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NEW MARKET TOWNSHIP PAVEMENT EVALUATION STUDY

January 5, 2016

Description of Project

- Pavement Assessment
  - Surface Evaluation (all roads)
  - GPR Testing and Pavement Coring (subset of roads)
- Laboratory Testing
- Maintenance and Rehabilitation Repair Recommendations

Project Timeline

June, Discussions with Chris, field review, proposal

July, conducted our field review

August, final report

October, report revisions

Dec, Jan, Executive Summary, board presentation

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Pavement Assessment

Pavement assessment is the first step in making good decisions.

The condition of the existing pavement is assessed through:

- Pavement History (as-builts, repair records – very limited)
- Pavement Condition/Distress Evaluation
- Pavement Strength Evaluation
- Surface, Base and Subgrade Analysis (GPR, Coring, Boring)
- Surface and Subsurface Drainage Review

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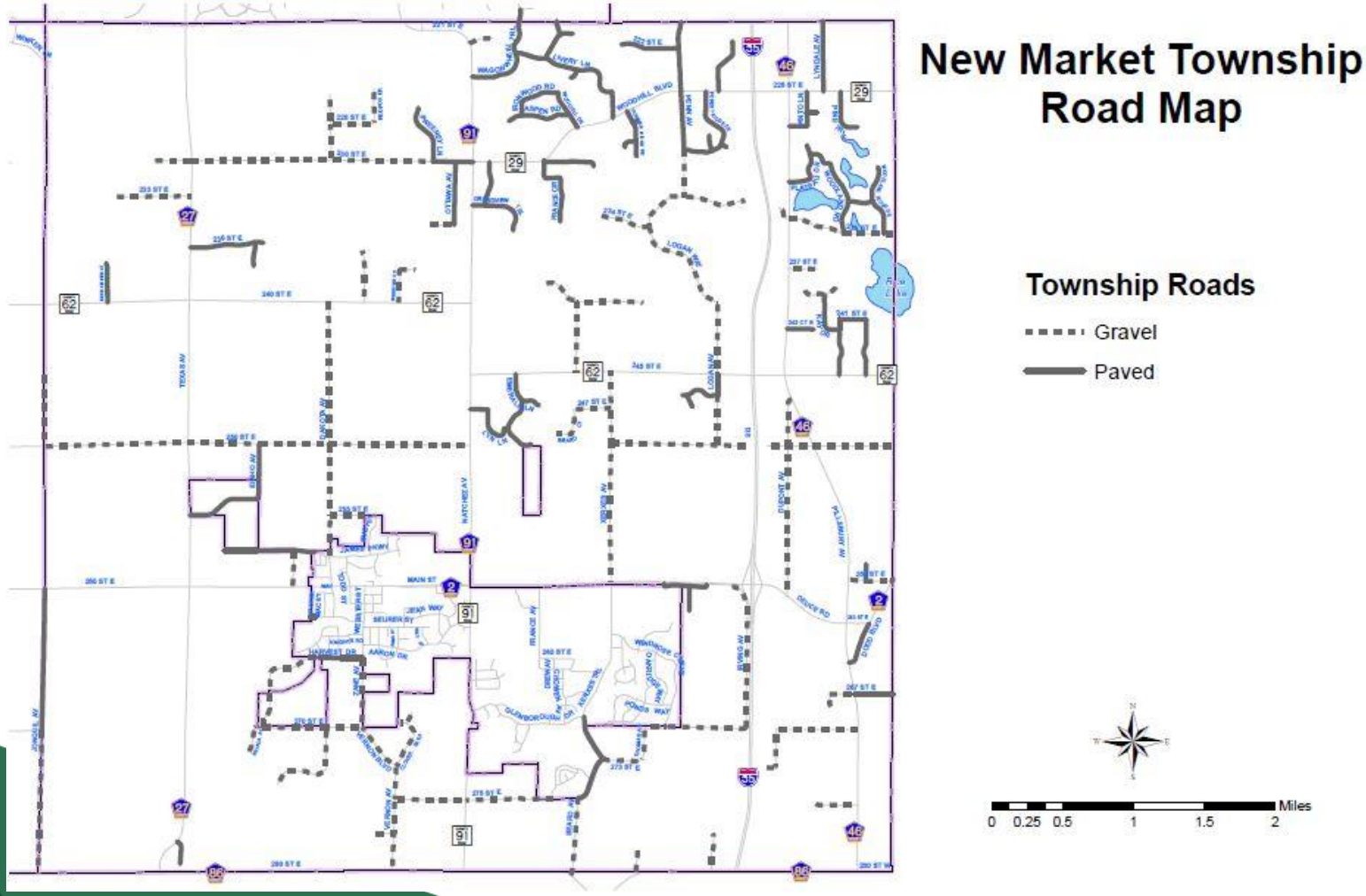
Pavement Surface Evaluations



Pavement Surface Evaluations

Gravel Roadways

- Video Log
- Reviewed the following features:
  - Crown
  - Drainage
  - Gravel layer
  - Surface deformations (washboarding)
  - Surface defects (dust, loose aggregate)

Gravel Roadways

275th Street

Gravel Roadways

Logan Avenue

Gravel Roadways

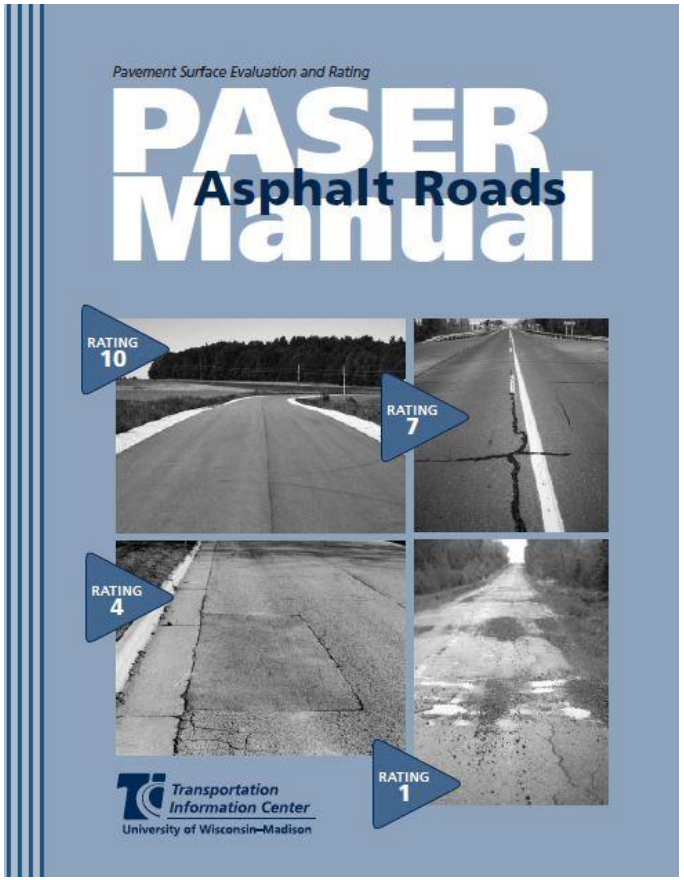
Summary of Findings

- Little to no crown
- No sloped shoulder areas
- Wide gravel surface
- Washboarding
- Vegetation near roadway edge
- Loose aggregate observed near edges
- No plasticity in material
- Good overall gradation

Bituminous Roadways

PASER Rating System

- Qualitative Rating System
- Rating scale from 1 to 10
- Rating puts us in the "ballpark" of needed repair



