

# INFRASTRUCTURE RECOVERY AFTER DISASTER 2018 CAMP FIRE

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Marc Mattox, PE  
Public Works Director/Town Engineer  
Town of Paradise



Purest  
Ingredients

Finest  
Quality

SIERRA NEVADA<sup>®</sup>



PALE ALE











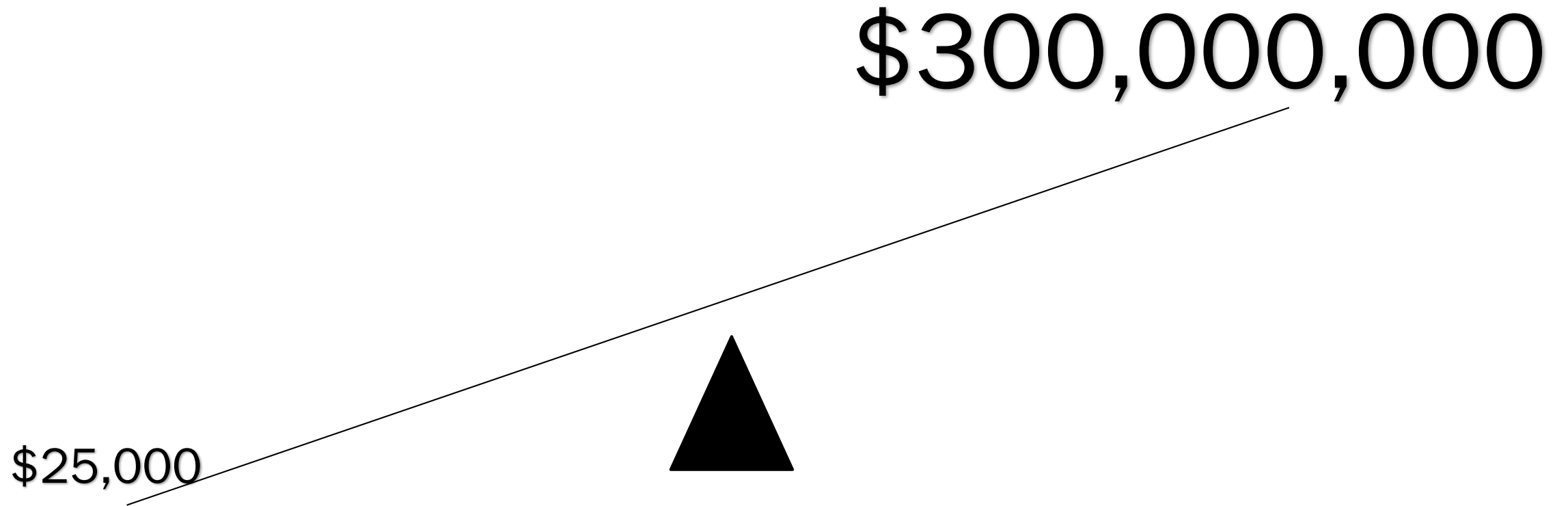
www.hillcountrydraft.com

LEAGUE: Hill Country

DATE:

DATE	TEAM	SCORE	STATUS
10/10	Red Sox	5-3	W
10/11	Yankees	4-2	W
10/12	Blue Jays	6-1	W
10/13	Orioles	3-1	W
10/14	Mariners	2-1	W
10/15	Angels	4-3	W
10/16	Rangers	5-2	W
10/17	Astros	3-2	W
10/18	Braves	4-1	W
10/19	Phillies	6-4	W
10/20	Reds	5-3	W
10/21	Pirates	4-2	W
10/22	Cubs	3-1	W
10/23	Cardinals	5-4	W
10/24	Pastors	6-5	W
10/25	Mariners	4-3	W
10/26	Angels	3-2	W
10/27	Rangers	5-4	W
10/28	Astros	4-3	W
10/29	Braves	6-5	W
10/30	Phillies	5-4	W
10/31	Reds	4-3	W
11/1	Pirates	3-2	W
11/2	Cubs	5-4	W
11/3	Cardinals	4-3	W
11/4	Pastors	6-5	W
11/5	Mariners	5-4	W
11/6	Angels	4-3	W
11/7	Rangers	6-5	W
11/8	Astros	5-4	W
11/9	Braves	6-5	W
11/10	Phillies	5-4	W
11/11	Reds	4-3	W
11/12	Pirates	3-2	W
11/13	Cubs	5-4	W
11/14	Cardinals	4-3	W
11/15	Pastors	6-5	W
11/16	Mariners	5-4	W
11/17	Angels	4-3	W
11/18	Rangers	6-5	W
11/19	Astros	5-4	W
11/20	Braves	6-5	W
11/21	Phillies	5-4	W
11/22	Reds	4-3	W
11/23	Pirates	3-2	W
11/24	Cubs	5-4	W
11/25	Cardinals	4-3	W
11/26	Pastors	6-5	W
11/27	Mariners	5-4	W
11/28	Angels	4-3	W
11/29	Rangers	6-5	W
11/30	Astros	5-4	W
12/1	Braves	6-5	W
12/2	Phillies	5-4	W
12/3	Reds	4-3	W
12/4	Pirates	3-2	W
12/5	Cubs	5-4	W
12/6	Cardinals	4-3	W
12/7	Pastors	6-5	W
12/8	Mariners	5-4	W
12/9	Angels	4-3	W
12/10	Rangers	6-5	W
12/11	Astros	5-4	W
12/12	Braves	6-5	W
12/13	Phillies	5-4	W
12/14	Reds	4-3	W
12/15	Pirates	3-2	W
12/16	Cubs	5-4	W
12/17	Cardinals	4-3	W
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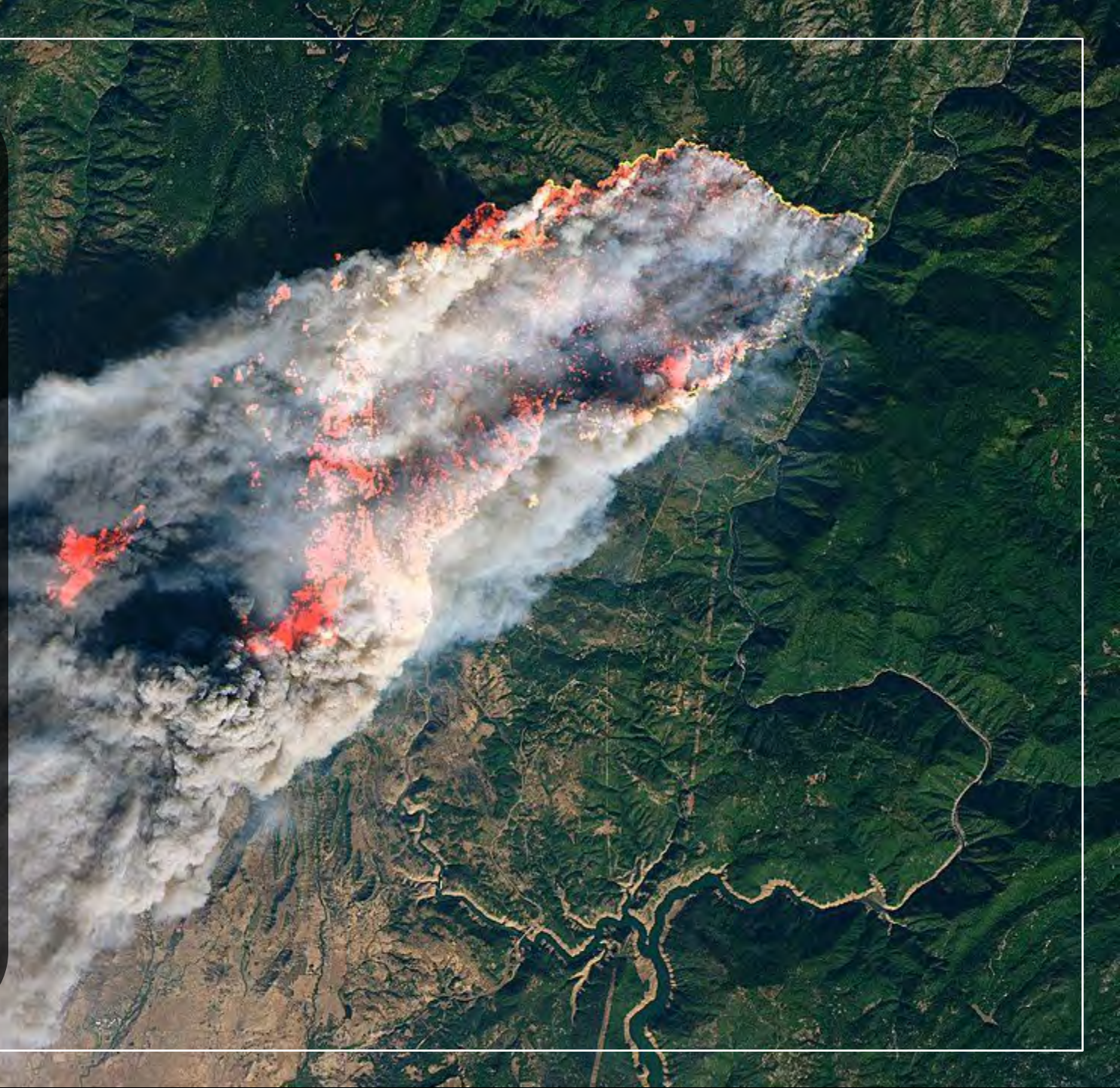
# Leveraging Resources





