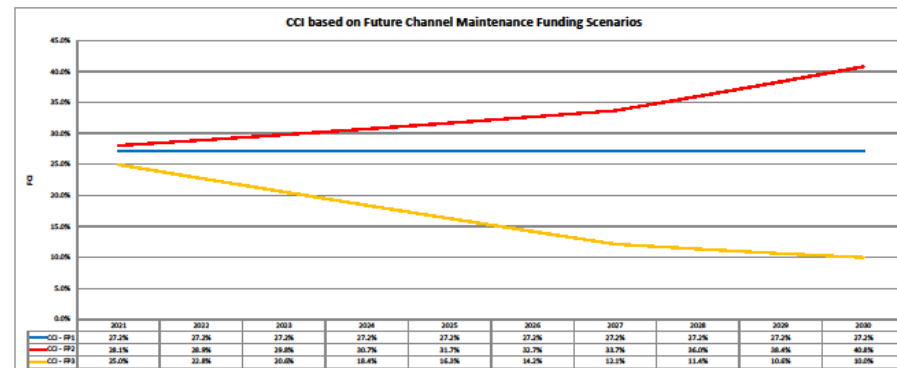
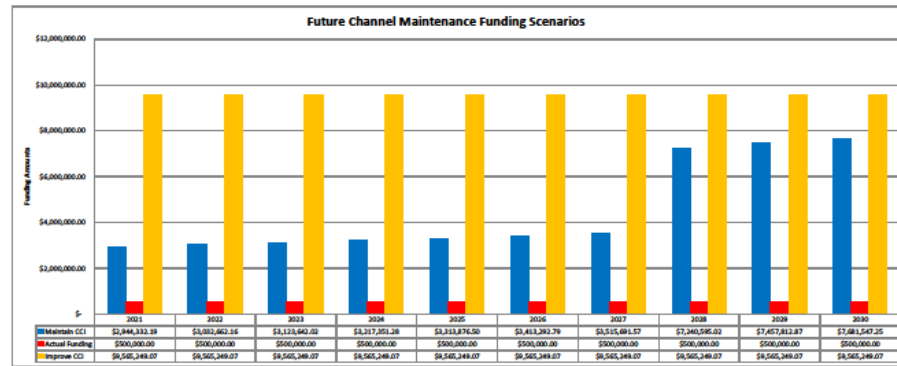
- EACH COMPONENT OF THE CHANNEL IS ASSIGNED A LIFE EXPECTANCY
- FUTURE MAINTENANCE REQUIREMENTS ARE CALCULATED BASED UPON A LINEAR EXPIRATION RATE OF EACH CHANNEL COMPONENT BASED ON ITS LIFE EXPECTANCY.
- THE RATE OF EXPIRATION (LIFE CYCLE) IS ADJUSTED BASED ON THE AGE OF A COMPONENT.

EXAMPLE: CONCRETE COMPONENTS HAVE A LIFE CYCLE OF 100 YEARS WHICH EQUATES TO A RENEWAL PERIOD OF 1% ANNUALLY.

# 10-YEAR FUNDING SCENARIOS

HUNT & COLIARS

Client: Jefferson County Drainage District 6  
 Watershed: Concrete Channels  
 Channel: Concrete Channels  
 Channel Number: Concrete Channels  
 Replacement Cost: \$ 294,387,472.54  
 Current Deficiencies: \$ 80,150,434.35  
 Current CCI: 27.2%



BLUE INDICATES FUNDING COMMITMENT TO MAINTAIN CURRENT CONCRETE CHANNEL CONDITIONS

(CCI REMAINS CONSTANT AT 27.2%)

RED ILLUSTRATES CURRENT ANNUAL FUNDING COMMITMENT OF \$500K

(CCI INCREASES FROM 27.2% TO 40.8%)