Bituminous Roadways

Plateau Drive

Bituminous Roadways

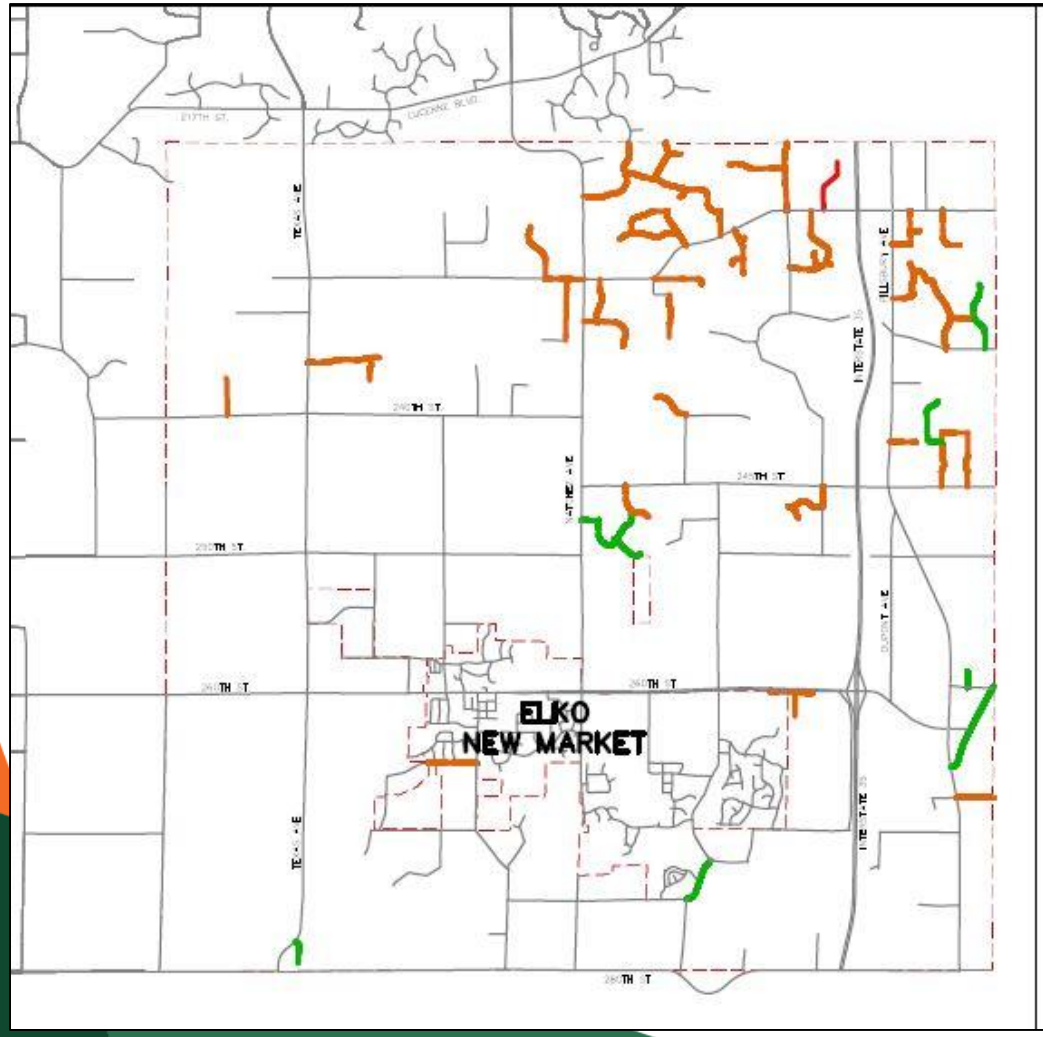
Pinto Lane

Bituminous Roadways

Ridge Circle

Duck Creek Court

Map of PASER Ratings



PAVEMENT CONDITION MAP
2015 PASER DATA

LEGEND

- Good (Rated 8-10)
- Fair (Rated 4-7)
- Poor (Rated 0-3)
- Unrated
- Township Border

Current Average of 6.1

Testing of Inplace Materials

GPR Testing and Pavement Coring

- Performed on a subset of the network
- Identify thickness of inplace materials
- Identify underlying conditions (stripping?)
- Provide options for repair

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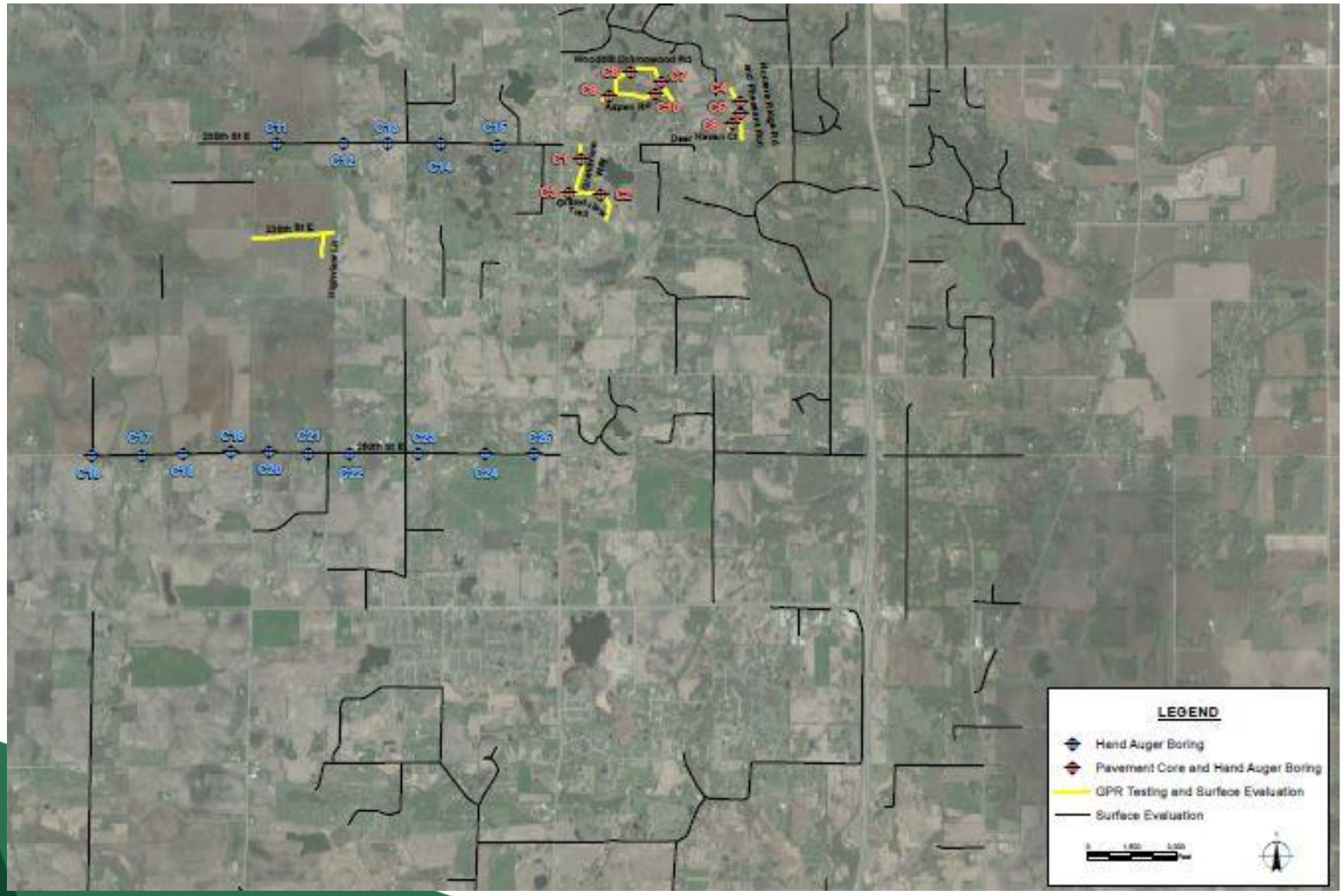
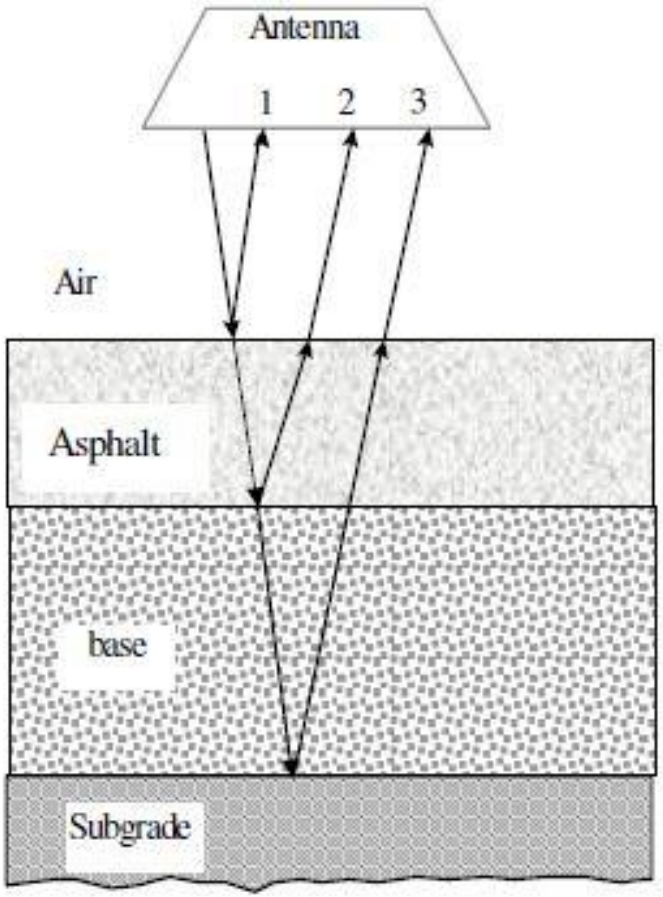
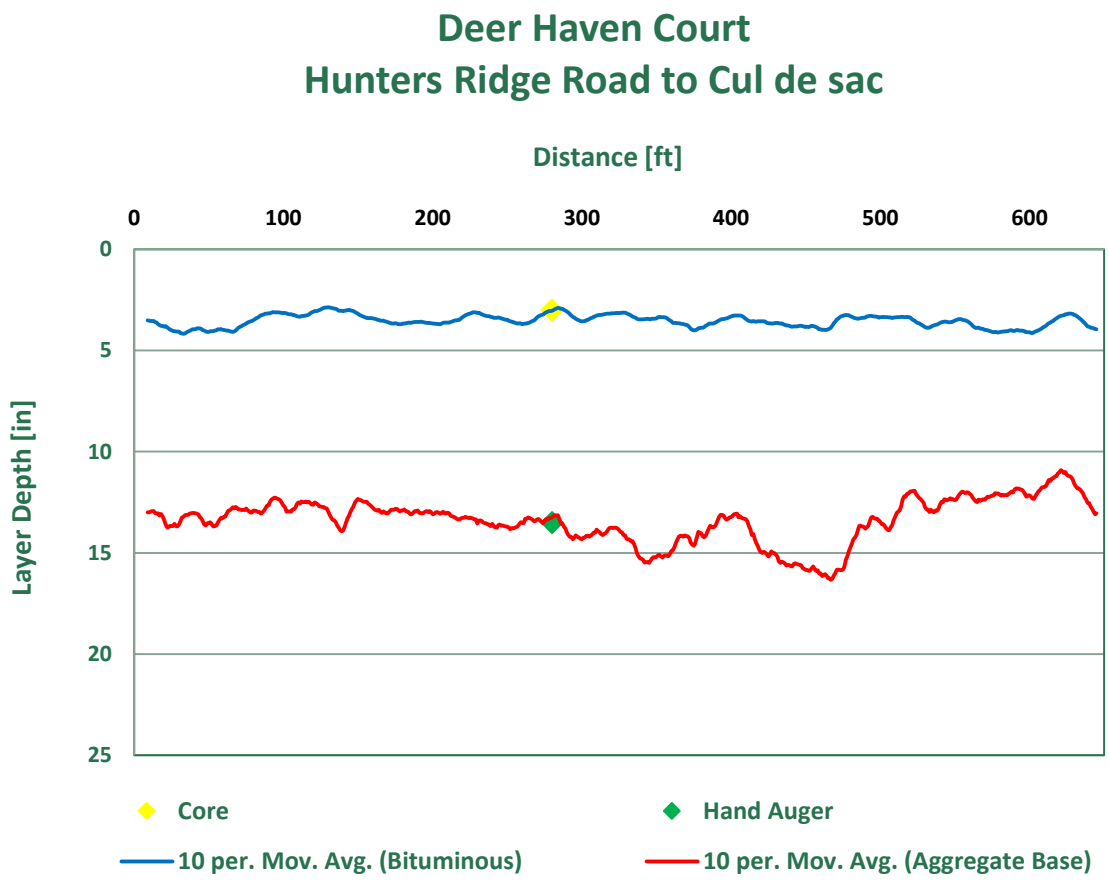
Testing of Inplace Materials