# 2018 Camp Fire

- Most destructive wildfire in California history
- Globe's most expensive disaster of 2018
- At least 85 fatalities
- 153,336 acres burned and 18,000 structures destroyed, most of which occurring in the first 12 hours
- Paradise lost 90-95% of all structures
- 2018 population reduced from 27,000 to about 4,000 overnight







# Initial Shock

- Immediately following the fire, infrastructure damage was concerning
  - Roads
  - Culverts
  - Hardscape
  - Guardrails
  - Trees
- Town of Paradise the municipal corporation had just lost nearly all population and associated revenues for at least two decades
- Financial solvency was a top concern



# Infrastructure Recovery Arms of Government at Work



**FEMA**



U.S. Department of Transportation  
**Federal Highway  
Administration**



**Cal OES**  
GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES



# Damage Still to Come

- Debris removal from 11,200 structures
- Tree removal associated with in utility, local, state and federal programs
  - Estimated 500,000+ trees removed







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# BUTTE STRONG

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FUND



**AARON RODGERS**  
NORCAL  
FIRE RECOVERY  
FUND at NVCF



Housing  
 Children & Youth Services  
 Health & Wellness  
 Education  
 Community Development  
 Business Recovery  
 Direct Assistance

**\$72M Raised, \$57M Granted**





# December 2019

- Debris Removal Operations scheduled to start any day
- ARRB Van was scheduled for California already
- Town didn't have certain funding or time to procure a vendor
- Town approached NVCF to ask for \$25,000 to pay ARRB for the first of two data collection cycles
- Existing relationships between the non-profit and Town staff were key to approval









MURNEY VEHICLE

KEEP CLEAR 30 FT

rtb

ZHS-5244

HAWKEYE

rtb



# Driving Data

- 5 digital cameras and laser system measuring:
  - Google-maps based imagery
  - Deflection bowls and slopes
  - Cracking
  - Rutting
  - Roughness
  - Pavement Distress
  - Friction
- 10,000+ unique measurements

SECTION_ID	ROUTE	FROM	TO	IRI_RIGHT	IRI_LEFT	IRI_AVE	IRI_LANE	RUT_RIGHT	RUT_LEFT	WIDTH
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	1066	1053	1059	822	0.67	0.39	47.9
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	1301	774	1037	701	0.18	0.45	38.3
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	309	427	367	312	0.13	0.43	29.7
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.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	259	186	222	203	0.11	0.09	29.6
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	822	140	481	428	0.31	0.09	49.5
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	279	243	261	231	0.20	0.08	57.3
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	522	267	395	357	0.23	0.09	57.7
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.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	265	210	238	188	0.16	0.13	63.7
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	359	302	331	300	0.09	0.09	38.2
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.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	317	176	246	174	0.14	0.14	44.5
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	194	205	200	171	0.09	0.10	40.3
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	309	245	277	186	0.12	0.14	39.7
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	335	266	300	234	0.33	0.10	53.5
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.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	447	91	269	235	0.32	0.06	44.6
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	407	163	285	269	0.15	0.05	26.5
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	447	189	318	220	0.18	0.08	32.6
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	307	54	181	162	0.30	0.08	45.8
.0001001	BILLE RD	Forty Oaks Ln - Cliff Dr	W Wagstaff Rd	318	115	217	179	0.34	0.09	49.2
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.0001002	BILLE RD	W Wagstaff Rd	Oliver Rd	203	115	159	141	0.16	0.07	49.3
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.0001002	BILLE RD	W Wagstaff Rd	Oliver Rd	187	98	143	117	0.09	0.07	51.0
.0001002	BILLE RD	W Wagstaff Rd	Oliver Rd	328	146	237	180	0.14	0.09	39.9
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.0001002	BILLE RD	W Wagstaff Rd	Oliver Rd	326	113	219	200	0.25	0.10	48.6
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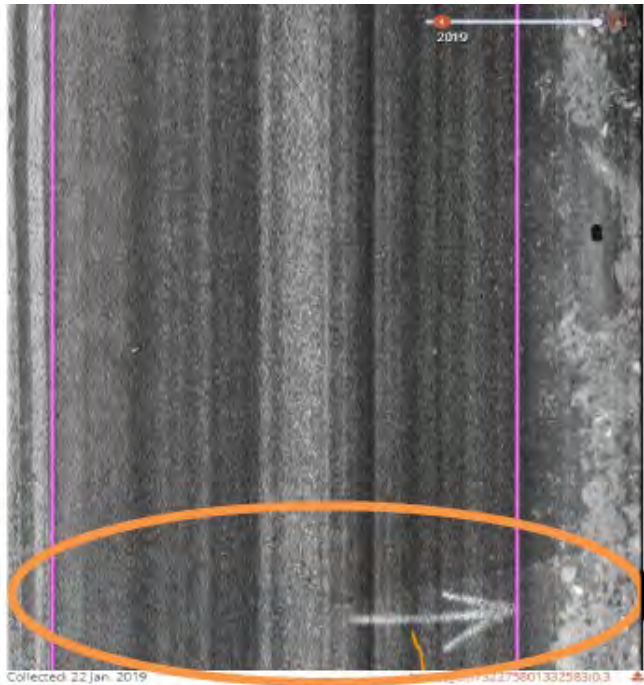
# DEBRIS REMOVAL OPERATIONS