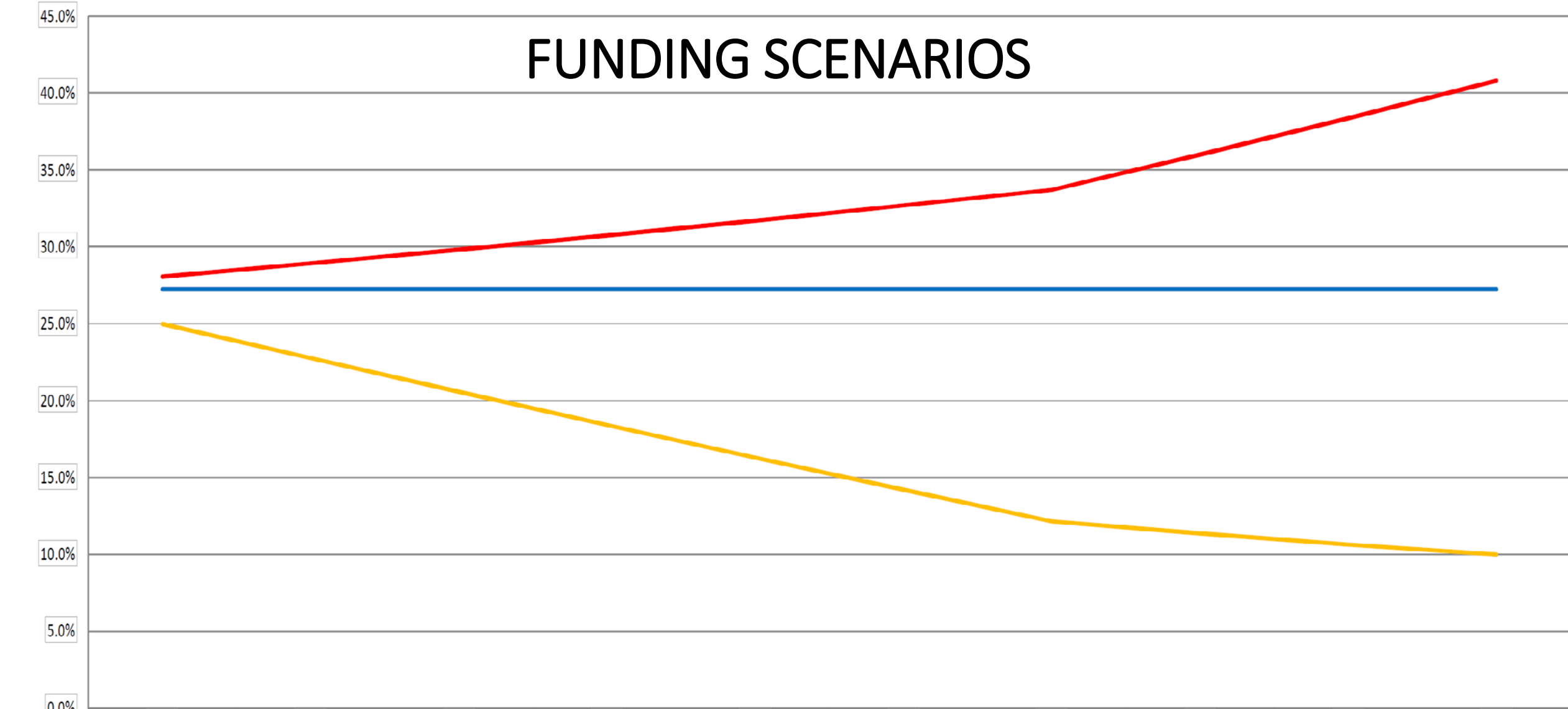
GOLD INDICATES ANNUAL FUNDING COMMITMENT REQUIRED TO SIGNIFICANTLY IMPROVE CONDITIONS

(CCI DECREASES FROM 27.2% TO 10.0%)



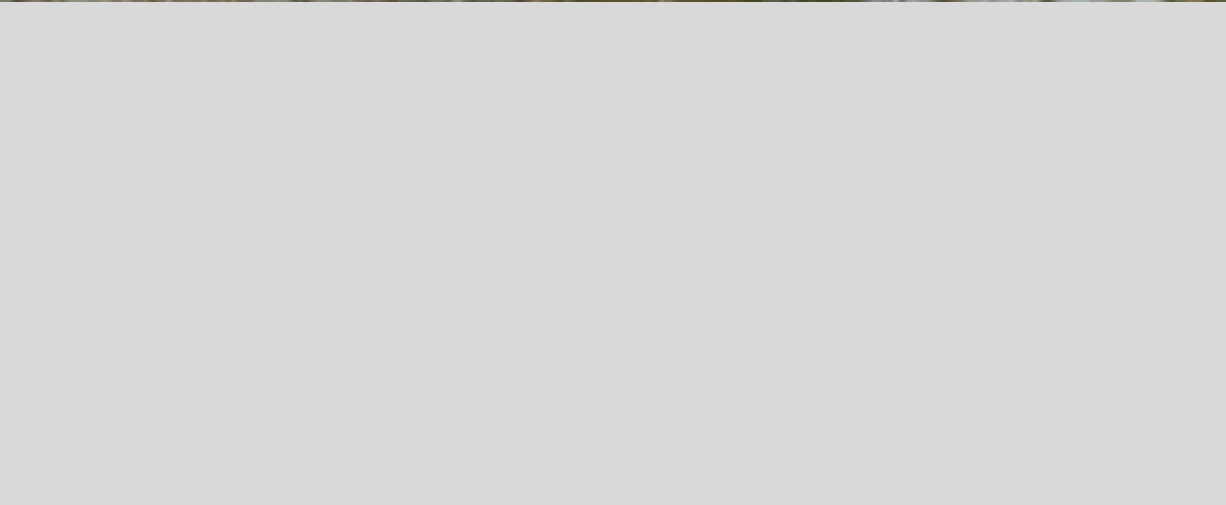
CCI based on Future Channel Maintenance Funding Scenarios