GPR and Coring



GPR Figure


Deer Haven Court
Hunters Ridge Road to Cul de sac
Distance [ft]
0
100
200
300
400
500
600
Layer Depth [in]
0
5
10
15
20
25
Core
Hand Auger
10 per. Mov. Avg. (Bituminous)
10 per. Mov. Avg. (Aggregate Base)

Summary of Test Results

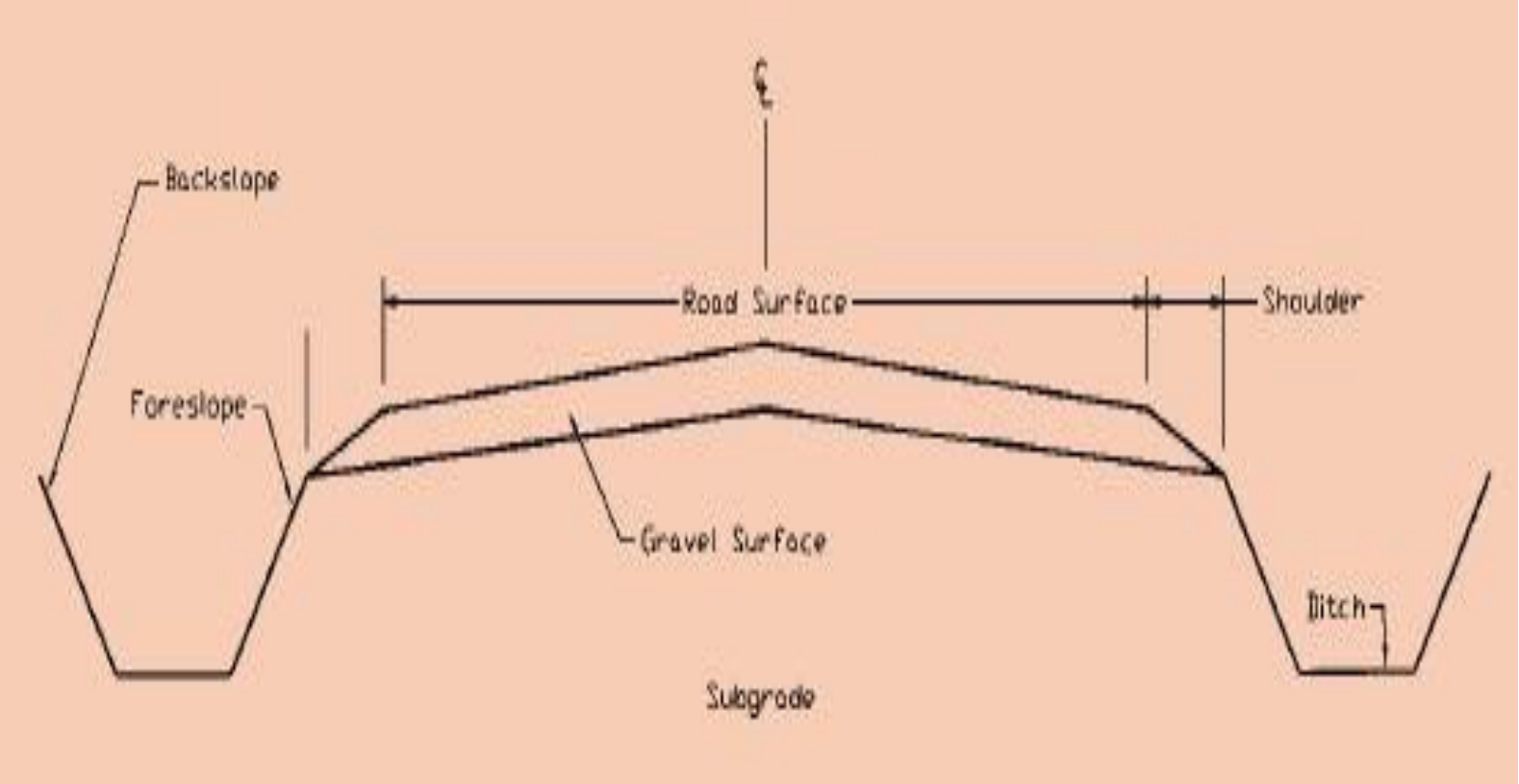
- Based on coring, roadways have 3.5 inches of bituminous over 10 inches of aggregate base
- Based on GPR, roadways have 3.9 inches of bituminous over 8 inches of aggregate base
- No material stripping observed in the cores
- Gravel roadways have 2 to 3 inches of aggregate surfacing
- Gradation results were good; however, no plastic fines (clay)

Recommendations

Gravel Roadway Recommendations

- Width of 20 to 22 feet; 24 feet max
- Crown of 3 ½ to 4 percent
- Creation of sloped shoulder areas
- Slow blading operations (5 mph)
- Higher plasticity index (helps bind material)
- Testing to ensure gradation requirements
- Calcium or magnesium chloride