- 3.7 million tons removed
  - 10,900 participating properties
  - 4 Golden Gate Bridges
- 28.2 million road miles traveled
  - 305,000 loads
  - 59 round trips to the moon
- Although debris removal operations were continuing and tree removal operations hadn't started, a second data collection cycle was required before September 30, 2019



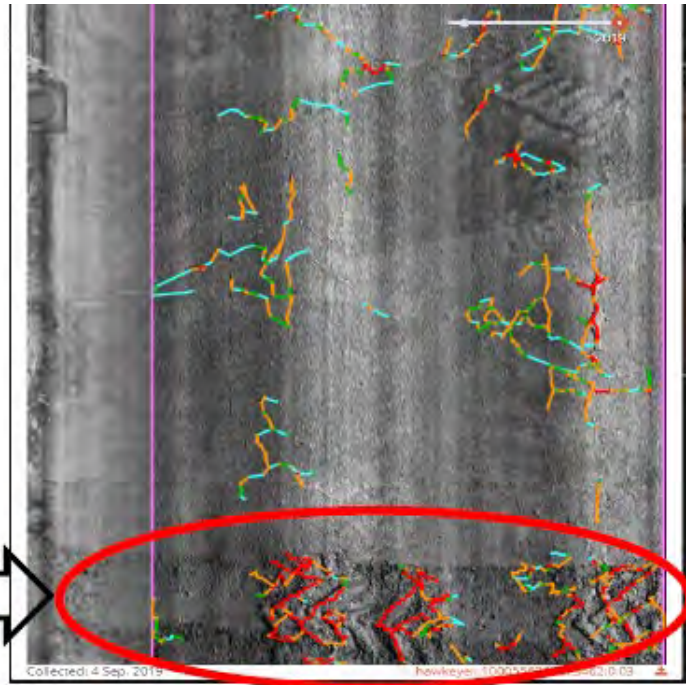
**9 MONTH BEFORE & AFTER**





Collected: 22 Jan. 2019

Dean Road (PM 0.27) – January 2019

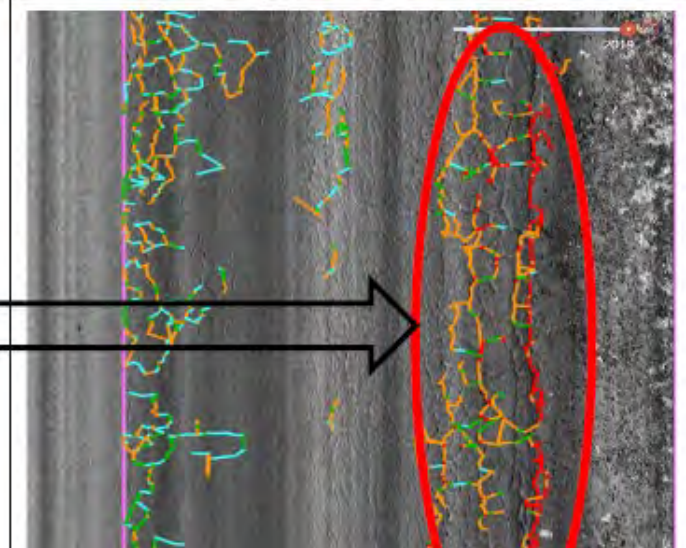


Collected: 4 Sep. 2019

September 2019



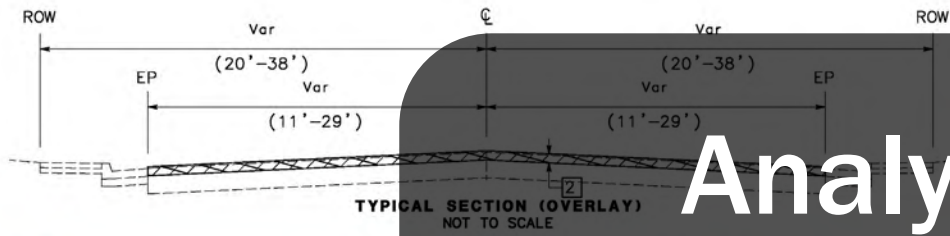
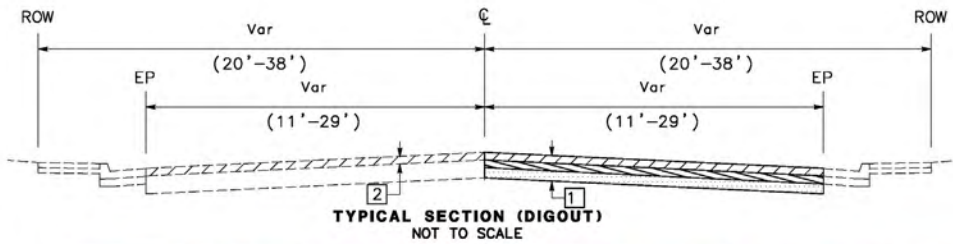
Collected: 22 Jan. 2019