# FUNDING SCENARIOS



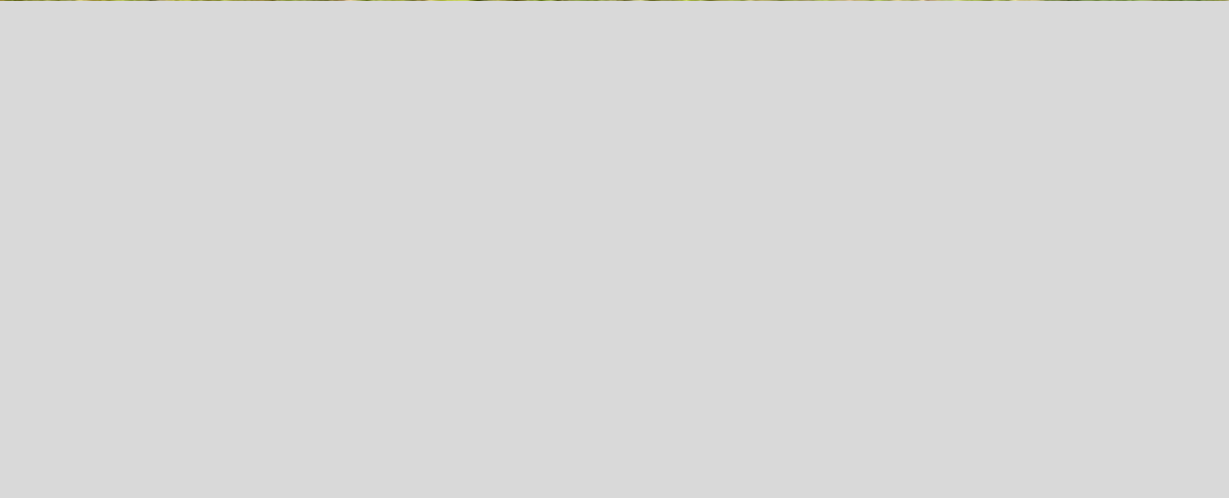
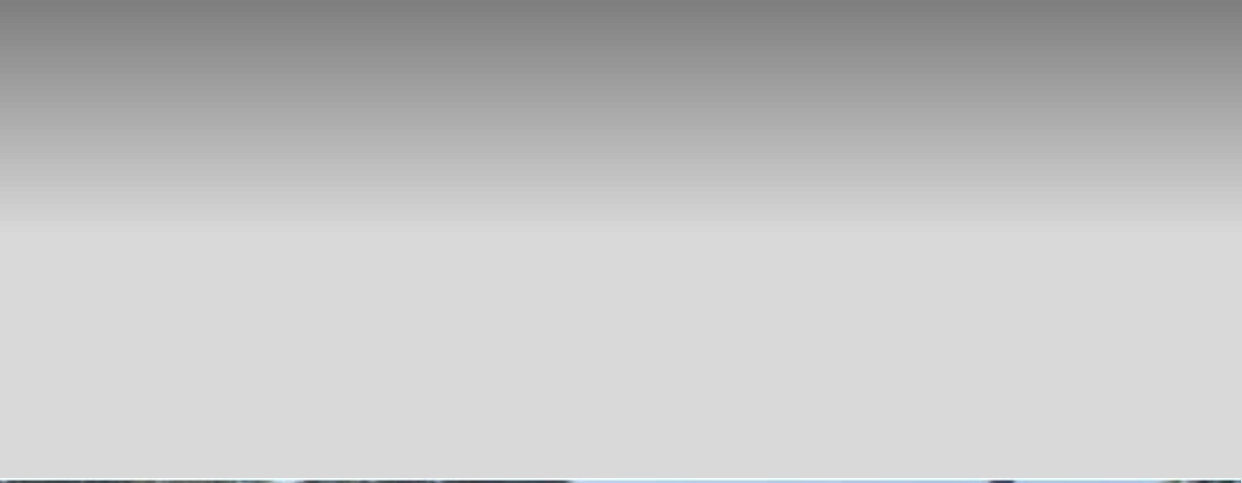
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CCI - FP1	27.2%	27.2%	27.2%	27.2%	27.2%	27.2%	27.2%	27.2%	27.2%	27.2%
CCI - FP2	28.1%	28.9%	29.8%	30.7%	31.7%	32.7%	33.7%	36.0%	38.4%	40.8%
CCI - FP3	25.0%	22.8%	20.6%	18.4%	16.3%	14.2%	12.1%	11.4%	10.6%	10.0%