Gravel Roadway Recommendations



Bituminous Roadway Recommendations

- Preventive Maintenance Repairs
  - Chip Seal
  - Fog Seal
  - Micro/Slurry Seal
- Rehabilitation Repairs
  - Full Depth Reclamation
  - Stabilized full depth repair
  - Subgrade stabilization

Pavement Life Cycle

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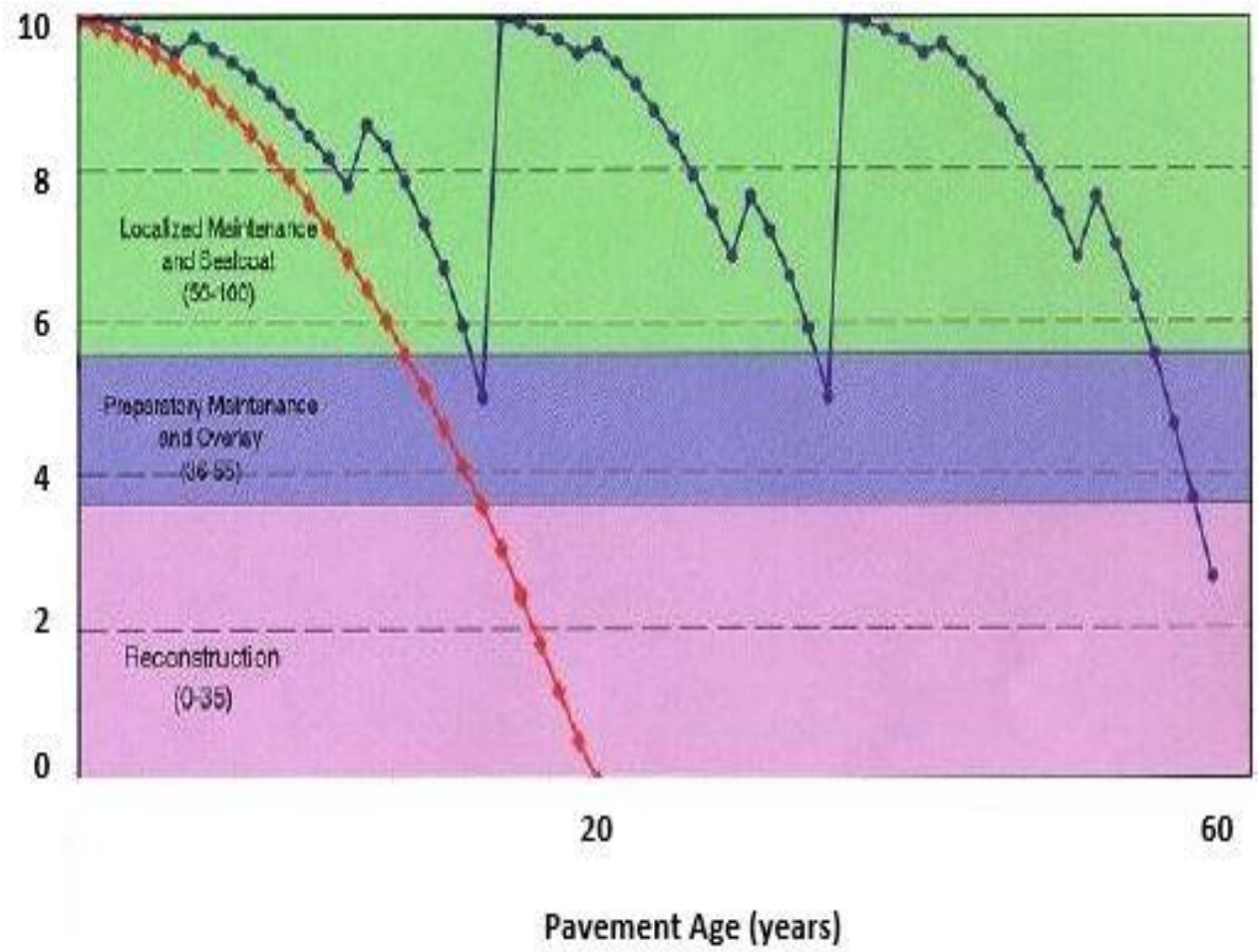
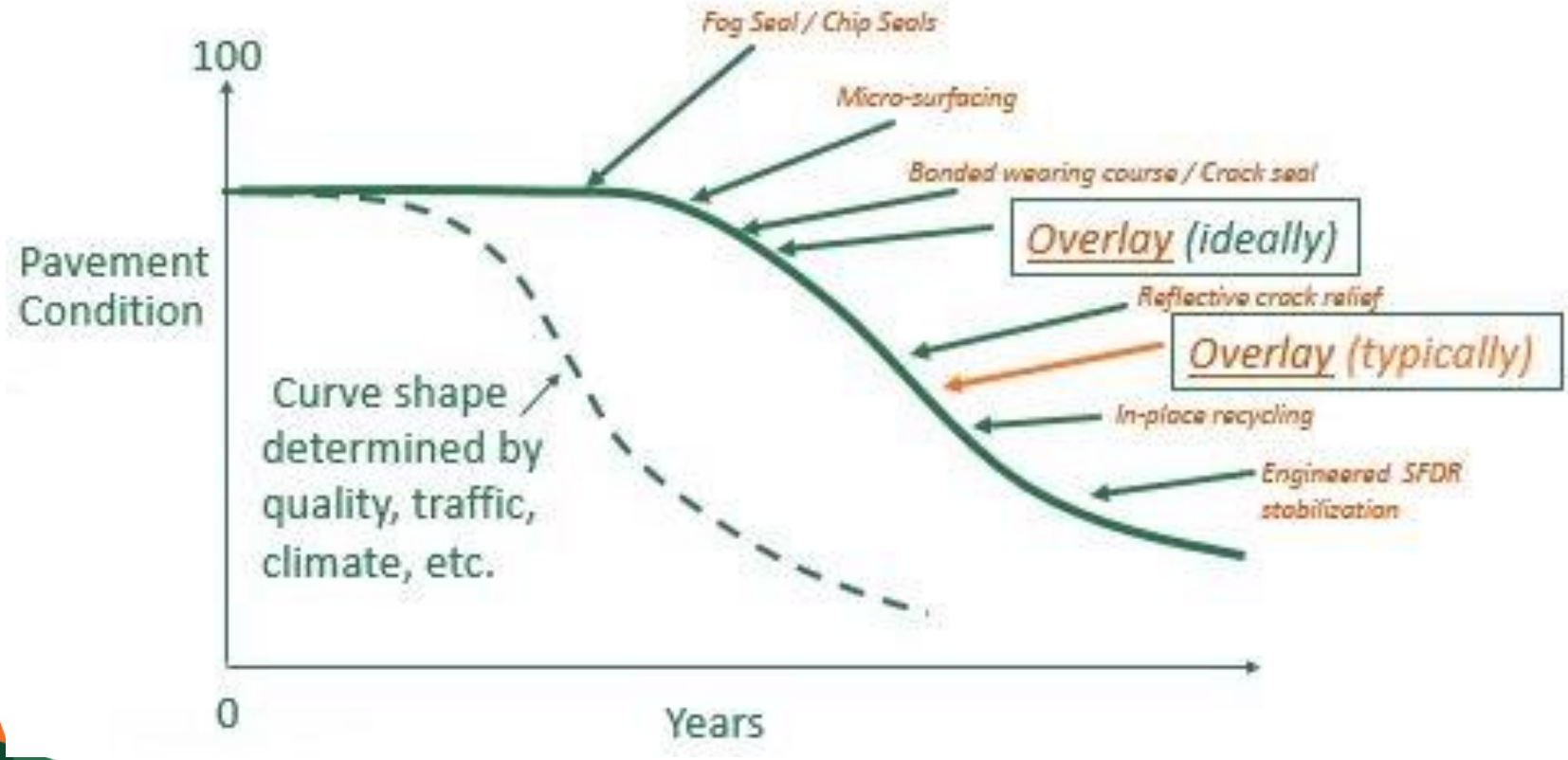
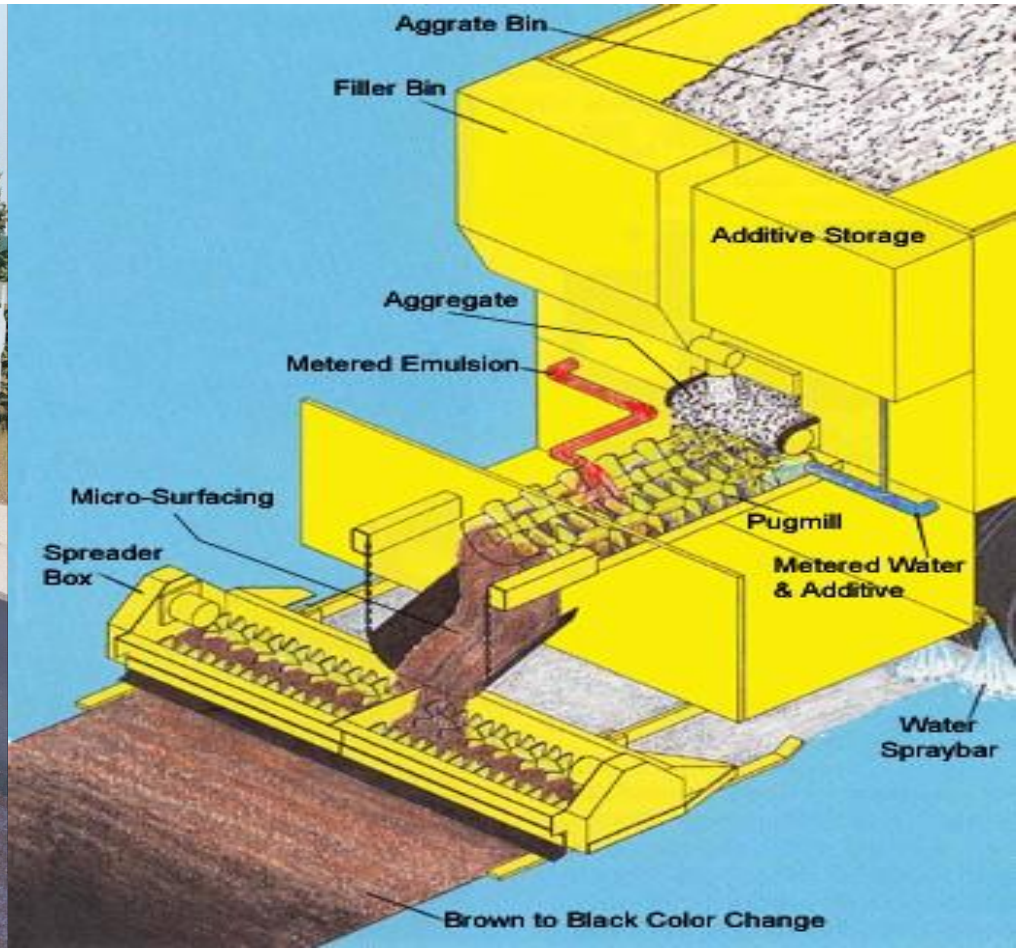