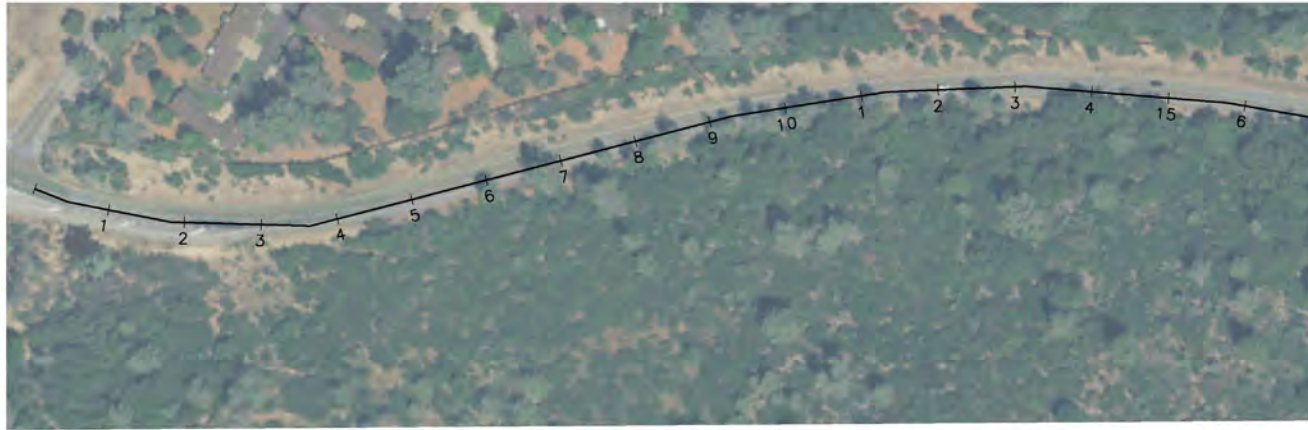
Collected: 4 Sep. 2019

# VISUAL AND TABULAR DATA



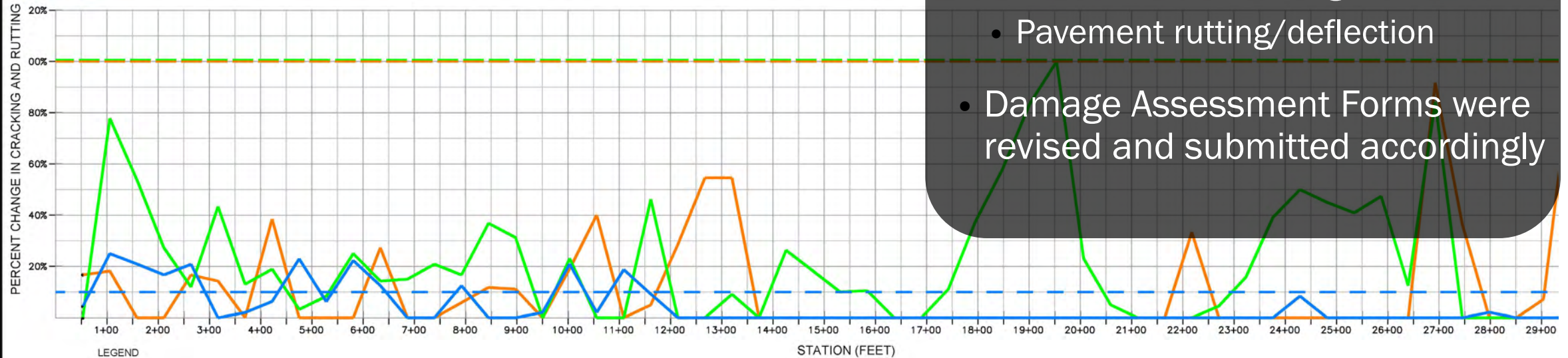


# Analysis



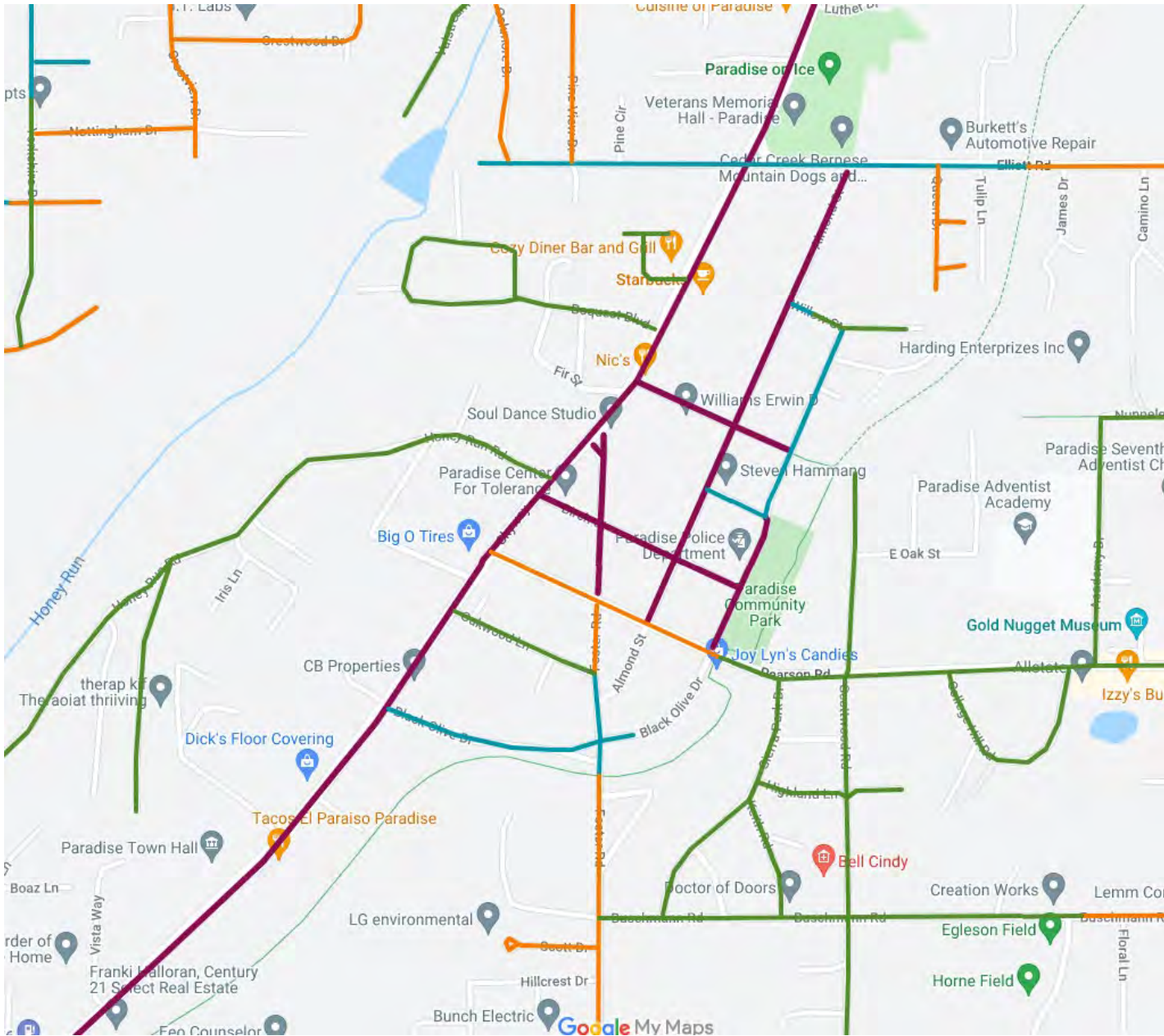
PLAN VIEW

DIGOUT (SB LANE)  
DIGOUT (NB LANE)



- Using the critical data, analysis was performed by a team of civil and geotechnical engineers to quantify the percent change along each roadway corridors for the two primary factors:
  - Surface area cracking
  - Pavement rutting/deflection
- Damage Assessment Forms were revised and submitted accordingly





# First \$100M Approved

- On-system roads approved through Caltrans, Federal Highways Administration (FHWA) under the Emergency Relief Program
- Off-system roads approved through Federal Emergency Management Agency (FEMA) under the Public Assistance process.
- A net total of **\$100M** work has been approved and is planned for construction starting in 2022 through 2025.
  - Dig-outs, overlays, mill & fill, and full depth reclamation