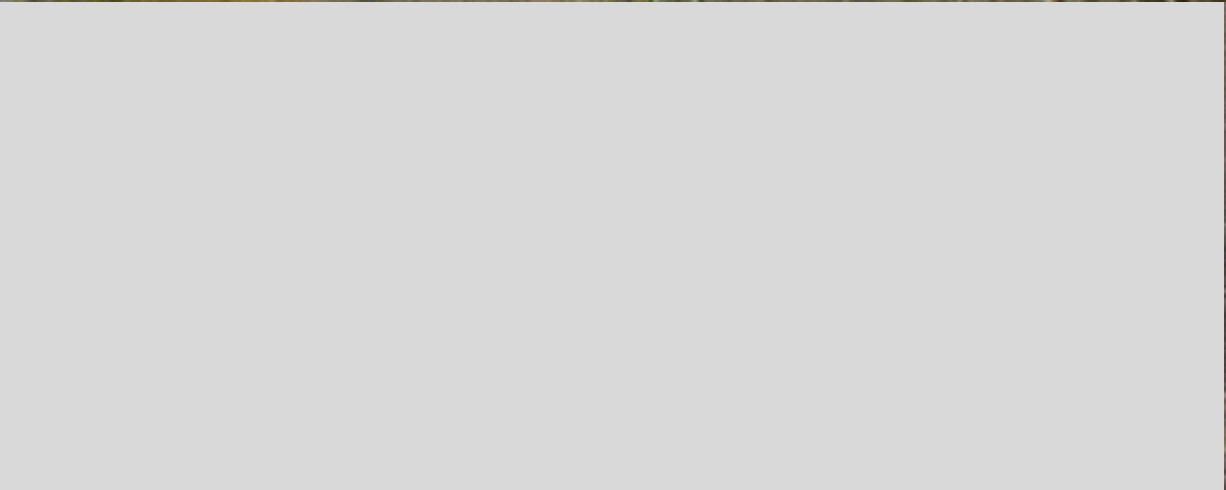
**THE FOLLOWING SLIDES  
REPRESENT  
VARIOUS TYPES OF EXISTING DEFICIENCIES**

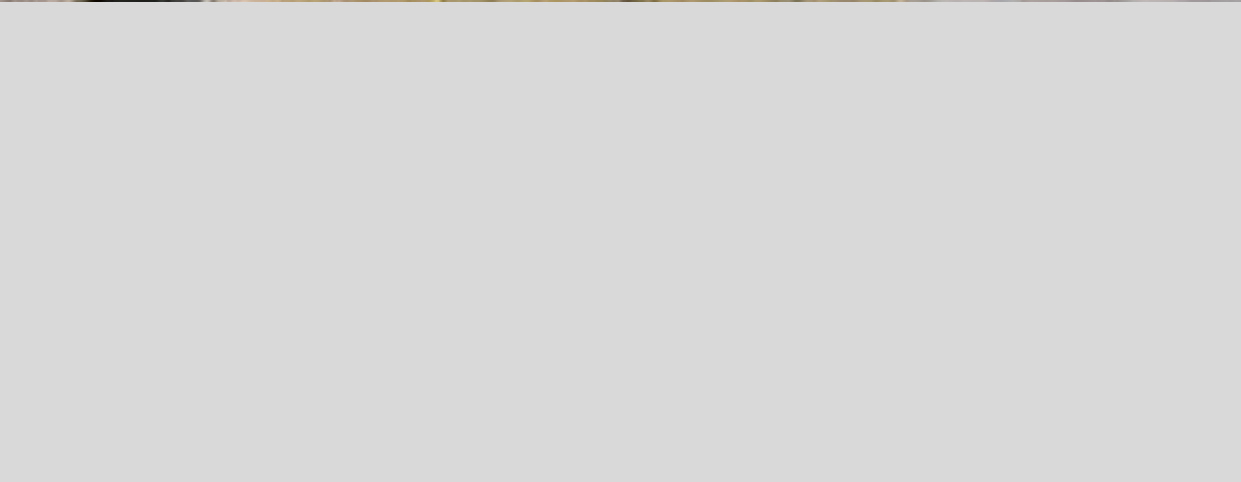














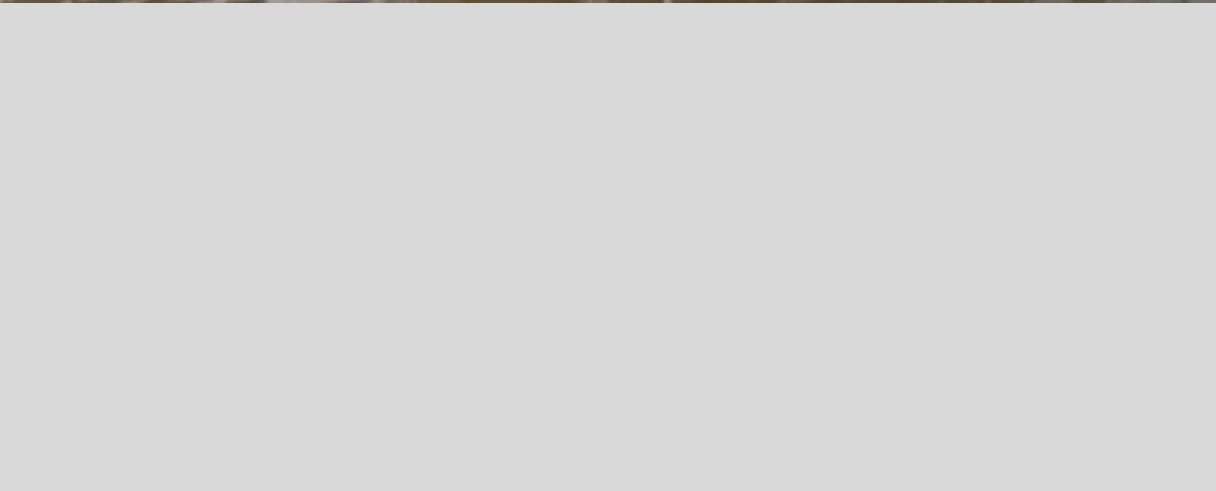














# SUMMARY

- 337 DEFICIENCIES IDENTIFIED ON 42 CHANNELS
- OVERALL CCI FOR THE DISTRICT'S CONCRETE CHANNELS IS 27.2% INDICATING MORE THAN ONE QUARTER OF THE SYSTEM IS DEFICIENT
- APPROXIMATELY \$80M IN EXISTING DEFICIENCIES COMPARED TO CONCRETE CHANNEL REPLACEMENT VALUE OF \$294M
  - \$35.4M PRIORITY-1
  - \$40.3M PRIORITY-2
  - \$4.3M PRIORITY-3
- CHANNEL 100 ESTIMATED DEFICIENCY VALUE OF \$33M
- APPROXIMATELY \$9.7M ANNUAL FUNDING REQUIRED TO REDUCE THE CCI TO 10% OR LOWER OVER TEN-YEAR PERIOD

# SUMMARY

- ASSET MANAGEMENT PROGRAM PROVIDES A BASELINE OF THE CONDITION OF OUR EXISTING DRAINAGE SYSTEM
- CHANNEL CONDITION ASSESSMENT AND STRUCTURED MAINTENANCE PROGRAM PROVIDES A COMPREHENSIVE PLAN FOR LONG TERM MAINTENANCE AND FOUNDATION FOR FUTURE BUDGET ALLOCATION
- CAPTURE LOST CARRYING CAPACITY AND RESTORE STRUCTURAL INTEGRITY OF THE DISTRICT'S DRAINAGE SYSTEM
- END RESULT IS AN EFFECTIVE AND WELL MANAGED MAINTENANCE PROGRAM FOR BOTH EXISTING AND FUTURE MAINTENANCE NEEDS



QUESTIONS?