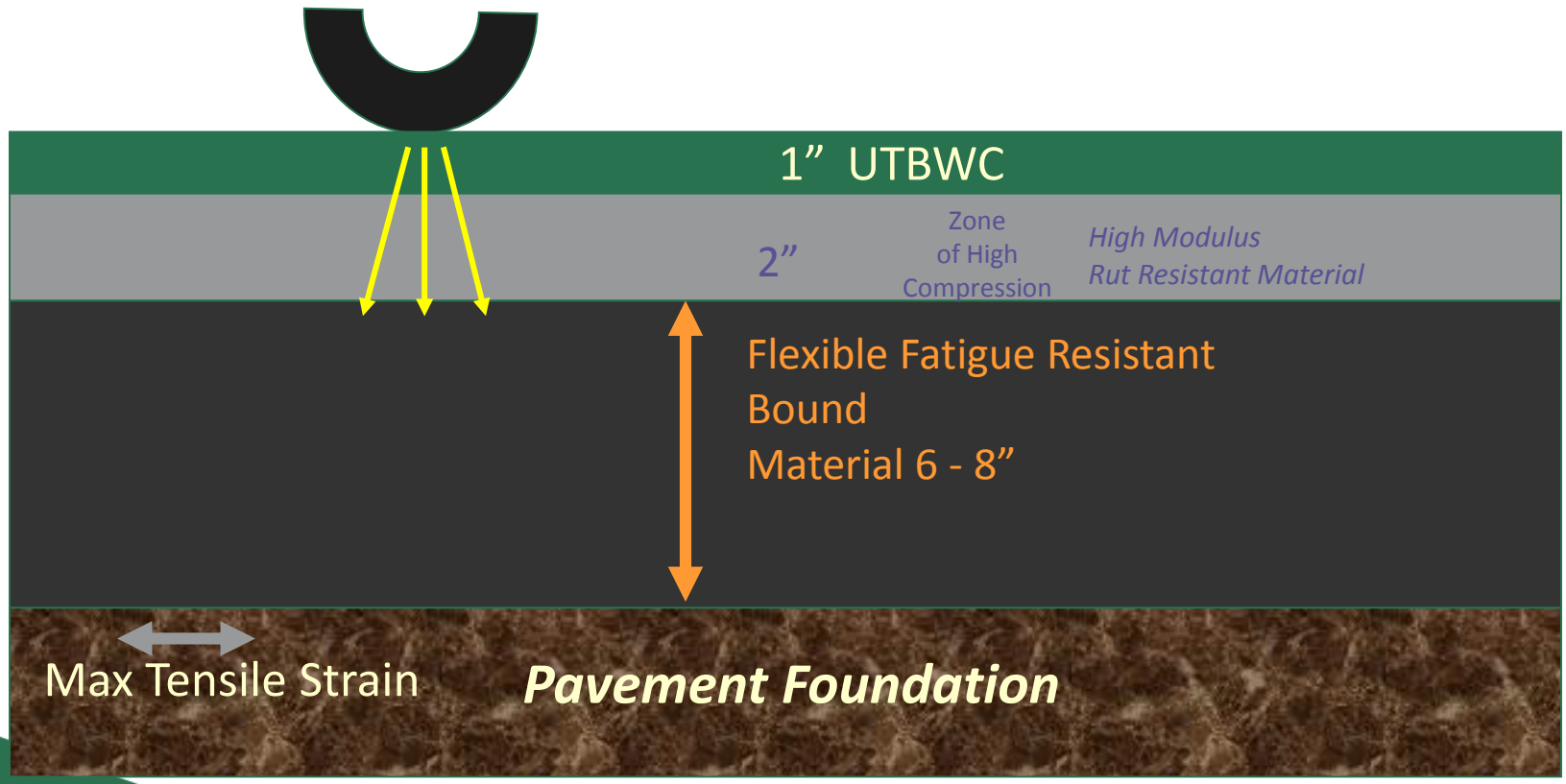
Pavement Management Options



Preservation Alternatives - Microsurfacing



Perpetual Pavement Concept MnRoad



Full Depth Reclamation (FDR)

Base Stabilization vs. HMA Overlay

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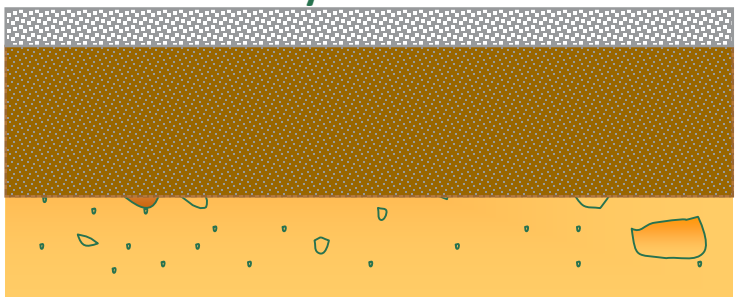
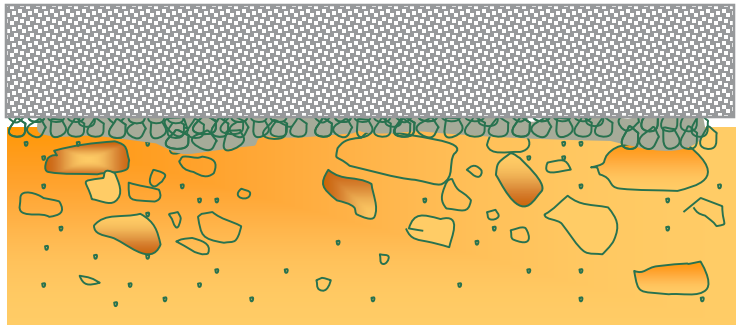
Over <u>Poor</u> Existing Base

Stabilized Base
Flexible Overlay





Base Stabilization

- Strengthens base
- Reduces Overlay Thickness
  - Flexible
  - Better Fatigue Resistance
- Ready for
  - Staged construction
  - Future growth

4-6" HMA Overlay

- Over existing base
- Poor base = overlay failure
- Requires widening, slope corrections