# Concurrent EDA Grant

- 7-Months post-fire Town of Paradise adopted a Long-Term Recovery Plan (also funded by NVCF)

## Safer!

- Improve Evacuation Routes
  - Establish Interconnected Path System
  - Resolve Long, Dead-End Streets
  - Underground Utilities
- January 2020, EDA approves \$1.8M Grant for development of Town Transportation Master Plan

SAFER

WELCOMING

STRONGER

VISION





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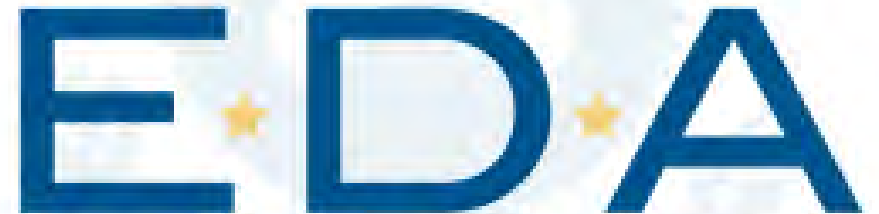
SAFER

WELCOMING

STRONGER

VISION

Lesson's Learned Session  
tomorrow at 4:15



EDA

U.S. ECONOMIC DEVELOPMENT ADMINISTRATION



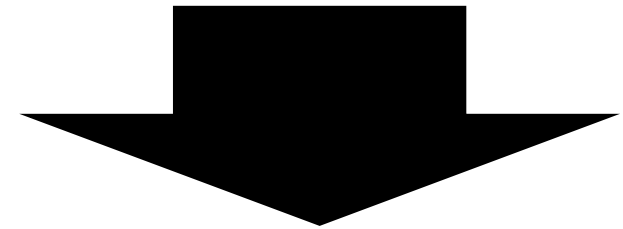
# TMP Process

Workshops

Technical Analysis

Regional Coordination

Surveys



50 projects

\$600M in Need



# Projects

Installation of unobstructed safety turn lanes (increases evacuation capacity)

Connecting dead-end roads

Increasing circulation with new roadway connections

Installation of Class I Bike Paths (doubles as emergency asset)



# CDBG-DR Infrastructure Funding



- Congressionally appropriated funding Disaster Recovery funds to support recovery process
- 2018 Allocation for Infrastructure was \$317M
- Paradise submitted 60 projects including match requirements through FEMA Public Assistance, Hazard Mitigation and Emergency Relief – totaling \$800m



# August 19 Funding Announcement

Local Jurisdiction	Total Awarded
Butte County	\$72,722,679.61
City of Chico	\$12,388,409.65
City of Malibu	\$47,276.93
City of Redding	\$22,563,043.51
City of Shasta Lake	\$6,326,184.69
Los Angeles County	\$3,788,157.86
<b>Town of Paradise</b>	<b>\$199,592,735.75</b>
<i>Total</i>	<i>\$317,428,488.00</i>





MARK THOMAS



Cal OES  
GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES



FEMA



U.S. Department of Transportation  
Federal Highway  
Administration



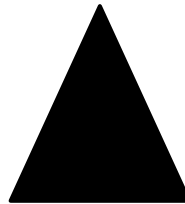
AARON RODGERS  
NORCAL  
FIRE RECOVERY  
FUND at NVCF