Bituminous Roadway Recommendations

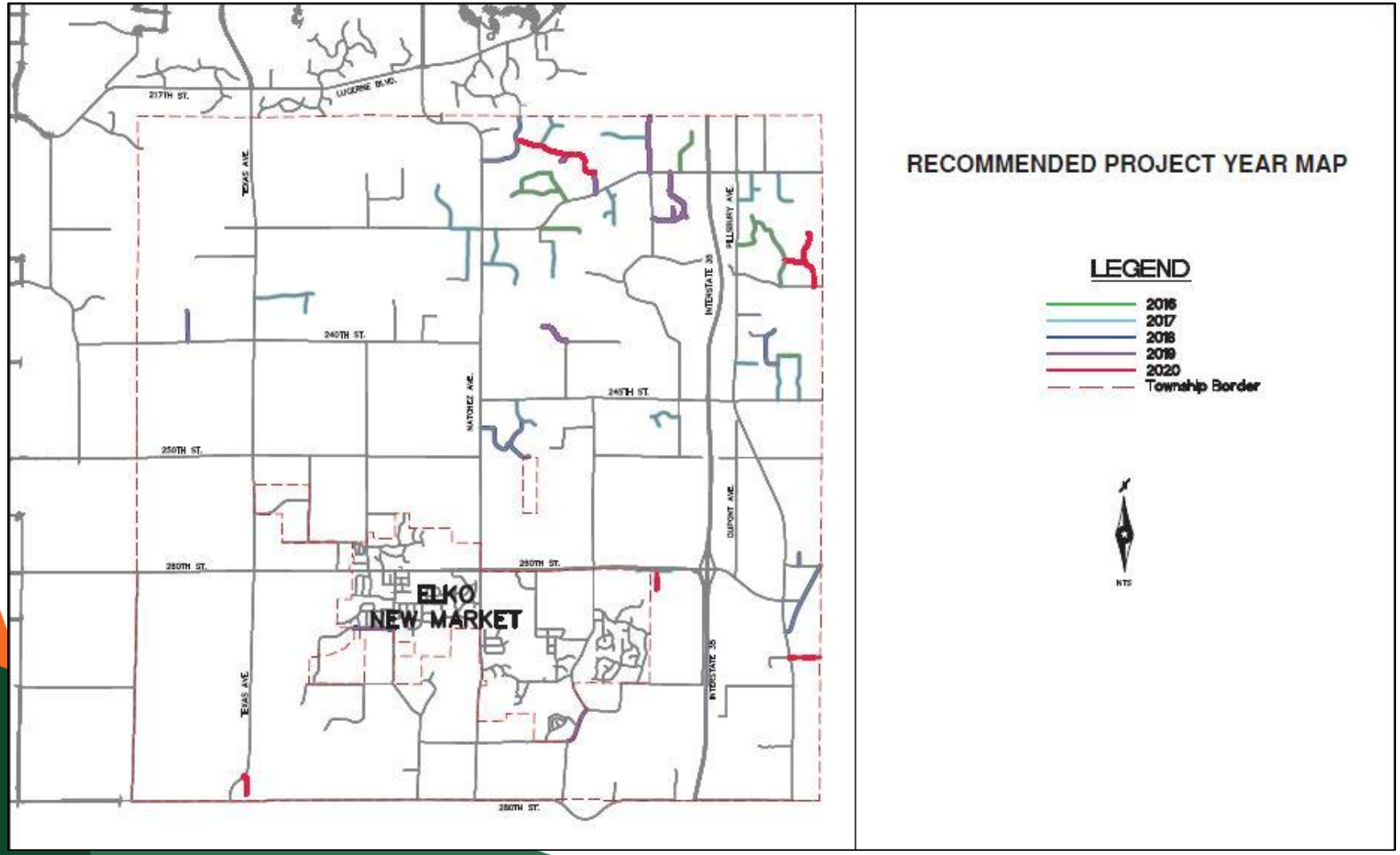
Grandview Trail

Skyline Circle

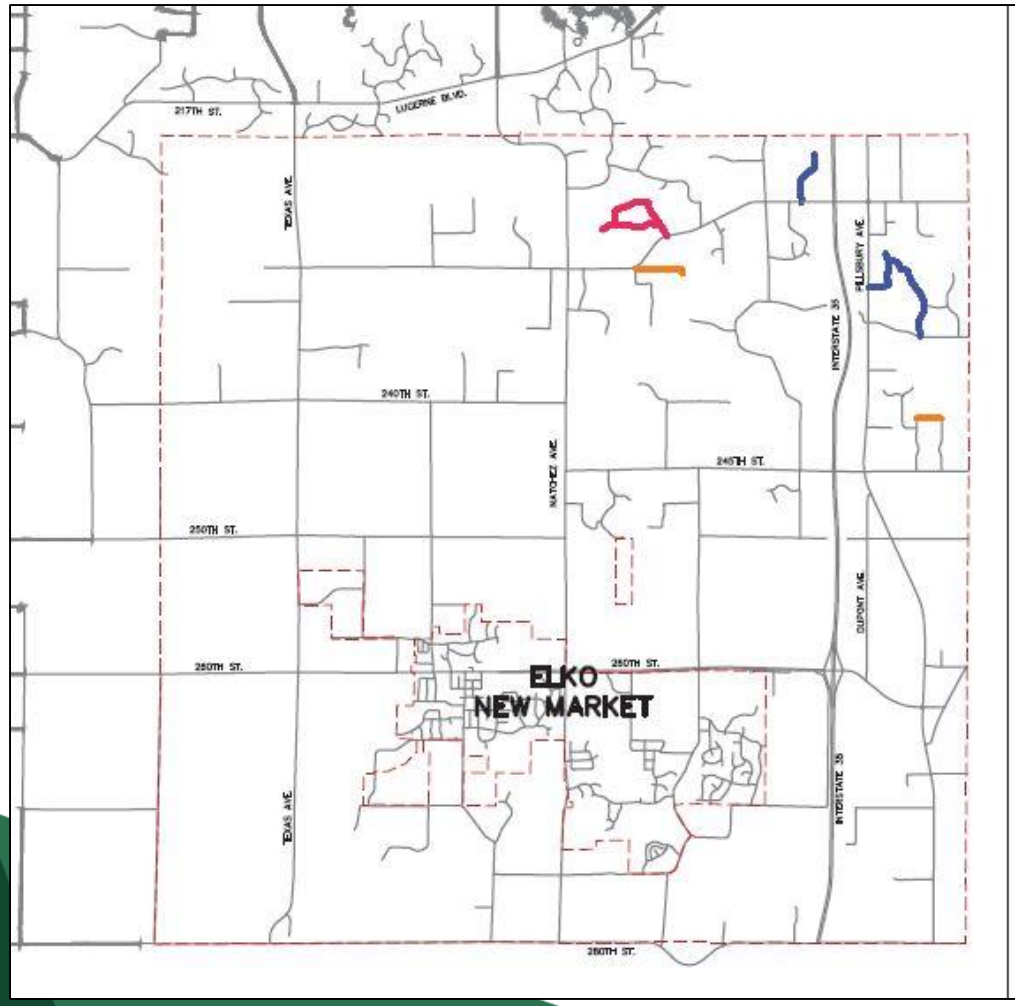
Bituminous Roadway Recommendations

Street Name/ Description	Length (ft)	Width (ft)	PASER	Age (yrs)	Drainage	Subgrade Soils	Recommendation	Recommended Repair Year	Total Est Const Cost
Logan Ave (north of 225th)	2112	24	3		Poor	Sandy Clay	Stablized Full Depth Repair	2016	$ 168,960
230th (east of France Ave)	1795.2	24	6		Fair	Sandy Clay	Chip Seal	2016	$ 9,574
241st	1320	28	6	16	Fair	Clay/Organic	Micro/Slurry Seal	2016	$ 14,373
Woodhill, Ironwood, Aspen	5808	22	6	41	Fair	Sandy Clay	Stabilized Full Depth Repair with Micro Surfacing, Micro/ Slurry Surfacing	2016	$ 201,176
Woodland Rd, Plateau Dr	6230.4	26	5	42	Poor	Sandy Clay	Stabilized Full Depth Repair	2016	$ 377,978
Black Walnut Drive	6494.4	28	6	16	Fair	Sandy Clay/Orgar	Micro/Slurry Seal	2017	$ 70,717
Pine Trail	1900.8	30	7		Fair	Sandy Clay	Chip Seal	2017	$ 13,306
Pinto Lane, Pinto Circle, 228th	2164.8	30	6	40	Fair/Poor	Sandy Clay	Stablized Full Depth Reclamation with Chip Seal	2017	$ 90,922
222nd	2323.2	26	7		Fair	Sandy Clay	Chip Seal	2017	$ 14,094
Norway Hills	2112	28	7	17	Fair	Sandy Clay	Micro/Slurry Seal	2017	$ 24,180
230th (Natchez to past Sweeny)	1584	26	7		Fair	Sandy Clay	Micro/Slurry Seal	2017	$ 16,840
Sweeny Ln	2112	28	7	13	Fair	Sandy Clay	Chip Seal	2017	$ 13,798
236th, High View Ln	3432	28	7		Fair	Sandy Clay	Chip Seal	2017	$ 22,422

Bituminous Roadway Recommendations - All



Bituminous Roadway Recommendations - 2016



2016 RECOMMENDED ROADWAY TREATMENTS

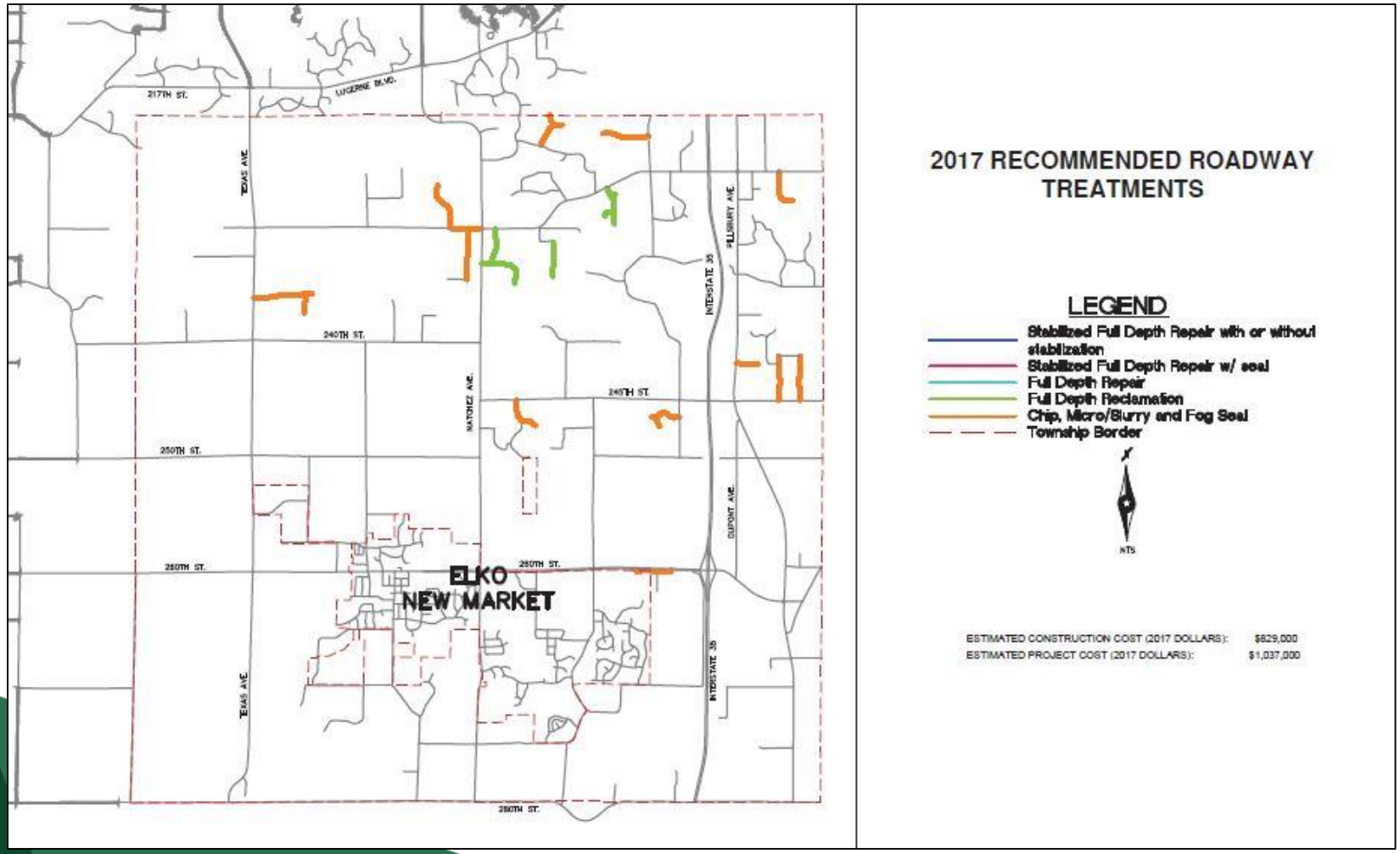
LEGEND

- Stabilized Full Depth Repair with or without stabilization
- Stabilized Full Depth Repair w/ seal
- Full Depth Repair
- Full Depth Reclamation
- Chip, Micro/Slurry and Fog Seal
- Township Border

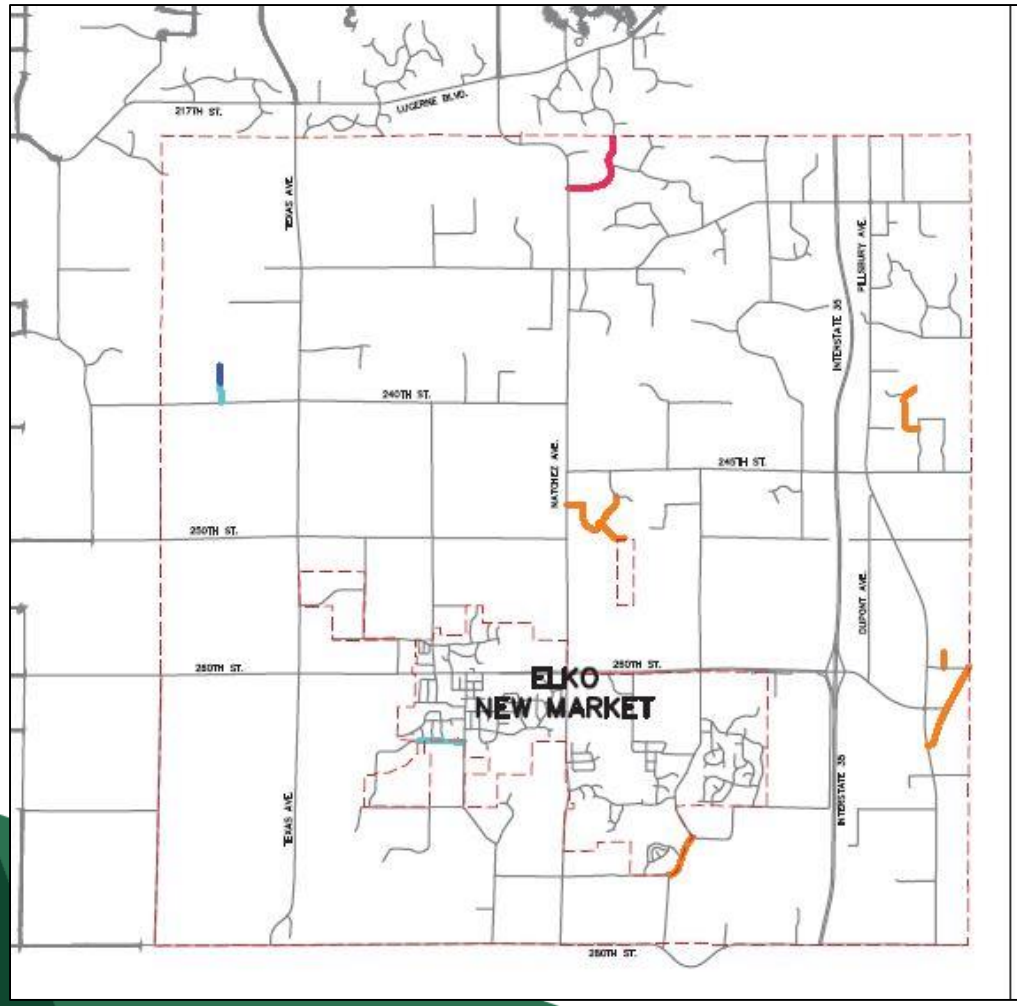
NTS

ESTIMATED CONSTRUCTION COST (2016 DOLLARS):	$772,000
ESTIMATED PROJECT COST (2016 DOLLARS):	$965,000

Bituminous Roadway Recommendations - 2017



Bituminous Roadway Recommendations - 2018



2018 RECOMMENDED ROADWAY TREATMENTS

LEGEND

- Stabilized Full Depth Repair with or without stabilization
- Stabilized Full Depth Repair w/ seal
- Full Depth Repair
- Full Depth Reclamation
- Chip, Micro/Slurry and Fog Seal
- Township Border