# Leveraging Resources It's all connected!

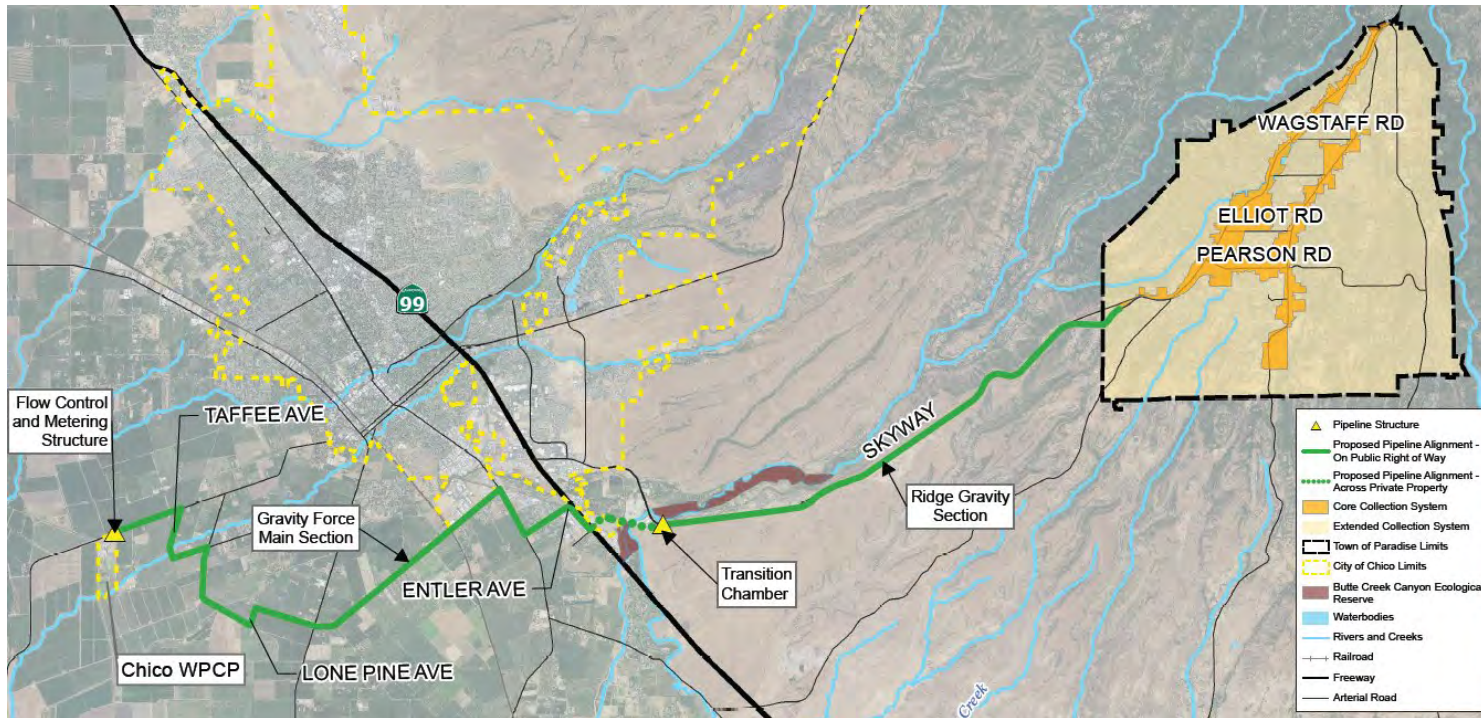
# \$300,000,000



\$25,000



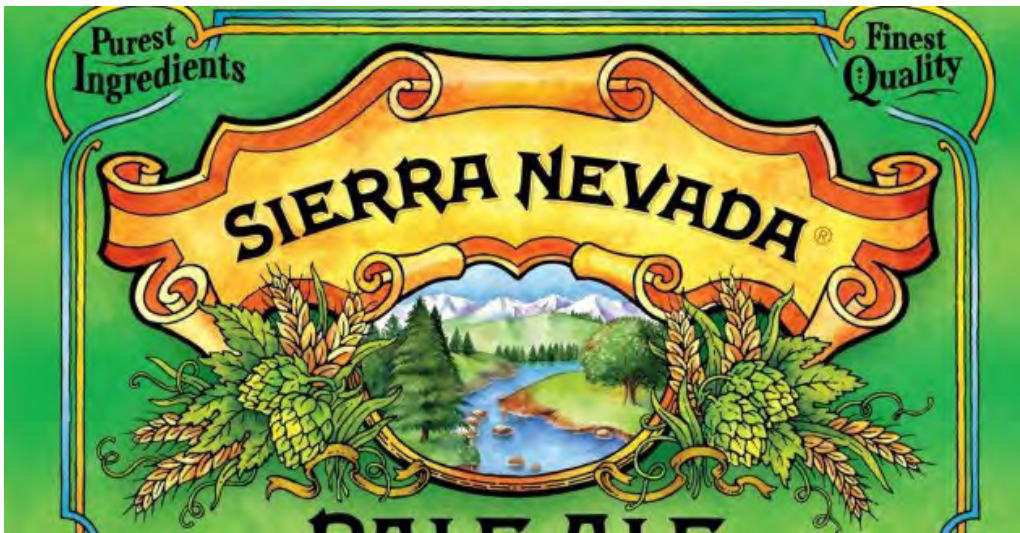




## What Else is Happening in Paradise?

- Undergrounding utilities town-wide
- Early warning system
- Defensible space projects (public and private)
- Wrapping EIR for potential 18-mile sewer connection to the City of Chico
- IBHS Wildfire Prepared Homes
- Rebuild Activity
  - 3000+ applications
  - 1800+ rebuilt





# Leveraging From Experience

- Work together
- Identifying the best and highest use of a given resource
- Maximizing potential and efficiency
- Analyzing risks and taking some
- Plan ahead... carefully
- Make decisions... quickly
- Make mistakes... and learn from them
- **Build relationships before disasters!**



# QUESTIONS?

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Marc Mattox, PE  
Public Works Director/Town Engineer  
Town of Paradise