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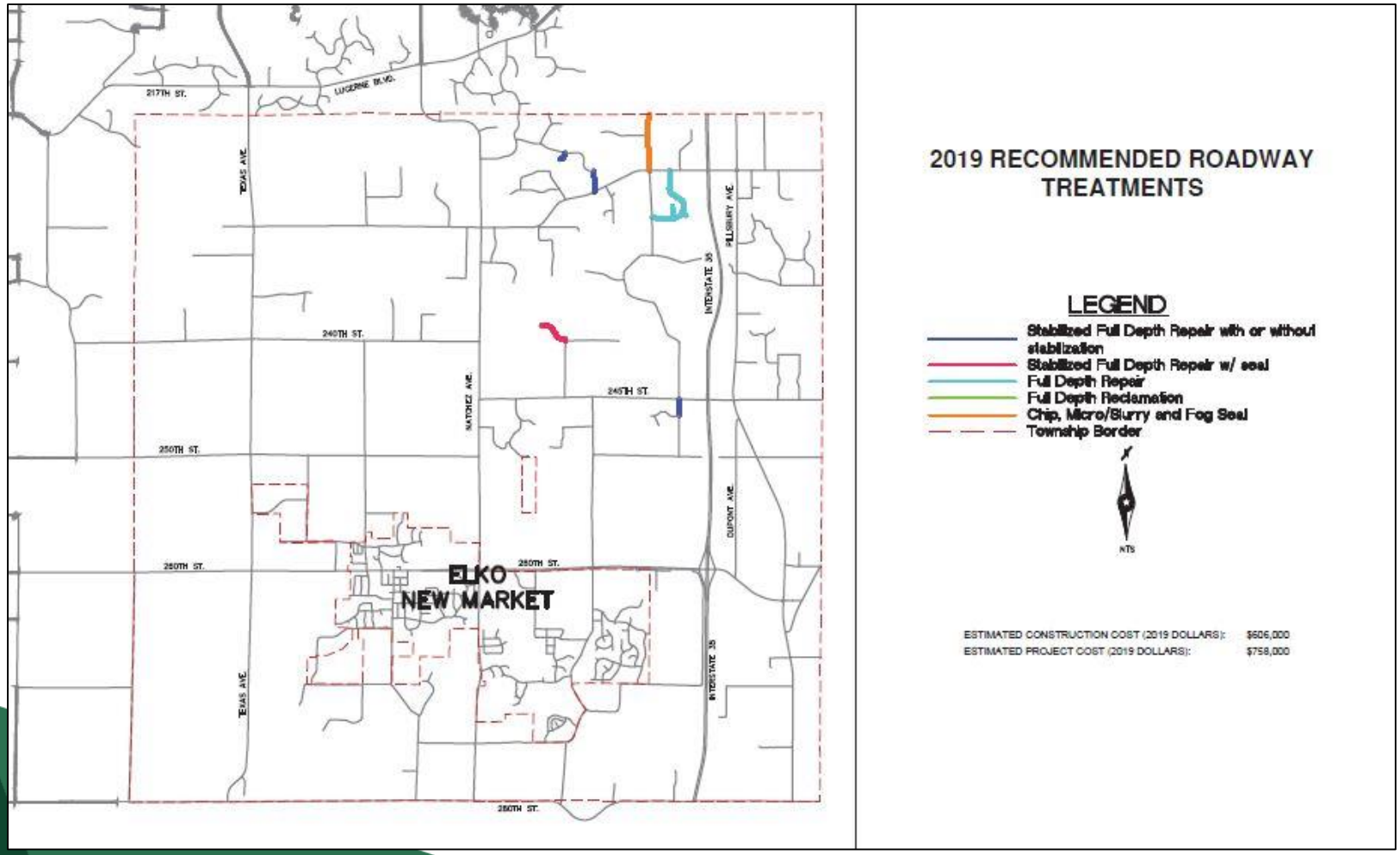
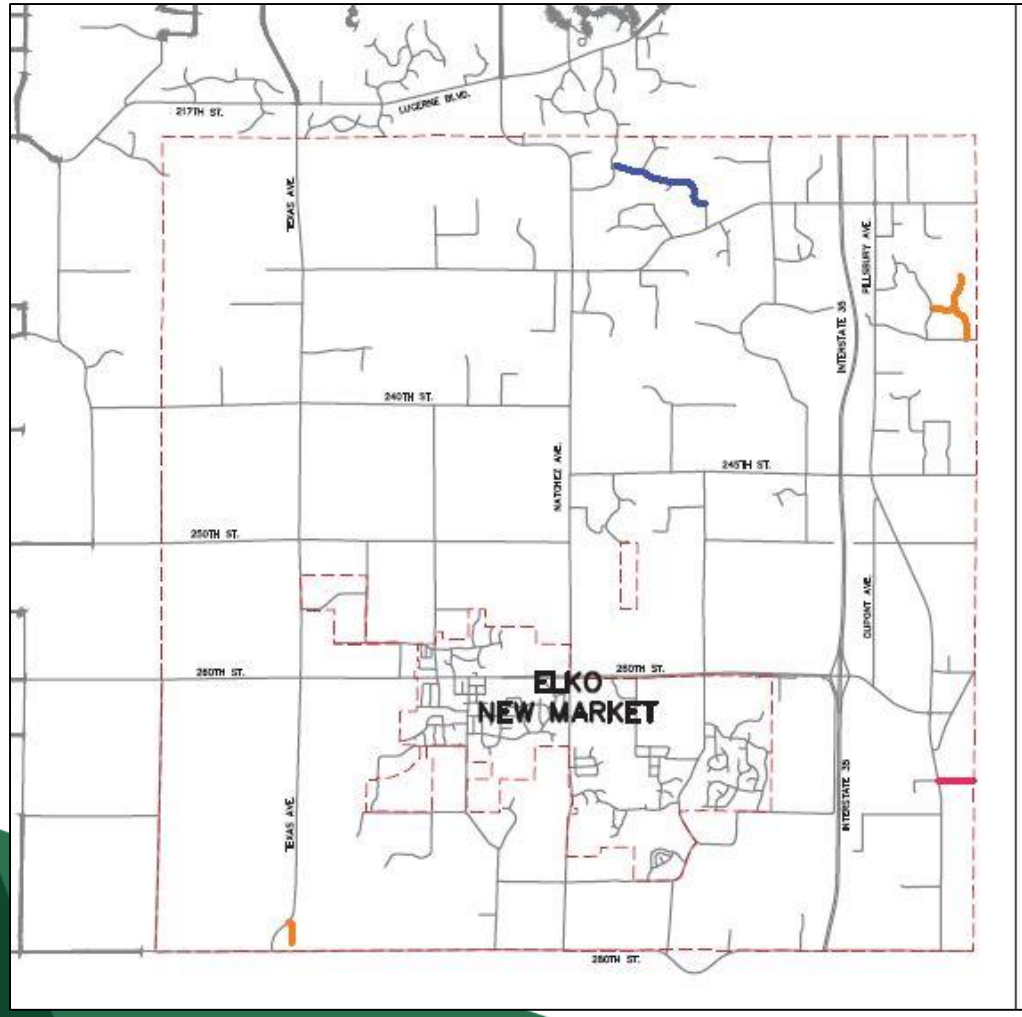
NTS

ESTIMATED CONSTRUCTION COST (2018 DOLLARS):	$726,000
ESTIMATED PROJECT COST (2018 DOLLARS):	$908,000

Bituminous Roadway Recommendations - 2019



Bituminous Roadway Recommendations - 2020



2020 RECOMMENDED ROADWAY TREATMENTS

LEGEND

- Stabilized Full Depth Repair with or without stabilization
- Stabilized Full Depth Repair w/ seal
- Full Depth Repair
- Full Depth Reclamation
- Chip, Micro/Slurry and Fog Seal
- Township Border

N

NTS

ESTIMATED CONSTRUCTION COST (2020 DOLLARS):	$645,000
ESTIMATED PROJECT COST (2020 DOLLARS):	$806,000

Bituminous Roadway Recommendations

Results

- Need approx. $900,000 per year for 5 years
  - Annual construction need ~$716K
  - Plus 25% fee for engineering, administration, etc.
  - Includes annual inflation factor
- Average goes from a 6.1 to 8

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THANK YOU!